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BOLLETTINO BIBLIOGRAFICO

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Kesetyaningsih T.W., Kusbaryanto K., Listyaningrum N.

Association of geographical factors with leptospirosis incidence in Sleman Regency, Yogyakarta

(2024) AIP Conference Proceedings, 3155 (1), art. no. 050001

DOI: 10.1063/5.0218114

ABSTRACT: Leptospirosis is the largest zoonotic bacterial disease that can be fatal, which is transmitted through rat urine and body fluids, apart from animal reservoirs. The risk of leptospirosis prevalence increases in watery areas. Sleman Regency is an area with a varied geographical surface and an endemic for leptospirosis. This study aims to identify environmental risk factors that influence the incidence of leptospirosis in Sleman Regency. This research is an observational ecological study, with a cross-sectional design. The environmental variables examined are the elevation and distance to the capital. The variable data analyzed is in units per district per year from 2010-2020. The incidence of leptospirosis was obtained from the Regency Health Office. Altitude and the distance from the capital city were obtained from the Regency Statistics Agency. The total incidence of leptospirosis was 328 cases during the 2010-2020 period with a minimum incidence of 2 cases in 2016 and a maximum of 68 cases in 2011. The Spearman Rank Test correlation analysis showed that altitude was negatively correlated with mild strength (p 0.031; r - 0.158), while the distance from the capital is positively correlated with moderate strength (p 0.000; r 0.286). It was concluded that leptospirosis is a disease of a rural nature and is more common in the lower plains of Sleman Regency. Lowland and rural areas are priorities for leptospirosis prevention di Sleman Regency.

LANGUAGE OF ORIGINAL DOCUMENT: English

Osorio-Rodríguez E., Rodelo-Barrios D., Rebolledo-Maldonado C., Polo-Barranco A., Patiño-Patiño J., Aldana-Roa M., Sánchez-Daza V., Sierra-Ordoñez E., Bettin-Martínez A.

Acute Kidney Injury Associated with Severe Leptospirosis: Fatal Re-Emerging Disease in Latin America

(2024) Kidney and Dialysis, 4 (2), pp. 78 - 92

DOI: 10.3390/kidneydial4020006

ABSTRACT: Leptospirosis is a re-emerging zoonotic disease that has had an unprecedented impact on most health systems in the world. The spectrum of symptoms is variable and usually ranges from asymptomatic cases to severe manifestations involving multiple organ dysfunction accompanied by jaundice, hemorrhage, meningitis, and acute kidney injury that requires the need for intensive care assistance. Although early antibiotic treatment is usually effective, in severe cases, it may require renal replacement therapy, invasive mechanical ventilation, vasoactive support, and invasive hemodynamic monitoring, increasing the risk of death. In Latin America, the real burden of acute kidney injury in this condition is unknown and may be underestimated due to the rapid progression of the disease, similar to other vector zoonoses, and the low coverage of diagnostic tests in primary care, especially in rural regions. Therefore, below, we review the clinical aspects and describe the scientific, clinical, and therapeutic evidence of acute kidney injury attributed to Leptospira spp. and its relevance in patients with severe leptospirosis in Latin America.

LANGUAGE OF ORIGINAL DOCUMENT: English

Silva-Caso W., Aguilar-Luis M.A., Espinoza-Espíritu W., Vilcapoma-Balbin M., Del Valle L.J., Misaico-Revate E., Soto-Febres F., Pérez-Lazo G., Martins-Luna J., Perona-Fajardo F., del Valle-Mendoza J.

Leptospira spp. and Rickettsia spp. as pathogens with zoonotic potential causing acute undifferentiated febrile illness in a central-eastern region of Peru

(2024) BMC Research Notes, 17 (1), art. no. 171

DOI: 10.1186/s13104-024-06837-1

ABSTRACT: Objective: this study was to determine the relationship between acute febrile illness and bacterial pathogens with zoonotic potential that cause emerging and re-emerging diseases in a central-eastern region of Peru. Results: Out of the 279 samples analysed, 23 (8.2%) tested positive for infection by Rickettsia spp., while a total of 15 (5.4%) tested positive for Leptospira spp. Women had a higher frequency of infection by Rickettsia spp., with 13 cases (53.3%), while men had a higher frequency of infection by Leptospira spp., with 10 cases (66.7%). The most frequently reported general symptom was headache, with 100.0% (n = 23) of patients with Rickettsia (+) and 86.7% (n = 13) of patients with Leptospira (+) experiencing it. Arthralgia was the second most frequent symptom, reported by 95.6% (n = 22) and 60% (n = 9) of patients with Rickettsia (+) and Leptospira (+), respectively. Myalgia was reported by 91.3% (n = 21) and 66.7% (n = 10) of patients with Rickettsia (+) and Leptospira (+), respectively. Retroocular pain, low back pain, and skin rash were also present, but less frequently. Among the positives, no manifestation of bleeding was recorded, although only one positive case for Leptospira spp. presented a decrease in the number of platelets.

LANGUAGE OF ORIGINAL DOCUMENT: English

Cataldo C., Bellenghi M., Masella R., Busani L.

One Health and sex and gender-related perspective in the ecosystem: Interactions among drivers involved in the risk of leptospirosis in Europe. A scoping review

(2024) One Health, 19, art. no. 100841

DOI: 10.1016/j.onehlt.2024.100841

ABSTRACT: Leptospirosis has a complex transmission, involving rodents and many species of domestic and wild animals. Carrier animals spread leptospires, contaminating soil and water, the main sources of human infection. The risk of infection is modulated by socio-economic factors, environment and host animals and has changed, historically linked to agriculture but now prevalent in recreational environments. Leptospirosis also reveal gender-specific exposure patterns that determine infection risks. Emphasizing the interconnectedness of humans, animals, and the environment, the One Health approach highlights the ecosystem dynamics through which leptospires interact with hosts and abiotic factors, ensuring their survival and transmission. We advocate for integrating gender considerations into the ecosystem dynamics of complex zoonoses, such as leptospirosis, through a One Health perspective. This approach, yet to be fully explored, may enhance our understanding of the infection and its modulating factors. A scoping review of the literature was conducted across Embase and Pubmed databases to collect information on sex and gender-specific drivers, sources of infections, environmental drivers, and related risks of leptospirosis. Quantitative data were extracted from the articles selected according to a list of criteria, and analyzed to discern sex and gender disparities and identify primary drivers of leptospirosis. We confirmed that the excess of male leptospirosis cases described in many parts of the world is also present in Europe. Furthermore, we identified environmental and sociocultural drivers and hypothesized their interactions between and within human, animal, and environmental sectors. These interactions modulate direct and indirect exposure to Leptospira, heightening infection risks across the ecosystem. Based on our findings, utilizing leptospirosis as a model, we advocate for integrating One Health

and gender approaches in public health practices to better plan and implement more effective and timely intervention measures.
LANGUAGE OF ORIGINAL DOCUMENT: English

Shi X., Zhou D., Zhou X., Yu F.

Predicting the trend of leptospirosis in China via a stochastic model with vector and environmental transmission

(2024) Electronic Research Archive, 32 (6), pp. 3937 - 3951
DOI: 10.3934/era.2024176
ABSTRACT: A stochastic model of leptospirosis with vector and environmental transmission is established in this paper. By mathematical analysis of the model, the threshold for eliminating the disease is obtained. The partial rank correlation coefficient was used to analyze the parameters that have a greater impact on disease elimination, and a sensitivity analysis was conducted on the parameters through numerical simulation. Further, combined with the data of leptospirosis case reports in China from 2003 to 2021, two parameter estimation methods, Least Squares method (LSM) and Markov Chain Monte Carlo-Metropolis Hastings method (MCMC-MH), are applied to estimate the important parameters of the model and the future trend of leptospirosis in China are predicted.
LANGUAGE OF ORIGINAL DOCUMENT: English

Holenova K., Giannasi C., Alloway E., Harper A.

Hepatic T-cell lymphoma in a dog with chronic hepatitis and presence of Leptospira spp. in hepatic tissue

(2024) Veterinary Record Case Reports
DOI: 10.1002/vrc2.926
ABSTRACT: A 7-year-old, female, neutered Border collie was referred for investigation of increased liver enzymes, accompanied by mild non-specific clinical signs. Investigations subsequently revealed the presence of chronic pyogranulomatous hepatitis, copper accumulation and presence of multiplying Leptospira spp. in the liver tissue. Following treatment with doxycycline and D-penicillamine, the liver parameters and clinical signs improved. However, 9 months after the treatment was initiated, the dog re-presented for overall deterioration, small intestinal diarrhoea and cough. Investigations were consistent with a hepatic large cell lymphoma. The dog was euthanased shortly after diagnosis, and histopathology of the postmortem samples taken from the liver showed presence of CD3+, CD11d+ T-cell lymphoma as well as multiplying Leptospira spp. in the tissue.
LANGUAGE OF ORIGINAL DOCUMENT: English

Souza G.M., Nascimento H., Belfort R., Jr.

Ocular Leptospirosis: Report of a Challenging Diagnosis

(2024) Ocular Immunology and Inflammation
DOI: 10.1080/09273948.2024.2367651
ABSTRACT: Purpose: To report a challenging case of serologically confirmed posterior uveitis due to leptospirosis. Methods: Review of medical records Results: Thirteen-year-old boy presented focal necrotizing retinochoroiditis after flood exposure. Laboratory work-up confirmed leptospirosis infection and proper

antibiotic treatment was done. The patient evolved well. but during late follow-up he developed nummular keratitis. Conclusion: Leptospirosis is a possible etiology of necrotizing posterior uveitis. The use of antimicrobial therapy is controversial but was used in this case, in association with corticosteroids, leading to resolution of retinal inflammation. Despite treatment, the patient developed late corneal opacities, which did not lead to visual impairment.
LANGUAGE OF ORIGINAL DOCUMENT: English

Zečević I., Picardeau M., Vince S., Hađina S., Perharić M., Štritof Z., Stevanović V., Benvin I., Turk N., Lohman Janković I., Habuš J.

Association between exposure to Leptospira spp. and abortion in mares in Croatia

(2024) Microorganisms, 12 (6), art. no. 1039

ABSTRACT: Leptospirosis is one of the most common zoonotic infections and a major problem in terms of both veterinary medicine and public health. However, the disease is under-recognised and under-diagnosed worldwide, particularly in horses. Clinical leptospirosis in horses is mainly associated with recurrent uveitis (ERU), which has recently been studied more intensively, and reproductive disorders, the epidemiology of which is still relatively poorly understood. To enhance our comprehension of abortions caused by leptospirosis in horses and to identify the causative strains, a serological study was carried out with subsequent molecular characterisation of the isolate obtained. Using the microscopic agglutination test (MAT), serum samples from mares that aborted and foetal fluids (when available) were tested for antibodies against Leptospira spp. Furthermore, bacteria isolation from kidney cultures was conducted. Of 97 mare serum samples, 21 (21.64%) tested positive, with Grippotyphosa and Pomona being the most frequently detected serogroups. A significantly higher seroprevalence was found in aborting mares compared to the healthy horse population from the same geographical area, as well as a pronounced seasonal variation. Leptospiral antibodies were not detected in any of the foetal fluids, but isolation was successful in 1 case out of 39 (2.56%). Genotyping by multilocus sequence typing (MLST) and core genome multilocus sequence typing (cgMLST) identified the obtained isolate as Leptospira kirschneri, serogroup Pomona, serovar Mozdok. Further surveillance and molecular typing of Leptospira strains causing abortion in horses would be invaluable in understanding the prevalence and impact of leptospirosis on equine reproductive health in Europe.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ye H.-N., Wan B.-F., Zhao Y.-Q., Li B.-X., Zhang H.-F.

Responsive refractive index sensor based on actively tuning liquid crystal topological edge states

(2024) Physics of Fluids, 36 (7), art. no. 077103

DOI: 10.1063/5.0212260

ABSTRACT: In this paper, using the electric field regulation and low loss properties of liquid crystal materials, a tunable polarization-separated liquid crystal (LC) topological edge state is proposed, whose potential in responsive sensors (RSs) is explored. Adjustment of the measuring range and sensitivity of the RS can be realized by controlling the orientation angle of LC and the analyte proportion. In the case of a low ratio of analytes, as the LC orientation angle changes from 18° to 0°, the measurement range will also vary from 1-1.8 RIU (refractive index unit) to 1.8-2.3 RIU. When adding the proportion of analytes and the number of periods, the normalized sensitivity will be increased from 0.0759 c/d/RIU (c is the propagation speed of light in vacuum, and d is the normalized thickness) to 0.299 c/d/RIU, leading to a reduction in the detection limit from

2.75 × 10−4 to 5 × 10−6 RIU, so biological indicators such as bacteria Leptospira in rodent urine can be detected.
LANGUAGE OF ORIGINAL DOCUMENT: English

Udechukwu C.C., Kudi C.A., Abdu P.A., Mamman P.H., Pilau N.N., Jolayemi K.O., Okoronkwo M.O.
Risk practices and awareness of leptospirosis amongst residents of Zaria, Nigeria
(2024) Scientific Reports, 14 (1), art. no. 15229
DOI: 10.1038/s41598-024-66361-x
ABSTRACT: This study evaluated the level of risk practices and awareness of leptospirosis among residents of Zaria, Nigeria. A pre-tested questionnaires were administered via face-to-face interview to 100 residents. The data was analyzed using chi-square and multivariate analysis to identify risk factors for leptospirosis. The demography showed that the majority of the respondents were male, aged 21–40 years, and majorly crop farmers. The risk factors identified showed that males were 4.14 times more likely to be affected by leptospirosis (OR 4.14, 95% CI [1.93–5.37], p = 0.02) and the source of animal's water was 5.56 times more likely to be contaminated by Leptospira spp. (OR 4.14, 95% CI [2.88–8.03], p = 0.01) and these relationships were significant. The majority of respondents were not aware of the disease (OR 1.87, 95% CI [1.22–4.57], p = 0.01) with 78% of the respondents not sure of which of the animal species leptospirosis affected (OR 1.67, 95% CI [1.07–2.62], p = 0.02). This study has demonstrated the existence of risk behaviors, and paucity of knowledge about leptospirosis in the study area. It is therefore recommended to organize an enlightenment program and the need for protective clothing for individuals occupationally at risk of infection by Leptospira spp.
LANGUAGE OF ORIGINAL DOCUMENT: English

da Costa Barnabé N.N., Soares R.R., Barros D.K.S., Araújo Júnior J.P., Malossi C.D., Rodrigues Silva M.L.C., Brasil A.W.D.L., da Costa D.F., Higino S.S.D.S., Santos C.D.S.A.B., de Azevedo S.S., Alves C.J.
The Role of transplacental infection in Leptospira spp. epidemiology in cattle in Caatinga Biome, Brazil
(2024) Microorganisms, 12 (6), art. no. 1044
ABSTRACT: Leptospirosis is an infectious disease that affects domestic animals, wild animals, and humans. It represents a public health problem and has an important economic impact on livestock. This study aims to investigate the importance of genital and transplacental infection in the epidemiology of leptospirosis in cows maintained in Caatinga biome conditions, Northeastern Brazil, as well as reporting organs colonized by Leptospira spp. in embryos and fetuses. Blood, urinary tract (urine, bladder, and kidney), and reproductive tract (vaginal fluid, uterus, uterine tube, ovary, and placenta) samples were collected from 15 slaughtered pregnant cows. Two embryos and 13 fetuses were sampled. Central nervous system and choroid ovoid samples were collected from embryos. Blood, central nervous system, lung, peritoneal liquid, abomasal content, liver, spleen, urine, bladder, kidney, and reproductive system samples were collected from fetuses. Diagnostic methods included the microscopic agglutination test (MAT) using a collection of 24 serovars belonging to 17 different pathogenic serogroups of five species as antigens, as well as polymerase chain reaction (PCR). Anti-Leptospira spp. antibodies were found in 9 cows (60%), while 13 cows (86.67%) had at least one organ or urine with leptospiral DNA. No fetus was seroreactive. Among the embryos and fetuses, 13 (86.67%) presented leptospiral DNA, proving a high frequency of transplacental infection (100%). For cows, the most frequent biological materials regarding Leptospira spp. DNA detection were placenta (13 out of 15

samples; 86.7%), uterus (10 out of 15 samples; 66.7%), and vaginal fluid (5 out of 15 samples; 33.3%), while, for fetuses/embryos, the most frequent PCR-positive samples were choroid ovoid (1/2; 50%), spleen (6/13; 46.2%), kidney (5/13; 38.5%), and central nervous system (5/15; 33.3%). Sequenced samples based on the LipL32 gene presented 99% similarity with L. borgpetersenii. The results indicate that transplacental infection is an efficient way of spreading Leptospira spp. in cows maintained in Caatinga biome conditions. Therefore, prevention and control strategies must include actions that interrupt transmission through this alternative route.
LANGUAGE OF ORIGINAL DOCUMENT: English

Petakh P., Oksenych V., Khovpey Y., Kamyshnyi O.

Comprehensive analysis of antiphage defense mechanisms: serovar-specific patterns

(2024) Antibiotics, 13 (6), art. no. 522

DOI: 10.3390/antibiotics13060522

ABSTRACT: Leptospirosis is a major zoonotic disease caused by pathogenic spirochetes in the genus Leptospira, affecting over a million people annually and causing approximately 60,000 deaths. Leptospira interrogans, a key causative agent, likely possesses defense systems against bacteriophages (leptophages), yet these systems are not well understood. We analyzed 402 genomes of L. interrogans using the DefenseFinder tool to identify and characterize the antiphage defense systems. We detected 24 unique systems, with CRISPR-Cas (Clustered Regularly Interspaced Short Palindromic Repeats and CRISPR-associated proteins), PrrC, Borvo, and Restriction-Modification (R-M) being the most prevalent. Notably, Cas were identified in all strains, indicating their central role in phage defense. Furthermore, there were variations in the antiphage system distribution across different serovars, suggesting unique evolutionary adaptations. For instance, Retron was found exclusively in the Canicola serovar, while prokaryotic Argonaute proteins (pAgo) were only detected in the Grippotyphosa serovar. These findings significantly enhance our understanding of Leptospira's antiphage defense mechanisms. They reveal the potential for the development of serovar-specific phage-based therapies and underscore the importance of further exploring these defense systems.
LANGUAGE OF ORIGINAL DOCUMENT: English

Lu X., Westman M.E., Mizzi R., Griebsch C., Norris J.M., Jenkins C., Ward M.P.

Are pathogenic Leptospira species ubiquitous in urban recreational parks in Sydney, Australia?

(2024) Tropical Medicine and Infectious Disease, 9 (6), art. no. 128

DOI: 10.3390/tropicalmed9060128

ABSTRACT: Leptospirosis is a zoonotic disease caused by the spirochete bacteria Leptospira spp. From December 2017 to December 2023, a total of 34 canine leptospirosis cases were reported in urban Sydney, Australia. During the same spatio-temporal frame, one locally acquired human case was also reported. As it was hypothesised that human residents and companion dogs might both be exposed to pathogenic Leptospira in community green spaces in Sydney, an environmental survey was conducted from December 2023 to January 2024 to detect the presence of pathogenic Leptospira DNA in multipurpose, recreational public parks in the council areas of the Inner West and City of Sydney, Australia. A total of 75 environmental samples were collected from 20 public parks that were easily accessible by human and canine visitors. Quantitative PCR (qPCR) testing targeting pathogenic and intermediate Leptospira spp. was performed, and differences in detection of Leptospira spp. between dog-allowed and dog-prohibited areas were statistically examined. The global Moran's Index was calculated to identify any spatial autocorrelation in the qPCR results. Pathogenic

leptospires were detected in all 20 parks, either in water or soil samples (35/75 samples). Cycle threshold (Ct) values were slightly lower for water samples (Ct 28.52–39.10) compared to soil samples (Ct 33.78–39.77). The chi-squared test and Fisher's exact test results were statistically non-significant ($p > 0.05$ for both water and soil samples), and there was no spatial autocorrelation detected in the qPCR results ($p > 0.05$ for both sample types). Although further research is now required, our preliminary results indicate the presence of pathogenic Leptospira DNA and its potential ubiquity in recreational parks in Sydney.
LANGUAGE OF ORIGINAL DOCUMENT: English

Petakh P., Tymchyk V., Kamyshnyi O.

Surveillance of human leptospirosis infections in Ukraine between 2018 and 2023

(2024) Frontiers in Public Health, 12, art. no. 1394781

ABSTRACT: Leptospirosis is a bacterial disease that affects both humans and animals worldwide. Currently, a positional war is ongoing in Ukraine, and the military is encountering a significant number of rodents in trenches and dugouts, which are known reservoirs for Leptospira, the causative agent of leptospirosis—a potentially dangerous infectious disease with a high mortality rate. The civilian population is also at potential risk of leptospirosis. The destruction of the Kakhovka Dam on June 6, 2023, has led to widespread devastation and human suffering. In the short term, there is a significant risk of rodent-borne diseases such as leptospirosis. We utilized data from the Ukrainian Centre for Disease Prevention Control and observed a substantial increase in prevalence in 2023. The notification rate in Ukraine in 2023 was 1.06 per 100,000 persons, which is higher than that of other countries in the European Union. Particular attention is being given to Zakarpattia Oblast, located on the western border of Ukraine, which shares boundaries with Romania, Hungary, Poland, and Slovakia, with an extremely high incidence rate of 12.08 per 100,000 persons. Based on these findings, we recommend education and awareness campaigns, vaccination, personal protective measures, and improved surveillance to address the increasing incidence of leptospirosis in Ukraine.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bjork A., Stoddard R.A., Anderson A.D., de Perio M.A., Niemeier R.T., Self J.S., Fitzpatrick K.A., Gulland F.M.D., Field C.L., Kersh G.J., Gibbins J.D.

