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BOLLETTINO BIBLIOGRAFICO

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Poulakida I., Kotsiou O.S., Boutlas S., Stergioula D., Papadamou G., Gourgoulianis K.I., Papagiannis D.

Leptospirosis incidence post-flooding following Storm Daniel: the first case series in Greece

(2024) Infectious Disease Reports, 16 (5), pp. 880 - 887

DOI: 10.3390/idr16050069

ABSTRACT: The present study investigates the public health impact of flooding on leptospirosis incidence after Storm Daniel in Thessaly, Greece, in September 2023. A notable increase in cases was observed, with seven cases of female patients and a mean age of 40.2 years, indicating a significant risk among working-age adults. From the end of September to the beginning of November 2023, a total of 35 patients from flood-prone areas presented to the Emergency Department of the Tertiary University Hospital of Larissa. Diagnosis of leptospirosis was established by meeting the criteria suggested by the national public health organisation (EODY)-compatible clinical course, epidemiological exposure, molecular and serologic confirmation by the detection of immunoglobulin M antibodies to leptospira spp. using a commercially available enzyme-linked immunosorbent assay and real-time quantitative PCR for the molecular detection of leptospira. The larger part (84.6%) of leptospirosis cases were associated with contact with floodwater. The majority of these patients (71.4%) were from the prefecture of Larissa, followed by 14.3% from the prefecture of Karditsa, 8.6% from the prefecture of Trikala, and 5.7% from the prefecture of Magnesia. Occupational exposure and urbanisation were key risk factors. The most prevalent clinical feature was rash (69.2%), followed by fever (61.5%) and myalgia (30.7%). The findings emphasise the need for robust public health strategies, improved sanitation, rodent control, and protective measures for sanitation workers. The data highlight the broader implications of climate change on public health and the necessity for ongoing surveillance and community education to mitigate future outbreaks.

LANGUAGE OF ORIGINAL DOCUMENT: English

Pothiaraj G., Saxena S., Manoranjani M., Pitchaikani S., Saravanan K.M., Shakila H.

Development of a recombinant construct as an immunogenic target for leptospirosis using LipL41 and molecular adjuvants

(2024) Biomedical Research and Therapy , 11 (9), pp. 6775 - 6785

DOI: 10.15419/bmrat.v11i9.921

ABSTRACT: Introduction: Leptospirosis, an infectious disease that can spread from animals to humans, requires the development of a safe and effective vaccine. The immunogenic characteristics of LipL41, a conserved outer membrane protein of Leptospira, have been identified as a promising vaccine candidate. In this study, a recombinant DNA construct, pTR-EGFP-LipL41, incorporating the LipL41 gene and hGMCSF adjuvant in the pTR600 vector with a cytomegalovirus (CMV) promoter, was designed and evaluated. Methods: The Chinese hamster ovary (CHO) cell line was transfected with pTR-EGFP-LipL41 and pTR-EGFP-hGMCSF-LipL41 using Lipofectamine 2000, and fluorescence microscopy analyzed their expression. Results: The expression analysis demonstrated successful expression of pTR-EGFP-LipL41 and pTR-EGFP-hGMCSF-LipL41 in CHO cells. In vitro analysis of cell lines further assessed the expression of chemokines and cytokines, and molecular docking analyses were conducted to investigate interactions between various adjuvants (hGMCSF, hIgGFc, and hC3d) and LipL41. Docking studies uncovered key interactions between LipL41 and other adjuvants. The constructed recombinant DNA and molecular adjuvants exhibited a robust immunogenic response. Conclusion: Further evaluation in suitable animal models may establish its effectiveness as a productive and safe immunogenic molecule against leptospiral infection.

LANGUAGE OF ORIGINAL DOCUMENT: English

Filipe J., Lauzi S., Bullo F., D'Incau M., Meroni G., Martino P.A., Magistrelli S., Restelli M., Dall'Ara P.
Leptospira spp. antibody seroprevalence in stray dogs and cats: a study in Milan, Northern Italy
(2024) Veterinary Sciences, 11 (10), art. no. 478
DOI: 10.3390/vetsci11100478
ABSTRACT: Leptospirosis is a widespread zoonosis recognised as a re-emerging infectious disease in both humans and dogs, yet the actual seroprevalence of Leptospira in pets in Italy is relatively unknown. The aim of this study was to evaluate Leptospira antibody prevalence in dogs and cats from a shelter by the microscopic agglutination test (MAT), the gold standard test in leptospiral serology, and to assess risk factors for Leptospira infection. This seroepidemiological study investigated the prevalence of leptospiral antibodies in a cohort of 106 dogs and 51 cats housed in a municipal shelter in Milan. Blood samples were collected from the animals during two sampling periods: spring/summer 2014 and autumn/winter 2016/2017. Eight serogroups were evaluated: L. Australis, L. Ballum, L. Canicola, L. Grippotyphosa, L. Icterohaemorrhagiae, L. Pomona, L. Sejroe, and L. Tarassovi. Antibody titres ranged from 1:100 to 1:6400. The results indicated that 21.7% of dogs had antibodies against serogroups L. Icterohaemorrhagiae and L. Australis, making them the most often found. Conversely, none of the cats showed any presence of antibodies. Seropositivity was higher in the spring/summer period (32.7%) than in autumn/winter (11.1%), and no statistically significant results were found regarding sex or age. These findings underscore the importance of ongoing serological surveillance and biosecurity measures in shelter environments to mitigate the zoonotic risk posed by leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Franco M.B., Gomes L.R., Rostkwoska C., Pajuaba A.C.A.M., Mineo J.R., Lima A.M.C., Oliveira S.V.D.
Under-reporting of human leptospirosis cases in cities of Triângulo Mineiro, Minas Gerais, Brazil
(2024) Tropical Medicine and Infectious Disease, 9 (10), art. no. 229
DOI: 10.3390/tropicalmed9100229
ABSTRACT: Leptospirosis is an infectious disease caused by the pathogenic Leptospira species through direct or indirect contact with infected animals. Due to protean clinical manifestation in the early stages, leptospirosis is often difficult to distinguish from other common acute febrile illnesses, such as dengue. Thus, this study aimed to investigate the prevalence of leptospirosis in suspected dengue patients whose serological diagnosis was negative. A total of 449 serum samples from patients (negative IgM-ELISA dengue) with fever, headache, myalgia, and nausea were tested. The Dual-Path Platform (DPP) rapid test developed by the Instituto de Tecnologia em Imunobiológicos Bio-Manguinhos in the city of Rio de Janeiro, Brazil was used for screening IgM antibodies against Leptospira in blood serum, and the microscopic agglutination test (MAT) was performed on samples positive in the DPP for leptospirosis, as well as on an equal number of negative samples. Results: The data obtained from the samples analyzed with the DPP assay showed 26 positive results (5.79%), of which 38.46% were male and 61.54% female, with a mean age of 41 years. We tested 52 samples using the MAT, including 26 reactive for IgM and 26 non-reactive in the DPP assay. Nine samples (17.31%) were reactive, and among them, six also showed reactivity in the DPP assay. Of the six samples reactive in both tests, 66.67% were female, living in urban areas in the city of Uberlândia, with a mean age of 50 years, being 50% white, 33.33% brown, and 16.67% black. The findings demonstrated that leptospirosis cases are

underdiagnosed and undertreated in the study population and more attention needs to be paid for ruling out leptospirosis and other pathogens causing acute febrile illness in dengue-endemic areas.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sonam A., Hameed A., Rekha P.D., Stothard P., Tellis R.C., Arun A.B.

Ketone body oxidation and susceptibility to ethyl acetoacetate in a novel hemolytic multidrug-resistant strain Leptospira interrogans KeTo originated from sewage water

(2024) Scientific Reports, 14 (1), art. no. 25198

ABSTRACT: Terrestrial and aquatic environments contaminated with animal urine may contribute to the transmission of Leptospira, a causative agent of leptospirosis in humans and wild/domesticated animals. Although enormous amounts of work have been done decoding the ecophysiology, the factors governing the cell growth and virulence in Leptospires derived from environmental samples still remain elusive. Here, we show oxidation of a wide array of organic acids including acetoacetate by a new strain of Leptospira interrogans designated as KeTo, isolated from a sewage sample originating from a wildlife enclosure located at Mangalore, India. We further demonstrate the susceptibility of KeTo to ethyl ester of acetoacetate (ethyl acetoacetate, EA). A 4.7 Mbp genome of KeTo shared the highest relatedness to pathogenic L. interrogans RGAT (99.3%), followed by L. kirschneri 3522CT (91.3%) and other related species of Leptospira (80.8–74.3%), and harbored genes encoding acetoacetyl-CoA synthetase and acetoacetate decarboxylase respectively involved in the acetoacetate utilization and acetone formation. In line with this, strain KeTo oxidized acetoacetate when supplied as a sole carbon. Aqueous EA suppressed biofilm formation ($p < 0.0001$) of KeTo in basal Ellinghausen–McCullough–Johnson–Harris (EMJH) medium. Similarly, significant inhibition in the growth/biofilm of Leptospira was recorded in semisolid EMJH with/without blood supplementation when exposed to volatile EA. The extent of ketone body oxidation and susceptibility to EA was found to vary with strain as evident through the analysis of L. interrogans serogroup Australis sv. Australis strain Ballico and L. interrogans serogroup Icterohaemorrhagiae sv. Lai Like strain AF61. In conclusion, our study demonstrated the ketone body metabolic ability and susceptibility to an esterified derivative of a major ketone body in the tested strains of L. interrogans. Molecular aspects governing EA-driven growth inhibition warrant further investigations to develop optimal therapeutics for leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Donneschi A., Recchia M., Romeo C., Pozzi P., Salogni C., Maisano A.M., Santucci G., Scali F., Faccini S., Boniotti M.B., D'Incau M., Maes D., Alborali G.L.