Zoonoses in the workplace: a Seroprevalence study of Coxiella, Brucella, and Leptospira among marine mammal rescue and rehabilitation workers in California

(2024) Public Health Challenges, 3 (2), art. no. e132

DOI: 10.1002/puh2.132

ABSTRACT: Background: Q fever, brucellosis, and leptospirosis are zoonoses typically associated with terrestrial animal reservoirs. These bacterial agents are now known to infect marine mammal species, though little is known about potential human health risks from marine mammal reservoir species. We investigated potential risks of these bacteria in humans associated with marine mammal exposure. Methods: The Marine Mammal Center (TMMC) in Sausalito, California, requested a Health Hazard Evaluation by the National Institute for Occupational Safety and Health. In June 2011, an investigation occurred, which included a written questionnaire and serosurvey among workers for Coxiella burnetii, Brucella spp., and Leptospira spp., and an environmental assessment for C. burnetii. Results: Serologic evidence of past exposure was detected in 4% (C. burnetii), 0% (Brucella), and 1% (Leptospira) of 213 participants, respectively. One of 130 environmental samples tested positive for C. burnetii. No significant marine mammal-specific risk factors were identified, but

some safety deficiencies were noted that could lead to a higher risk of exposure to zoonotic diseases. Conclusion: Although this study did not identify disease exposure risks associated with marine mammals, additional studies in different settings of other groups with frequent exposure to marine mammals are warranted. Some deficiencies in safety were noted, and based on these, TMMC modified protocols to improve safety.
LANGUAGE OF ORIGINAL DOCUMENT: English

Reyes A., Lucero-Prisno D.E., III, Catahay J.A., Gibas C., Uy-Lumandas M., de Paz-Silava S.L., Flores M.J., Carandang T.H.D.C., Tantengco O.A., Climacosa F.M., Moron-Espiritu L., Pastrana A., de Guia J.J., Ilagan-Tagarda D., Notarte K.I.
Reinvigorating vigilance: updates on emerging and re-emerging infectious diseases in the Philippines
(2024) Biosafety and Biosecurity: Practical Insights and Applications for Low and Middle-Income Countries, pp. 259 - 307
DOI: 10.1201/9781003426219-13
ABSTRACT: The global concern surrounding emerging and re-emerging infectious diseases has reached paramount levels. These diseases encompass novel infections that have recently manifested within a population, or those that have existed but are now experiencing a rapid surge in both occurrence and geographical spread. Within the context of the Philippines, a developing country, the battle against infectious diseases is uniquely challenging. The intricacies of these challenges are deeply interwoven with factors such as poverty, densely packed living conditions, and limited accessibility to healthcare services. This intricate web of circumstances cultivates an environment that substantially amplifies the susceptibility to transmission and proliferation of infectious diseases, particularly within urban settings. Consequently, there emerges an urgent need for all-encompassing and sustainable strategies capable of effectively managing and alleviating the impact of infectious diseases, and thus? safeguarding? the health and overall well-being of the Filipino populace. This chapter delves into the latest insights regarding emerging and re-emerging infectious diseases in the Philippines. It encompasses a spectrum of conditions including influenza, dengue, Zika, HPV, HIV, TB, meningococcemia, leptospirosis, aspergillosis, candidiasis, mucormycosis, cryptococcosis, soil-transmitted helminthiasis, and schistosomiasis. The aim of this chapter is to provide a comprehensive overview of the present state of these disease,while highlighting the trends in ongoing research endeavors and the collective pursuit of effective control and mitigation strategies.
LANGUAGE OF ORIGINAL DOCUMENT: English

Jayathangaraj M.G., Raman M.
One health concept with emphasis on zoonoses
(2024) Indian Veterinary Journal, 101 (6), pp. 29 - 34
DOI: 10.62757/IVA.2024.101.6.29-34
ABSTRACT: There are many diseases that are communicable from animals to human beings esp. the wild fauna. When population of any one species increases due to multifaceted etiological factors, there may be an increase in the incidences of few zoonotic diseases, which cause more potential risks to the humans, in reality. Outbreaks of diseases have been documented in many incidences, esp. the diseases like Nipah viral infections. Japanese encephalitis, leptospirosis, Erysipeleas infections, Zerka viral infections etc. are the examples of such diseases related to the zoonotic pathogens affecting both man and animals. All such

diseases need not be expected to reveal significant clinical symptoms apparently but the potentials related to the general health status, performance and reproduction related aspects may get frequently affected to a greater extent. Working together of both veterinary and medical communities was emphasized in order to maintain one health policy and close dependency between animal and human health is a vital factor to be taken into account when one health policy is to be achieved, successfully.
LANGUAGE OF ORIGINAL DOCUMENT: English

Delgadillo-Tellez E., Zavaleta-Villa B., Atilano-López D., Hernández-Castro R., Olivo-Díaz A., Carrillo-Casas E.M.

Polymerase chain reaction and dot-blot hybridization for Leptospira detection in water samples

(2024) Journal of visualized experiments: JoVE, (208)
DOI: 10.3791/65435
ABSTRACT: The dot-blot is a simple, fast, sensitive, and versatile technique that enables the identification of minimal quantities of DNA specifically targeted by probe hybridization in the presence of carrier DNA. It is based on the transfer of a known amount of DNA onto an inert solid support, such as a nylon membrane, utilizing the dot-blot apparatus and without electrophoretic separation. Nylon membranes have the advantage of high nucleic acid binding capacity (400 µg/cm2), high strength, and are positively or neutrally charged. The probe used is a highly specific ssDNA fragment of 18 to 20 bases long labelled with digoxigenin (DIG). The probe will conjugate with the Leptospira DNA. Once the probe has hybridized with the target DNA, it is detected by an anti-digoxigenin antibody, allowing its easy detection through its emissions revealed in an X-ray film. The dots with an emission will correspond to the DNA fragments of interest. This method employs the non-isotopic labelling of the probe, which may have a very long half-life. The drawback of this standard immuno-label is a lower sensitivity than isotopic probes. Nevertheless, it is mitigated by coupling polymerase chain reaction (PCR) and dot-blot assays. This approach enables the enrichment of the target sequence and its detection. Additionally, it may be used as a quantitative application when compared against a serial dilution of a well-known standard. A dot-blot application to detect Leptospira from the three main clades in water samples is presented here. This methodology can be applied to large amounts of water once they have been concentrated by centrifugation to provide evidence of the presence of Leptospiral DNA. This is a valuable and satisfactory tool for general screening purposes, and may be used for other non-culturable bacteria that may be present in water, enhancing the comprehension of the ecosystem.
LANGUAGE OF ORIGINAL DOCUMENT: English

Girón J.M.O., Díaz D.J.O., González Á.B., Cornejo N.D., Garcés L.C.R., De La Rosa M.J.S.

Clinical hematology of patients with leptospirosis who consult urgently in a hospital in Monteria, Colombia [Hematología clínica de pacientes con leptospirosis que consultan de urgencia en un hospital de Montería, Colombia]

(2024) Gaceta Medica de Caracas, 132 (2), pp. 472 - 478
DOI: 10.47307/GMC.2024.132.2.18
ABSTRACT: Introduction: Leptospirosis is a severe febrile disease transmitted by rodents, generally observed after heavy rains and floods, caused by pathogenic spirochetes of the genus Leptospira spp. It is considered the most frequent zoonosis in the world and recognized as an immunomodulator where innate immunity and immunity acquired in the guest's defense remain unclear. The present work aims to establish the clinical-

hematological correlation in patients diagnosed with leptospirosis who consult Emergency in Montería, Colombia. Methodology: A descriptive and retrospective observational study was conducted; the data were gathered by reviewing the patient's clinical histories. The information obtained from each patient was organized in a database, and the information analysis was subsequently performed to obtain the hematological profiles of the patients. Clinical suspicion was essential for its diagnosis. Since the culture was not very sensitive, the sensitive polymerase chain reaction was used in blood and urine samples and serological tests. Results: Two hundred five patients who consulted emergency with febrilesyndromewereanalyzed;37%ofthecaseswere under 20 years, 51 % were male, 64.2 % were people from rural zone, 38.5 % presented anemia grade III, 89.7 % had a fever, and 29 % had abdominal pain. Conclusions: Leptospirosis is a re-emerging and important disease in public health since it spreads rapidly, reducing people's quality of life due to little knowledge of this zoonosis in the population; for this reason, it is often underdiagnosed.
LANGUAGE OF ORIGINAL DOCUMENT: English

Mevada Y., Vinod K.K., Balamurgan V., Chavhan S., Kumar J., Palkhade R.
Seroprevalence and risk factors associated with leptospirosis in high-risk occupational groups in the State of Gujarat as determined by IgM ELISA and MAT test: a cross-sectional study
(2024) Indian Journal of Occupational and Environmental Medicine, 28 (2), pp. 106 - 114
DOI: 10.4103/ijoem.ijoem_83_23
ABSTRACT: Background: Leptospirosis is a reemerging zoonosis affecting humans and animals worldwide in tropical and subtropical countries. The study was conducted to estimate the seroprevalence of leptospirosis in high-risk occupational groups (cattle farm workers, poultry farm workers, and slaughterhouse workers) in the state of Gujarat and to determine related risk factors for leptospirosis. Methods: Using an interview-guided questionnaire, a cross-sectional study was conducted involving 123 people in high-risk occupational groups (namely, cattle farm workers, poultry farm workers, and slaughterhouse workers) from five districts of the state of Gujarat, India. The participants' serum samples were screened for antileptospiral antibodies by using Immunoglobulin G (IgG) and Immunoglobulin M (IgM) enzyme-linked immunosorbent assays (ELISAs) followed by a microscopic agglutination test (MAT). The Chi-square ($\chi 2$) test and odds ratio were calculated using IBM SPSS Statistics for Windows, version 22 (IBM Corp., Armonk, N.Y., USA) to ascertain the associated risk factors. Results: Regarding demographic information, this study included 104 men and 19 women in high-risk occupational groups. The overall seroprevalence of antileptospiral antibodies in these high-risk workers was 46.3%. The seroprevalence was the highest among poultry farm workers (56.6%), followed by cattle farm workers (54.5%) and slaughterhouse workers (25.6%). The MAT in combination with IgM is adequate for the serological diagnosis of leptospirosis, but we have also employed IgG ELISA to understand the chronic infection in these high-risk occupational groups as exposure was both past and present. Tests were conducted for antibodies against various Leptospira serovars in the major serogroups; frequent serovars included Hurstbridge, Panama, Javanica, Tarassovi, Copenhageni, Pomona, and Weaveri, among others. The significant ($P < 0.05$) risk factors associated with leptospirosis in these high-risk occupations reported to be living in field areas, the presence of livestock in the neighborhood, working in slaughterhouses, drinking water from natural water resources, contact with animals such as dogs or livestock, and wounds during occupational practice. Conclusion: Considering the high seroprevalence of leptospirosis, high-risk occupational groups should be regularly screened for potential development of the fatal disease.

Hurstbridge was found to be the most prevalent serovar in the studied population, followed by Panama, Javanica, and Tarassovi.
LANGUAGE OF ORIGINAL DOCUMENT: English

Onafruo D., Klein J., Erume J., Kankya C., Jubara A., Kokas I., Odoch T., Munyeme M., Alinaitwe L., Kitale E., Marin P., Sabbath E., Dreyfus A.

Molecular and serological prevalence of Leptospira spp. among slaughtered cattle and associated risk factors in the Bahr El Ghazal region of South Sudan

(2024) BMC Veterinary Research, 20 (1), art. no. 296
DOI: 10.1186/s12917-024-04154-0

ABSTRACT: Introduction: Leptospirosis is a neglected emerging and zoonotic disease reported worldwide. This study sought to determine the molecular and serological prevalence of Leptospira spp. and the associated risk factors in slaughtered cattle from the Bahr El Ghazal region of South Sudan. Materials and methods: Between January 16th and February 25th, 2023, blood and urine samples were collected from 402 cattle at the Lokoloko Municipal Slaughterhouse in Western Bahr El-Ghazal State. Serum samples were tested using the microscopic agglutination test (MAT), with a panel of 12 serovars (sv) from 12 serogroups (sg) and 4 species (spp) of Leptospira spp. These serovars had been previously identified in Sudan and the East African region. Simultaneously, 400 corresponding urine samples were screened using qualitative real-time polymerase chain reaction (PCR) to detect the shedding of Leptospira spp. in urine. To identify the associated risk factors, the age, sex, breed and body condition score of each sampled cattle was noted at the time of sampling and subsequently analysed using logistic regression models. Results: Among the 402 serum samples screened, a substantial 81.8% (329/402, 95% CI 77.9–85.3) displayed seropositivity for Leptospira spp. with a MAT titre ≥ 100. The prevalence of urine shedding determined by PCR was 6% (23/400, 95% CI 3.8–8.4), while probable recent leptospirosis with a MAT ≥ 1:800 was observed in 33.1% (133/402, 95% CI 28.6–37.8) of the cattle. Multiple reactions were detected in 34.8% (140/402, 95% CI 30.6–39.5) serum samples. The seropositivity was against L. borgpetersenii sg. Tarassovi (78.6%; 316/402, 95% CI 74.4–82.3), followed by L. borgpetersenii sg. Ballum at 20.4% (82/402, 95% CI, 16.7–24.4%), L. kirschneri sg. Autumnalis At 8.7% (35/402, 95% CI 5.7–11.7), L. interrogans sg. of Pomona at 7.0% (28/402, 95% CI 4.5–9.5), and L. interrogans sg. Hebdomadis was 5.0% (20/402, 95% CI 2.8–7.2). Several risk factors are associated with seropositivity. Older animals (≥ 2 years) had 2.0 times greater odds (95% CI 1.14–3.5) of being seropositive than younger animals (< 2 years), P-value = 0.016. Female animals demonstrated 2.1 times greater odds (95% CI 1.2–3.6) of seropositivity than males did (P-value = 0.008). Additionally, Felata/Mbororo cattle exhibited 2.4 times greater odds (95% CI 1.3–4.5) of being seropositive than did local Nilotic cattle (P-value = 0.005). The agreement between the MAT and PCR results was poor, as indicated by a kappa statistic value of 0.001 and a P-value of 0.913. But there was a moderate agreement between MAT high titres ≥ 800 and PCR positivity with a kappa statistic value = 0.501 and a P-value < 0.001. Conclusion: In addition to the high seroprevalence, Leptospira spp. were found in the urine of slaughtered cattle, suggesting that leptospirosis is endemic to the study area. This finding underscores the significance of cattle as potential sources of infection for slaughterhouse workers, the general public, and other animal species. To address this issue effectively in the Bahr El Ghazal Region and South Sudan, a comprehensive strategy involving a multidisciplinary approach is essential to minimize disease among animals, hence reducing potential zoonotic risks to humans.
LANGUAGE OF ORIGINAL DOCUMENT: English

Pinto G.V., Rai P., Kabekkodu S.P., Karunasagar I., Kumar B.K.

Identification of circulating miRNA biomarkers in leptospirosis for early detection: a promising diagnostic approach

(2024) Microbial Pathogenesis, 193, art. no. 106781

DOI: 10.1016/j.micpath.2024.106781

ABSTRACT: Leptospirosis is a zoonotic disease of global significance, contributing to morbidity and mortality worldwide. It is endemic to tropical regions, with outbreaks during monsoons. The disease manifestations are similar to that of other febrile illness such as dengue, malaria hence often misdiagnosed and underreported. The zoonoses if undetected, progresses to cause severe life-threatening complications also known as Weil's disease. Routine diagnostic tests are based on the detection of antibodies in patient serum and are not accurate during the initial phase of the infection. Therefore, it is necessary to detect novel biomarkers that can be used in early detection of leptospirosis. Circulating miRNAs are known to be promising biomarkers for various diseases including cancer, tuberculosis, influenza; hence in this study the potential of miRNAs as biomarkers for leptospirosis was evaluated. A total of 30 leptospirosis cases were screened for the differential expression of 10 miRNA by RT-qPCR assay. The differential expression was calculated by relative quantification using healthy individuals as controls. Among the 10 miRNA,3 miRNA, miR-28–5p, miR-302c-3p and miR-302a-3p were reported to exhibit a significant trend of upregulation. Further their role in immune pathways and biological processes was investigated by KEGG analysis and Gene Ontology. The 3 miRNAs were observed to target various immune response pathways, thus confirming their role in host immune response. Based on the results obtained in this study, miR-28–5p, miR-302c-3p and miR-302a-3p can be considered as potential biomarkers for the detection of leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Musumeci S., Kruse A., Chappuis F., Ostergaard Jensen T., Alcoba G.

Neglected etiologies of prolonged febrile illnesses in tropical and subtropical regions: a systematic review

(2024) PLoS neglected tropical diseases, 18 (6), pp. e0011978

DOI: 10.1371/journal.pntd.0011978

ABSTRACT: BACKGROUND: Febrile illnesses that persist despite initial treatment are common clinical challenges in (sub)tropical low-resource settings. Our aim is to review infectious etiologies of "prolonged fevers" (persistent febrile illnesses, PFI) and to quantify relative contributions of selected neglected target diseases with limited diagnostic options, often overlooked, causing inadequate antibiotic prescriptions, or requiring prolonged and potentially toxic treatments. METHODS: We performed a systematic review of articles addressing the infectious etiologies of PFI in adults and children in sub-/tropical low- and middle-income countries (LMICs) using the PRISMA guidelines. A list of target diseases, including neglected parasites and zoonotic bacteria (e.g., Leishmania and Brucella), were identified by infectious diseases and tropical medicine specialists and prioritized in the search. Malaria and tuberculosis (TB) were not included as target diseases due to well-established epidemiology and diagnostic options. Four co-investigators independently extracted data from the identified articles while assessing for risk of bias. RESULTS: 196 articles from 52 countries were included, 117 from Africa (33 countries), 71 from Asia (16 countries), and 8 from Central and -South America (3 countries). Target diseases were reported as the cause of PFI in almost half of the articles, most frequently rickettsioses (including scrub typhus), relapsing fever borreliosis (RF-borreliosis), brucellosis, enteric fever,

leptospirosis, Q fever and leishmaniasis. Among those, RF-borreliosis was by far the most frequently reported disease in Africa, particularly in Eastern Africa. Rickettsioses (including scrub typhus) were often described in both Africa and Asia. Leishmaniasis, toxoplasmosis and amoebiasis were the most frequent parasitic etiologies. Non-target diseases and non-tropical organisms (Streptococcus pneumoniae, Escherichia coli, and non-typhoidal Salmonella spp) were documented in a fifth of articles. CONCLUSIONS: Clinicians faced with PFI in sub-/tropical LMICs should consider a wide differential diagnosis including enteric fever and zoonotic bacterial diseases (e.g., rickettsiosis, RF-borreliosis and brucellosis), or parasite infections (e.g., leishmaniasis) depending on geography and syndromes. In the absence of adequate diagnostic capacity, a trial of antibiotics targeting relevant intra-cellular bacteria, such as doxycycline or azithromycin, may be considered.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tam W.Y.J., Nekouei O., Rizzo F., Cheng L.S.T., Choi Y.R., Staples M., Hobi S., Gray J., Woodhouse F., Shuen P.Y.M., Chai Y.F., Beatty J.A., Barrs V.R.

Seroreactivity against Leptospira spp. differs between community cats and privately-owned cats in Hong Kong

(2024) One Health, 19, art. no. 100851
DOI: 10.1016/j.onehlt.2024.100851
ABSTRACT: Leptospirosis is a bacterial zoonotic disease of major One Health significance and public health impact globally, with a wide host range including mammals, cetaceans and herpetofauna. This study aimed to determine Leptospira seroprevalence, risk factors for seroreactivity and prevalence of urinary Leptospira shedding among domestic cats in Hong Kong. Microagglutination testing of 22 Leptospira serovars from 20 serogroups was performed on 738 sera from outdoor free-roaming “community” cats (n = 391) and privately-owned (n = 347) cats. Urine from 268 community cats was tested for pathogenic Leptospira DNA by qPCR targeting lipL32. Potential risk factors associated with exposure were assessed using logistic regression. Overall Leptospira seroprevalence was 9.35%. Of 14 serogroups detected, Javanica (4.3%), Djasiman (2.3%) and Australis (1.5%) were most common. Seroreactivity was significantly higher among community (13.3%) than privately-owned cats (4.9%; OR 2.98 [95% CI 1.68–5.25], P < 0.001), especially to Javanica (7.65% of community cats versus 0.58% of privately-owned cats (P < 0.001). Antibody titres to all serogroups ranged from 1:100 to 1:6400 (median 1:200) and were highest for Javanica (median 1:800). Leptospira DNA was detected in urine from 12/268 community cats (4.48%; median load 6.42 × 102 copies/mL urine; range 1.40 × 101–9.63 × 104). One in three seroreactive community cats with paired urine and blood samples had leptospiruria. After adjusting for source, none of breed, sex, neuter status, age, district rodent infestation rate, serum alanine transaminase or creatinine values were associated with seroreactivity. Cats in Hong Kong are exposed to a diversity of Leptospira serogroups and can shed Leptospira silently in urine. The higher seroprevalence among outdoor free-roaming community cats highlights the importance of environmental drivers in leptospirosis transmission and risks of exposure for sympatric human populations. Gloves should be worn when handling feline urine to minimise the risk of zoonotic transmission from subclinically infected cats.
LANGUAGE OF ORIGINAL DOCUMENT: English

Radyuk E.V., Breneva N.V., Budaeva S.E., Makenov M.T., Stukolova O.A., Bulanenko V.P., Le L.A.T., Dao M.N., Nguyen C.V., Bui Thi N.T., Luong M.T., Nguyen T.N., Balakhonov S.V., Karan L.S.

Leptospira infection in bats in Vietnam

(2024) Acta Tropica, 257, art. no. 107298

DOI: 10.1016/j.actatropica.2024.107298

ABSTRACT: Bats from three provinces in Vietnam (Lai Chau, Son La, and Dong Thap) were examined for the presence of pathogenic Leptospira or specific antibodies using polymerase chain reaction (PCR), enzyme-linked immunosorbent assay (ELISA), and microscopic agglutination test (MAT). Tissue specimens from 298 bats belonging to 11 species were analyzed using a real-time PCR assay specific for leptospires of pathogenic species. Leptospiral DNA was identified in 40 bats from following species: Rousettus amplexicaudatus (5/9; 55.5 %), Rousettus leschenaultii (17/42; 40.4 %), Myotis hasseltii (8/25; 32 %), Taphozous longimanus (3/12; 25 %), and Eonycteris spelaea (7/32; 21.9 %). Based on secY phylogeny, sequences from M. hasseltii bore a strong resemblance to L. borgpetersenii. Sequences from other species revealed unique lineages: one of them resembled Leptospira sp., previously identified in Rousettus madagascariensis (Madagascar) and Rousettus aegyptiacus (South Africa); the second lineage showed close relation to L. kirshneri; and the third held an intermediary position between L. noguchii and L. interrogans. Through ELISA, anti-Leptospira antibodies were found in 83 of 306 bats, with the highest seroprevalence observed in R. leschenaultii (44/48; 91.6 %), R. amplexicaudatus (6/8; 75 %), and E. spelaea (19/25; 76 %). 66 of these ELISA-positive samples were tested using MAT; 41 of them were confirmed in MAT as positive. The predominant serogroups in our study were Tarassovi and Mini.

LANGUAGE OF ORIGINAL DOCUMENT: English

Nossa D.N., Nóbrega Y.C., Acosta I.C.L., Santos M.R.D., Menezes P.Q., Heinemann M.B., Souza Filho A.F., Srbek-Araujo A.C.

Antibodies against Leptospira spp. in free-living and captive broad-snouted caiman (Caiman latirostris) and free-living yacare caiman (Caiman yacare) in Brazil

(2024) Journal of wildlife diseases, 60 (3), pp. 795 - 798

DOI: 10.7589/JWD-D-23-00185

ABSTRACT: We evaluated antibodies against Leptospira spp. in both free-living and captive Caiman latirostris from Atlantic Forest, and free-living Caiman yacare from Pantanal, Brazil, by using a microscopic agglutination test. Overall seropositivity was 17%, with rates of 36% in captive C. latirostris (n=4/11) and 18% in free-living C. yacare (n=4/22).

LANGUAGE OF ORIGINAL DOCUMENT: English

Ruiz-Pacheco J.A., Reyes-Martínez J.E., Gómez-Navarro B., Castillo-Díaz L.A., Portilla de Buen E.

Leptospirosis: a dual threat – predisposing risk for renal transplant and trigger for renal transplant dysfunction

(2024) Human Immunology, 85 (5), art. no. 110835

DOI: 10.1016/j.humimm.2024.110835

ABSTRACT: Leptospirosis (LTPS) is a bacterial infection that affects humans, often with mild or no symptoms. It is estimated that approximately 10 % of patients with LTPS may experience multi-organ dysfunction, including renal abnormalities. In regions where LTPS is widespread, a considerable number of instances involving acute kidney injury (AKI) and chronic kidney disease (CKD) of unknown etiology (CKDu) have been reported. Additionally, studies have shown a correlation between kidney graft dysfunction in patients with

stable kidney transplants after LTPS. These findings indicate that exposure to LTPS may increase the likelihood of kidney transplantation due to the onset of both acute and chronic kidney injuries. Simultaneously, it poses a potential risk to the stability of kidney grafts. Unfortunately, there is limited scientific literature addressing this issue, making it difficult to determine the negative impact that LTPS may have, such as its role as a risk factor for the need of kidney transplantation or as a threat to individuals who have undergone kidney transplants. This study aims to shed light on the immune mechanisms triggered during LTPS infection and their importance in both kidney damage and allograft dysfunction.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kirkimbayeva Z., Biyashev B., Yermagambetova S., Kuzembekova G., Abdeliev B.

A retrospective study of animal leptospirosis in Kazakhstan

(2024) Journal of Advanced Veterinary and Animal Research, 11 (2), pp. 439 - 448
DOI: 10.5455/javar.2024.k793
ABSTRACT: Objective: The purpose of the paper was to monitor the disease incidence in farm and wild animals in some areas of Kazakhstan, which are most susceptible to leptospirosis, and the typification of isolated pathogens, carried out under the scientific and technical program “Studying the epizootological characteristics of the country territory on particularly dangerous diseases and developing veterinary and sanitary measures to improve their effectiveness” in 2021–2023. Materials and Methods: The material included the reports of veterinary laboratories on leptospirosis in recent years, as well as laboratory tests on samples carried out at the “SANA” research and development enterprise. During this period, 6,701 serum samples from farm animals and 86,651 serum samples from rodents were tested by enzyme-linked immunosorbent assay. Results: The serological results showed antibody titers in the blood of 6.32% of cattle, 5.4% of sheep, 4.2% of horses, and 1.8% of pigs. The highest number of positive samples were found in Turkestan (12.3%), Almaty (11.7%), and Kyzylorda (11.4%) regions. Infection in rodents was lower and ranged from 0.34% to 0.07% during these years. The population of leptospira-causing diseases of animals on the territory of the country is represented by 8 serogroups. Studies in 2022 on the detection of pathogenic leptospires by polymerase chain reaction in 350 samples of blood serum from animals and 350 samples of biomaterial from rodents from different regions of Kazakhstan were negative. Conclusion: Studies conducted as part of this work will help reduce the incidence of disease among the population and animals in Kazakhstan.
LANGUAGE OF ORIGINAL DOCUMENT: English

Khaki P., Bagherpour M., Gharakhani M., Soltani M.S., Shahcheraghi F., Nikbin V.S.

Application of pulsed-field gel electrophoresis for molecular identification of pathogenic Leptospira species in Iran: a rapid and reliable method

(2024) Iranian Journal of Microbiology, 16 (3), pp. 323 - 328
DOI: 10.18502/ijm.v16i3.15763
ABSTRACT: Background and Objectives: Leptospirosis is a zoonotic disease caused by pathogenic Leptospira serovars. The genus Leptospira cannot differentiated by conventional techniques. However, identity determination of pathogenic serovar is pre-cious of public health problems and epidemiological studies. Pulsed-field gel electrophoresis facilitates rapid identification of Leptospires to the serovar levels. Materials and Methods: In this study, we employed PFGE to evaluate 28 Leptospira isolates, with animal, human and environmental origin, obtained from Razi Vaccine and Serum Research Institute of Karaj, Iran. PFGE patterns

of 28 Leptospira serovars were generated using the Not I restriction enzyme in comparison with the lambda ladder. Results: Out of 28 serovars evaluated, we identified 22 different pulsed types, designated P1-P22. Out of 22 pulse groups, 3 were found to be a common type, but others were a single Type. Groups consisting of the common type were P3, P9, P14, and P16. The results showed that the discriminatory index of PFGE by Not I enzyme was 0.99, demonstrating heterogeneous differentiation among serovar members. Conclusion: The PFGE methodology used in this study showed excellent interlaboratory report usability, rapid, reliable, enabling standardization and data sharing between laboratories.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kumar K.V., M S., Bokade P.P., S S., V B., Govindaraj G., Hemadri D., Shome B.R., Balamurugan V.
Mapping serogroup distribution and seroprevalence of leptospirosis in livestock of Assam, Northeastern State of India: unveiling uncommon Leptospira serogroups
(2024) Comparative Immunology, Microbiology and Infectious Diseases, 111, art. no. 102215
DOI: 10.1016/j.cimid.2024.102215
ABSTRACT: Leptospirosis is a significant zoonotic disease affecting livestock, leading to reproductive issues and economic losses. Despite its endemic status in India, research has predominantly focused on coastal regions, leaving the North Eastern Region (NER) underexplored. This study aims to investigate the seroprevalence and serogroup distribution of leptospirosis in livestock across Assam, a major state in the North Eastern Region (NER) of India. Serum samples (n=811) from cattle, buffalo, sheep, goats, and pigs were collected between 2016 and 2019 and screened using the Microscopic Agglutination Test (MAT) for 24 serogroups. The overall seroprevalence was 22.9 % (186/811), with highest prevalence in cattle (26.2 %) and buffalo (25 %), followed by small ruminants (19.8 %) and pigs (18.6 %). Notably, uncommon serovars such as Mini (28.8 %), Manhao (12.4 %), and Cynopteri (7.5 %) were identified, indicating a unique epidemiological pattern in Assam. High seroprevalence was observed in districts like Bongaigaon (66.7 %), Kamrup Metropolitan (50.0 %), and Nalbari (40.0 %), emphasizing the need for targeted intervention strategies. The presence of these uncommon serogroups, typically found in neighbouring countries and other regions, suggests potential transboundary transmission from these countries. This study provides valuable insights into the seroprevalence and serogroup distribution of leptospirosis in Assam's livestock, highlighting the need for region-specific surveillance and control measures. These findings underscore the importance of understanding the local epidemiological landscape to develop effective disease management and prevention strategies, ultimately reducing the impact of leptospirosis in the NER of India.
LANGUAGE OF ORIGINAL DOCUMENT: English

Giraud-Gatineau A., Nieves C., Harrison L.B., Benaroudj N., Veyrier F.J., Picardeau M.
Evolutionary insights into the emergence of virulent Leptospira spirochetes
(2024) PLoS Pathogens, 20 (7 July), art. no. e1012161
DOI: 10.1371/journal.ppat.1012161
ABSTRACT: Pathogenic Leptospira are spirochete bacteria which cause leptospirosis, a re-emerging zoonotic disease of global importance. Here, we use a recently described lineage of environmental-adapted leptospires, which are evolutionarily the closest relatives of the highly virulent Leptospira species, to explore the key phenotypic traits and genetic determinants of Leptospira virulence. Through a comprehensive approach integrating phylogenomic comparisons with in vitro and in vivo phenotyping studies, we show that the evolution

towards pathogenicity is associated with both a decrease of the ability to survive in the environment and the acquisition of strategies that enable successful host colonization. This includes the evasion of the mammalian complement system and the adaptations to avoid activation of the innate immune cells by the highly-virulent Leptospira species (also called P1+ species), unlike other species belonging to the phylogenetically related P1- and P2 groups, as well as saprophytes. Moreover, our analysis reveals specific genetic determinants that have undergone positive selection during the course of evolution in Leptospira, contributing directly to virulence and host adaptation as demonstrated by gain-of-function and knock-down studies. Taken together, our findings define a new vision on Leptospira pathogenicity, identifying virulence attributes associated with clinically relevant species, and provide insights into the evolution and emergence of these life-threatening pathogens.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ashaiba A., Sapna K., Arun A.B., Tellis R.C., Prasad K.S.

Development and evaluation of a noninvasive microfluidic-based paper analytical device for leptospirosis diagnosis

(2024) Analytical Chemistry

DOI: 10.1021/acs.analchem.4c01934

ABSTRACT: Leptospirosis is a re-emerging infectious disease that presents a diagnostic enigma for clinicians with frequent misdiagnosis due to lack of rapid and accurate diagnostic tests, as the current methods are encumbered by inherent limitations. The development of a diagnostic sensor with a sample-in-result-out capability is pivotal for prompt diagnosis. Herein, we developed a microfluidic paper-based analytical device (spin-μPAD) featuring a sample-in-result-out fashion for the detection of Leptospira specific urinary biomarker, sph2 sphingomyelinase, crucial for noninvasive point-of-care testing. Fabrication of paper devices involved precise photolithography techniques, ensuring a high degree of reproducibility and replicability. By optimizing the device’s configuration and protein components, a remarkable sensitivity and specificity was achieved for detecting leptospiral sph2 in urine, even at low concentrations down to 1.5 fg/mL, with an assay time of 15 min. Further, the spin-μPAD was validated with 20 clinical samples, suspected of leptospirosis including other febrile illnesses, and compared with gold standard microscopic agglutination test, culture, Lepto IgM ELISA, darkfield microscopy, and Leptocheck WB spot test. In contrast to commercial diagnostic tools, the spin-μPAD was noninvasive, rapid, easy to use, specific, sensitive, and cost-effective. The results highlight the potential of this innovative spin-μPAD for an efficient and dependable approach to noninvasive leptospirosis diagnosis, addressing critical needs in the realms of public health and clinical settings.
LANGUAGE OF ORIGINAL DOCUMENT: English

Craig S.B., Prior S.J., Weier S.L., Graham G.C., Collet T.A., Moore F.A.J., Hewitson G.R., McMahon J.L., Moore P.R., Sultana I.-M., Hall-Mendelin S., McKay D.B.

Leptospirosis: messing with our minds - a review of unusual neurological and psychiatric complexities

(2023) Zoonoses: Infections Affecting Humans and Animals, pp. 1313 - 1330

DOI: 10.1007/978-3-031-27164-9_34

ABSTRACT: Leptospirosis is a biphasic febrile illness common in tropical and subtropical regions. Clinically, patients may present with a mild, influenza-like illness through to syndromes revealing multiorgan failure. The aim of the current review is to focus on the rare neurological and psychiatric complexities of leptospirosis. A review of neuroleptospirosis and psychosis in leptospirosis will precede a review of the extant literature

concerning acute disseminated encephalomyelitis following a leptospiral infection. Physicians working in areas where the incidence of leptospirosis is high should remain cognizant of patients with leptospirosis presenting primarily with a neurological syndrome. Such awareness will ensure a diagnosis of leptospirosis is not delayed and appropriate treatment strategies implemented.
LANGUAGE OF ORIGINAL DOCUMENT: English

Camous L., Pommier J.-D., Tressières B., Martino F., Picardeau M., Loraux C., Valette M., Chaumont H., Carles M., Demoule A., Breurec S.

Organ involvement related to death in critically ill patients with leptospirosis: unsupervised analysis in a french west indies ICU

(2024) Critical Care Explorations, 6 (7), pp. e1126
DOI: 10.1097/CCE.0000000000001126
ABSTRACT: OBJECTIVES: To identify distinct phenotypes of critically ill leptospirosis patients upon ICU admission and their potential associations with outcome. DESIGN: Retrospective observational study including all patients with biologically confirmed leptospirosis admitted to the ICU between January 2014 and December 2022. Subgroups of patients with similar clinical profiles were identified by unsupervised clustering (factor analysis for mixed data and hierarchical clustering on principal components). SETTING: All patients admitted to the ICU of the University Hospital of Guadeloupe on the study period. PATIENTS: One hundred thirty critically ill patients with confirmed leptospirosis were included. INTERVENTIONS: None. MEASUREMENTS AND MAIN RESULTS: At ICU admission, 34% of the patients had acute respiratory failure, and 26% required invasive mechanical ventilation. Shock was observed in 52% of patients, myocarditis in 41%, and neurological involvement in 20%. Unsupervised clustering identified three clusters - "Weil's Disease" (48%), "neurological leptospirosis" (20%), and "multiple organ failure" (32%) - with different ICU courses and outcomes. Myocarditis and neurological involvement were key components for cluster identification and were significantly associated with death in ICU. Other factors associated with mortality included shock, acute respiratory failure, and requiring renal replacement therapy. CONCLUSIONS AND RELEVANCE: Unsupervised analysis of critically ill patients with leptospirosis revealed three patient clusters with distinct phenotypic characteristics and clinical outcomes. These patients should be carefully screened for neurological involvement and myocarditis at ICU admission.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tantiapibalkun Y., Nuchpun S., Mekseriwattana W., Limsampan S., Doungchawee G., Jangpatarapongsa K., Srikhirin T., Katewongsa K.P.

Quantum dots as a fluorescent labeling tool for live-cell imaging of Leptospira

(2024) Nanoscale
DOI: 10.1039/d4nr00543k
ABSTRACT: Leptospirosis is a global public health problem caused by Gram-negative pathogenic bacteria belonging to the genus Leptospira. The disease is transmitted through the urine of infected animals, which contaminates water and soil, leading to the infection of other animals and humans. Currently, several approaches exist to detect these bacteria; however, a new sensitive method for the live-cell imaging of Leptospira is required. In this study, we report the green synthesis of cadmium telluride quantum dots (CdTe QDs) which are unique fluorescent nanocrystals with a high fluorescence quantum yield capable of modifying

cell surfaces and are biocompatible with cells. The fabrication of QDs with concanavalin A (ConA), a carbohydrate-binding lectin and known biological probe for Gram-negative bacteria, produced ConA-QDs which can effectively bind on Leptospira and exhibit strong fluorescence under simple fluorescence microscopy, allowing the live-cell imaging of the bacteria. Overall, we performed the simple synthesis of ConA-QDs and demonstrated their potential use as versatile fluorescent probes for the live-cell imaging of Leptospira. This technique could be further applied to track leptospiral cells and study the infection mechanism, contributing to a more thorough understanding of leptospirosis and how to control it in the future.
LANGUAGE OF ORIGINAL DOCUMENT: English

Grace D., Cook E.

Zoonoses and poverty: The multiple burdens of zoonoses in low- and middle- income countries

(2023) Zoonoses: Infections Affecting Humans and Animals, pp. 1685 - 1697
DOI: 10.1007/978-3-031-27164-9_46
ABSTRACT: Poor people have greater exposure to zoonoses through livestock keeping; living in agricultural communities; greater exposure to peri-domestic and wild animals; and less access to clean water and sanitation. Although their consumption of animal source products is low, the quality of these products is poor. In addition to human health burdens, zoonoses reduce livestock productivity and are important barriers to trade in livestock products, as well as causing more difficulty to quantify harms such as spillover to wildlife populations. These additional impacts also contribute to poverty in developing countries. However, the relation between poverty and zoonoses is complicated. Assessing the impacts of zoonoses helps prioritize management. Among the most important zoonoses in developing countries are leptospirosis, cysticercosis, brucellosis, tuberculosis, and rabies and zoonoses causing foodborne disease. The COVID-19 pandemic also showed how lack of resilience leads to greater vulnerability of poor people to emerging zoonoses of high economic impact. Investment and innovation are urgently needed to tackle zoonoses in developing countries where they currently impose massive burdens on human, animal, and ecosystem health.
LANGUAGE OF ORIGINAL DOCUMENT: English

Vásquez-Jiménez J.M., Mackenzie S., Pulido-Arenas J., Bernal-Macías S., Garzon J.R., Ordóñez I.T., Correa N.F., Muñoz O.

Fever of unknown origin: a 12-year case series in Colombia

(2024) Journal of Infection in Developing Countries, 18 (6), pp. 880 - 886
DOI: 10.3855/jidc.18192
ABSTRACT: Background: Fever of unknown origin (FUO) is a diagnostic challenge with highly heterogeneous causes. Its etiology can change according to the studied regions, and the chance of reaching a diagnosis depends on available resources. The aim of this study is to describe the clinical characteristics, etiology and the usefulness of diagnostic aids in cases of FUO managed over 12 years in a Colombian reference center. Methodology: Single-institution retrospective case series. All cases of FUO between 2006 and 2017 were identified with the help of an electronic medical record search software. Cases of adults with fever for more than three weeks who remained undiagnosed after three days of hospitalization are described. Results: Of 1,009 cases evaluated, 112 cases met the inclusion criteria (median age 43 years, 66% men). The etiologies identified were infectious (31.2%), inflammatory (20.5%), neoplastic (14.3%), and miscellaneous (2.7%) diseases. 31.2% remained without etiological diagnosis. The most frequent conditions were tuberculosis

(17%), Hodgkin's lymphoma (7.1%), systemic lupus erythematosus (6.3%), disseminated histoplasmosis, and adult Still's disease. Contrast tomography and biopsies were the studies that most frequently supported or confirmed the final diagnosis. Conclusions: This series of contemporary Latin American cases suggests that the categories of FUO etiologies are similar to those reported in studies from developed countries, with tuberculosis being the most frequent cause in our setting. Our results highlight the importance of tomography-guided invasive studies in the diagnostic approach to FUO.
LANGUAGE OF ORIGINAL DOCUMENT: English

Magliocca M., Taddei R., Urbani L., Bertasio C., Facile V., Gallina L., Sampieri M., Rugna G., Rubini S., Maioli G., Terrusi A., Battilani M., Balboni A.

Molecular detection of viral and bacterial pathogens in red foxes (Vulpes vulpes) from Italy

(2024) Animals, 14 (13), art. no. 1969
DOI: 10.3390/ani14131969
ABSTRACT: Animals, including wildlife, are part of One-Health concept since many infectious diseases can affect both humans and animals. In this study, 126 red foxes (Vulpes vulpes) from Northern Italy in 2022–2023 were tested by molecular assays for Protoparvovirus carnivoran 1 (PPVC-1), Canine adenovirus type 1 and 2 (CAdV-1 and CAdV-2), Circovirus canine (CanineCV), Canine distemper virus (CDV), and Leptospira spp. A total of 39 of 126 (30.9%) red foxes were infected with at least one pathogen and five of these were coinfected: 20/126 (15.9%) red foxes tested positive for PPVC-1, 3/126 (2.4%) for CAdV, 20/126 (15.9%) for CanineCV, and 2/126 (1.6%) for Leptospira spp. DNA. No foxes tested positive for CDV RNA. The pathogens identified were genetically analysed. New findings were reported such as a fox with multiple feline panleukopenia virus (FPV) and canine parvovirus type 2b (CPV-2b) infection associated with quasispecies dynamics, typical genetic characteristics of the identified CanineCV, and the first detection in red foxes of Leptospira ST198 related to L. interrogans serogroup Australis. Further studies are necessary to investigate the transmission between domestic animals and wildlife and to understand the role of red foxes in the maintenance of these pathogens not only in the wild but also in urban and peri-urban environments. © 2024 by the authors.
LANGUAGE OF ORIGINAL DOCUMENT: English

Salman M., Steneroden K.