Infectious agents associated with abortion outbreaks in Italian pig farms from 2011 to 2021

(2024) Veterinary Sciences, 11 (10), art. no. 496

ABSTRACT: The present study retrospectively analyzed the infectious agents associated with 829 abortion outbreaks occurring from 2011 to 2021 in northern Italy. Foetuses were subjected to necropsies, and organ samples were analyzed by direct PCR to screen for six swine pathogens. In 42.0% of the examined outbreaks, at least one infectious agent was found. Porcine reproductive and respiratory syndrome virus (PRRSV) (24.9%) and porcine circovirus-2 (PCV2) (11.5%) were the most frequently detected among the known abortion-inducing pathogens. Chlamydia spp. (5.6%), porcine parvovirus (PPV) (4.0%), and Leptospira spp. (2.6%) were less common. Although its role in swine reproductive disorders is still unclear, PCV3 was detected in 19.6% of the cases. Coinfections were detected in 25.0% of positive outbreaks, and the most frequent

coinfection was represented by PRRSV and PCV2 (32.2%), followed by PRRSV and PCV3 (23%). PCV2 prevalence showed a slight but consistent reduction during the study period, while PCV3 increased in frequency. Our data suggest an overall reduction in abortion outbreaks during the study period. PRRSV was confirmed as the main abortion agent detected in the examined area, while PCV2 prevalence showed a decline. Conversely, PCV3 detection has been increasing, supporting its potential role as an abortion agent. Our results highlight the importance of implementing a consistent and standardized sampling procedure, as well as a thorough diagnostic protocol, to reduce the incidence of inconclusive diagnoses.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sutiningsih D., Sari D.P., Permatasari C.D., Azzahra N.A., Rodriguez-Morales A.J., Yuliawati S., Maharani N.E.

Geospatial analysis of abiotic and biotic conditions associated with leptospirosis in the Klaten Regency, Central Java, Indonesia

(2024) Tropical Medicine and Infectious Disease, 9 (10), art. no. 225

DOI: 10.3390/tropicalmed9100225

ABSTRACT: The Klaten Regency, Central Java Province, Indonesia, is a leptospirosis endemic area. The purpose of this study is to spatially describe the abiotic and biotic environmental factors that contributed to the incidence of leptospirosis in the Klaten Regency in 2018. This was a descriptive observational with a cross-sectional approach conducted in the Klaten Regency, Central Java, in 2019 with 59 respondents. The results revealed that the percentage of abiotic environmental factors such as poor waste disposal facilities, poor gutter conditions, rivers < 200 m, and flooding history, namely 35.6%, 41.2%, 54.2%, and 6.8%, respectively. The highest leptospirosis cases occurred in April 2018, with 325 mm of rainfall, an average temperature of 27 °C, an average humidity of 82.3%, and an altitude of 100–200 MASL (79.7%). Meanwhile, biotic factors included rat nest existence (100%), having pets at risk (32.2%), and ≥three types of vegetation (79.7%). The main result confirmed that all leptospirosis cases had rat nests throughout the respondent's house. This finding emphasizes the importance of rat pest control programs by establishing cross-sectoral collaboration with the Department of Agriculture and educating the public to also play a role in environmental cleanliness in controlling rats.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bergamo P., Le Guyader M., Hugonnard M., Bourhy P., Simon-Dufay N., Bouvet J., Thibault J.-C., Cupillard L.

Isolation of virulent Leptospira serogroup Australis field strains from symptomatic dogs for canine leptospiral vaccine development

(2024) Microorganisms, 12 (10), art. no. 1946

DOI: 10.3390/microorganisms12101946

ABSTRACT: Leptospirosis is a widespread zoonosis caused by spirochaetes belonging to the pathogenic species of Leptospira, which are classified into more than 25 serogroups and 250 serovars. Vaccination can prevent the disease in dogs but offers incomplete efficacy because of a lack of cross-protection between serogroups. The aim of this study was to validate a robust recruitment and sampling process, with the objectives of isolating and typing circulating Leptospira pathogenic strains and then selecting those of proven virulence and pathogenicity for vaccine development. Blood and urine samples from dogs with clinical syndromes compatible with acute leptospirosis were sterilely collected and transported to a reference

laboratory for a micro-agglutination test (MAT), PCR, and bacterial isolation. Isolated strains underwent molecular typing using RNA16S, variable-number tandem repeat (VNTR), and pulsed-field gel electrophoresis (PFGE). Subtyping was performed using core genome multilocus sequence typing (CgMLST). Among 64 included dogs, 41 had MAT and/or PCR results compatible with Leptospira infection, and 14 Leptospira strains were isolated. Based on molecular typing, 11 isolates were classified as L. interrogans serogroup Australis, serovar Bratislava, and 3 as serogroup Icterohaemorrhagiae, serovar Icterohaemorrhagiae. CgMLST subtyping revealed a diversity of clonal groups (CGs) distributed in several regional clusters. Besides validating a robust recruitment and sampling process, this study outlines the value of combining PCR and serological testing when suspecting leptospirosis and the usefulness of implementing molecular typing methods to identify circulating field strains. It also confirms the epidemiological importance of the Australis serogroup and allows for the collection of different highly pathogenic strains for vaccine development.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bouvet J., Segouffin Cariou C., Oberli F., Guiot A.-L., Cupillard L.

A new licensed quadrivalent antileptospiral canine vaccine prevents mortality, clinical signs, infection, bacterial excretion, renal carriage and renal lesions caused by Leptospira Australis experimental challenge

(2024) Vaccines, 12 (10), art. no. 1104

DOI: 10.3390/vaccines12101104

ABSTRACT: Background: L. Australis is one of the most prevalent Leptospira strains infecting dogs, leading, in natural conditions, to severe life-threatening cases. Objective: The objective was to evaluate the onset and duration of immunity (OOI and DOI) induced by a new licensed quadrivalent antileptospiral vaccine (EURICAN® L4) including four Leptospira components (Canicola, Icterohaemorrhagiae, Grippotyphosa and Australis) against L. Australis. To this end, a severe L. Australis challenge model was developed, using a canine strain recently isolated from the field. Material and Methods: Seven- to ten-week-old puppies received two doses of the vaccine four weeks apart and were challenged with an L. Australis isolate two weeks (OOI) and 12 months (DOI) later. Mortality, clinical signs, leptospiremia, leptospiruria, renal carriage, and renal lesions were assessed after challenge. Results: The challenge induced multiple severe clinical signs in controls, leading to the death or euthanasia of 83% of puppies and 57% of adults. In controls, leptospiremia was detected in all dogs, leptospiruria in 67% of puppies and 86% of adults, kidneys tested positive for Leptospira in 83% of puppies and 71% of adults, and kidney lesions were observed in 100% of puppies and 86% of adults. In addition, thrombocytopenia associated with increased concentrations of urea, creatinine, and aspartate aminotransferase was recorded in controls displaying severe clinical signs. In both OOI and DOI studies, none of the vaccinates had clinical signs, no Leptospira was detected in blood, urine, and kidney samples, and no kidney lesions were observed in vaccinates. No significant changes in hematological and biochemical parameters in vaccinates were recorded. Conclusion: EURICAN® L4 was shown to induce quick and long-lasting protection against a severe L. Australis infectious challenge, preventing mortality, clinical signs, infection, bacterial excretion, renal lesions, and renal carriage.
LANGUAGE OF ORIGINAL DOCUMENT: English

Gharakhani M., Faezi Ghasemi M., Khaki P., Esmaelizad M., Tebianian M.

Immunological characterization of recombinant outer membrane Loa22 protein of local pathogenic Leptospira serovars

(2024) Veterinary Research Forum, 15 (10), pp. 565 - 573

DOI: 10.30466/vrf.2024.2017700.4099

ABSTRACT: Leptospirosis is a worldwide zoonotic disease caused by pathogenic Leptospira spp., often occurring in tropical and subtropical regions. Focusing on development of rapid diagnostic methods to facilitate early diagnosis and a universal vaccine are the main critical issues to overcome the burden of leptospirosis. Here, we have studied the immunogenic potential of prepared recombinant Loa22 protein (rLoa22) of local pathogenic Leptospira species in mice and its ability to induce humoral and cellular immunity, being further evaluated by analyzing the immunoglobulin G (IgG) subclasses and cytokines produced through immunization. Based on the results, mice immunized with rLoa22/adjuvant and a trivalent vaccine, induced high titers of total IgG. All immunized groups increased IgG1 almost on the same level; but, IgG2a level was significantly higher in the vaccine and rLoa22/adjuvant groups than rLoa22 alone group. Animals immunized with the vaccine produced more interleukin 4 than rLoa22/ adjuvant group. The results of evaluating interferon gamma level showed that the rLoa22/adjuvant and vaccine groups had a significant increase compared to the rLoa22 alone group. The results also demonstrated that the rLoa22 protein, in indirect enzyme-linked immunosorbent assay, was able to detect the anti-Leptospira antibodies in mice serum that can be used as a marker in assessing the seroprevalence of leptospirosis and/or in combination with other leptospiral antigens in development of an effective vaccine against leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Miura K., Chambers J., Takahashi N., Nuradji H., Dharmayanti N.L.P.I., Susanti, Randusari P., Noor S.M., Adji R.S., Saepulloh M., Sumarningsih, Yoshimatsu K., Koizumi N.

Coinfection with Orthohantavirus and Leptospira spp. in rats collected from markets in Indonesia

(2024) Vector-Borne and Zoonotic Diseases

DOI: 10.1089/vbz.2023.0170

ABSTRACT: Background: Rats are an important reservoir animal for several zoonotic pathogens worldwide, including hantaviruses and Leptospira spp., which are the causative agents of hemorrhagic fever with renal syndrome, hantavirus cardiopulmonary syndrome, and leptospirosis. Although a previous study indicated a high frequency of antihantaviral antibodies in patients with acute fever in Indonesia, circulating hantaviruses and their reservoir animals in the country remain limited. Materials and Methods: The presence of hantavirus in rats captured in the urban area of Bogor, Indonesia, from which Leptospira spp. were isolated using PCR, followed by DNA sequencing. Immunohistochemical analyses were performed to detect hantaviral and leptospiral antigens in rat kidney tissues. Results: Seoul of Orthohantavirus seoulense (SEOV) RNA was detected from 24 of 80 Rattus norvegicus (30%). SEOV and Leptospira coinfection was detected in 10 of 80 rats (12.5%). Immunohistochemistry revealed that hantavirus antigens were positively stained in the interstitial capillaries and cells, whereas Leptospira antigens were stained in the luminal side of the renal tubules. Conclusion: This study revealed a high prevalence of SEOV and SEOV and Leptospira coinfection among rats in the urban areas of Bogor, Indonesia, indicating a potential risk of rat-borne zoonotic diseases in the area.

LANGUAGE OF ORIGINAL DOCUMENT: English

Tansakul M., Sawangjai P., Bunsupawong P., Ketkan O., Thongdee M., Chaichoen K., Sakcamduang W.