Important zoonotic diseases of cattle and their prevention measures

(2023) Zoonoses: Infections Affecting Humans and Animals, pp. 91 - 111
DOI: 10.1007/978-3-031-27164-9_1
ABSTRACT: Cattle production is a vital component of the global food chain. Through meat or milk, animal protein is an essential dietary requirement for most people across the world. Increased cattle production will attempt to meet the need for more protein with both positive and negative impacts. Those impacts may include the spread of disease from livestock to humans directly or indirectly through milk, meat, hide, or manure. The following zoonotic diseases of cattle are included in this chapter due to their potential severity in human or cattle populations and/or their wide distribution or recent emergence: anthrax, bovine spongiform encephalopathy (BSE), bovine cysticercosis, bovine tuberculosis, brucellosis, cryptosporidium, Escherichia coli O157:H7, leptospirosis, listeria, methicillin resistant Staphylococcus aureus (MRSA), Q fever, Rift Valley Fever, and Salmonella.
LANGUAGE OF ORIGINAL DOCUMENT: English

Waranius B., Tillman C., Van Houten C., Harrist A., Digianantonio R., Hasel H., Atherstone C., Curren E.

Human case of leptospirosis during a canine disease outbreak - Wyoming, 2023

(2024) MMWR. Morbidity and mortality weekly report, 73 (27), pp. 602 - 606
DOI: 10.15585/mmwr.mm7327a1

ABSTRACT: Leptospirosis is a zoonotic bacterial disease spread through the urine of infected animals; the typical incubation period is 5-14 days. In approximately 90% of human cases, illness is asymptomatic or mild, characterized by fever, chills, myalgia, nausea, vomiting, diarrhea, headache, calf pain, and conjunctival suffusion, but severe illness can progress to multiorgan dysfunction and death. Although Wyoming is considered a low-risk area for leptospirosis because of its cold and semiarid climate, the Wyoming Department of Health was notified of a probable human case in August 2023, the first reported in the state since 1983. The patient had occupational exposure to dogs but did not report other risk factors. The same week that the human patient's illness began, public health authorities received notification of an increase in canine leptospirosis cases. Public health authorities investigated to determine potential sources of infection, identify additional cases, and recommend control measures. After public health outreach activities were implemented, canine vaccination practices changed substantially in the affected city: a survey conducted after the outbreak revealed that all responding veterinary clinics in the affected city were recommending the vaccine more frequently to dog owners and reporting higher levels of owner compliance with vaccination recommendations. Increased vaccination coverage offers protection from leptospirosis for both dogs and persons exposed to them. Leptospirosis should be considered in the differential diagnosis of persons with occupational exposure to animals and clinically compatible signs and symptoms, including fever, chills, myalgia, nausea, vomiting, diarrhea, headache, calf pain, and conjunctival suffusion, irrespective of geographic location.

LANGUAGE OF ORIGINAL DOCUMENT: English

Davood U.B., Kaur P., Gupta A., Tripathi A., Chatterjee A.K., Kumar A., Nigam A., Bhatia S.

Hepatitis a and leptospirosis dual infection-induced fulminant hepatic failure successfully treated with standard volume therapeutic plasma exchange

(2024) Transfusion Clinique et Biologique
DOI: 10.1016/j.tracli.2024.06.005
LANGUAGE OF ORIGINAL DOCUMENT: English

Khurtsilava I., Tsirdava N., Kanjaradze D., Parulava T.

Case report of pediatric triple infection: brucellosis, leptospirosis, and infective mononucleosis in Georgia

(2023) IP International Journal of Medical Microbiology and Tropical Diseases, 9 (4), pp. 282 - 284
DOI: 10.18231/j.ijmmtd.2023.052

ABSTRACT: Zoonotic infections are rare in the pediatric population of Georgia. We report a case of co-existing infections with brucellosis, leptospirosis, and infectious mononucleosis in a pediatric patient. An 11-year-old girl presented to our facility with a 12-day history of fever, chills, fatigue, arthralgia, myalgia, and refusal to walk. On evaluation, she was febrile and tachycardic, with hepatosplenomegaly and lymphadenopathy. The

patient responded well to combination therapy of doxycycline and gentamicin, had a full recovery and was doing well with no relapse for 2 months follow-up.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sánchez-Soto M.F., Gaona O., Vigueras-Galván A.L., Suzán G., Falcón L.I., Vázquez-Domínguez E.
Prevalence and transmission of the most relevant zoonotic and vector-borne pathogens in the Yucatan peninsula: a review
(2024) PLoS Neglected Tropical Diseases, 18 (7), art. no. e0012286
DOI: 10.1371/journal.pntd.0012286
ABSTRACT: Background Habitat modification and land use changes impact ecological interactions and alter the relationships between humans and nature. Mexico has experienced significant landscape modifications at the local and regional scales, with negative effects on forest cover and biological biodiversity, especially in the Yucatan peninsula in southeastern Mexico. Given the close relationship between landscape modification and the transmission of zoonotic and vector-borne diseases, it is essential to develop criteria for identifying priority zoonoses in the south of the country. Methodology/Principal findings We reviewed 165 published studies on zoonotic and vector-borne diseases in the region (2015–2024). We identified the most frequent vectors, reservoirs, and hosts, the most prev-alent infections, and the factors associated with transmission risk and the anthropogenic landscape modification in urban, rural, ecotone, and sylvatic habitats. The most relevant pathogens of zoonotic risk included Trypanosoma cruzi, arboviruses, Leishmania, Rickettsia, Leptospira, and Toxoplasma gondii. Trypanosoma cruzi was the vector-borne agent with the largest number of infected vertebrate species across habitats, while Leishmania and arboviruses were the ones that affected the greatest number of people. Dogs, cats, backyard animals, and their hematophagous ectoparasites are the most likely species maintaining the transmission cycles in human settlements, while rodents, opossums, bats, and other synanthropic animals facilitate connection and transmission cycles between forested habitats with human-modified landscapes. Pathogens displayed different prevalences between the landscapes, T. cruzi, arbovirus, and Leptospira infections were the most prevalent in urban and rural settlements, whereas Leishmania and Rickettsia had similar prevalence across habitats, likely due to the diversity and abundance of the infected vectors involved. The prevalence of T. gondii and Leptospira spp. may reflect poor hygiene conditions. Additionally, results suggest that prevalence of zoonotic and vector-borne diseases is higher in deforested areas and agricultural aggregates, and in sites with precarious health and infrastructure services. Conclusions Some hosts, vectors, and transmission trends of zoonotic and vector-borne diseases in the YP are well known but others remain poorly recognized. It is imperative to reinforce practices aimed at increasing the knowledge, monitoring, prevention, and control of these diseases at the regional level. We also emphasize the need to perform studies on a larger spatio-temporal scale under the socio-ecosystem perspective, to better elucidate the interactions between pathogens, hosts, vectors, environment, and sociocultural and economic aspects in this and many other tropical regions.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tapajóz R.C.D.S., Santos F.D.S., de Oliveira N.R., Maia M.A.C., Seixas Neto A.C.P., Maiocchi L.D.V., Souza P.H.F.C., Oliveira T.L., Dellagostin O.A.
Chimeric lipoproteins for leptospirosis vaccine: immunogenicity and protective potential
(2024) Applied Microbiology and Biotechnology, 108 (1), art. no. 424

DOI: 10.1007/s00253-024-13196-1

ABSTRACT: Abstract: Leptospirosis, a neglected zoonotic disease, is caused by pathogenic spirochetes belonging to the genus Leptospira and has one of the highest morbidity and mortality rates worldwide. Vaccination stands out as one of the most effective preventive measures for susceptible populations. Within the outer membrane of Leptospira spp., we find the LIC12287, LIC11711, and LIC13259 lipoproteins. These are of interest due to their surface location and potential immunogenicity. Thorough examination revealed the conservation of these proteins among pathogenic Leptospira spp.; we mapped the distribution of T- and B-cell epitopes along their sequences and assessed the 3D structures of each protein. This information aided in selecting immunodominant regions for the development of a chimeric protein. Through gene synthesis, we successfully constructed a chimeric protein, which was subsequently expressed, purified, and characterized. Hamsters were immunized with the chimeric lipoprotein, formulated with adjuvants aluminum hydroxide, EMULSIGEN®-D, Sigma Adjuvant System®, and Montanide™ ISA206VG. Another group was vaccinated with an inactivated Escherichia coli bacterin expressing the chimeric protein. Following vaccination, hamsters were challenged with a virulent L. interrogans strain. Our evaluation of the humoral immune response revealed the production of IgG antibodies, detectable 28 days after the second dose, in contrast to pre-immune samples and control groups. This demonstrates the potential of the chimeric protein to elicit a robust humoral immune response; however, no protection against challenge was achieved. While this study provides valuable insights into the subject, further research is warranted to identify protective antigens that could be utilized in the development of a leptospirosis vaccine. Key points: • Several T- and B-cell epitopes were identified in all the three proteins. • Four different adjuvants were used in vaccine formulations. • Immunization stimulated significant levels of IgG2/3 in vaccinated animals.

LANGUAGE OF ORIGINAL DOCUMENT: English

Choi K.-S., Hwang S., Kim M.C., Cho H.-C., Park Y.-J., Ji M.-J., Han S.-W., Chae J.-S.

Molecular surveillance of zoonotic pathogens from wild rodents in the Republic of Korea

(2024) PLoS Neglected Tropical Diseases, 18 (7), art. no. e0012306

DOI: 10.1371/journal.pntd.0012306

ABSTRACT: Background rodents are recognized as major reservoirs of numerous zoonotic pathogens and are involved in the transmission and maintenance of infectious diseases. Furthermore, despite their importance, diseases transmitted by rodents have been neglected. To date, there have been limited epidemiological studies on rodents, and information regarding their involvement in infectious diseases in the Republic of Korea (ROK) is still scarce. Methodology/Principal findings We investigated rodent-borne pathogens using nested PCR/RT-PCR from 156 rodents including 151 Apodemus agrarius and 5 Rattus norvegicus from 27 regions in eight provinces across the ROK between March 2019 and November 2020. Spleen, kidney, and blood samples were used to detect Anaplasma phagocytophilum, Bartonella spp., Borrelia burg-dorferi sensu lato group, Coxiella burnetii, Leptospira interrogans, and severe fever with thrombocytopenia syndrome virus (SFTSV). Of the 156 rodents, 73 (46.8%) were infected with Bartonella spp., 25 (16.0%) with C. burnetii, 24 (15.4%) with L. interrogans, 21 (13.5%) with A. phagocytophilum, 9 (5.8%) with SFTSV, and 5 (3.2%) with Borrelia afzelii. Co-infections with two and three pathogens were detected in 33 (21.1%) and 11 rodents (7.1%), respectively. A. phagocytophilum was detected in all regions, showing a widespread occurrence in the ROK. The infection rates of Bartonella spp. were 83.3% for B. grahamii and 16.7% for B. taylorii. Conclusions/Significance To the best of our knowledge, this is the first report of C. burnetii

and SFTSV infections in rodents in the ROK. This study also provides the first description of various rodent-borne pathogens through an extensive epidemiological survey in the ROK. These results suggest that rodents harbor various pathogens that pose a potential threat to public health in the ROK. Our findings provide useful information on the occurrence and distribution of zoonotic pathogens disseminated among rodents and emphasize the urgent need for rapid diagnosis, prevention, and control strategies for these zoonotic diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kumar V., Chellasamy S.K., Srikakulam N., Satheeshkumar P.K., Madathiparambil M.G., Tennyson J.

Identification of inhibitors for the collagenase of Leptospira interrogans through docking and molecular simulation

(2024) Proceedings of the Indian National Science Academy

DOI: 10.1007/s43538-024-00330-w

ABSTRACT: Leptospirosis is a neglected tropical zoonotic infection caused by Leptospira interrogans. Collagenase protein is a virulence factor for pathogenic L. interrogans, which facilitates its invasion into Homo sapiens. There is a paucity of chemical compounds that can inhibit the colonisation and infiltration of the pathogen into the host. We looked at the modelled collagenase from L. interrogans for docking studies with ligands and simulations in this study. Based on the results, 4-(3,4-Dihydroxyphenyl)-2-hydroxy-1H-phenalen-1-one, obtained from Musella lasiocarpa (Chinese Dwarf Banana) basically a nutraceuticals and terpene deoxyherqueinone from tea plants and Penicillium herquei was identified as having drug-like properties and demonstrated better binding within the active site pocket of collagenase during the course of protein–ligand docking and simulation. This selected phytochemical can be further taken up for wet-lab-based validation to provide a potential drug to curb this waterborne disease in the near future.
LANGUAGE OF ORIGINAL DOCUMENT: English

Caraballo L., Rangel Y., Reyna-Bello A., Muñoz M., Figueroa-Espinosa R., Sanz-Rodriquez C.E., Guerrero E., Loureiro C.L., Liu Q., Takiff H.E.

Outbreak of intermediate species Leptospira venezuelensis spread by rodents to cows and humans in L. interrogans-endemic region, Venezuela

(2024) Emerging infectious diseases, 30 (8), pp. 1514 - 1522

DOI: 10.3201/eid3008.231562

ABSTRACT: Leptospirosis is a common but underdiagnosed zoonosis. We conducted a 1-year prospective study in La Guaira State, Venezuela, analyzing 71 hospitalized patients who had possible leptospirosis and sampling local rodents and dairy cows. Leptospira rrs gene PCR test results were positive in blood or urine samples from 37/71 patients. Leptospira spp. were isolated from cultured blood or urine samples of 36/71 patients; 29 had L. interrogans, 3 L. noguchii, and 4 L. venezuelensis. Conjunctival suffusion was the most distinguishing clinical sign, many patients had liver involvement, and 8/30 patients with L. interrogans infections died. The Leptospira spp. found in humans were also isolated from local rodents; L. interrogans and L. venezuelensis were isolated from cows on a nearby, rodent-infested farm. Phylogenetic clustering of L. venezuelensis isolates suggested a recently expanded outbreak strain spread by rodents. Increased awareness of leptospirosis prevalence and rapid diagnostic tests are needed to improve patient outcomes.
LANGUAGE OF ORIGINAL DOCUMENT: English

Cabada M.M., Aguilar P.V., Rodas J.D., Hidalgo M., Mozo K., Gonzalez-Diaz E.S., Jimenez-Coello M., Diaz F.J., Dacso M.M., Ortega-Pacheco A., Arboleda M., Walker D.H., Weaver S.C., Melby P.C.

Establishment of a multisite umbrella cohort study protocol to describe the epidemiology and aetiologies of acute undifferentiated febrile illness in Latin America

(2024) BMJ Open, 14 (7), art. no. e083560

DOI: 10.1136/bmjopen-2023-083560

ABSTRACT: Introduction: Acute undifferentiated febrile illnesses (AUFIs) impose a large burden in the tropics. Understanding of AUFI's epidemiology is limited. Insufficient diagnostic capacity hinders the detection of outbreaks. The lack of interconnection in healthcare systems hinders timely response. We describe a protocol to study the epidemiology and aetiologies of AUFI and pathogen discovery in strategic areas of Latin America (LA). Methods and analysis: Global Infectious Diseases Network investigators comprising institutions in Colombia, Dominican Republic, México, Perú and the USA, developed a common cohort study protocol. The primary objective is to determine the aetiologies of AUFI at healthcare facilities in high-risk areas. Data collection and laboratory testing for viral, bacterial and parasitic agents are performed in rural and urban healthcare facilities and partner laboratories. Centralised laboratory and data management cores deploy diagnostic tests and data management tools. Subjects >6 years with fever for <8 days without localised infection are included in the cohort. They are evaluated during the acute and convalescent phases of illness. Study personnel collect clinical and epidemiological information. Blood, urine, nasal or pharyngeal swabs and saliva are collected in the acute phase and blood in convalescent phase. Specimens are banked at −80°C. Malaria, dengue and COVID-19 are tested onsite in the acute phase. The acute-phase serum is PCR tested for dengue, chikungunya, Venezuelan equine encephalitis, Mayaro, Oropouche, Zika, and yellow fever viruses. Paired convalescent and acute serum antibody titters are tested for arbovirus, Leptospira spp, and Rickettsia spp. Serum is used for viral cultures and next-generation sequencing for pathogen discovery. Analysis includes variable distributions, risk factors and regression models. Laboratory results are shared with health authorities and network members. Ethics and dissemination: The protocol was approved by local ethics committees and health authorities. The results will be published in peer-reviewed journals. All study results are shared with local and regional health authorities.

LANGUAGE OF ORIGINAL DOCUMENT: English

Martínez M.L., Esteban M., Sánchez C., Saraullo V., Hamer M., Samartino L., Brihuega B.

Study on the interference of vaccine antibodies with the serological diagnosis of leptospirosis in cattle

(2024) Veterinary Microbiology, 296, art. no. 110169

DOI: 10.1016/j.vetmic.2024.110169

ABSTRACT: A simple IgG-specific ELISA for Leptospira spp. was compared with the microscopic agglutination test (MAT) to detect IgG antibody responses to a commercial vaccine in cattle. We used an enzyme-linked immunosorbent assay (ELISA) with sonicated Leptospira interrogans serovar copenhageni M 20. After initial vaccination, specific antibodies against Leptospira spp. were detected in 90 % of the animals by IgG-ELISA and 60 % by MAT, while after booster, antibodies were detected in 100 % and 80 % of the animals by IgG-ELISA and MAT, respectively. Both serological MAT and ELISA tests revealed interferences of vaccine antibodies. Disease diagnosis with ELISA and MAT methods should be made two and a half months and four months, respectively, after vaccination to avoid interference of vaccine antibodies. On the other hand, our

results suggest that IgG-ELISA may be a useful method to assess the development of IgG antibodies induced by Leptospira vaccine.
LANGUAGE OF ORIGINAL DOCUMENT: English

Fang K., Md Nor N.S.

Encapsulated phage cocktail: the destined environmental biocontrol agent for pathogenic Leptospira

(2024) Malaysian Applied Biology, 53 (2), pp. 1 - 20
DOI: 10.55230/mabjournal.v53i2.2885

ABSTRACT: Leptospirosis is one of the often-neglected fatal zoonotic diseases endemic to most developing countries. The disease transmits mostly through contact of rodent urine contaminated with pathogenic Leptospira in the environment. This review discusses the need for environmental bioremediation of these pathogens and the reasons phage could very well be employed for that purpose. With a few modifications like encapsulation and cocktail formulation, the functionality and stability of phage as the natural predator could easily be heightened. Host specificity, ability to auto-dose and co-evolve along its hosts, effectiveness against biofilms and independence of its production are some of the promising features of a phage. Here we also highlight the interactions and interference among phages in a cocktail, transduction probability, and hypothetic usage of phage lysin in biocontrolling pathogenic Leptospira.
LANGUAGE OF ORIGINAL DOCUMENT: English

Abiayi E.A., Itelima J.U., Onwuliri F.C., Abiayi D.C., Udechukwu C.C., Jolayemi K.O., Abiayi D.C., Agida G., Forcados G.

Effect of single and combination therapy on methanol extracts of Khaya senegalensis stem bark, Vernonia amygdalina leaves and Garcinia kola seed in Leptospira interrogans-infected mice

(2024) Journal of Ethnopharmacology, 335, art. no. 118601
DOI: 10.1016/j.jep.2024.118601

ABSTRACT: Ethnopharmacological relevance: Pastoralists in Nigeria mix Garcinia kola seed (GK), Khaya senegalensis stem bark (KS), and Vernonia amygdalina leaves (VA) to treat leptospirosis. Aim: To determine the in vitro and in vivo effect on single and combination therapy on Leptospira interrogans-infected mice. Materials and methods: Evaluation of in vitro assay for anti-leptospiral motility of the extracts was carried out in triplicates. For the in vivo assessment, 40 adult male mice inoculated with Leptospira were randomly allocated into 8 groups of 5 mice each. Groups IV-IX were treated with 800 mg/kg b.w. of KS, GK, VA, KS + GK, KS + VA, GK + VA for 5 days. Group I was negative control, II was model control, and III was treated with penicillin (3.7 mg/kg b.w.) intramuscularly. Results: In vitro, at 90 min, all the extracts at 800, 400, and 200 mg/ml showed complete cessation of motility which was significantly ($p < 0.05$) different when compared to the negative control. A significant ($p < 0.05$) IC50 of 0.18 mg/ml was recorded with GK when compared to KS (0.40 mg/ml), VA (0.25 mg/ml), and procaine penicillin (0.31 mg/ml). Mean packed cell volume, haemoglobin concentration, and mean corpuscular haemoglobin concentration decreased significantly ($p < 0.05$) in all infected groups and returned to almost pre-infection values. However, significant leucocytosis ($p < 0.05$) was observed in group II. AST and ALP showed a significant increase ($p < 0.001$). Histopathological evaluation showed the extracts to prevent the distortion of normal architecture of the selected organs. Conclusion: This study demonstrates the significant potential of Garcinia kola, Khaya senegalensis, and Vernonia amygdalina extracts singly and in combination to combat leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Nieves C., Huete S.G., Veyrier F.J., Picardeau M.

Taxonomy and phylogenomics of Leptospira

(2024) Phylogenomics: Foundations, Methods, and Pathogen Analysis, pp. 359 - 390

DOI: 10.1016/B978-0-323-99886-4.00018-1

ABSTRACT: Accurate identification of bacterial species is critical for epidemiologic, phylogenetic, and diagnostic purposes. The classification of leptospires has undergone several changes following the discovery of the leptospirosis agent more than a century ago. With the genomic era, the number of described Leptospira species has more than doubled in recent years. Genotyping, including whole-genome-based typing, allows discrimination of isolates at the subspecies level. Access to genomes has also facilitated the study of gene repertoire and virulence-associated factors. Herein we review the taxonomic classification of the genus Leptospira and highlight recent findings based on the analysis of genomes.

LANGUAGE OF ORIGINAL DOCUMENT: English

Filipe J., Lauzi S., Marinoni V., Servida F., Dall'Ara P.

Zoonoses and pet owners: a survey on risk perception in Northern Italy

(2024) Comparative Immunology, Microbiology and Infectious Diseases, 112, art. no. 102224

DOI: 10.1016/j.cimid.2024.102224

ABSTRACT: Veterinary and human medicine are focused on the issue of emerging and re-emerging diseases, which are especially represented by zoonosis that could be a threat for public health. Zoonotic risk may come from pets: some canine and/or feline viral, bacterial, parasitic, protozoal or mycotic diseases can be transmitted directly to humans. There are several strategies to prevent the transmission of such zoonosis, and among them vaccination plays an important role. Through a survey carried out in Northern Italy aimed to collect information regarding owners' knowledge and perception of the zoonotic risks associated with three zoonoses (rabies, leptospirosis, and dermatophytosis), it was demonstrated that dog owners tend to adhere more consistently to their pets' vaccination schedules and are more receptive to changes in vaccination scheduling compared to cat owners. This study also suggests that cat owners predominantly visit veterinarians for vaccination purposes, whereas dog owners seek veterinary services for a variety of reasons. The survey highlighted the ongoing need to enhance owners' understanding of zoonoses affecting their pets and also the protective role of vaccines. Veterinarians should undertake the responsibility of educating, reassuring, and informing pet owners about the significance of vaccines for their pets and for public health.

LANGUAGE OF ORIGINAL DOCUMENT: English

Rompa E., Strangalies J.

Leptospirosis in dogs - an update [Leptospirose bei hunden - ein update]

(2024) Kleintierpraxis, 69 (7), pp. 386 - 392

LANGUAGE OF ORIGINAL DOCUMENT: German

Christie S.A.D., Hariharan S., Chakraborti S., Srinivasan N., Madanan M.G.

A New beginning to the existing medicines; repurposing fda-approved drugs for the neglected re-emerging disease leptospirosis

(2024) ACS Omega
DOI: 10.1021/acsomega.4c02535
ABSTRACT: Leptospirosis is one of the re-emerging zoonotic diseases, especially in tropical regions. Many antibiotics are used to treat leptospirosis, but there are no scientific evidence-based guidelines or systematic clinical trials for using these drugs. A bioinformatics approach was made to shortlist some Food and Drug Administration (FDA) of the United States of America-approved and currently used drugs for leptospirosis. The existing drugs from the Drug Bank database, which are currently not used for leptospirosis, were selected to identify their target proteins and binding sites using bioinformatics methods. Orthologues of these target proteins were selected from the proteome database of Leptospira. The similar sites and their interactions with the drugs were validated and recommended for use in leptospirosis. Further, the sensitivity of recommended drugs was also validated in vitro. The sequences and structures of these proteins were compared under strictly controlled parameters and shortlisted Gatifloxacin, Imipenem, Latamoxef, Doripenem, Tigecycline, and Lactams as repurposable drugs for leptospirosis. An in vitro validation of the drugs showed significant antileptospiral activity in 12 serovars with low IC50 concentrations and also showed that the IC50 values varied across Leptospira serovars. Further, suitable proteins under the concept of “One Target, Many Drugs” identified DNA gyrase subunit A (Q72WD1), 30S ribosomal protein S9 (Q72U99), and 30S ribosomal protein S12 (Q72UA6), and these proteins were found across the pathogenic, saprophytic, and intermediate species of Leptospira. We describe a method to find repurposable drugs from the approved list that are not currently used to treat leptospirosis and validate them to be taken forward for systematic clinical trials specific to leptospirosis for recommendations in clinical use.
LANGUAGE OF ORIGINAL DOCUMENT: English

Moinet M., Abrahão C.R., Gasparotto V.P.O., Wilkinson D.A., Vallée E., Benschop J., Russell J.C.
Density matters: how population dynamics of house mice (Mus musculus) inform the epidemiology of Leptospira
(2024) Journal of Applied Ecology
DOI: 10.1111/1365-2664.14714
ABSTRACT: Rodents are maintenance hosts of numerous pathogens, and both their density and the pathogen prevalence determine the risk they pose to other animals or humans. However, density is often overlooked. We investigated a capture-mark-recapture-sampling strategy to study introduced mice (Mus musculus) and Leptospira as a model and demonstrate the advantages of a combined approach. We estimated population density and Leptospira prevalence in mice in a replicated longitudinal survey conducted between 2016 and 2018. Capture-mark-recapture sessions were undertaken at two sites in Spring and Autumn and blood and kidney samples were collected at the end of each session. Mouse density and areas of activity were estimated using spatially explicit capture–recapture (SECR) models and both were compared between Leptospira positive and negative mice. Leptospira exposure and shedding status were estimated using Microscopic Agglutination Test, and a combination of culture and lipL32 PCR on kidneys. Leptospira prevalence was higher in spring (83%–86%) than in autumn (31%–37%) and mouse densities simultaneously varied from 3.6 to 55.9/ha. However, despite these variations in prevalence and density, the density of infected animals remained relatively constant over time (3–8/ha). Shedding or being seropositive was also associated with the activity of mice. Shedding or seropositive mice had a larger activity area, and seropositive mice were trapped on average 1 day earlier than seronegative mice. Synthesis and applications: Our results show how understanding the

population dynamics of pathogen-carrying rodents is critical in epidemiology. The wider movement patterns and easier encounters of positive mice highlight the possibility of biases in classical prevalence surveys and have implications for disease transmission within and between species. Importantly, and quite counter-intuitively, Leptospira prevalence was negatively associated with mouse density, resulting in a constant density of shedders that contradicts the conventional view of higher exposure risk at high rodent density. More broadly, such sampling designs can improve animal and disease control policies and better inform modelling studies by providing more parameter estimates than classical prevalence surveys.
LANGUAGE OF ORIGINAL DOCUMENT: English

Lagarde-Guerrero R., de Jesús Navarro-Arias M., Duran-Pérez S.A., Osuna-Ramírez I., Osuna-Martínez L.U., Gonzáles-Durán E., Rendon-Maldonado J.G.

Frequency of Leptospira in the blood of patients with fever of unknown origin in Sinaloa, Mexico

(2024) Vector-Borne and Zoonotic Diseases
DOI: 10.1089/vbz.2024.0001
ABSTRACT: Background: Leptospira is a genus of bacteria that causes the zoonotic disease known as leptospirosis, which mainly affects countries with tropical and subtropical climates. Its prevalence may be underestimated because the initial stage of the infection is characterized by presenting a febrile condition that is easily confused with other diseases, such as dengue. This work reports the frequency of leptospirosis in the blood of patients with febrile symptoms of unknown origin. Materials and Methods: A total of 218 peripheral blood samples were analyzed from volunteer participants from Culiacan Sinaloa in June 2019, one half corresponded to patients with undiagnosed febrile symptoms and the other half to asymptomatic volunteers. Data collected included the age and sex of the participants. Leptospira was detected by qPCR using a fragment of the lipL32 gene from the bacteria's genome as a target. Fisher's exact test was used as a statistical method to estimate the relationship between the infection and the data collected. Results: The study group comprised 134 female and 84 male patients ranging from ages 1 to 92 years, averaging 41 years. In this study, Leptospira infection was identified in the blood of 22/218 participating volunteers (10.09%), of which 20/109 (18.34%) presented febrile symptoms, whereas 2/109 (1.83%) were asymptomatic. The most affected participants were women with ages between 27 and 59 years. However, the analysis of the relationship between infection and the variables studied did not show statistical significance. Conclusions: Leptospirosis was detected in blood samples from patients with undiagnosed febrile illness and asymptomatic symptoms in Sinaloa. The lipL32 gene is useful as a target in identifying Leptospira in human blood in the acute phase of the disease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Veena R.K., Vinod Kumar K., Swathi M., Bokade P.P., Pal A., SowjanyaKumari S., Arun Y.P., Devaraj S., Jagadeesha K., Padma M.R., Jayashankar M., ChethanKumar H.B., Shome B.R., Gulati B.R., Balamurugan V.

Epidemiological analysis of leptospirosis, dengue, and co-infection rates among febrile illness cases in Dakshina Kannada, Karnataka

(2024) Indian Journal of Medical Microbiology, 51, art. no. 100698
DOI: 10.1016/j.ijmmb.2024.100698
ABSTRACT: Introduction: Leptospirosis and dengue are two significant public health concerns in tropical and subtropical regions, often resulting in severe forms of disease and fatality. This study addresses the pressing

public health issues of leptospirosis and dengue in the Dakshina Kannada district of Karnataka, India. Both diseases pose significant health risks and are relatively understudied in this region, making it essential to investigate their prevalence and clinical presentations for targeted healthcare planning. Aim: The primary aim is to determine the frequency of leptospirosis and dengue among febrile illness cases to understand the epidemiological patterns and assess co-infection rates in Dakshina Kannada. Method: Between 2020 and 2021, serum samples suspected of leptospirosis were tested using IgM ELISA (n = 1629) and the Microscopic Agglutination Test (MAT) (n = 92) for leptospirosis, while dengue was tested using NS1Ag and IgM antibodies ELISA (n = 1415). Data were collected through medical records and patient interviews. Seasonal trends, gender, and age distributions were analyzed. Result: The study found a significant prevalence of leptospirosis (21 %) and dengue (10 %) among febrile illness cases in the study area, with a 1.3 % co-infection rate. Clinically, fever was common to both diseases, but leptospirosis also frequently exhibited symptoms such as abdominal pain, myalgia, and jaundice. MAT screening revealed a predominance of anti-leptospiral antibodies against the Djasiman, Pyrogenes, Hurstbridge, Hebdomadis, and Grippotyphosa serogroups in Dakshina Kannada. Conclusion: The study highlights the urgent need for focused public health interventions, improved diagnostic tools, and targeted epidemiological studies to manage these diseases. The findings underscore the necessity of enhancing diagnostic capabilities and public health awareness, particularly considering the significant health risks posed by leptospirosis and dengue in the region.
LANGUAGE OF ORIGINAL DOCUMENT: English

Manjunathachar H.V., Barde P.V., Chouksey V., Tiwari P., Mathapati B., Shrivastava S., Chakma T.
Leptospirosis in central India: a retrospective study to explore burden of tropical illness
(2024) Indian Journal of Medical Microbiology, 51, art. no. 100689
DOI: 10.1016/j.ijmmb.2024.100689
ABSTRACT: Leptospirosis, an underdiagnosed zoonotic disease in India, was studied retrospectively in Madhya Pradesh, Central India. Between 2018 and 2019, 2617 samples from patients with hepatitis-related symptoms were collected. Of these, 518 tested negative for hepatitis and other tropical viral diseases under the VRDL project were analyzed for leptospira IgM using ELISA. 68 (13.12%) were positive for leptospirosis. Common symptoms included fever (97.45%) and jaundice (42.27%), with renal involvement in 30.88% of cases. Higher incidence was observed in the 31–60 age group, especially during monsoon and post-monsoon seasons. The study highlights the need for increased clinician awareness and inclusion of leptospirosis in screening panels to differentiate tropical illnesses in India.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ackermann M.R., Bannantine J.P.
Progress and persistence of diseases of high consequence to livestock in the United States
(2024) One Health, 19, art. no. 100865
DOI: 10.1016/j.onehlt.2024.100865
ABSTRACT: The USDA/ARS-National Disease Center (NADC) will celebrate its 65th anniversary of existence in November 2026. NADC continues as one of the world's premier animal health research centers conducting basic and applied research on endemic diseases with economic impact on U.S. livestock and wildlife. This research center also supports a program studying important food safety pathogens such as Salmonella, E. coli and Campylobacter. NADC has contributed significantly to the elimination of a few diseases, notably hog

cholera and milk fever, and made progress in reducing the impact of many other animal diseases through vaccines, therapies and managerial recommendations. Despite nearly 65 years of targeted research on these diseases and much progress, some of these continue to persist. The reasons for such persistence vary for each disease condition and they are often multifactorial involving host susceptibility, virulence and even environmental conditions. Individually and in aggregate, these disease conditions have a massive economic impact and can be devasting to animal producers, owners and individuals that become infected through zoonotic disease agents such as tuberculosis, leptospirosis and avian influenza. They also diminish the health, well-being and welfare of affected animals, which directly affects the food supply. The NADC is using all available technologies including genomic, biochemical, reverse genetics, and vaccine trials in the target host to combat these significant diseases. We review the progress and reasons for persistence of selected diseases and food safety pathogens as well as the progress and potential outcomes should research and programmatic plans to eliminate these disease conditions cease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Petersen K., Maranich A.

Antibiotic chemoprophylaxis for leptospirosis: previous shortcomings and future needs

(2024) Tropical Medicine and Infectious Disease, 9 (7), art. no. 148

DOI: 10.3390/tropicalmed9070148

ABSTRACT: Leptospirosis is a neglected tropical disease that remains potentially life threatening and hard to diagnose. Climate change combined with overlapping reservoir and human habitats will likely lead to increasing incidence, outbreaks, and mortality in the future. Preventative vaccines are either of limited scope and availability, or under development. Antibiotic chemoprophylaxis for prevention has been the subject of numerous clinical trials. However, despite 40 years of effort, clinical trials to better define protective efficacy, dosing, and the preferred medication are of poor quality and offer limited evidence. We reviewed the literature and offer critiques of the existing trials as well as potential areas for future exploration that may better define the epidemiology and yield a better evidence base for both travel medicine and public health efforts.
LANGUAGE OF ORIGINAL DOCUMENT: English

Yusof M.A., Mohd-Taib F.S., Ishak S.N., Md-Nor S., Md-Sah S.A.

Home range and macrohabitat usage of the important rodent reservoirs of Leptospira in Selangor, Malaysia

(2024) Mammal Study, 49 (3), pp. 171 - 184

DOI: 10.3106/ms2023-0044

ABSTRACT: Rodents serve as the main carriers for leptospirosis disease. Home range and habitat usage are part of the ecological study, which was less explored in disease ecology. In this study, Rattus norvegicus (RN), Rattus rattus complex (RR), and Sundamys muelleri (SM) were chosen due to their high prevalence with pathogenic Leptospira. Three pairs of each species were tracked from urban, semi-urban, and forested areas. The rats were fitted with a transmitter radio-collar and tracked with a portable telemetry receiver consisting of a 3-element Yagi antenna and located using standard methods of ground-based triangulation. Home range and core area were higher in the forest species (SM) than urban species (RN and RR). RN roaming and nesting areas were restricted inside houses and sewers, which is similar to RR roaming outside houses but nesting in houses. SM shows more expansive roaming areas in the forest but occasionally visits dump sites.

Food resources, primarily from leftovers and dumping sites, were found to be the main factor in the viability of these species. The information on the movement ecology of rats could give accurate and valuable data on the population control, by targeting the specific areas occupied by the rats.
LANGUAGE OF ORIGINAL DOCUMENT: English

Surontee R.A., Hoque M.M., Tasneem T., Fariduzzaman M., Hasan M.M., Bari M.S.
Coinfection of leptospirosis with scrub typhus: a case report
(2024) Journal of Medicine (Bangladesh), 25 (2), pp. 187 - 190
DOI: 10.3329/jom.v25i2.74660
ABSTRACT: Leptospirosis and scrub typhus are common zoontic illnesses in tropical countries. Leptospira, a spirochaete, can cause leptospirosis when a patient comes in contact with contaminated water. Following a period of bacteraemic illness, leptospirosis may progress to a more severe form.Weil's disease is a severe form of leptospirosis characterised by jaundice, haemorrhage and acute kidney injury. Scrub typhus, a rickettsial disease, common in South-East Asia is caused by Orientia tsutsugamushi occurs due to bite of Trombicula mite. An eschar forms at the site of the bite. Here we present a case of a 60-year-old gentleman, hailing from Savar who was diagnosed as a case of coinfection of scrub typhus and leptospirosis. Patient presented with an eschar, high grade fever and features of Weil's disease. He didn't initially respond to Ceftriaxone and then Doxycycline was added after which he became afebrile.
LANGUAGE OF ORIGINAL DOCUMENT: English

Klier C.M., Princk C., Richter M.H., Luge E., Mayer-Scholl A., Mylius M., Meyer-Schlinkmann K.M., Rettenbacher-Riefler S., Monazahian M., Baillot A., Ulrich R.G., Dreesman J.
Anti-Leptospira seroprevalence and associated risk factors among forestry workers in Lower Saxony, North-West Germany
(2024) Microorganisms, 12 (7), art. no. 1262
DOI: 10.3390/microorganisms12071262
ABSTRACT: As leptospirosis is re-emerging, a seroprevalence study was conducted, assessing the prevalence of anti-Leptospira IgG antibodies and infection-associated risk factors among forestry workers (FWs) in Lower Saxony, Germany, to develop targeted public health measures. Sera of 877 FWs, sampled in 2016, were tested for anti-Leptospira seropositivity by commercial IgG-ELISA. Data on demographics and Leptospira-specific exposures, knowledge, sources of information, and preventive measures were collected by standardized, self-administered questionnaire. A subset of 244 sera was retested via in-house IgG-ELISA. Risk factors were assessed from the subset using multivariable logistic regression analysis. The commercial IgG-ELISA revealed a seroprevalence of 4.8% (95% confidence interval CI95 = 3.5–6.4). Of the 601 FWs who completed the questionnaire, 67.9% had been informed about leptospirosis and Leptospira spp., mainly by employers (55.2%) and peers (38.9%). Positive associations with seropositivity were observed for canoeing (adjusted odds ratio (aOR) = 2.35, p = 0.044), touching rodents (aOR = 2.4, p = 0.021), and living close to beech trees (aOR = 2.18, p = 0.075). Frequently cleaning animal stables was negatively associated (aOR = 0.20, p = 0.002). The unexpected positive association with wearing gloves when handling plants and soil (aOR = 2.16, p = 0.011) needs further discussion. Overall, seroprevalence was in the range of other studies in Germany. The identified factors will be used to develop targeted information reaching out to at-risk groups tapping various communication channels.
LANGUAGE OF ORIGINAL DOCUMENT: English

Udayanga S., Kankanamge D., Gamage T., Suresh De Zoysa L., Chamathya Y., Bellanthudawa B.K.A., Batuwanthudawa S., Ruwanpathirana N., Gayashan N., Gunasekara S., Chandana E.P.S.

Unraveling sociocultural influences on leptospirosis incidence and prevalence: a qualitative study in Sri Lanka

(2024) Asia-Pacific Journal of Public Health

DOI: 10.1177/10105395241265259

ABSTRACT: This study aimed to explore sociocultural determinants that might contribute to the increased prevalence and incidence of leptospirosis, and how those determinants can also hinder health promotion interventions, particularly in rural areas of Sri Lanka. Even though several epidemiological studies have been conducted on leptospirosis in the Asia-Pacific region, the sociocultural background of this disease has not received sufficient attention. Therefore, through a qualitative study involving nine public health officials and 25 infected patients in five selected health administrative divisions, we demonstrate that a set of certain sociocultural determinants influence leptospirosis incidence and its prevalence. The thematic analysis generated six themes: a lack of knowledge of the causes and consequences of leptospirosis, false illness interpretations, a lack of readiness for the disease, poor economic conditions, social capital failure, and issues within the health system at the community level. Overall, results suggest that awareness programs aimed at demystifying false interpretations of leptospirosis lie at the centre of any health promotion interventions at the community level.

LANGUAGE OF ORIGINAL DOCUMENT: English

Torres-Castro M., Suárez-Galaz A., Yeh-Gorocica A., Sosa-Bibiano E., Loría-Cervera N., López-Ávila K., Ochoa-Valencia J.L., Lugo-Caballero C.

Identification of Leptospira interrogans in Ototylomys phyllotis (Rodentia: Cricetidae) from Yucatan, Mexico [Identificación de Leptospira interrogans en Ototylomys phyllotis (Rodentia: Cricetidae) de Yucatán, México]

(2024) Revista Cientifica de la Facultad de Veterinaria, 34 (2), art. no. rcfcv-e34383

DOI: 10.52973/rcfcv-e34383

ABSTRACT: Small rodents are the most relevant natural reservoirs of pathogenic Leptospira species. Several species of these small rodents have been described as carriers in Yucatan, Mexico. It is recognized that identifying the carriers and knowing their distribution is relevant to reducing the transmission risk of Leptospira spp. to susceptible hosts, including humans. The aim is to evidence the presence of pathogenic Leptospira spp. in small rodents captured in Tinum, Yucatan, Mexico. Forty-seven rodents of the species Heteromys gaumeri, Ototylomys phyllotis, Peromyscus yucatanicus, Sigmodon hispidus and Mus musculus were captured in four sites from the study municipality. A kidney fragment was collected and used in the extraction of total DNA. Two endpoint polymerase chain reactions (PCR) were used to detect Leptospira spp. DNA. The bioinformatic analysis and the construction of a phylogenetic tree determined the bacteria species. The reactions showed a total infection frequency of 8.5 % (95 % CI 3.3 – 19.9 %). All positive specimens were O. phyllotis. The species identified in the bioinformatic analysis and the phylogenetic tree was L. interrogans. This Leptospira species is relevant for public health because it is responsible for most severe cases of leptospirosis in humans. Likewise, it has been previously identified in small rodents from Mexico and Yucatan. The study shows that O. phyllotis carries L. interrogans. More research is needed to determine the risk of transmission to other hosts, including humans.

LANGUAGE OF ORIGINAL DOCUMENT: English

Khairullah A.R., Kusala M.K.J., Fauziah I., Furqoni A.H., Suhendro I., Effendi M.H., Raissa R., Moses I.B., Silaen O.S.M., Yuliatun L., Yanestria S.M., Riwu K.H.P., Hasib A., Ayuti S.R.