Survival outcomes, low awareness, and the challenge of neglected leptospirosis in dogs

(2024) Open Veterinary Journal, 14 (9), pp. 2368 - 2380

DOI: 10.5455/OVJ.2024.v14.i9.25

ABSTRACT: Background: Leptospirosis is a globally neglected zoonotic disease with significant morbidity and mortality in dogs, particularly in resource-limited settings. Aim: This study aimed to characterize prognostic factors and survival outcomes in dogs with suspected leptospirosis, emphasizing the potential underestimation of disease burden. Methods: This retrospective study was conducted using medical records of dogs diagnosed with urinary Leptospira polymerase chain reaction (PCR). Results: Urinary Leptospira PCR was positive in 22 dogs and negative in 62. Azotemia was present in approximately two-thirds of both groups, with no predictive value identified between PCR-positive and PCR-negative dogs. However, PCR-positive dogs exhibited significantly shorter survival times for both all-cause mortality (median 60 days, range: 8–601 days) and leptospirosis-related death (median 27 days, range: 8–67 days) compared to PCR-negative dogs (median 402 days, range: 7–812 days) ($p < 0.01$). The neutrophil-to-lymphocyte ratio (NLR) in-dependently predicted leptospirosis-related death (HR = 1.073, 95%CI: 1.02–1.13, $p = 0.01$), while the BUN-to-creatinine ratio predicted all-cause mortality (HR = 1.02, 95% CI: 1.003–1.03, $p = 0.02$). Conclusion: Our findings underscore the severity of leptospirosis in older dogs, particularly those with azotemia or positive PCR results. NLR and BUN to creatinine ratios could be valuable tools for risk assessment and guiding treatment strategies in this vulnerable population.

LANGUAGE OF ORIGINAL DOCUMENT: English

Bağatir P.Ş., Aktaş O.

Investigation of leptospirosis agents in cattle and humans

(2024) Malaysian Journal of Medical Sciences, 31 (5), pp. 151 - 160

DOI: 10.21315/mjms2024.31.5.11

ABSTRACT: Background: Leptospirosis, a global zoonotic disease, causes serious morbidity and mortality generally in low-income societies. This study aimed to investigate the prevalence of Leptospira serovars in cattle and high-risk human populations. Methods: This study investigated the presence of pathogenic Leptospira serogroups in the blood and kidney samples of cattle arriving at the Erzurum Meat and Milk Institution for slaughter between April and July, and between September and December 2022, and in the serum samples of humans. Kidney and serum samples from 289 cattle and serum samples from 100 individuals from at-risk occupational groups (58 farmers, 25 veterinarians and 17 butchers) were collected. As a control, 100 human blood samples were collected from civil servants who had no contact with animals. Microagglutination testing was used to investigate Leptospira serogroups in bovine sera, real-time polymerase chain reaction (PCR) for Leptospira DNA in kidney samples, and microagglutination testing and enzyme-linked immunosorbent assays for Leptospira antibodies in human blood serum samples. Results: Microagglutination test in 4.5% of cattle; Leptospira DNA was positive in 0.7%. Six strains of Leptospira interrogans, two of Bratislava, one of Pomana and one of Icterohaemorrhagiae were found in cattle, as well as one strain of Leptospira kirschneri Dadas. In humans, two Icterohaemorrhagiae, one Hebdomadis and one Dadas serovar were detected in both the risk group and the control group. Using ELISA, antibody positivity was found to be 14.0% in the risk group and 11.0% in the control group. Conclusion: The seroprevalence of Leptospira spp. in

cattle in Erzurum, Türkiye, is relatively high. In this region, the risk of encountering Leptospira in the normal population is as high as in the risk group.
LANGUAGE OF ORIGINAL DOCUMENT: English

dos Santos Courrol D., Santos C., Chura-Chambi R., Morganti L., Avelar K., de Moraes Maia F., Rodrigues-da-Silva R., Wunder E., Jr., Barbosa A.

Leptospira leptolysin contributes to serum resistance but is not essential for acute infection

(2024) Molecular Microbiology
DOI: 10.1111/mmi.15327
ABSTRACT: Previous in vitro works focusing on virulence determinants of the spirochete Leptospira implicated metalloproteinases as putative contributing factors to the pathogenicity of these bacteria. Those proteins have the capacity to degrade extracellular matrix components (ECM) and proteins of host's innate immunity, notably effectors of the complement system. In this study, we gained further knowledge on the role of leptolysin, one of the leptospiral-secreted metalloproteinases, previously described as having a broad substrate specificity. We demonstrated that a proportion of human patients with mild leptospirosis evaluated in the current study produced antibodies that recognize leptolysin, thus indicating that the protease is expressed during host infection. Using recombinant protein and a knockout mutant strain, Manilae leptolysin−, we determined that leptolysin contributes to Leptospira interrogans serum resistance in vitro, likely by proteolysis of complement molecules of the alternative, the classical, the lectin, and the terminal pathways. Furthermore, in a hamster model of infection, the mutant strain retained virulence; however, infected animals had lower bacterial loads in their kidneys. Further studies are necessary to better understand the role and potential redundancy of metalloproteinases on the pathogenicity of this important neglected disease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Mosquera P., Mejia L., Ortiz G., Pazmino G., Pearson T., Barragán V., Trueba G.

Mixed Leptospira infections in domestic animals from a rural community with high leptospirosis endemicity

(2024) PLoS ONE, 19 (10), art. no. e0312556
DOI: 10.1371/journal.pone.0312556
ABSTRACT: Background Leptospirosis is one of the most common zoonoses in the world which is associated with a severe febrile disease in humans causing a variety of syndromes including meningitis, interstitial nephritis, hepatitis, and sometimes death. Leptospirosis is caused by different pathogenic Leptospira species divided into almost 30 serogroups and more than 300 serovars which are carried by some animal asymptomatic chronic infections. Humans can become infected through direct contact with animal urine or indirectly by coming into contact with fresh water or mud contaminated with urine. Methodology/Principal findings In this research, we looked for leptospiral DNA in urine samples from dogs living in a rural, low-income and highly endemic community in the coast of Ecuador. We used molecular biology and next-generation sequencing for the detection. Our results showed evidence of two Leptospira species, L interrogans and L. santarosai, genomes in three dogs. Conclusions/Significance It has been widely known that animal carriers are typically infected with a single leptospiral strain. However, recent reports, including the present one, indicate that carrier animals may be coinfected with two or more leptospiral species.

LANGUAGE OF ORIGINAL DOCUMENT: English

Kim M., Enzler M.J., Pritt B.S., Kumlien A.C., Wolf M.J., Theel E.S., Norgan A.P., Paisie T., Patel R.

The brief case: human leptospirosis acquired in Minnesota and diagnosed using 16S ribosomal RNA gene PCR/next-generation sequencing of blood

(2024) Journal of Clinical Microbiology, 62 (10)

DOI: 10.1128/jcm.00572-24

LANGUAGE OF ORIGINAL DOCUMENT: English

Mariano I.H.D.M., Blanco R.M., de Souza C.E., de Freitas G.S., Ho P.L., Martins E.A.L., Romero E.C., da Silva J.B.

Chemokine profile in the serum of patients with leptospirosis

(2024) Frontiers in Cellular and Infection Microbiology, 14, art. no. 1484291

DOI: 10.3389/fcimb.2024.1484291

ABSTRACT: Introduction: Leptospirosis is a global zoonosis that affects more than one million people per year, with a lethality rate of approximately 15%. Chemokines are crucial in the immune response against Leptospira, recruiting leukocytes to the site of infection and regulating immune activity. In previous studies, we have shown that CCL2, CXCL5, and CCL8 are involved in the leptospirosis process, although the mechanisms are not understood. Methods: In this study, we present the frequency of Leptospira serovars in human samples. We then evaluated the profile of various chemokines in sera from patients diagnosed with leptospirosis, assessing the possible correlation between them. Moreover, we evaluated the changes in the chemokine profile on different days after the first symptoms. The frequency of the Leptospira serovars in human samples is presented. Results and discussion: The main findings were that CCL5, CXCL5, and CXCL9 are highly expressed during leptospirosis, indicating a special role of these molecules in the immunity and pathogenesis of the disease. The correlation analysis of detected chemokines CXCL11, CXCL9, CCL3, and CCL2 helps to clarify the role of each cytokine in leptospirosis. The possible use of CCL5 as a biomarker for complementary diagnosis of the disease is suggested.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ayral F., Harran E., Fournier-Chambrillon C., Gautrelet M., Tourniaire O., Peutot A., Groud K., Thenon N., Fournier P., Richomme C.

Characterisation of pathogenic Leptospira in invasive raccoons (Procyon lotor) in northeast and southwest France

(2024) Epidemiology and Infection, 152, art. no. e136

DOI: 10.1017/S095026882400116X

ABSTRACT: Leptospirosis is a widespread zoonosis caused by bacteria of the genus Leptospira. Although crucial to mitigate the disease risk, basic epidemiological information is lacking, such as the identities of Leptospira maintenance hosts. The raccoon (Procyon lotor), an alien invasive species in France, could pose a public health risk if it carries pathogenic Leptospira. We investigated the rate and type (selective vs. unselective) of Leptospira carriage in the two main raccoon populations in France. Out of the 141 raccoons

collected, seven (5%) tested quantitative PCR positive, targeting lfb1 gene, based on kidney, lung, and urine samples. Phylogenetic analysis revealed the presence of three different L. interrogans clusters. The results suggest that raccoons were more likely accidental hosts and made only a limited contribution to Leptospira maintenance.
LANGUAGE OF ORIGINAL DOCUMENT: English

Pappas C.J., Hamond C., Pětrošová H., Putz E.J.
Editorial: Spirochetal diseases (syphilis, Lyme disease, and leptospirosis): transmission, pathogenesis, host-pathogen interactions, prevention, and treatment
(2024) Frontiers in Microbiology, 15, art. no. 1510000
DOI: 10.3389/fmicb.2024.1510000
LANGUAGE OF ORIGINAL DOCUMENT: English