Deciphering leptospirosis: insights into an emerging global threat

(2024) Journal of Advanced Veterinary Research, 14 (6), pp. 1065 - 1071

ABSTRACT: Leptospirosis is caused by bacteria that are members of the Leptospira genus. This illness can occur in a variety of environments, although it is more prevalent in tropical regions where humidity and wetness greatly aid in its spread. Geographically broad, leptospirosis primarily affects tropical, temperate, and subtropical regions. Bacteria can enter the body through the vaginal system, mucosa, conjunctiva, and tiny abrasions. Hazardous germs are released into the urine when the bacteria settle in the complex kidney pathways. Leptospirosis symptoms are similar to those of other diseases, making diagnosis challenging. The majority of leptospirosis patients are resolved without problems. Laboratory techniques are used to research leptospirosis in humans and animals. Humans are classified as accidental hosts because they have had direct or indirect interaction with leptospirosis-infected animals. Leptospirosis infection can occur in at-risk groups who work in contaminated environments or animal shelters, such as abattoir and sewer workers, coal mines, plumbers, salver workers, agricultural workers, veterinarians, military personnel, abattoir employees, animals, meat handlers, and fishing industry workers. Antimicrobial therapy is one way to treat leptospirosis. Among the antibiotics are doxycycline, amoxicillin, ceftriaxone, ampicillin, penicillin, and erythromycin. Reducing the incidence of leptospirosis in domestic and wild animals can help manage the disease in people. Leptospirosis in wild animals is difficult to control, but in domesticated animals, vaccinations using inactivated whole cells or outer membrane preparations can effectively manage the disease.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ohore G.O., Jarikre T.A., Emikpe B.O., Asare D.A.

Seroprofile of leptospiral antibodies and a simple tube-ELISA for serological evaluation of antibodies to Leptospira in dogs

(2024) Pan African Medical Journal One Health, 13, art. no. 15

DOI: 10.11604/pamj-oh.2024.13.15.42530

ABSTRACT: Introduction: leptospirosis is a contagious disease affecting both humans and domestic animals posing a significant global public health threat. This study examined leptospirosis vaccination adherence, and sero-profile of leptospiral antibodies in dogs using a novel tube-ELISA method to overcome existing diagnostic limitations. Methods: blood samples from 134 dogs in Southwest Nigeria were collected, and their vaccination status, breed, sex, and age were documented. A plate ELISA served as a reference method, while a tube-ELISA was developed for individual samples and compared to the plate-ELISA. Data analysis utilized chi-square and Fisher exact tests. Results: the study revealed a 77.6% adherence to leptospirosis vaccination among sampled dogs, varying among breeds. Notably, 41.8% of dogs had detectable leptospiral antibodies, and 40% of unvaccinated dogs were seropositive, underscoring their role as potential pathogen carriers. Post-vaccination seropositivity rates varied over time intervals without significant differences. The tube-ELISA exhibited 83.3% sensitivity and 100% specificity compared to the plate-ELISA, suggesting its diagnostic potential. Conclusion: this study underscores the challenges in controlling leptospirosis, including low vaccination adherence and limited seroconversion rates among vaccinates. The tube-ELISA offers a cost-effective method for individual dog sero-monitoring, mitigating existing diagnostic constraints.

LANGUAGE OF ORIGINAL DOCUMENT: English

Zorilla R., Ching L.L., Elisara T., Kramer K., Nerurkar V.R.

Re-emerging, under-recognized zoonotic, and neglected tropical diseases in Hawai'i

(2024) Japanese Journal of Infectious Diseases, 77 (4), pp. 187 - 200

DOI: 10.7883/yoken.JJID.2023.476

ABSTRACT: Hawai'i, the United States' most western geographic state in the Pacific, lies between the North and South American continents and the Indo-Pacific regions, including Japan. The tropical environmental conditions of the Hawaiian Islands provide favorable ecosystems for various infectious pathogens, their vectors, and reservoirs. This creates an environment conducive to the transmission of zoonotic diseases affecting both humans and animals. Hawai'i has experienced an increase in dengue, leptospirosis, and murine typhus outbreaks. Furthermore, toxoplasmosis and neuroangiostrongyliasis cases remain prevalent throughout the state, and the putative presence of autochthonous Zika cases identified in a retrospective study may be of national public health concern. Understanding the factors that affect the transmission and distribution of zoonoses is necessary to identify at-risk locations and populations. The One Health approach seeks to understand, report, and interpret these factors and requires collaboration between private and governmental institutions. One Health should focus on neglected tropical diseases (NTD) and prioritize development of interventions to control and prevent the transmission of diseases that spread between animals and humans. This review focuses on the epidemiological and clinical characteristics of under-recognized zoonotic and NTD affecting Hawai'i, including leptospirosis, murine typhus, neuroangiostrongyliasis, toxoplasmosis, dengue, and Zika.

LANGUAGE OF ORIGINAL DOCUMENT: English

Charles J.C., Kiriwandeniya K.G.K.U., Liyanapathirana K.V., Gunarathna R.D.S., Mendis S., Liyanarachchi G.G.

Remedy or tragedy: Acalypha indica-induced acute oxidative hemolysis associated with acute kidney injury and infective endocarditis: an initial presentation of G6PD deficiency: a case report

(2024) SAGE Open Medical Case Reports, 12

DOI: 10.1177/2050313X241266554

ABSTRACT: Acalypha indica is used as an herbal broth in Sri Lanka for medicinal purposes. It can induce acute oxidative hemolysis and severe methemoglobinemia in G6PD deficiency patients. Leptospirosis is an endemic infection in Sri Lanka, resembling the clinical presentation of acute oxidative hemolysis in G6PD deficiency. As the presentation can mimic leptospirosis, a high index of suspicion is maintained when an infective focus is not identified in patients with fever, jaundice, and hematuria. Here, we present a case of a 33-year-old male patient with hemolysis following Acalypha herbal broth ingestion. He has recovered from acute oxidative hemolysis with supportive management, but he acquired infective endocarditis during inward stay through the central intravenous line, necessitating valve replacement.

LANGUAGE OF ORIGINAL DOCUMENT: English

Cruz-Romero A., Gil-Alarcón G., Ochoa-Valencia J.L., Ramos-Vásquez J.R., Romero-Salas D., Becker I., Sánchez-Montes S., Arenas P.

Seroprevalence of Leptospira in feral dogs from El Pedregal de San Ángel Ecological Reserve, Mexico [Seroprevalencia de Leptospira en perros ferales de la Reserva Ecológica del Pedregal de San Ángel, México]

(2024) Revista Cientifica de la Facultad de Veterinaria, 34 (2), art. no. rcfcv-e34384
DOI: 10.52973/rcfcv-e34384

ABSTRACT: Leptospirosis is the most widely distributed zoonotic disease worldwide, which is caused by 17 species of spirochetes of the genus Leptospira. These microorganisms are associated with a wide range of vertebrate hosts, particularly canids, in which they can generate a wide range of clinical signs, which can go from a subclinical infection to acute cases that generates liver and / or kidney disfunction. Given that dogs are considered as sentinel units that allows identifying the degree of dissemination of these bacteria in the environment, for this reason epidemiological surveillance is a priority in these hosts. The aim of this study was to identify the sero-reactivity against the species of the genus Leptospira in free-range and feral canids in an urban ecological reserve in Mexico City and explore its implications for public health and conservation medicine. Serum samples were obtained from 19 dogs, which were subjected to the microscopic agglutination test (MAT). The frequency of anti-Leptospira spp. antibodies in feral dogs was 100% (95% CI 82.3–100), with sero-reactivity against three serovars. This is the first approach that identifies the degree of exposure to Leptospira spp. in feral dogs in Mexico, particularly in an Ecological Reserve.

LANGUAGE OF ORIGINAL DOCUMENT: English

Abiayi E.A., Itelima J.U., Onwuliri F.C., Udechukwu C.C., Jolayemi K.O., Abiayi D.C., Abiayi D.C., Pam H.L., ThankGod D.G., Meseko C.

Pathogenic Leptospira interrogans in Jos North Abattoir, Nigeria: occurrence, serology, and molecular characterization

(2024) Comparative Immunology, Microbiology and Infectious Diseases, 112, art. no. 102223
DOI: 10.1016/j.cimid.2024.102223

ABSTRACT: Leptospirosis, a neglected zoonotic disease, adversely affects animal, human health, and socioeconomic conditions, particularly in developing countries like Nigeria. This study aimed to determine the occurrence and molecular identification of pathogenic Leptospira spp. among abattoir workers, cattle, and rats in Jos North, Plateau State, Nigeria. Using a cross-sectional study design, a total of 394 samples were collected, including 149 urine samples from abattoir workers, 125 urine samples from cattle bladders, and 120 bladders from trapped rats. Samples were processed and cultured in Ellinghausen McCullough Johnson Harrison (EMJH) medium and examined under a darkfield microscope. Positive cultures were confirmed using the Microscopic Agglutination Test (MAT) and nested Polymerase Chain Reaction (N-PCR) targeted the 16 S rDNA gene. Results revealed a prevalence of 33.76 % for Leptospira spp. across all samples, with the highest occurrence in abattoir workers (13.96 %), followed by rats (13.45 %), and cattle (6.35 %). The MAT showed L. interrogans serovar Hardjo str. Hardjoprajitno as the most prevalent serotype (41.61 %), followed by L. interrogans serovar Icterohaemorrhagiae str. RGA (34.31 %). N-PCR confirmed the presence of pathogenic Leptospira spp., showing bands of 1200 bp. Phylogenetic analysis of the 16 S rDNA gene sequences revealed close similarities to known pathogenic Leptospira strains from Brazil and the USA. The study underscores the significant public health risk posed by leptospirosis in Jos North and highlights the need for improved diagnostic capabilities, increased awareness, and effective control measures to mitigate the disease burden. Enhanced surveillance and preventive strategies are crucial to protect both animal and human health in the region.

LANGUAGE OF ORIGINAL DOCUMENT: English

Petakh P., Oksenych V., Kamyshnyi O.

Corticosteroid treatment for leptospirosis: a systematic review and meta-analysis

(2024) Journal of Clinical Medicine, 13 (15), art. no. 4310

DOI: 10.3390/jcm13154310

ABSTRACT: Background: Leptospirosis, a zoonotic disease prevalent in tropical regions, often leads to severe complications such as Weil's disease and acute respiratory distress syndrome (ARDS). This pioneering meta-analysis investigated the role of corticosteroids in treating severe leptospirosis, addressing a critical gap in the current clinical knowledge. Methods: We systematically reviewed studies from PubMed and Scopus, focusing on randomized controlled trials and observational cohort studies involving adult patients diagnosed with leptospirosis. Five studies comprising 279 participants met the inclusion criteria. Results: Although some studies suggest potential benefits, particularly for pulmonary complications, the evidence remains inconclusive due to the limited number of studies and their methodological limitations. Notably, while four of the five reviewed studies indicated a possible positive role of corticosteroids, the single randomized controlled trial showed no significant benefit, highlighting the need for more robust research. Conclusions: While the current evidence provides a basis for potential benefits, it is not sufficient to make definitive clinical recommendations. Further research is essential to clarify the role of corticosteroids in the treatment of severe leptospirosis, with the aim of improving patient outcomes and guiding clinical practices effectively.

LANGUAGE OF ORIGINAL DOCUMENT: English

Suwannin P., Polpanich D., Lebaz N., Saimuang K., Jindakaew J., Tangboriboonrat P., Jangpatarapongsa K., Elaissari A.

Pathogenic Leptospira detection in environmental contaminant water sources by highly performance antibody absorption polystyrene agglutinating particles

(2024) Particle and Particle Systems Characterization

DOI: 10.1002/ppsc.202400023

ABSTRACT: Leptospirosis is a re-emerging bacterial zoonotic disease that affects both humans and animals, with a significantly higher incidence in tropical and sub-tropical regions. Disease control, epidemiology, and surveillance rely on a One Health approach, as accurate detection can be applied to humans, animals, and the environment. This study represents the first attempt to develop a method for detecting the pathogenic Leptospira santarosai serovar Shermani based on the latex agglutination reaction. The serological activity of the antibody is examined to achieve a high titer of antibody before adsorption onto polystyrene particles. Using a pH medium of 6.8–7.8, total antibody adsorption of up to 3 mg m−2 is achieved. Particle agglutination is observed after incubating the antibody-adsorbed PS with leptospiral culture for 4 min, revealing a detection limit of 1.7 × 102 leptospires mL−1. Interestingly, the detection limit increased by 1000 times when observing agglutination using spectrophotometer. The test exhibits high specificity with Shermani and shows negligible cross-agglutination with non-pathogenic Leptospira and water-borne bacteria. Agglutination testing in collected water samples from natural sources demonstrates a good correlation with culture technique. This simple and rapid leptospires agglutination detection method can be applied as a screening test in environmental, human, and animal specimens.

LANGUAGE OF ORIGINAL DOCUMENT: English

Steinrigl A., Willixhofer D., Schindler M., Richter S., Unterweger C., Ahmed A.A., van der Linden H., Mende D.R., Pucci N., Steinparzer R.

Isolation and characterization of Leptospira licerasiae in Austrian swine: a first-time case report in Europe

(2024) BMC Veterinary Research, 20 (1), art. no. 348

DOI: 10.1186/s12917-024-04213-6

ABSTRACT: Background: Leptospiraceae comprise a diverse family of spirochetal bacteria, of which many are involved in infectious diseases of animals and humans. Local leptospiral diversity in domestic animals is often poorly understood. Here we describe the incidental detection of Leptospira (L.) licerasiae in an Austrian pig. Case presentation: During an experiment to characterize the pathogenesis of L. interrogans serovar Icterohaemorrhagiae in pigs, cultivation of a urine sample from a non-challenged contact pig resulted in growth of a spirochetal bacterium that tested negative for pathogenic Leptospira (LipL32 gene). PCR, Sanger sequencing and standard serotyping further confirmed that the recovered isolate was clearly different from the challenge strain L. interrogans serovar Icterohaemorrhagiae used in the animal experiment. Whole genome sequencing revealed that the isolate belongs to the species L. licerasiae, a tropical member of the Leptospiraceae, with no prior record of detection in Europe. Conclusions: This is the first report describing the occurrence of L. licerasiae in Europe. Since L. licerasiae is considered to have intermediate pathogenicity, it will be important to follow the geographical distribution of this species and its pathogenic and zoonotic potential in more detail.

LANGUAGE OF ORIGINAL DOCUMENT: English

Asaduzzaman M., Karmaker L., Rahman A., Rahman M.S., Awaul M.A., Chakraborty S.R.

Dengue and leptospirosis coinfection: a case series

(2024) Journal of Medical Case Reports, 18 (1), art. no. 370

DOI: 10.1186/s13256-024-04675-0

ABSTRACT: Background: Both dengue and Leptospira infections are endemic to tropical and subtropical regions, with their prevalence increasing in recent decades. Coinfection with these pathogens presents significant diagnostic challenges for clinicians due to overlapping clinical manifestations and laboratory findings. This case report aims to elucidate two clinical scenarios where the coinfection of dengue and leptospirosis complicates the disease course, creating a diagnostic conundrum. Case presentation: We present the clinical scenarios of two Bangladeshi males, aged 25 and 35 years, who were admitted to our hospital with acute febrile illness. The first patient exhibited hepatic and renal involvement, while the second presented with symptoms initially suggestive of meningoencephalitis. Both cases were initially managed under the presumption of dengue infection based on positive serology. However, further evaluation revealed coinfection with Leptospira, complicating the disease course. Both patients received appropriate treatment for dengue and antibacterial therapy for leptospirosis, ultimately resulting in their recovery. Conclusion: These case scenarios underscore the critical importance for clinicians in regions where dengue and Leptospira are endemic to consider both diseases when evaluating patients presenting with acute febrile illness.

LANGUAGE OF ORIGINAL DOCUMENT: English

Moriczi R., Muresan M.G., Neagoe R., Sala D., Torok A., Bara T., jr., Balmos I.A., Ion R., Vasiesiu A.M.

Acute calculous cholecystitis associated with leptospirosis: which is the emergency? A case report and literature review

(2024) Journal of Critical Care Medicine, 10 (3), pp. 271 - 278

DOI: 10.2478/jccm-2024-0033

ABSTRACT: Introduction: Leptospirosis is a bacterium with a worldwide distribution and belongs to the group of zoonoses that can affect both humans and animals. Most cases of leptospirosis present as a mild, anicteric infection. However, a small percentage of cases develop Weil's disease, characterized by bleeding and elevated levels of bilirubin and liver enzymes. It can also cause inflammation of the gallbladder. Acute acalculous cholecystitis has been described as a manifestation of leptospirosis in a small percentage of cases; however, no association between leptospirosis and acute acalculous cholecystitis has been found in the literature. Case presentation: In this report, we describe the case of a 66-year-old patient who presented to the emergency department with a clinical picture dominated by fever, an altered general condition, abdominal pain in the right hypochondrium, nausea, and repeated vomiting. Acute calculous cholecystitis was diagnosed based on clinical, laboratory, and imaging findings. During preoperative preparation, the patient exhibited signs of liver and renal failure with severe coagulation disorders. Obstructive jaundice was excluded after performing an abdominal ultrasound and computed tomography scan. The suspicion of leptospirosis was then raised, and appropriate treatment for the infection was initiated. The acute cholecystitis symptoms went into remission, and the patient had a favorable outcome. Surgery was postponed until the infection was treated entirely, and a re-evaluation of the patient's condition was conducted six-week later. Conclusions: The icterohemorrhagic form of leptospirosis, Weil's disease, can mimic acute cholecystitis, including the form with gallstones. Therefore, to ensure an accurate diagnosis, leptospirosis should be suspected if the patient has risk factors. However, the order of treatments is not strictly established and will depend on the clinical picture and the patient's prognosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Morais D.A., Nunes B.C., Barnabé N.N.C., Anjos D.M., Bezerra C.S., Costa D.F., Santos C.S.A.B., Azevedo S.S., Alves C.J.

Spatial and seasonal distribution of Leptospira spp. seropositive horses in the Northeast region of Brazil

(2024) Preventive Veterinary Medicine, 231, art. no. 106301

DOI: 10.1016/j.prevetmed.2024.106301

ABSTRACT: Leptospirosis is an anthropozoonosis of economic and public health importance, caused by bacteria of the genus Leptospira. Horses are deemed important in its transmission chain due to their proximity to humans, and because the species is often asymptomatic, making these animals potential silent reservoirs. In this context, the objectives of this study were to determine the prevalence of seropositive horses for Leptospira spp., and to identify the presence of Leptospira spp. serogroups and antibody titers, the occurrence of areas with higher density of infection cases and demographic characteristics associated with seropositivity in the states of Paraíba (PB), Pernambuco (PE), Rio Grande do Norte (RN) and Ceará (CE), in the Northeast region of Brazil, during rainy (May and June) and dry (October and November) seasons from 2017 to 2019. Using the microscopic agglutination test (MAT), 1152 equine serum samples from 225 municipalities were analyzed. Anti-Leptospira antibodies were detected in 23.9 % (95 % CI= 21.4 – 26.3 %) of the samples in the

three-year period, with a frequency of 30.4 % (95 % CI= 26.7 – 34.2 %) during the rainy period (with greater emphasis on the Ballum serogroup) and 17.4 % (95 % CI= 14.3 – 20.5 %) in the dry period (with greater emphasis on the Sejroe serogroup). Age of horses ≥ 6 years (6–10 years, 11–15 years and ≥ 16 years), rainy season, and animal belonging to Pernambuco state were factors with higher seropositivities. Regarding spatial distribution, a higher percentage of seropositive animals was observed in Pernambuco ($P < 0.05$), in interstate border areas, and large urban centers, with a spatial cluster detected in the dry season of 2018 with relative risk of 2.8 ($P = 0.049$) times higher in municipalities within the cluster. It is suggested that measures for controlling rodents and contact with wild animals in equine farming, both in rainy and dry periods, combined with care regarding the use of pastures shared with cattle and the adoption of immunoprophylaxis are important in preventing and controlling leptospirosis in horses in the Northeast region of Brazil.
LANGUAGE OF ORIGINAL DOCUMENT: English

Pujato N., Gimenez J.M., Peretti L.E., Landolt N.Y., Jacob P., Chiani Y.T., Schmeling M.F., Miraballes I., Vanasco N.B.

Development of a new accurate lateral flow immunoassay for diagnosis of human leptospirosis

(2024) European Journal of Clinical Microbiology and Infectious Diseases
DOI: 10.1007/s10096-024-04912-w
ABSTRACT: Purpose: The current diagnostic methods for leptospirosis diagnosis are technically complex and expensive, with limited applicability to specialized laboratories. Furthermore, they lack diagnostic accuracy in the acute stage of the disease, which coincides with a period when antibiotics are highly effective. New simple and accurate tests are mandatory to decentralize and improve diagnosis. Here, we introduced a new lateral flow immunoassay (Lepto-LF) for human leptospirosis. Methods: We conducted a double-blinded assay using 104 serum samples from patients with confirmed or discarded diagnosis for leptospirosis. The diagnostic performance of Lepto-LF was estimated across different ranges of days from onset of symptoms (dpo), considering the diagnostic algorithm as reference standard. Additionally, it was compared with the screening methods enzyme-linked immunosorbent assay (IgM-ELISA) and the slide agglutination test using temperature-resistant antigen (SATR). Results: Lepto-LF exhibited perfect diagnostic performance with a Youden´s index $J = 1$ from 6 dpo in the acute phase. IgM-ELISA gave slightly lower accuracy with $J = 0.91$ and 95.5% of both sensitivity and specificity; while SATR showed a markedly inferior yield ($J = 0.41$, sensitivity = 95.5%, specificity = 45.5%). The performances remained consistent in the convalescence phase of the disease (> 10 dpo). Conclusion: Lepto-LF was found to be a reliable test for simple, rapid and early diagnosis of leptospirosis, resulting a promising tool for decentralizing leptospirosis diagnosis and enabling timely treatment of patients. In addition, Lepto-LF may be employed as confirmatory test, especially in remote areas and vulnerable contexts where the standard MAT is not available.
LANGUAGE OF ORIGINAL DOCUMENT: English

Guo S., Yao W., Liu Y., Shi X., Ren J., Zhang R., Luo M., Yang Z., Sun J.

Surveillance and analysis of leptospirosis in Zhejiang Province in 2023

(2024) Chinese Journal of Endemiology, 43 (7), pp. 559 - 563
DOI: 10.3760/cma.j.cn231583-20240304-00049
ABSTRACT: Objective The epidemiological and host animal pathogen data of leptospirosis in the population of Zhejiang Province in 2023 were analyzed, providing scientific basis for formulating prevention and control

strategies of leptospirosis. Methods The data of human leptospirosis in the population were collected from the China Information System for Disease Control and Prevention, and analyzed using descriptive epidemiological methods. The data on isolation, culture, and nucleic acid testing of Leptospira pathogens from mouse kidneys, frog kidneys, pig kidneys, and duck kidneys as well as duck serum antibody data were collected from Zhejiang Provincial Center for Disease Control and Prevention "Leptospirosis Surveillance Project of Zhejiang Province". The carrying and changing status of Leptospira epidemic microbiota in populations and host animals were analyzed. Results In 2023, a total of 83 cases of leptospirosis were reported in Zhejiang Province, with a incidence rate of 0.126 2/ 100 000, aged (62.66 ± 11.31) years, including 68 males and 15 females. Leptospirosis cases were reported in 11 cities, mainly concentrated in the southern cities of Wenzhou City, Lishui City and Taizhou City(a total of 68 cases), accounting for 81.93% of the total number of cases. August to October were high incidence months for leptospirosis (a total of 70 cases), accounting for 84.34% of the total number cases. The male to female ratio of patients was 4.53∶1.00, and all were adults ≥20 years old, the middle and old people aged 45 - 79 years were the high-risk population (a total of 77 cases), accounting for 92.77% of the total number of cases. The patient's occupation was mainly farmers, with a total of 54 cases, accounting for 65.06% of the total number cases. The shortest time from onset to initial diagnosis for patients with leptospirosis was 0 day, and the longest was 13 days. The shortest time from initial diagnosis to confirmed diagnosis was 0 day, and the longest was 16 days. The 72.29% of the leptospirosis cases (60 cases) had a history of field labor or suspected contact with contaminated water within one month before the onset of the disease, and 18.07% of the leptospirosis cases (15 cases) had a history of contact with animals such as mice, frogs, pigs, cows, dogs, fish or ducks, or their excreta within one month before the onset of the disease. The average nucleic acid positive rate of host animals with leptospirosis was 5.92% (31/524) in mouse kidney, 6.74% (36/534) in frog kidney, and 0.66% (1/151) in pig kidney. The isolation and culture of leptospirosis from duck kidney, nucleic acid detection, and antibody detection in duck blood were all negative. The leptospirosis bacteria detected in human population were serogroup Icterohaemorrhagiae (3 samples) and Hebdomadis (4 samples), and the bacteria group detected in host animals was serogroup Icterohaemorrhagiae (3 samples). Conclusions The outbreak of leptospirosis in Zhejiang Province mainly occurs in the summer and autumn, with the affected areas mainly concentrated in the southern region of Zhejiang Province. The affected population is mainly middle-aged and elderly males, and the population carrying Leptospira is still mainly composed of the serogroup Icterohaemorrhagiae and the Hebdomadis, with the host animal being the serogroup Icterohaemorrhagiae.
LANGUAGE OF ORIGINAL DOCUMENT: Chinese

Vyn C.M., Libera K.C., Weese J.S., Jardine C.M., Berke O., Grant L.E.
Social and environmental risk factors for canine leptospirosis: a scoping review
(2024) Veterinary Record
DOI: 10.1002/vetr.4437
ABSTRACT: Background: Canine leptospirosis is a zoonotic disease of global importance. The identification of social and environmental risk factors remains limited and is needed for planning interventions. Our objectives were to summarise the global trends in social and environmental risk factors for canine leptospirosis and to identify knowledge gaps. Methods: We searched peer-reviewed and grey literature for observational studies on canine leptospirosis written in English. Variables assessed via formal statistical tests were recorded and categorised into thematic risk factor groups. The risk factors were summarised by the number of unique

studies and their direction of association. Results: Of the 3184 articles identified, 66 met the inclusion criteria. Eight environmental and three social risk factor groups were identified. Exposure to animals and water was commonly studied, but social risk factors were infrequently examined. Most studies were conducted on populations in higher-income countries and countries in the Americas. Limitations: Several limitations were encountered, including inconsistent study designs and measurement and control of variables as well as disproportionate representation of studies from the Americas and higher-income countries. Conclusion: The weight and quality of evidence for social and environmental risk factors were highly variable. Additional research following standard reporting guidelines to improve transparency and increase generalisability to different contexts is needed.
LANGUAGE OF ORIGINAL DOCUMENT: English

Nakashiro H., Umakoshi K., Tanaka K., Tachibana N.
Leptospirosis transmitted from a pet dog
(2024) BMJ case reports, 17 (8)
DOI: 10.1136/bcr-2024-261369
ABSTRACT: Leptospirosis is a widespread zoonosis in tropical regions and it is not frequently recognised in developed countries. We report a case of leptospirosis transmitted from a pet dog. A middle-aged woman was referred to our emergency department with a 7-day history of fever and diarrhoea. She presented with hypotension, tachycardia, grasping pain in the entire muscle and petechiae. A detailed medical interview revealed that her pet dog had been to the veterinarian 1 month earlier with similar symptoms. We treated her with intravenous antibiotics. The patient's diagnosis of leptospirosis was confirmed by serological testing and the detection of DNA in her urine. We contacted the veterinarian and shared the information. We found that the dog had suffered from leptospirosis based on serological testing. We emphasise the possibility of leptospirosis being transmitted from pet dogs. Persistent suspicion of leptospirosis will contribute to its diagnosis and improved public health.
LANGUAGE OF ORIGINAL DOCUMENT: English

Garcia-Sanchez P., Romero-Trancón D., Falces-Romero I., Navarro Carrera P., Ruiz-Carrascoso G., Carmena D., Casares Jiménez M., Rivero-Juárez A., Moya L., Rodón J., Esperón F., Pérez-Hernando B., Sánchez-León R., Hurtado-Gallego J., Alcolea S., Sainz T., Calvo C., Méndez-Echevarría A.
Zoonosis screening in Spanish immunocompromised children and their pets
(2024) Frontiers in Veterinary Science, 11, art. no. 1425870
DOI: 10.3389/fvets.2024.1425870
ABSTRACT: Introduction: Although pets provide several social–emotional benefits for children, the risk of zoonosis must be considered among immunocompromised individuals. Methods: A prospective study was conducted in a tertiary hospital including immunocompromised patients younger than 20 years owning dogs and/or cats. Colonization and/or infection was evaluated by stool studies, bacterial swabs, blood polymerase chain reaction and serological studies in both patients and their pets, to evaluate potential zoonotic transmission occurrence. Results: We included 74 patients and their 92 pets (63 dogs, 29 cats). Up to 44.6% of the patients and 31.5% of the pets had at least 1 positive result. Up to 18.4% of pets' fecal samples were positive (bacteria, parasites or hepatitis E virus). No helminths were observed despite the high frequency of incorrect intestinal deworming practices. Among children, gastrointestinal microorganisms were found in

37.3% (primarily Clostridium difficile). Colonization by Staphylococcus pseudintermedius was common among pets (8.0%) but not among children (0.0%). No shared colonization between owners and pets was observed, except in one case (Blastocystis in both patient and pet feces). Among patients, serologies were positive for Strongyloides stercoralis (14.8%), Toxocara canis (3.2%), Bartonella henselae (19.1%) and hepatitis E (5.6%). Serology was positive for Rickettsia spp. (22.6%) and Babesia spp. (6.5%) in dogs and for Leishmania spp. (14.3%) and Toxoplasma spp. (14.3%) in cats. Conclusion: Exposure to zoonotic agents was detected in both patients and pets; however, shared colonization events were almost nonexistent. In our cohort, dogs and cats do not appear to entail high zoonosis transmission risk for immunocompromised patients.
LANGUAGE OF ORIGINAL DOCUMENT: English

Basiri S.

Interconnected risks: exploring the nexus of zoonosis and climate change

(2024) Journal of Zoonotic Diseases, 8 (3), pp. 515 - 523
DOI: 10.22034/jzd.2024.18076
ABSTRACT: Climate change is the twenty-first century's most significant threat to human health. Human activity has led to a gradual increase in greenhouse gas concentrations, resulting in global warming and other related hazards. Climate change is significantly impacting ecosystems and biodiversity, leading to a potential increase in zoonotic diseases. Zoonoses are infectious diseases that are transmitted among animals and humans. Vector-borne, foodborne, and waterborne diseases are major infectious diseases associated with climate change. Changes in temperature and precipitation patterns influence the survival, reproduction, and activity of disease-carrying vectors like mosquitoes, ticks, and sandflies. Variations in climate can affect the spread of diseases such as malaria, leishmaniasis, and rodent-borne illnesses like leptospirosis, bartonellosis, plague, and hantavirus infections. Climate change can also impact waterborne illnesses by altering water quality and increasing the risk of contamination during natural disasters. Additionally, higher temperatures and increased humidity can cause transmission of airborne zoonotic diseases, such as aspergillosis, tuberculosis, and influenza. The evolving climate may also contribute to the development of resistance in disease-causing microorganisms, making treatment more challenging. Human behavior influenced by climate change, such as changes in agricultural practices and land use, can indirectly affect disease transmission by altering vector habitats and human-animal interactions. Overall, the complex interplay between climate change, ecological factors, and human behavior underscores the need for comprehensive strategies to mitigate the risks posed by zoonotic diseases and protect public health.
LANGUAGE OF ORIGINAL DOCUMENT: English

Arberry J., Williams S., Abbas M.

Weil's disease in a temperate climate: diagnostic uncertainty and the importance of prompt antibiotic treatment

(2024) BMJ case reports, 17 (7)
DOI: 10.1136/bcr-2024-261771
ABSTRACT: A man in his 50s presents with a short history of rigors, back pain and dark urine. This was associated with scleral icterus. He was initially treated as urosepsis due to perinephric fat stranding on his first CT but continued to deteriorate with worsening sepsis requiring intensive care admission. He had a conjugated hyperbilirubinaemia (peak 708 µmol/L) with normal liver enzymes, anaemia, thrombocytopaenia, acute kidney

injury requiring filtration and respiratory failure requiring ventilatory support. A subsequent CT revealed mediastinal lymphadenopathy and extensive ground-glass changes with patchy consolidation. When his history was revisited, exposure to rodents was identified, and serological testing for leptospirosis subsequently came back positive. This case explores the causes of hyperbilirubinaemia in leptospirosis, the dangers of tunnel vision in diagnostic medicine and the importance of prompt antibiotic therapy in Weil's disease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Khandait V.N., Singh A., Singh S.K., Rashmi, Rawat U.S.
Awareness and knowledge of zoonotic diseases among pet owners in Uttar Pradesh
(2024) Veterinary Practitioner, 25 (1), pp. 126 - 129
ABSTRACT: The pet ownership rates are increasing continuously throughout India despite the higher-than-average reluctance levels during the pandemic. Dogs and cats are the most common household companion animals. Hence, they can be a direct or indirect source of many infections in human beings. The current study was designed to assess the awareness and knowledge of pet owners about zoonotic diseases. The results on rabies awareness revealed that the majority of 89.00 per cent pet owners heard about the rabies and 86.00 per cent were well aware of its mode of transmission. As far as the awareness about other zoonotic diseases (toxoplasmosis, leptospirosis, and scabies) are concerned, less than 25.00 per cent of pet owners were aware of the diseases and their mode of transmission and consequences in humans.
LANGUAGE OF ORIGINAL DOCUMENT: English

Manyenya S., Nthiwa D., Lutta H.O., Muturi M., Nyamota R., Mwatondo A., Watene G., Akoko J., Bett B.
Multiple pathogens co-exposure and associated risk factors among cattle reared in a wildlife-livestock interface area in Kenya
(2024) Frontiers in Veterinary Science, 11, art. no. 1415423
DOI: 10.3389/fvets.2024.1415423
ABSTRACT: Introduction: Understanding multi-pathogen infections/exposures in livestock is critical to inform prevention and control measures against infectious diseases. We investigated the co-exposure of foot-and-mouth disease virus (FMDV), Brucella spp., Leptospira spp., and Coxiella burnetii in cattle in three zones stratified by land use change and with different wildlife-livestock interactions in Narok county, Kenya. We also assessed potential risk factors associated with the transmission of these pathogens in cattle. Methods: We identified five villages purposively, two each for areas with intensive (zone 1) and moderate wildlife-livestock interactions (zone 2) and one for locations with low wildlife-livestock interactions (zone 3). We sampled 1,170 cattle from 390 herds through a cross-sectional study and tested the serum samples for antibodies against the focal pathogens using enzyme-linked immunosorbent assay (ELISA) kits. A questionnaire was administered to gather epidemiological data on the putative risk factors associated with cattle's exposure to the investigated pathogens. Data were analyzed using the Bayesian hierarchical models with herd number as a random effect to adjust for the within-herd clustering of the various co-exposures among cattle. Results: Overall, 88.0% (95% CI: 85.0–90.5) of the cattle tested positive for at least one of the targeted pathogens, while 41.7% (95% CI: 37.7–45.8) were seropositive to at least two pathogens. FMDV and Brucella spp. had the highest co-exposure at 33.7% (95% CI: 30.9–36.5), followed by FMDV and Leptospira spp. (21.8%, 95% CI: 19.5–24.4), Leptospira spp. and Brucella spp. (8.8%, 95% CI: 7.2–10.6), FMDV and C. burnetii (1.5%, 95% CI: 0.7–2.8), Brucella spp. and C. burnetii (1.0%, 95% CI: 0.3–2.2), and lowest for Leptospira spp. and C. burnetii (0.3%, 95% CI: 0.0–

1.2). Cattle with FMDV and Brucella spp., and Brucella spp. and Leptospira spp. co-exposures and those simultaneously exposed to FMDV, Brucella spp. and Leptospira spp. were significantly higher in zone 1 than in zones 2 and 3. However, FMDV and Leptospira spp. co-exposure was higher in zones 1 and 2 than zone 3. Discussion/conclusion: We recommend the establishment of a One Health surveillance system in the study area to reduce the morbidity of the targeted zoonotic pathogens in cattle and the risks of transmission to humans..
LANGUAGE OF ORIGINAL DOCUMENT: English

Carithers D., Loebach E., Williams T., Sponseller J., Schreibman A., Platts D.
Field assessment of potential exposure of dogs to leptospirosis by measuring antibody titers in dogs: a multisite study in five geographic regions of the United States
(2024) Frontiers in Veterinary Science, 11, art. no. 1435630
DOI: 10.3389/fvets.2024.1435630
ABSTRACT: Leptospirosis vaccine for dogs in the United States is considered a lifestyle or non-core vaccine, making individual veterinary practitioners responsible for determining if vaccination is necessary for their patients. Veterinary professionals often base their vaccination decisions on local rates of clinical cases. However, even subclinical leptospirosis infections have zoonotic potential. The microscopic agglutination test (MAT) is effective for screening unvaccinated animals, but previous vaccination can lead to inconsistent results and variable MAT titers over time. This prospective research survey evaluated if local experience was sufficient to justify selective vaccination for leptospirosis. MAT analyses were performed on sera collected from well-cared-for, unvaccinated dogs residing in five different geographies across the United States: South-Central (East Texas), New England, the Mid-Atlantic (North Carolina and Virginia), Midwest (Wisconsin/northern Illinois), and Southwest (southern California). Thirty-eight clinics participated, submitting a total of 1345 qualified samples from unvaccinated dogs over 1 year of age. 11.6% of these unvaccinated dogs had MAT titers for one or more serogroups of Leptospira. While seropositivity does not necessarily indicate that disease will result or that a specific serovar is involved, these MAT-positive cases do indicate that the potential for exposure exists and clinical signs or a carrier-state could result from infection. These survey results would indicate that a more aggressive vaccination protocol for leptospirosis should be considered.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ávila-Martínez E.G., Cardoso T.L., Pereira I.L., Caballero P.S., Wozeak D.R., Seixas Neto A.C.P., da Silva Pinto L., Hartwig D.D.
Immunoinformatic approaches for ErpY-LemA chimeric protein design for use in leptospirosis control
(2024) Journal of Applied Microbiology, 135 (8), art. no. lxae179
DOI: 10.1093/jambio/lxae179
ABSTRACT: Aims: Currently, immunoinformatic approaches have shown promise in rapidly and cost-effectively identifying new antigens from the Leptospira proteome. Chimeric multiepitope proteins offer a strategy with significant potential for implementation in diagnosis and vaccines development. Methods and results: In this study, we detail the immunoinformatic analyses and design of a new recombinant chimeric protein constructed with epitopes identified from the sequences of ErpY-like and LemA proteins, previously identified as potential antigens for controlling leptospirosis. We expressed the chimeric protein using Escherichia coli heterologous systems, evaluated its antigenicity using serum from naturally infected patients,

and its immunogenicity in mice as an animal model, with Freund as an adjuvant. The resulting recombinant chimeric protein, named rErpY-LemA, was successfully expressed and purified using a prokaryotic system, with an expected mass of 35 kDa. Serologic assays using serum samples from naturally infected patients demonstrated recognition of the chimera protein by antibodies present in sera. Animals immunized with the chimera exhibited a significant IgG antibody response from the 7th day ($P < 0.001$), persisting until day 49 of experimentation, with a titer of 1:12,800 ($P < 0.05$). Notably, significant production of IgA, IgM, and IgG subclasses was observed in animals immunized with the chimera. Conclusions: These results highlight the promising role of immunoinformatics in rapidly identifying antigens and the potential of chimeric multiepitope proteins in developing effective strategies for leptospirosis control. Impact Statement The study employs immunoinformatics to create rErpY-LemA, a novel chimeric protein. By analysing the Leptospira proteome, epitopes from ErpY-like and LemA proteins were integrated. Successfully expressed and purified using E. coli systems, it demonstrated antigenicity in infected patients' serum and immunogenicity in mice. Animals immunized with rErpY-LemA showed significant antibody responses, suggesting its potential as a diagnostic tool and vaccine candidate. These findings underscore immunoinformatics' role in antigen discovery and the promise of chimeric proteins in disease control.
LANGUAGE OF ORIGINAL DOCUMENT: English

Akbar Z., Ristiyanto R., Handayani F.D., Sayono S.

Evaluation of rat density and the associated factors in leptospirosis endemic areas: the first report on the use of Bi-index

(2024) Jurnal Kesehatan Lingkungan, 16 (3), pp. 190 - 199

DOI: 10.20473/jkl.v16i3.2024.190-199

ABSTRACT: Introduction: Leptospirosis is a health problem in tropical countries where rats serve as the reservoir of Leptospira contamination. Previous investigations implementing the Bi-index to assess rat density in Leptospirosis endemic areas are highly limited. This study aimed to use the Bi-index in monitoring rat density and the associated factors in urban Leptospirosis endemic areas. Methods: Four endemic areas in Semarang City were selected as the study sites based on Leptospirosis data in Puskesmas Gayamsari. Live traps were positioned in one case house and 39-49 neighboring houses in a 100m radius, on three consecutive days. Trapped rats were collected for species identification, morphometrics evaluation, and calculation of Bi-index and rat indices, while environmental parameters were obtained through observation. Results and Discussion: 67.1% of participants were women, private employees, and aged 17-55, while trap success ranged from 2.5-26.5% with the Bi, diversity, dominance, and evenness indices of 0.02-0.32, 0.94-1.09, 0.36-0.44, and 0.79-0.96, respectively. Trapped species included Rattus norvegicus, Rattus tanezumi, and Mus musculus with proportions of 61.3%, 34.1%, and 4.7%, respectively. The presence of rats was associated with closeness to the river containing stagnant water, frequent flooding, water entering houses during floods, open trash bins, and rubbish bins around the houses. The high rat density, dominant species, and correlated environmental conditions are strategic targets in controlling Leptospirosis in Semarang City. Conclusion: The rat density (dominated by R. norvegicus) in Semarang City was correlated with water drainage and garbage management, hence further investigation was recommended to determine Leptospira bacterial infection in rodents.
LANGUAGE OF ORIGINAL DOCUMENT: English

Haake D.A.

A tale of two islands - Leptospirosis in strikingly different ecological settings reveals pathogenomic insights

(2024) The American journal of tropical medicine and hygiene, 111 (2), pp. 221 - 222
DOI: 10.4269/ajtmh.24-0254
LANGUAGE OF ORIGINAL DOCUMENT: English

Athukorala N., Wickramasinghe S., Yatawara L., Weerakoon K.