Haake A.F.H., Eisenberg T., Heuser E., Stollberg K., Richter M.H., Dreesman J., Pfeffer M., Hoffmann D., Ulrich R.G., Mundhenk L., Böhmer M.M.
Cuddle with care! A current overview of zoonotic pathogens transmitted by pet rats [Vorsicht beim Kuscheln! Ein aktueller Überblick zu Heimtierratten-übertragenen Zoonoseerregern]
(2024) Berliner und Munchener Tierarztliche Wochenschrift, 137, pp. 1 - 17
DOI: 10.2376/1439-0299-2024-7
ABSTRACT: Pet (fancy) rats (Rattus norvegicus forma domestica), which have their genetic origin in the Norway rat, are kept as pets due to their valued characteristics. However, it is often unknown that the pet rat, like its ancestral form, can be a carrier of zoonotic pathogens. Transmission of Leptospira spp., cowpox virus, the rat-bite fever pathogen Streptobacillus moniliformis and the Seoul virus have been detected in Germany. In this paper, in addition to a brief historical digression on the ori-gins of the fancy rat, an overview of the most important zoonotic pathogens detected in pet rats and their associated diseases will be given. In addition to case descriptions of outbreaks of leptospirosis and Seoul virus infections, the special relation-ship between the pet rat and its owners, which can favour the transmission of pathogens, is discussed. Practical advice is also given on protective measures to prevent the transmission of pathogens from pet rats to humans. This information is intended to serve as an educational aid for practitioners of veterinary and human medicine as well as animal owners and to help with infection prevention..
LANGUAGE OF ORIGINAL DOCUMENT: German

Nunes Batista J.M., Barbosa Guedes I., Messias Vila E., Rodrigues Jorge F., Bergmann Esteves S., Cavalcanti Brito J.E., Carrillo Gaeta N., Gagete Veríssimo de Mello B., Mori E., Cortez A., Augusto Dias R., Soares Ferreira Neto J., Bryan Heinemann M.
Serological and molecular investigation of Leptospira spp. in bats (Chiroptera, Mammalia) from Brazil
(2025) Microbial Pathogenesis, 198, art. no. 107117
DOI: 10.1016/j.micpath.2024.107117
ABSTRACT: Bats play a crucial role in the ecosystem, yet concerns have arisen regarding their potential as carriers of zoonotic bacteria, including Leptospira spp. Due to the lack of knowledge about the carrier state of bats in Brazil, this study aimed to evaluate the presence of antibodies against Leptospira spp. and its DNA in bats from four Brazilian States (São Paulo, Paraíba, Pernambuco, and Ceará). Bats were captured using mist

nets and categorized by sex, age, and species. Antibodies were searched in 22 bats via the microscopic agglutination test (MAT). Additionally, 168 kidney and nine urine samples were subjected to PCR for Leptospira spp. Out of 177 samples tested, two (1.13 %) were positive in PCR, while none showed reactivity in MAT. These results suggest a low prevalence of Leptospira spp. infection in bats, indicating a limited role in transmitting leptospirosis to humans, domestic animals, and wildlife in the studied region.
LANGUAGE OF ORIGINAL DOCUMENT: English

Hota S., Kumar M.

Unveiling the impact of Leptospira TolC efflux protein on host tissue adherence, complement evasion, and diagnostic potential

(2024) Infection and immunity, 92 (11), pp. e0041924
DOI: 10.1128/iai.00419-24
ABSTRACT: The TolC family protein of Leptospira is a type I outer membrane efflux protein. Phylogenetic analysis revealed significant sequence conservation among pathogenic Leptospira species (83%-98% identity) compared with intermediate and saprophytic species. Structural modeling indicated a composition of six β-strands and 10 α-helices arranged in two repeats, resembling bacterial outer membrane efflux proteins. Recombinant TolC (rTolC), expressed in a heterologous host and purified via Ni-NTA chromatography, maintained its secondary structural integrity, as verified by circular dichroism spectroscopy. Polyclonal antibodies against rTolC detected native TolC expression in pathogenic Leptospira but not in nonpathogenic ones. Immunoassays and detergent fractionation assays indicated surface localization of TolC. The rTolC's recognition by sera from leptospirosis-infected hosts across species suggests its utility as a diagnostic marker. Notably, rTolC demonstrated binding affinity for various extracellular matrix components, including collagen and chondroitin sulfate A, as well as plasma proteins such as factor H, C3b, and plasminogen, indicating potential roles in tissue adhesion and immune evasion. Functional assays demonstrated that rTolC-bound FH retained cofactor activity for C3b cleavage, highlighting TolC's role in complement regulation. The rTolC protein inhibited both the alternative and the classical pathway-mediated membrane attack complex (MAC) deposition in vitro. Blocking surface-expressed TolC on leptospires using specific antibodies reduced FH acquisition by Leptospira and increased MAC deposition on the spirochete. These findings indicate that TolC contributes to leptospiral virulence by promoting host tissue colonization and evading the immune response, presenting it as a potential target for diagnostic and therapeutic strategies.
LANGUAGE OF ORIGINAL DOCUMENT: English

Audu K.J., Tiamiyu A.T., Akpabio J.N., Ahmad H., Olabiyi M.A.

Numerical assessment of some semi-analytical techniques for solving a fractional-order leptospirosis model

(2024) Malaysian Journal of Science, 43 (3), pp. 68 - 85
DOI: 10.22452/mjs.vol43no3.9
ABSTRACT: This research aims to apply and compare two semi-analytical techniques, the Variational Iterative Method (VIM) and the New Iterative Method (NIM), for solving a pre-formulated mathematical model of Fractional-order Leptospirosis. Leptospirosis is a significant bacterial infection affecting humans and animals. By implementing the VIM and NIM algorithms, numerical experiments are conducted to solve the leptospirosis model. Comparing the obtained findings demonstrates that VIM and NIM are effective semi-analytical methods

for solving systems of fractional differential equations. Notably, our study unveils a crucial dynamic in the disease's spread. The application of VIM and NIM offers a refined depiction of the biological dynamics, highlighting that the susceptible human population gradually decreases, the infectious human population declines, the recovered human population increases, and a significant rise in the infected vector population is observed over time. This nuanced portrayal of the disease's dynamics is crucial for understanding the intricate interplay of Leptospirosis among human and vector populations. The study's outcomes contribute valuable insights into the applicability and performance of the methods in solving the Fractional Leptospirosis model. Results indicate rapid convergence and comparable outcomes for both methods.
LANGUAGE OF ORIGINAL DOCUMENT: English

Milovanovic L., Singh G., Townsend D., Nagendran J., Sligl W.

Extracorporeal life support for severe leptospirosis: Case series and narrative review

(2024) JAMMI, 9 (3), pp. 173 - 182
DOI: 10.3138/jammi-2023-0033

ABSTRACT: INTRODUCTION: Leptospirosis can be associated with multi-system organ failure (MSOF) and significant morbidity and mortality. Extracorporeal life support (ECLS) has been used as salvage therapy for severe leptospirosis complicated by acute respiratory distress syndrome (ARDS). Current knowledge in this field is limited, with no standardized treatment approaches. We aim to describe the literature to date on the use of ECLS in patients with leptospirosis, highlighting associations, outcomes, and complications. METHODS: We report on the successful use of ECLS in two cases of severe leptospirosis and conduct a narrative review of the literature. Using a search strategy developed in consultation with a medical librarian and validated across pre-selected articles, several databases were searched. We included case reports, case series, cohort studies, and prospective studies of adult patients with confirmed leptospirosis undergoing ECLS. Editorials, surveys, or opinion articles without primary patient data were excluded. Overall mortality was our primary outcome. RESULTS: Two cases of previously healthy males presenting with ARDS due to leptospiral infection are described. Literature review identified 25 articles containing 43 reported cases of patients treated with ECLS for severe leptospirosis. Patients were mostly young and male. Overall mortality was 16%. The most common complication recognized was acute renal failure requiring renal replace-ment therapy. Additional complications included diffuse intravascular coagulation, necrotizing pancreatitis, and limb ischemia. CONCLUSION: Leptospirosis should be considered in patients with epidemiologic exposure(s) presenting with critical illness, including ARDS and MSOF. ECLS is a viable rescue strategy in severe leptospirosis, even with established MSOF.
LANGUAGE OF ORIGINAL DOCUMENT: English

Renuga D.V., Gunasekaran N., Varadaraj P., Yaswanth V.

Unveiling the diagnostic potential: hypocalcemia, eosinopenia, and hypochloremia as clinical predictors for leptospirosis

(2024) Romanian Journal of Infectious Diseases, 27 (3), pp. 242 - 247
DOI: 10.37897/RJID.2024.3.13

ABSTRACT: Background. Leptospirosis presents diagnostic challenges due to its nonspecific symptoms which often overlap with other febrile illnesses. Identifying reliable clinical predictors could streamline diagnostic processes and improve patient outcomes. Methods. This study analyzed the occurrence of hypocalcemia,

eosinopenia, and hypochloremia in 200 patients suspected of having leptospirosis. We conducted a retrospective analysis comparing laboratory values of confirmed leptospirosis cases against those of patients where the disease was ruled out. Conclusion. Hypocalcemia, eosinopenia, and hypochloremia show potential as clinical predictors for leptospirosis, suggesting that these markers could be integrated into diagnostic protocols to enhance early detection and treatment strategies.
LANGUAGE OF ORIGINAL DOCUMENT: English

Chhabra A., Khattar S., Bagga P.

Infectious diseases complicated by hemophagocytic lymphohistiocytosis – a rare case series

(2024) Asian Journal of Pharmaceutical and Clinical Research, 17 (5), pp. 1 - 4
DOI: 10.22159/ajpcr.2024v17i5.50419

ABSTRACT: Hemophagocytic lymphohistiocytosis (HLH) is a rare, yet potentially fatal disorder of uncontrolled inflammation and dysregulated immunity. Patients may present with features ranging from fever, rash, and cytopenias to fatal multiorgan failure. Here, we present a case series reporting four cases of HLH, their clinicopathological findings, laboratory investigations, and outcomes. The underlying causes for the four cases were found to be infective ones, i.e., Leptospira, hepatitis-E and herpes simplex virus-1, kala-azar and malaria and enteric fever. HLH is a manifestation of the dysregulated immune response of various T cells leading to cytokinemia causing an accumulation of macrophages and T lymphocytes in various tissues. Infections account for about half of all HLH cases in adults the world over. In our institute, infections may still be more prevalent as a cause. Moreover, this may be the scenario in our country where infectious diseases remain a major proportion of the disease burden.
LANGUAGE OF ORIGINAL DOCUMENT: English

Shankar U.N., Andole S., Das K., Shiraz M., Akif M.