A systematic review of zoonotic disease prevalence in Sri Lanka (2000–2022)

(2024) Vector-Borne and Zoonotic Diseases, 24 (8), pp. 453 - 472
DOI: 10.1089/vbz.2023.0141

ABSTRACT: Background: The burden of zoonotic diseases in developing countries is significantly underestimated, influenced by various factors such as misdiagnosis, underreporting, natural disasters, climate change, resource limitations, rapid unplanned urbanization, poverty, animal migration, travel, ecotourism, and the tropical environmental conditions prevalent in the region. Despite Sri Lanka's provision of a publicly funded free health care system, zoonoses still contribute significantly to the burden of communicable diseases in the country. This study serves as a timely and exhaustive systematic review of zoonoses reported over the past 22 years in Sri Lanka. Materials and Methods: This systematic review adhered to the guidelines provided by the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses" (PRISMA) statement. A systematic literature search was conducted between July and September 2022, utilizing the following databases and sources: Google Scholar, PubMed, Cochrane Library, Weekly Epidemiological Reports, and Rabies Statistical Bulletins published by the Ministry of Health, Sri Lanka. Results: From the initial database search, 1,710 articles were identified. After excluding nonzoonotic diseases, duplicated reports, inaccessible articles, and those not meeting the inclusion criteria, 570 reports were evaluated for eligibility. Of these, 91 reports were selected for data extraction, comprising 58 original research articles, 10 case reports, 16 weekly epidemiological reports, and 7 rabies statistical bulletins. Over the study period (2000–2022), 14 parasitic, 7 bacterial, and 7 viral zoonoses have been reported in Sri Lanka. Notably, leptospirosis emerged as the most reported zoonotic disease in the country. Conclusions: In response to these findings, we strongly recommend the implementation of a tailored, country-specific prevention and control program. To achieve this goal effectively, we emphasize the importance of adopting a country-specific "One Health" approach as a comprehensive framework for managing and controlling zoonotic diseases in Sri Lanka.

LANGUAGE OF ORIGINAL DOCUMENT: English

Desmoulin A., Rajaonarivelo A., Maillard O., Collet L., Jaffar-Bandjee M.-C., Moiton M.-P., Poubeau P., Fayeulle S., François-Wattrelot C., Blondé R., Tortosa P., Raffray L.

A comparative study of human leptospirosis between Mayotte and Reunion Islands highlights distinct clinical and microbial features arising from distinct inter-island bacterial ecology

(2024) The American journal of tropical medicine and hygiene, 111 (2), pp. 237 - 245
DOI: 10.4269/ajtmh.23-0846

ABSTRACT: Leptospirosis is a neglected zoonosis for which investigations assessing host-pathogen interaction are scarce. The aim of this study was to compare the severity and bacterial species involved in human cases of leptospirosis on Reunion and Mayotte islands, territories located in the southwest Indian

Ocean that have recorded high human leptospirosis incidence but display fairly distinct epidemiological situations. A retrospective multicentric study including all patients over 18 years of age from Mayotte or Reunion with proven leptospirosis was conducted from January 2018 to April 2020. This study collected demographic, geographical, clinical, and biological data. Overall, 490 patients were included, 222 on Mayotte and 268 on Reunion. More patients were hospitalized on Reunion (n = 215, 80%) compared with Mayotte (n = 102, 46%). Severe disease was more common on Reunion (n = 75, 28%) than on Mayotte (n = 22, 10%). The dominant Leptospira species on Reunion was Leptospira interrogans (79%) followed by Leptospira borgpetersenii (21%), contrasting with the epidemiological situation on Mayotte where L. interrogans was found in only a minority of patients (10%). The high frequency of severe cases on Reunion could be explained not only by higher comorbidities but also by the higher occurrence of L. interrogans infections compared with Mayotte. Finally, the distribution of cases linked to L. borgpetersenii was found almost exclusively on the west coast of Reunion, raising the potential role of a ruminant reservoir.
LANGUAGE OF ORIGINAL DOCUMENT: English

Suzuki R., Suzuki S., Sato O.S., Alfonso R., Kitalong C., Nwe Y.Y., Takabe K., Morita M., Akeda Y., Koizumi N.
Bacteriological and serological investigation of leptospirosis in dogs and pigs in Palau
(2024) The American journal of tropical medicine and hygiene, 111 (2), pp. 246 - 250
DOI: 10.4269/ajtmh.24-0129
ABSTRACT: Leptospirosis is a zoonotic disease caused by the pathogenic spirochaetes of the genus Leptospira. It is a public health concern in the Pacific Islands and is considered endemic in Palau. However, information on the genotypes and serotypes of causative Leptospira spp. in the country is limited. In this study, we isolated leptospires and detected antileptospiral antibodies in dogs and pigs. The isolates were characterized using a serological method and whole-genome sequencing. Leptospira interrogans was isolated from five of the 20 symptomatic dogs and one of the 58 healthy pigs. Their serogroups were identified as Icterohaemorrhagiae and Pyrogenes; however, the serogroup of one isolate could not be determined. Anti-Leptospira antibodies were detected in 14.4% (26/181) of the dogs and 20% (10/50) of the pigs. The reactive serogroups in dogs and pigs were almost identical, except for the Panama serogroup. Core genome multilocus sequence typing revealed that five of the six core genome sequence types (cgSTs) were newly identified in this study. The cgSTs from the serogroup Icterohaemorrhagiae isolates belonged to the same group as the Copenhageni and Icterohaemorrhagiae serovars isolated in other countries, whereas no similar cgSTs were identified in the Pyrogenes or unidentified serogroup strains. We demonstrated a high incidence of canine and porcine leptospirosis and identified new L. interrogans genotypes (cgSTs) circulating in Palau. Further investigations are needed to determine whether dogs and pigs serve as maintenance hosts for newly identified L. interrogans genotypes and whether they pose a risk of leptospirosis transmission to humans.
LANGUAGE OF ORIGINAL DOCUMENT: English

Nugraheni W.P., Lestyoningrum S.D., Ristiyanto, Putro W.G., Pawitaningtyas I., Nuraini S., Putri L.M., Faisal D.R., Noveyani A.E., Mikrajab M.A.
Economic loss of leptospirosis: is it still appropriate to be tropical neglected zoonosis disease?
(2024) Kesmas: Jurnal Kesehatan Masyarakat Nasional, 19 (5), pp. 61 - 69
DOI: 10.21109/kesmas.v19isp1.1098

ABSTRACT: Leptospirosis is a tropical endemic disease that can reduce the productivity of sufferers. However, research on economic and productivity losses due to leptospirosis is rare. This study aimed to determine economic and productivity losses due to leptospirosis in the Banyumas District, Indonesia, as an endemic area. This study used a cross-sectional design and quantitative methods conducted in October 2022. Secondary data of medical records and billing information from 73 inpatients receiving treatment at a Public Hospital in the Banyumas District from February 2021 to September 2022 obtained from the hospital's archives were used. This study examined the actual costs (direct and indirect costs) of treatment, average length of stay, and patient characteristics. Statistical tools were carried out to check the results. The results showed that over half of leptospirosis patients used insurance with an economic loss of USD 289.64 and a productivity loss value of USD 388,499. Patients infected with leptospirosis vary in age. Leptospirosis results in loss of patient productivity during treatment. Increasing prevention and control to prevent deaths and economic burdens on society and local governments is proposed to local governments.
LANGUAGE OF ORIGINAL DOCUMENT: English

Artiono R., Prawoto B.P., Savitri D., Maulana D.A., Hamdan N.I., Latif N.S.A., Hadi N.A.

Mathematical analysis and numerical simulation on free-living Leptospira: a mathematical modelling perspective

(2024) European Journal of Pure and Applied Mathematics, 17 (3), pp. 1637 - 1658
DOI: 10.29020/nybg.ejpam.v17i3.5178
ABSTRACT: A bacterial disease called leptospirosis is very typical in both tropical and subtropical regions. It is a well-known animal-borne illness that is brought on by spiral-shaped bacteria (Leptospira spp.). Both directly and indirectly, the disease can spread to humans through the urine of sick animals or polluted water, soil, or food. Two phases might appear in leptospirosis symptoms. The patient will have mild symptoms during the first phase, which is known as the septicemic phase. In the meantime, the Immune phase, the second, is more severe. This study aimed to create a mathematical model of leptospirosis disease using free-living bacteria. In the model, interactions occur between people, free-living Leptospira, animal hosts, and animal vectors. The population's characteristics are used to build the model, and the actual issue is used to identify the disease's transmission paths. While the endemic equilibrium is investigated numerically through ODE45 solver, the disease-free equilibrium is analysed theoretically. The paper demonstrates that for the established mathematical model with an epidemic threshold R0, analytical and numerical solutions produced the same outcome.
LANGUAGE OF ORIGINAL DOCUMENT: English

de Araujo Santos J.C., de Vasconcelos I.F.F., Nogueira D.B., Júnior J.P.A., Malossi C.D., Santos C.D.S.A.B., Alves C.J., Silva M.L.C.R., de Azevedo S.S.

Follow-up investigation revealed that sheep may play an important role in the transmission of Leptospira spp. infection in Caatinga biome field conditions

(2024) Small Ruminant Research, 239, art. no. 107344
DOI: 10.1016/j.smallrumres.2024.107344
ABSTRACT: Leptospira spp. is poorly studied in sheep raised in field Caatinga biome conditions. We conducted a follow-up investigation for Leptospira spp. infection in sheep reared in field conditions in the Caatinga biome. Serum, urine and vaginal fluid samples were collected from adult sheep over five collection

periods in rainy and dry seasons. Serological diagnosis was performed using the microscopic agglutination technique (MAT) and polymerase chain reaction (PCR) was applied to urine and vaginal fluid samples. Overall, 45 sheep were monitored during the five collections: July 15, September 30 and November 27 of 2020 and March 3 and June 25 of 2021. The frequencies of seropositive animals at MAT (cut-off 25) per collection were 13.3 %, 15.6 %, 31.1 %, 20 % and 35.6 %, respectively. The most frequent serogroups in all collections were Autumnalis, Ballum, Icterohaemorrhagiae and Pyrogenes. PCR of urine and vaginal fluid carried out for the first two collections detected an average of 28.1 % and 48.1 % positive animals, respectively. In the other three collections, there was no PCR positivity for either urine or vaginal fluid. Two samples of vaginal fluid from the first collection were sequenced and showed 99 % similarity to L. interrogans and L. santarosai. The occurrence of Leptospira spp. genital carrier sheep may be important in the spread of infection in the Caatinga biome field conditions, where the environment is often unfavourable and challenges the adaptability of Leptospira spp., forcing the agent to seek alternative routes of transmission and highlighting the public health exposure risk, mainly in people who are at occupational risk.
LANGUAGE OF ORIGINAL DOCUMENT: English

Imran M., Saleem M.H., Durrani A.Z., Sheikh A.A.
Spatiotemporal analysis and clinico-epidemiological study for seroprevalence of canine leptospirosis
(2024) Veterinary Research Communications
ABSTRACT: Leptospirosis is a worldwide re-emerging zoonotic disease. The study was conducted to estimate the Seroprevalence of canine leptospirosis in a total of 450 dogs, from a total of 97 puppies and 353 adult dogs selected for examination Sampling, started from January to December 2023 in District Kasur in the province Punjab of the country Pakistan. Leptospira IgG ELISA kit manufactured by DRG Instruments GmbH, Germany was used for the screening of canine Leptospira antibodies. Out of 450 tested dogs, 183 dogs (40.67%) were tested positive for Leptospira antibody for the screening of Leptospira antibodies. The estimated Seroprevalence of leptospirosis in various age groups of dogs, were 23.7% (23/97) and 45.3% (160/353), in puppies and adults, respectively ($P < 0.05$). It was found that out of the sampled dogs, a total of 35/127 (27.6%), 29/100 (29%), 73/130 (56.2%), and 46/93 (49.5%) dogs were tested seropositive for Leptospira antibodies in winter, spring, summer and fall, respectively ($P < 0.05$).
LANGUAGE OF ORIGINAL DOCUMENT: English

Ip D.K.M., Ng Y.Y., Tam Y.H., Thomas N.V., Dahal P., Stepniewska K., Newton P.N., Guérin P.J., Hopkins H.
Non-malarial febrile illness: a systematic review of published aetiological studies and case reports from China, 1980–2015
(2024) BMC Infectious Diseases, 24 (1), art. no. 843
DOI: 10.1186/s12879-024-09542-3
ABSTRACT: Background: Rapid point-of-care tests for malaria are now widely used in many countries to guide the initial clinical management of patients presenting with febrile illness. With China having recently achieved malaria elimination, better understanding regarding the identity and distribution of major non-malarial causes of febrile illnesses is of particular importance to inform evidence-based empirical treatment policy. Methods: A systematic review of published literature was undertaken to characterise the spectrum of pathogens causing non-malaria febrile illness in China (1980–2015). Literature searches were conducted in English and Chinese languages in six databases: Ovid MEDLINE, Global Health, EMBASE, Web of Science™ – Chinese Science

Citation Database SM, The China National Knowledge Infrastructure (CNKI), and WanFang Med Online. Selection criteria included reporting on an infection or infections with a confirmed diagnosis, defined as pathogens detected in or cultured from samples from normally sterile sites, or serological evidence of current or past infection. The number of published articles, reporting a given pathogen were presented, rather than incidence or prevalence of infection. Results: A total of 57,181 records from 13 provinces of China where malaria used to be endemic were screened, of which 392 met selection criteria and were included in this review. The review includes 60 (15.3%) records published from 1980 to 2000, 211 (53.8%) from 2001 to 2010 and 121 (30.9%) from 2011 to 2015;. Of the 392 records, 166 (42.3%) were from the eastern region of China, 120 (30.6%) were from the south-west, 102 (26.0%) from south-central, and four (1.0%) were multi-regional studies. Bacterial infections were reported in 154 (39.3%) records, viral infections in 219 (55.9%), parasitic infections in four (1.0%), fungal infections in one (0.3%), and 14 (3.6%) publications reported more than one pathogen group. Participants of all ages were included in 136 (34.7%) studies, only adults in 75 (19.1%), only children in 17 (4.3%), only neonates in two (0.5%) and the age distribution was not specified in 162 (41.3%) records. The most commonly reported bacterial pathogens included Typhoidal Salmonella (n = 30), Orientia/ Rickettsia tsutsugamushi (n = 31), Coxiella burnetii (n = 17), Leptospira spp. (n = 15) and Brucella spp. (n = 15). The most commonly reported viral pathogens included Hantavirus/Hantaan virus (n = 89), dengue virus (DENV) (n = 76 including those with unknown serovars), Japanese encephalitis virus (n = 21), and measles virus (n = 15). The relative lack of data in the western region of the country, as well as in in neonates and children, represented major gaps in the understanding of the aetiology of fever in China. Conclusions: This review presents a landscape of non-malaria pathogens causing febrile illness in China over 36 years as the country progressed toward malaria elimination. These findings can inform guidelines for clinical management of fever cases and infection surveillance and prevention, and highlight the need to standardize operational and reporting protocols for better understanding of fever aetiology in the country.
LANGUAGE OF ORIGINAL DOCUMENT: English

Curci V.C.M., Magajevski F.S., Moreli F.C.G., Romaldini A.H.C.N., da Costa R.L.D., de Oliveira T.C.B., Cardoso T.C., Manzini S., Cavalheiro M.E., Alexandrino M., Bertozzo T.V., Steinle J.S., Gomes A.X.F., Aires I.N., Lucheis S.B., Girio R.J.S.

Leptospira spp. in dairy cattle in a family farming system [Leptospira spp. em bovinos leiteiros criados em sistema de agricultura familiar]

(2024) Medicina Veterinaria (Brazil), 18 (2), pp. 159 - 168

DOI: 10.26605/medvet-v18n2-6404

ABSTRACT: Leptospirosis is an endemic zoonosis in Brazil responsible for numerous reproductive and economic losses to the dairy industry. Brazil ranks fifth in global production of cow's milk, by and around 23 million cows are milked every day. The northwest region of the state of São Paulo has a large number of family farming settlements, with dairy farming being predominant. This article reports a seroepidemiological study to detect agglutinins against Leptospira spp. in 1,004 dairy cattle kept on 64 family farms producing milk in the northwest region of São Paulo. Management and environmental data for situational diagnosis were obtained through a questionnaire. Antibodies against Leptospira spp. were investigated by the microscopic agglutination test (MAT) and milk and urine samples were obtained from seroreactive animals with titer ≥400. These samples were submitted to molecular tests. Of the 64 farms studied, 63 (98%) had seroreactive animals. Of the 1,004 animals, 523 (52%) were reactive. According to the molecular tests, the presence of Leptospira spp. in the

urine and milk of the seroreactive animals was negative. Presence of wetlands, rodents, dogs, cats and horses and occurrence of abortion were variables associated with the risk of infection by Leptospira spp. In addition to its importance in animal health, leptospirosis poses a risk to human health, a situation that indicates the need for improvement of sanitary conditions in small farms.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ribeiro R.A.N., Avelar K.E.S., Balassiano I.T., Vargas A., Schubach E.Y.P., Rodrigues R.M.B., Fonseca L.X., Belo V.S.

Accuracy of the Dual Path Platform (DPP) rapid test for the diagnosis of leptospirosis: A multi-center study in six Brazilian states

(2024) Acta Tropica, 258, art. no. 107361
DOI: 10.1016/j.actatropica.2024.107361

ABSTRACT: Leptospirosis is a zoonotic disease with significant global impact and a challenging diagnosis. The utilization of adequately validated rapid tests is relevant for the opportune identification of the disease and for reduction in fatality rates. The present study analyzes the accuracy and reliability of the Dual Path Platform (DPP) assay -produced in Brazil by the Oswaldo Cruz Foundation (Fiocruz)- for diagnosing leptospirosis. Firstly, a serological panel was constructed in the Brazilian Reference Laboratory for Leptospirosis using samples routinely handled by reference laboratories of six Brazilian states. It consisted of 150 positive (according to MAT and IgM-ELISA) and 250 negative samples for leptospirosis. Subsequently, the panel samples were distributed to the reference laboratories for the performance of DPP assays in triplicate. Different measures were used in the assessment of diagnostic quality. Predictive values were estimated for different pre-test probability settings. Sensitivities varied between 67.33 % and 74.00 % and specificities between 93.20 % and 98.40 % in the states, and there were adequate agreements between them. Accuracies were lower for the samples of patients with less than 7 days of symptoms. In contexts of prevalence values up to around 25 %, positive and negative predictive values were around 90 %. However, in situations of high pre-test probabilities, NPVs were low. This study improves understanding of the use of DPP in diagnosing leptospirosis, particularly its application in healthcare settings. As long as the time of symptoms onset and clinical and epidemiological contexts are adequately considered for the interpretation of results, DPP is a valid option to be used in the leptospirosis diagnostic routine.
LANGUAGE OF ORIGINAL DOCUMENT: English

Gonzálvez M., Cano-Terriza D., Fayos M., Moroni B., Martínez R., Robetto S., Oleaga Á., Remesar S., Orusa R., Muñoz-Hernández C., Velarde R., García-Bocanegra I.

Monitoring of pathogenic Leptospira infection in wolves (Canis lupus) from Spain and Italy

(2024) Veterinary Microbiology, 298, art. no. 110222
DOI: 10.1016/j.vetmic.2024.110222

ABSTRACT: Leptospirosis is a bacterial disease of worldwide distribution with relevant implications for animal and human health. Different large wild carnivore species can act as reservoirs of this zoonotic pathogen. This study aimed to evaluate the circulation of Leptospira spp. in free-ranging wolves (Canis lupus) from southern Europe. A total of 281 kidney samples of wolves from Spain and Italy were collected between 2017 and 2023. The presence of Leptospira DNA was analysed by real-time PCR and phylogenetic analyses were carried out using a Bayesian approach. The overall prevalence was 3.2 % (9/281; 95 %CI: 1.1–5.3). Leptospira DNA was

detected in nine of the 180 wolves from Spain (5.0 %; 95 %CI: 1.8–8.2), but not in the Italian wolf population (0 %; 0/101). Molecular analyses revealed high homology between the sequences obtained in the present study and isolates of Leptospira interrogans and Leptospira borgpetersenii from different rodent and domestic ungulate species. Our results provide evidence of a low and spatially heterogeneous circulation of this pathogen in wolf populations of southern Europe. The detection of zoonotic Leptospira species in this survey supports the need to consider wolf populations in monitoring programs for leptospirosis with a One Health approach.
LANGUAGE OF ORIGINAL DOCUMENT: English

Falcão B.M.R., Limeira C.H., de Souza J.G., dos Santos Figuerêdo M.B., de Andrade Morais D., dos Santos Higino S.S.

Systematic review and meta-analysis on seroprevalence of leptospirosis in non-human primates worldwide

(2024) Research in Veterinary Science, 178, art. no. 105342
DOI: 10.1016/j.rvsc.2024.105342

ABSTRACT: Leptospirosis is a zoonotic disease whose transmission is linked to multiple factors involving the interface between animals, humans, and the environment. This disease is of great importance for public health, as it profoundly affects the health aspects of the population and animals. Considering the importance of non-human primates in this epidemiological chain, the objective of this research was to conduct a systematic literature review with meta-analysis, providing information on leptospirosis in non-human primates (NHPs) and an update on the infection situation in Brazil and other countries. Thus, a search was performed in five databases, initially finding 3332 studies, of which 32 met the eligibility criteria and were used for the systematic review. According to them, the most prevalent serogroup in non-human primates was Icterohaemorrhagiae, which is adapted to rodents as primary hosts. A wide distribution of the infection was found in the regions of both wild and captive animals. Through meta-analysis, the seroprevalence rate of leptospirosis in non-human primates was 27.21% (CI 17.97–38.95%). Cochran's Q test ($p < 0.01$) identified heterogeneity between studies, classified as high by the Higgins and Thompson test ($I2 = 92.4\%$). Therefore, seroepidemiological and Leptospira isolation studies in non-human primates are important to investigate and monitor the suspected impact of these species as maintainers or transmitters of the pathogen to humans and other wild and domestic animals, in addition to demonstrating the need for standardization related to control and prevention measures.
LANGUAGE OF ORIGINAL DOCUMENT: English