Biophysical characterization and structural insights of leptospiral complement regulator-acquiring protein A

(2024) Biochemical and Biophysical Research Communications, 739, art. no. 151003
DOI: 10.1016/j.bbrc.2024.151003

ABSTRACT: Many pathogens establish a successful infection by evading the host complement system, an essential arm of innate immunity. Pathogenic Leptospira is reported to escape complement-mediated killing by recruiting the host complement regulators by lipoproteins or outer surface proteins. One of the outer surface proteins, Leptospiral complement regulator-acquiring protein A (LcpA), is known to recruit complement regulators, C4b-binding protein (C4BP), and Factor H (FH) on the bacterial surface. Mapping of interacting domains from C4BP and FH with the LcpA has already been reported. However, the region or structural part of the LcpA mediating the interaction is not known yet. Here, we report cloning, expression, refolding and purification of recombinant LcpA from an inclusion body of E. coli heterologous expression system. We also demonstrate the biophysical characterization of recombinant LcpA and reveal its secondary structure contents. Moreover, the protein displays a moderate thermostability. The change of intrinsic fluorescence and CD spectra demonstrate a change in the secondary structure of protein due to binding with Zn2+ ions. Molecular docking of LcpA with the complement regulators displays important interface residues from both the individual counterparts. Molecular dynamic simulation analysis demonstrates the stability of interactions between LcpA and C4BP. In our understanding, this is the first report on the large-scale purification of LcpA through refolding

experiments and biophysical characterization of LcpA. This study may provide additional information on the structural basis of binding with the complement regulators.
LANGUAGE OF ORIGINAL DOCUMENT: English

Hou X., Zhang L., Zhao Y., Li J., Jiang Z., Wang S., Li X., Wang X., Liu X.

Changes in microbial communities across the whole A2/O wastewater treatment process and their drivers—Reduced community diversity but increased proportion of certain pathogens

(2025) Water Research, 268, art. no. 122790
DOI: 10.1016/j.watres.2024.122790

ABSTRACT: Microorganisms play a crucial role in pollutant removal and water quality stabilizing. However, limited research exists on the microbial variability and the factors driving it at different stages of wastewater treatment. In this study, the physicochemical properties of water and the composition of bacterial communities were thoroughly investigated across the entire A2/O wastewater treatment process, encompassing 3 stages (12 steps). The results revealed a significant reduction in alpha diversity, whereas the beta diversity remained largely unchanged across stages. Alpha diversity was primarily influenced by dissolved oxygen (DO) and pH, with DO having the most notable influence, while beta diversity was mainly constrained by nutrient conditions such as COD, BOD5, NH4-N, TN, and TP. Additionally, analyses of relative abundance, LEfSe, variance, and functional prediction indicated a significant increase in the relative abundance of certain pathogenic bacteria (e.g., Legionella, Leptospira), exhibiting different removal characteristics compared to Escherichia coli across various treatment steps. Even after UV disinfection, these pathogens persist, highlighting a potential pathogenic risk, which deserves more attention. In addition, this study helps explore the relatively under-researched area of microbial variability at different stages (steps) of wastewater treatment, especially in terms of how microbial communities respond to operational processes and environmental conditions. This will offer valuable guidance for addressing water treatment safety challenges encountered in real-world processes.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sarangi S., Vijaya Bharathi M., Madhanmohan M., Meenambigai T.V., Soundararajan C., Manimaran K., Senthilkumar T.M.A.

Molecular and serological detection of acute canine leptospirosis and associated predictive risk factors in and around Chennai, India

(2025) Microbial Pathogenesis, 198, art. no. 107120
DOI: 10.1016/j.micpath.2024.107120

ABSTRACT: Leptospirosis is a globally important re-emerging zoonotic disease affecting humans and many animal species including dogs. The present cross-sectional study aimed to diagnose acute leptospirosis among 210 suspected dogs using microscopic agglutination test (MAT) and polymerase chain reaction (PCR). Further, epidemiological risk factors were analyzed by univariate analysis and multivariate binomial logistic regression analysis. Out of the 210 dogs, anti-leptospiral antibody was detected in 123 (58.57 %; 95 % CI: 51.6–65.3) dogs by MAT (cut-off titer- ≥1:100), among which 67 (54.47 %; 95 % CI: 45.3–63.4) were seropositive to more than one serogroup. The predominant serogroups were Australis and Autumnalis in the study region. Whereas, acute leptospirosis was established in 49 (23.33 %, 95 % CI: 17.9–29.8) dogs based on ≥ 1:800 titer in unvaccinated dogs and ≥1:1600 titer in vaccinated dogs. The predictive risk factors of acute canine leptospirosis were adult dogs (1–5 years) (p = 0.001), north-east monsoon season (p = 0.011), outdoor

management (p = 0.047), history of rodent exposure (p = 0.001) and history of contact with wet soil or stagnant water (p = 0.046). Among 49 acutely infected dogs, thirteen dogs were positive for urine PCR and one dog was positive for both urine as well as plasma PCR. Positive PCR amplicons were identified as Leptospira interrogans based on secY gene sequencing and phylogenetic analysis. This study enlightened about the occurrence of acute leptospirosis among suspected dogs with the above important predictive risk factors, which should be taken into consideration while history taking so that proper treatment strategies can be adopted for early recovery of the animal.
LANGUAGE OF ORIGINAL DOCUMENT: English

Benvin I., Fitz D., Mojčec Perko V., Maurić Maljković M., Đurić V., Habuš J., Štritof Z., Perharić M., Hađina S., Zečević I., Turk N.

Insights into Leptospira spp. infection in pet cats in Croatia: Clinical, serological and molecular findings with emphasis on the potential important role of serogroup Pomona

(2024) Acta Tropica, 260, art. no. 107465

DOI: 10.1016/j.actatropica.2024.107465

ABSTRACT: Leptospirosis, a globally re-emerging zoonosis caused by pathogenic Leptospira spp., poses a significant threat to public health. Leptospirosis in cats is often neglected due to its high underdiagnosis. Therefore, the role of cats in disease transmission and bacterial maintenance in the environment remains unclear. For this study, 54 serum samples, 54 urine samples and 27 EDTA-anticoagulated blood samples from pet cats presenting to the Veterinary Teaching Hospital due to health problems were used. The serum samples were tested for antibodies against 12 pathogenic serovars of Leptospira spp. using the microscopic agglutination test (MAT). EDTA-anticoagulated blood and urine samples were tested for the lipL32 gene of pathogenic Leptospira spp. by conventional (PCR) and real-time (qPCR) polymerase chain reaction. Agglutinating antibodies were detected in 18.52% (10/54) of the sera with a titre range of 1:50 to 1:12800. The most common serogroup was Pomona, followed by Sejroe, Icterohaemorrhagiae, Australis and Javanica. Leptospira spp. DNA was found in 1.85% (1/54) of the urine samples, while all EDTA-anticoagulated blood samples were negative. A statistically significant difference in seropositivity regarding lifestyle was found between outdoor/indoor and indoor-only cats, while the presence of another cat in the household significantly increased the likelihood of seropositivity. Cats with immunocompromising conditions showed a significantly increased risk of seropositivity, especially those undergoing immunosuppressive treatment. In addition, respiratory signs and changes in lung structure associated with the presence of leptospiral antibodies, and these cats were more likely to be infected with the Pomona serogroup. Moreover, cats with anaemia, leucocytosis, and thrombocytopenia were significantly more likely to have antibodies against Leptospira spp., while seropositive cats had significantly lower urine-specific gravity compared to seronegative cats. The results underline the importance of raising awareness of feline leptospirosis in veterinary care and recognising pet cats as potential carriers of leptospires. Further research is needed to clarify the specific role of the Pomona serogroup as a potentially highly evolutionary drifting serogroup in terms of pathogenicity and to clarify the zoonotic potential of infected cats, which is crucial for the implementation of effective public health measures and veterinary interventions.
LANGUAGE OF ORIGINAL DOCUMENT: English

Petakh P., Kamyshnyi O.

Oliguria as a diagnostic marker of severe leptospirosis: a study from the Transcarpathian region of Ukraine

(2024) Frontiers in Cellular and Infection Microbiology, 14, art. no. 1467915

DOI: 10.3389/fcimb.2024.1467915

ABSTRACT: Leptospirosis is an emerging illness presenting a broad range of clinical manifestations, ranging from asymptomatic or mild cases to severe and fatal outcomes. Early detection is crucial for effective treatment; however, similar clinical presentations in various febrile illnesses or co-infections, along with challenges in laboratory diagnostics, can lead to misdiagnosis and severe consequences. Identifying clinical predictors for severe forms of the disease is essential in mitigating complications and reducing mortality. Consequently, we conducted a retrospective case-control study to identify clinical markers indicative of severe disease in leptospirosis patients from the Transcarpathian region. The study focused on patients admitted with clinically suspected leptospirosis, involving a total of 51 diagnosed cases, with 13 resulting in severe outcomes and death. Categorical variables were analyzed using $\chi 2$, revealing a mean patient age of 50 years, predominantly male (n = 36, 70.5%). Oliguria emerged as a significant independent factor associated with mortality (odds ratio [OR], 13.5; 95% confidence interval [CI], 2.56–71.12; p = 0.001). Additionally, our analysis uncovered a noteworthy increase in leptospirosis notification rates in Transcarpathian compared to Ukraine, with 150 cases out of the total 433 in Ukraine. The highest notification rates were observed in Mukachevo District and Perechyn District. These findings highlight the importance of early recognition of key clinical markers, such as oliguria, which are critical for predicting severe outcomes in leptospirosis patients. The higher notification rates in Transcarpathian regions also underscore the need for enhanced surveillance, targeted public health interventions, and timely treatment to reduce mortality in endemic areas.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ramlingam G., Muthukumar A., Aridass D., Ganesan S.T.

Seroprevalence and clinical profile of leptospirosis and scrub typhus in clinically suspected patients at a tertiary care center: a retrospective study from Theni, Tamil Nadu

(2024) Biomedical and Biotechnology Research Journal, 8 (3), pp. 382 - 386

DOI: 10.4103/bbrj.bbrj_192_24

ABSTRACT: Background: Leptospirosis and Scrub typhus are zoonotic illnesses that are found worldwide. Scrub typhus is a rickettsial infection caused by Orientia tsutsugamushi and spread through the biting of a mite's chigger. Leptospirosis is an anthropozoonotic illness that can be found anywhere but is most common in tropical and subtropical areas. In this study, we report the seroprevalence of Scrub typhus and Leptospirosis with relation to demographic factors in clinically suspected patients attending a tertiary care hospital in Theni, Tamil Nadu. Methods: This is a retrospective study in which 9574 serum samples from clinically suspected cases were collected from January 2018 to December 2023 and tested for immunoglobulin M (IgM) antibodies for Scrub typhus using the enzyme-linked immunosorbent assay (ELISA) and rapid test. A blood sample was taken from each patient, and an IgM ELISA was performed to make the diagnosis. The ELISA cut-off was determined. Results: In this study, 9574 probable cases, 4306 were examined for Leptospira IgM ELISA and 5268 for Scrub typhus IgM ELISA. Out of 4306 suspected Leptospira cases, 167 (3.8%) were positive and 485 (9.2%) were positive in 5268 suspected Scrub typhus cases. The bulk of Leptospirosis and Scrub typhus cases were in the 21-40 years' age range, followed by the 0-20 years' age range. Males were found to have higher

seroprevalence (57.1%) than females (42.9%). Conclusions: Scrub typhus and leptospirosis are developing infections, and prompt treatment can save many lives. It is strongly advised to take a programmatic approach to the prevention, control, and management of these developing diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kundu S., Shetty A., Gomes-Solecki M.

Exposure to live saprophytic Leptospira before challenge with a pathogenic serovar prevents severe leptospirosis and promotes kidney homeostasis

(2024) eLife, 13

DOI: 10.7554/eLife.96470

ABSTRACT: Previous studies demonstrated that Leptospira biflexa, a saprophytic species, triggers innate immune responses in the host during early infection. This raised the question of whether these responses could suppress a subsequent challenge with pathogenic Leptospira. We inoculated C3H/HeJ mice with a single or a double dose of L. biflexa before challenge with a pathogenic serovar, Leptospira interrogans serovar Copenhageni FioCruz (LIC). Pre-challenge exposure to L. biflexa did not prevent LIC dissemination and colonization of the kidney. However, it rescued weight loss and mouse survival thereby mitigating disease severity. Unexpectedly, there was correlation between rescue of overall health (weight gain, higher survival, lower kidney fibrosis marker ColA1) and higher shedding of LIC in urine. This stood in contrast to the L. biflexa unexposed LIC challenged control. Immune responses were dominated by increased frequency of effector T helper (CD4+) cells in spleen, as well as significant increases in serologic IgG2a. Our findings suggest that exposure to live saprophytic Leptospira primes the host to develop Th1 biased immune responses that prevent severe disease induced by a subsequent challenge with a pathogenic species. Thus, mice exposed to live saprophytic Leptospira before facing a pathogenic serovar may withstand infection with far better outcomes. Furthermore, a status of homeostasis may have been reached after kidney colonization that helps LIC complete its enzootic cycle.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kumar K.V., Bokade P.P., Pal A., Deenadayalan O., SowjanyaKumari S., Bharath V., Shome B.R., Balamurugan V.

Detection of anti-leptospiral antibodies using recombinant ErpY-like lipoprotein based latex agglutination test for serodiagnosis of animal leptospirosis

(2024) Letters in Applied Microbiology, 77 (11), art. no. ovae100

DOI: 10.1093/lambio/ovae100

ABSTRACT: Precise and timely diagnosis is essential to prevent severe outcomes of leptospirosis in humans and animals. Existing diagnostic methods face challenges and limitations, underscoring the need for novel, field-applicable screening, and diagnostic tests/assays. This study evaluates the diagnostic utility of a recombinant ErpY-like lipoprotein (rErpY-LIC11966) in a latex agglutination test (LAT) for diagnosis of animal leptospirosis. The ErpY gene sequence from Leptospira interrogans serovar Pomona, excluding the signal peptide, was amplified, cloned into the pETite vector, and expressed in Escherichia coli. The expressed rErpY (~16 kDa) was characterized by Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis and Western blot using Leptospira-specific standard sera. To assess the diagnostic potential of rErpY, Ni-NTA affinity-purified protein was used to sensitize latex-coated beads (0.8 μm colour beads), which were then employed

in the LAT for standardization and optimization with standard positive and negative sera. For evaluation, the rErpY-LAT was tested on serum samples from 177 suspected animal cases and compared to the microscopic agglutination test. It showed a relative diagnostic sensitivity of 90.6%, a specificity of 89.1%, and an overall accuracy of 90%. This study proposes rErpY-LAT as a field testing/screening diagnostic tool for preliminary serodiagnosis of leptospirosis, highlighting the potential of recombinant protein-based assays to address current diagnostic challenges.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tumash O.L., Mamchitss L.P.

Clinical and epidemiological characteristics of leptospirosis in the Gomel region

(2024) Epidemiologiya i Vaktsinoprofilaktika, 23 (4), pp. 63 – 70
DOI: 10.31631/2073-3046-2024-23-4-63-70

ABSTRACT: Relevance. Leptospirosis is a zoonotic ubiquitous natural focal infectious disease that has an adverse effect on human and pet health. The territory of the Republic of Belarus in terms of its natural-climatic and soil-geographical conditions is favourable for the existence of both natural and anthropurgical foci of leptospirosis. The purpose of the work is to study the long-term dynamics of the incidence of leptospirosis in the population of the Gomel region and the clinical and epidemiological features of leptospirosis. Materials and methods. The material for the study was the data of the state statistical reporting «Report on individual infectious, parasitic diseases and their carriers» for the period from 2002 to 2022. In this work, epidemiological diagnostic methods and statistical research methods were used. Descriptive retrospective continuous study of these case histories of patients diagnosed with Leptospirosis of the Gomel Regional Infectious Diseases Clinical Hospital institution was conducted to describe clinical data. Results. In the period from 2002 to 2022, 161 cases of leptospirosis were registered in the Gomel region with an average incidence rate of 0.52 per 100 thousand population. Over this period of time, the incidence of leptospirosis was characterized by an uneven distribution and was undulating. Periods with a low incidence of 0.14–0.42 cases per 100 thousand population lasting 5-6 years alternated with periods of rising incidence to 0.99 cases per 100 thousand population lasting 3 years. In 2022, a sharp rise in the incidence of leptospirosis in the Gomel region was registered, and therefore 15.8 times higher than the incidence in 2021, the incidence rate was 1.11 per 100 thousand of the population and exceeded the national average by 4.6 times. Adults predominated among the sick (93.3%). At the same time, 73.0% of the patients were urban residents. The source of infection in 81.2% of cases were rodents, in 7.52% of cases domestic animals. In 7.52% of cases, the disease appeared as a result of professional activity, only in 3.76% of cases the disease occurred after swimming in open water. Thus, the main route of transmission of leptospirosis at present is contact (88.72%), alimentary and water are less important, respectively 7.52% and 3.76%. Results of serological examination for leptospirosis by RMA showed that 5 serogroups of Leptospira circulate among rodents: L. Pomona and L. Canicola, L. Grippotyphosa, L. Icterohaemorrhagiae, L. Australis. 36.4% of the samples showed a positive result at the same time to several serogroups. L. Grippotyphosa, L. Icterohaemorrhagiae and L. Pomona were detected more often, in total, these pathogens accounted for 46.5% of positive samples. The results of the survey of farm animals showed that 60.6% of the sera studied had positive results of RMA with Leptospira of several serogroups. L. Sejroe was also isolated – in 12.3% of samples, L. Hebdomadis – in 1.3% of samples, L. Icterohaemorrhagiae – in 1.2%, L. Pomona – in 0.3%, others – 24.2%. In the period from 2002 to 2021, the following serogroups were isolated in patients with leptospirosis: L. Grippotyphosa – 36%, L. Pomona and L. Canicola – 16%, L. Australis

– 13%, L. Wolffi – 9%, L. Icterohaemorrhagiae – 7% and L. Tarassovi – 3%. In 2022, there is a change in the polytypage of Leptospira: L. Icterohaemorrhagiae (6.7%), L. Tarassovi (6.7%), L. Wolffi (6.7%), L. Pomona (13.3), L. Australis (13.3), L. Canicola (6.7%), 6.7% – L. Sejroe, L. Grippotyphosa Moskva – 40%. For the period from 2005 to 2022, 49 people diagnosed with leptospirosis were treated at the Gomel Regional Infectious Diseases Hospital, of which men accounted for 69%, the average age of patients was 34.5 ± 3.8 years. Most patients are hospitalized on day 6 [4 – 8] of illness. All patients complained of fever, 86% of patients had muscle pain, headaches were recorded in 56.0%, yellowing of the skin and sclera – 34.0%, abdominal pain – 38%, 25% of patients reported nausea, vomiting, diarrhoea syndrome. 28.6% of patients had an icteric form of leptospirosis, Weil's syndrome was diagnosed in 9.3% of patients, haemorrhagic syndrome was observed in 18.7% of patients. All patients had laboratory confirmation of the diagnosis. The duration of hospitalization was 15 [9 – 23] days. 1 case of the disease ended with a detailed outcome for the entire observation period. Conclusion. The incidence of leptospirosis in the Gomel region is undulating and is characterized by a change in periods of rising incidence lasting up to 3 years with periods of low incidence lasting up to 5 years. The results of the study suggest that the emergence and spread of the Leptospira serotype in the territory led to a new increase in the incidence. Thus, continuous qualitative monitoring of Leptospira serotypes among the population of sources of infection should be carried out.
LANGUAGE OF ORIGINAL DOCUMENT: Russian

Jayathangaraj M.G., Raman M., Bhavya Charitha B.V.S., Gollu C., Divya Sri B.
Review on leptospirosis in animals and associated one health concept
(2024) Indian Veterinary Journal, 101 (11), pp. 7 - 14
DOI: 10.62757/IVA.2024.101.11.7-14
ABSTRACT: Emerging concerns over zoonotic diseases like leptospirosis -“rat fever” frequently lead to the multisectoral and collaborative one-health approach. Incidental infections of leptospirosis are being encountered in various countries, including India. Conditions like flooding, stagnation of contaminated water, or sewage water may often lead to outbreak-like conditions associated with leptospirosis. The variable clinical symptoms, including jaundice and muscle pain, pyrexia etc., always lead to the implementation of a concrete diagnosis of this disease, using standard laboratory techniques. Eventhough leptospirosis surveillance is important among humans, animal surveillance appears to be more vital for maintaining the one health concept related to leptospirosis. This review focuses on the incidences, causes, pathogenesis, symptoms, etc., with emphasis on One Health Approach.
LANGUAGE OF ORIGINAL DOCUMENT: English

Vaishnavi K.I.S.N., Geetha N.K., Mariraj I., Balaganapathi P., Amin F.M., Shankar A.G.
An unusual case of haemoptysis: pulmonary haemorrhage in leptospirosis
(2024) Romanian Journal of Infectious Diseases, 27 (3), pp. 248 - 252
DOI: 10.37897/RJID.2024.3.5
ABSTRACT: Leptospirosis is a zoonotic disease with a wide clinical spectrum, including severe cases of leptospiral pulmonary haemorrhage syndrome (LPHS). A 45-year-old male presented with fever, myalgia, headache, and haemoptysis. Physical examination revealed pallor, tachycardia, and bilateral crepitations. Laboratory findings indicated anaemia, leucocytosis, thrombocytopenia, renal impairment, and hepatic dysfunction. Chest X-ray and HRCT confirmed diffuse alveolar haemorrhage. Serological testing confirmed

leptospirosis. The patient was treated with intravenous ceftriaxone, mechanical ventilation, and methylprednisolone. Gradual clinical improvement was noted with resolution of symptoms. To conclude, early recognition and multidisciplinary management of LPHS are crucial. Awareness of leptospirosis in endemic regions can improve outcomes through timely intervention.
LANGUAGE OF ORIGINAL DOCUMENT: English

Petakh P., Huber W., Kamyshnyi O.
Geographical factors and air raid alarms influence leptospirosis epidemiology in Ukraine (2018–2023)
(2024) One Health, 19, art. no. 100944
DOI: 10.1016/j.onehlt.2024.100944
ABSTRACT: Leptospirosis, a widespread zoonotic disease caused by Leptospira spp., affects approximately 1 million people annually and causes about 58,000 deaths worldwide. This study examines the epidemiology of leptospirosis in Ukraine from 2018 to 2023, focusing on the impact of weather and geographical factors on disease transmission. Data from the Ukrainian Centre for Disease Prevention and Control, the Ukrainian Hydrometeorological Center, and the State Agency of Water Resources of Ukraine were analyzed. The country was divided into five regions: North, East, Center, South, and West. For the visualization, but not the quantitative analyses, the notification rate (NR) of leptospirosis was classified into three categories: low, moderate, and high. The highest NR were in Zakarpattia, Ivano-Frankivsk, Khmelnytskyi, Mykolaiv, and Kherson regions, with Zakarpattia having the highest rate. We analyzed whether various weather parameters—such as average annual temperature, precipitation, days with precipitation ≥1 mm, and relative humidity—were associated with the notification rate (NR) of leptospirosis, but no significant correlations were detected. However, a significant positive correlation was observed between higher density of the river network and NR (Kendall's rank correlation, r = 0.65, p = 0.0005), indicating that geographical factors may play an important role in Leptospira transmission. Additionally, we found a significant correlation between monthly air raid alarm frequency and the NR of leptospirosis cases in 2023. Case reports of individuals contracting leptospirosis in bomb shelters further support the hypothesis that air raid evacuations impact leptospirosis epidemiology. Further investigation is needed to fully understand this relationship and its implications.
LANGUAGE OF ORIGINAL DOCUMENT: English

Blanda V., Giacchino I., Vaglica V., Milioto V., Migliore S., Di Bella S., Gucciardi F., Bongiorno C., Chiarenza G., Cardamone C., Mancuso I., Scatassa M.L., Cannella V., Guercio A., Purpari G., Grippi F.
Foodborne pathogens across different food matrices in Sicily (Southern Italy)
(2024) Pathogens, 13 (11), art. no. 998
DOI: 10.3390/pathogens13110998
ABSTRACT: Foodborne diseases result from the consumption of foods contaminated with pathogens or their toxins and represent a serious public health problem worldwide. This study aimed to assess the presence of Rotavirus (RoV), Adenovirus (AdV), Norovirus (NoV), Hepatitis A and Hepatitis E viruses (HAV and HEV, respectively), Toxoplasma gondii, Coxiella burnetii and Leptospira spp. across various food matrices in Sicily. The analysis concerned 504 samples, including mussels, farmed meat, game meat, vegetables and bulk milk. Following appropriate pre-treatment, acid nucleic extraction was carried out and amplification of pathogen nucleic acids was carried out by molecular methods. The mussels tested positive for NoVs (3/51, 5.9%) and farm meat resulted positive for T. gondii (1/34, 2.9%). The game offal samples tested positive for HEV, which

was detected in 17 out of 222 samples (7.7%), and T. gondii (18/318, 5.7%) and Leptospira spp. (2/318, 0.6%). The milk samples tested positive for C. burnetii (15/85, 17.6%), T. gondii (2/85, 2.4%) and Leptospira spp. (1/85, 1.2%). This study highlights the variability in the risk of contamination of different food matrices, confirming the importance of vigilance in the consumption of potentially contaminated food products.
LANGUAGE OF ORIGINAL DOCUMENT: English

Zhang L., Tan X., Li J., Yang F.

Dynamic analysis and optimal control of leptospirosis based on Caputo fractional derivative

(2024) Networks and Heterogeneous Media, 19 (3), pp. 1262 - 1285
DOI: 10.3934/nhm.2024054
ABSTRACT: Caputo fractional derivative solves the fractional initial value problem in Riemann-Liouville (R-L) fractional calculus. The definition of a Caputo-type derivative is in the same form as the definition of an integral differential equation, including the restriction of the value of the integral derivative to the value of the unknown function at the endpoint t = a. Therefore, this paper introduced the Caputo fractional derivative (CFD) to establish the transmission model of leptospirosis. First, to ensure that the model had a particular significance, we proved the dynamic properties of the model, such as nonnegative, boundedness, and stability of the equilibrium point. Second, according to the existence mode and genetic characteristics of pathogenic bacteria of leptospirosis, and from the perspective of score optimal control, we put forward measures such as wearing protective clothing, hospitalization, and cleaning the environment to prevent and control the spread of the disease. According to the proposed control measures, a control model of leptospirosis was established, and a forward-backward scanning algorithm (FB algorithm) was introduced to optimize the control function. Three different disease control strategies were proposed. Finally, the numerical simulation of different fractional orders used the fde12 (based on Adams–Bashforth–Moulton scheme) solver. The three optimized strategies, A, B, and C, were compared and analyzed. The results showed that the optimized control strategy could shorten the transmission time of the disease by about 80 days. Therefore, the above methods contributed to the study of leptospirosis and the World Health Organization.
LANGUAGE OF ORIGINAL DOCUMENT: English

Eghbal M., Khaki P., Ghandehari F., Taghizadeh M., Tebianian M.

Recombinant fusion protein LipL41-OmpL1 as a potential candidate for a cost-effective vaccine against leptospirosis

(2024) Archives of Razi Institute, 79 (5), pp. 1099 - 1108
DOI: 10.32592/ARI.2024.79.5.1099
ABSTRACT: Leptospirosis represents a significant threat to the health of both humans and animals. It is a disease caused by pathogenic Leptospira. The early detection of pathogenic Leptospira is an effective method for preventing a multitude of potential complications. The protected outer membrane protein (OMP) of pathogenic Leptospira, LipL41-OmpL1, was inserted into E. coli bacteria using different software for the amino acid sequence of OmpL1 and LipL41. This was done to design a recombinant fusion protein, which was then expressed to investigate immunogenicity. The selected genes were propagated and cloned as a fusion in a PET32a+ plasmid vector and expressed by Escherichia coli strain S (DE3) via a heat shock method. The evaluation was conducted using the BALB/c mouse as the laboratory animal model. The recombinant LipL41-OmpL1 protein was confirmed using the urea purification method and western blot, and its immunogenicity

was evaluated by measuring the high humoral immune stimulation and antibody secretion in BALB/c mice by the ELISA method. The findings demonstrated that the animals that received both the OmpL1 and LipL41 proteins exhibited 85% immunogenicity, whereas the control group that did not receive the fusion protein demonstrated only 25% immunogenicity (P<0.001). Moreover, no evidence of infection was identified in recipients of the OmpL1-LipL41 fusion protein, indicating that this protein is safe for use. The protective effects of immunization with OmpL1 and LipL41 were synergistic, as no significant levels of protection were observed in animals immunized with OmpL1 or LipL41 alone. In conclusion, this study underscores the potential of a recombinant OmpL1 and LipL41 fusion protein as a promising avenue for research in the development of vaccines and ELISA diagnostic kits for the prevention and rapid diagnosis of leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Acosta I.C.L., Chiebao D.P., Serafini P.P., Canani G., Pena H.F.J., Heinemann M.B., Souza-Filho A.F., Campolina C., Marques C.A., Neves T.S., Efe M.A., Nunes G.T., Labruna M.B., Bugoni L.

Analysis of free-living seabirds from Brazil as potential hosts of Toxoplasma gondii and serological investigation for antibodies against Leptospira spp.

(2025) Veterinary Research Communications, 49 (1), art. no. 14
DOI: 10.1007/s11259-024-10575-x

ABSTRACT: Dispersal patterns of zoonotic pathogens can be strongly influenced by mobility and contact among hosts. Toxoplasma gondii infection has been documented in many avian species, however, there is little information regarding free-living seabird populations. Leptospira can infect domestic and wild animals, with birds being potential carriers of the bacteria. The continental shelf of the southwestern Atlantic Ocean is a foraging area for seabirds that breed locally, as well as migratory seabirds wintering in the area, which may come into contact with each other in prey aggregation areas and contribute to T. gondii and Leptospira spread. Therefore, this study aimed to investigate the prevalence of two important zoonotic pathogens in free-living seabirds. Blood samples were collected from 322 birds of three local breeders (Phaethon aethereus, Sula leucogaster and S. dactylatra) in the eastern coast of Brazil (Abrolhos Archipelago), and two migratory species using the area during the pre-laying (Pterodroma arminjoniana) and the non-breeding periods (Thalassarche chlororhynchos). Serological agglutination tests for detection of anti-Toxoplasma gondii and anti-Leptospira spp. antibodies were performed. None of the seabirds in this study was seroreactive to Leptospira spp., whereas 34.5% (n = 111) of the animals presented antibodies anti-T. gondii. Antibody titers in seropositive birds ranged from 10 to 640. There were seropositive birds in all sampled localities. This study provides the first records for P. arminjoniana and T. chlororhynchos as seropositive to T. gondii, suggesting their potential role as sentinels for the environmental contamination by T. gondii and also T. gondii infection. These findings indicate the circulation of the parasite in the Brazilian coastal and oceanic regions, probably due to the ingestion of T. gondii oocysts by birds, the epidemiological involvement of migratory birds as hosts of pathogens, as well as the role of the historical introduction of invasive vertebrates on Brazilian islands. Therefore, due to the serological evidence of infection, the dynamics of toxoplasmosis in seabirds, regarding their susceptibility towards the disease and the possible anthropogenic influence need to be better understood for the colonies to be included in the wildlife cycle of T. gondii.
LANGUAGE OF ORIGINAL DOCUMENT: English

Perez Garzón M., Zarama-Eraso M.A., Sánchez Herrera P., Tipasoca Pineda J.

Atypical clinical debut associated with Jarisch Herxheimer reaction in an asplenic patient with leptospirosis: case report and review

(2024) BMC Infectious Diseases, 24 (1), art. no. 1344

DOI: 10.1186/s12879-024-09854-4

ABSTRACT: Background: Leptospirosis poses a diagnostic challenge owing to its wide array of symptoms, ranging from asymptomatic cases and febrile syndromes to severe disease with a high mortality rate. Risk factors are associated with exposure and the immune response, particularly in immunosuppressed patients. Case presentation: A clinical case involving a 49-year-old patient with a history of splenectomy and no immunization schedule. The patient presented to the emergency room with non-specific symptoms, primarily myalgias, arthralgias, and emesis, initially suggestive of a viral infection. However, there was a rapid progression to hypoxemic respiratory failure, requiring invasive ventilatory support. Given the immune status due to spleen absence, antibiotic treatment with meropenem and linezolid was promptly initiated, to mitigate the risk of post-splenectomy sepsis. During antibiotic administration, the patient experienced febrile episodes, accompanied by chills, myalgias, and emesis, which gradually decreased in both duration and intensity. Ultimately, the patient exhibited satisfactory progress, successfully underwent extubation, and completed a 7-day antibiotic course. Final reports confirmed positive IgM for Leptospira. Conclusion: Leptospirosis is a global zoonotic disease, displaying a diverse array of manifestations; recognized as a potential cause of undifferentiated fever, often confused with other prevalent tropical infections. The imperative to consider this diagnosis extends beyond the general population to encompass individuals in states of altered immunity. Recognizing and addressing leptospirosis in at-risk populations is crucial, as it can significantly impact the prompt initiation of treatment and, consequently, influence associated mortality rates.

LANGUAGE OF ORIGINAL DOCUMENT: English

Tamar M., Ia M., Nino K., Nana M., Tea B., Tamar I., Elene P., Levan R.

Clinical manifestation and epidemiological peculiarities of leptospirosis at the modern stage in Georgia

(2024) Georgian Medical News, 354 (9), pp. 184 - 187

ABSTRACT: Introduction: Leptospirosis is considered one of the most common zoonotic infections in the world and is characterized by distribution in countries of subtropical and tropical zones. In Georgia A sharp increase in the frequency of leptospirosis began in 2011, and the morbidity rate increased to 16.3. Also, the landscape of detected serovars changed during this period: L. Pomona, L. Icterohemorragiae, L. Grippotyphosa, L. Hebdomadis, among them the most frequently registered - L. Pomona -45%. Materials and Methods: A recent study aimed to reveal clinical and epidemiological peculiarities of leptospirosis at the modern stage, particularly those with heightened instances post-COVID-19. From January to June 2023, we studied 62 individuals with prolonged fever (more than 5 days without catarrhal events). The cohort study was conducted at the First University Clinic of TSMU); They were hospitalized at the First University Clinic. Comparative analysis was done with previous study which was conducted in 2013-2014 The diagnosis of leptospirosis was confirmed in the case of a reliable, diagnostic Ig M titre using the ELISA method, which was performed at the Lugar Research Centre. Results: According to the study which was done at the First University Clinic in 2023(From January to June) leptospirosis was confirmed in 40 cases (64.5%) due to serological analysis. The age range varied from 17 to 80 years, females were 29 % and males 71% with almost equal representation from urban

54.8 % and rural 45.2% areas. The clinical spectrum of leptospirosis included pneumonia, Weil's disease, and neurological diseases. Icteric forms registered in 12.9 %, anicteric forms in 87.1%; Pneumonia was the most common clinical syndrome in 35.5%, symptoms of CNS damage (meningitis, meningoencephalitis, meningomyelitis) were also registered 12.9% each. haemorrhagic stroke revealed in 1 (2.5%) patient. Weil's disease in 23.6 % cases. Comparative analysis of clinical-epidemiological features from 2013-2014 to 2023 revealed changes in the frequency of clinical variants and epidemiological characteristics. Increased rate of anicteric forms of Leptospirosis have been noticed recently Conclusion: The disease has expanded its distribution to urban areas, indicating a wider reach. Because of various clinical manifestation of leptospirosis. the study emphasizes the importance of diagnosing leptospirosis in cases of prolonged fever, leptospirosis with its dynamic nature and changing clinical patterns, underscores the importance of ongoing surveillance of fever of unknown origin, differential diagnosis with other diseases and prompt intervention, especially in period of post-Covid 19.
LANGUAGE OF ORIGINAL DOCUMENT: English

Pedrosa J., Ezepha C., Carvalho-Costa F.A., Di Azevedo M.I.N., Lilenbaum W.

A neglected part of bovine genital leptospirosis: bulls

(2024) Reproduction in Domestic Animals, 59 (11), art. no. e14747
DOI: 10.1111/rda.14747
ABSTRACT: Bovine leptospirosis is a worldwide disease that causes reproductive issues, including early embryonic death, stillbirths and infertility, which result in significant economic losses. Although bovine leptospirosis is well-documented in cows, the role of bulls in harbouring and potentially transmitting genital leptospirosis has been largely neglected. We examined genital and blood samples from 16 slaughtered bulls using microscopic agglutination testing (MAT), polymerase chain reaction (PCR) and sequencing of amplicons. Our results showed that 81.2% of bulls were seroreactive, and 75% were genitally infected. The amplicons displayed an identity greater than 99% with Leptospira interrogans strains from the Sejroe serogroup, specifically serovar Hardjoprajitno. This study demonstrates that bulls can harbour in their genital tract the same leptospires associated with reproductive syndromes in cows from the same geographic region, highlighting the importance of bulls in maintaining and transmitting Sejroe serogroup strains associated with reproductive disease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Rodríguez-Rodriguez V.C., Castro A.M., Soto-Florez R., Urango-Gallego L., Calderón-Rangel A., Agudelo-Flórez P., Monroy F.P.

Evaluation of serological tests for different disease stages of leptospirosis infection in humans

(2024) Tropical Medicine and Infectious Disease, 9 (11), art. no. 283
DOI: 10.3390/tropicalmed9110283
ABSTRACT: Background/Objectives: Leptospirosis is a zoonotic disease that is widely distributed around the world and presents symptoms similar to other febrile illnesses in tropical regions, which complicates clinical diagnosis. This study aimed to evaluate the performance and agreement between serological diagnostic tests for detecting both acute and convalescent human leptospirosis, using the micro agglutination test (MAT) as a reference in an endemic region of the Colombian Caribbean. Methods: A prospective descriptive study was conducted on 275 participants with suspected leptospirosis. Paired serum samples were obtained, and an

epidemiological survey was conducted. Using the MAT as the gold standard, we calculated positive and negative predictive values, sensitivity, specificity, and kappa index. A Bayesian latent class model was also used to compare the diagnostic tests. Results: In 223 paired serum samples, the sensitivity values for various stages of the disease ranged between 10.8% to 54.1% in the acute and 6.1% to 66.7% during the convalescent phase compared to the MAT. According to the Bayesian model, sensitivity was 9.5% to 75.3% in the acute phase and 5.7% to 85.3% in the convalescent phase. The Kappa value, an indicator of agreement, was moderate for the IgM ELISA in the acute phase (0.553) and substantial in the convalescent phase (0.692). Conclusions: The MAT was the best confirmatory test in both acute and convalescent phases of leptospirosis. Despite the high specificity of ELISA, 21.62% of participants identified as negative by IgM-ELISA in both phases were subsequently confirmed as positive by the MAT. It is necessary to re-evaluate diagnostic guidelines that do not employ the MAT for confirmation and to enhance the diagnostic and clinical identification of leptospirosis within healthcare institutions and public health laboratories while providing a rapid and reliable test for its implementation.
LANGUAGE OF ORIGINAL DOCUMENT: English

Said M., Roh Y., Jung I.H.

Mathematical modeling and analysis of leptospirosis–COVID-19 co-infection with real data

(2024) European Physical Journal Plus, 139 (11), art. no. 1030

DOI: 10.1140/epjp/s13360-024-05846-0

ABSTRACT: In this paper, we present a mathematical model to analyze the dynamics of leptospirosis and COVID-19 co-infection. The model used actual data, and estimation of the parameters via the MLE method is performed, which includes the rates of disease transmission, progression of the disease, disease-related death, and recovery rates for each disease and their co-infection. Key parameters: β1, β2, ϕ1, ϕ2, and μc are used to characterize the dynamics of the co-infection burden of leptospirosis and COVID-19. The results reveal a notable contrast in transmission dynamics and clinical outcomes between the two diseases, with leptospirosis demonstrating a higher transmission rate and increased morbidity. Co-infections showed more severe clinical outcomes, with higher mortality and delayed recovery than single infections. These findings highlight the importance of targeted public health strategies for managing co-infected populations.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bolat İ., Bolat M., Kiliçlioğlu M., Yıldırım S., Sağlam Y.S., Çomaklı S., Gözegir B., Özmen M., Warda M.

Differential TLR2 and TLR4 mediated inflammatory and apoptotic responses in asymptomatic and symptomatic Leptospira interrogans infections in canine uterine tissue

(2025) Microbial Pathogenesis, 198, art. no. 107186

DOI: 10.1016/j.micpath.2024.107186

ABSTRACT: Leptospirosis is major zoonotic disease with global implications, affecting both domestic animals and humans. It is caused by Leptospira interrogans (L. interrogans), which can damage multiple organs, including the kidneys, liver, testes, and uterus. Despite this, L. interrogans can also persist asymptomatically in tissues, akin to nonpathogenic strains. The mechanisms driving asymptomatic infections remain poorly understood. This study investigated the role of L. interrogans in asymptomatic infection within the uterine tissue of canines, focusing on the differential expression of Toll-like receptors (TLRs)2 and 4 and their roles in inflammatory and apoptotic pathways. We hypothesized that TLR2 and TLR4 coexpression is crucial for

eliciting inflammation and apoptosis, whereas TLR4 alone might be insufficient. Our findings revealed that in symptomatic infections, both TLR2 and TLR4 are coexpressed, leading to markedly elevated levels of the proinflammatory cytokines IL-10, IL-1β, TNF-α, and IL-6. This enhanced inflammatory response is further evidenced by increased CD4 expression, indicating robust T helper cell activation. In contrast, asymptomatic infections are characterized by exclusive TLR4 expression, with inflammatory markers remaining at baseline levels. Additionally, we observed that L. interrogans induces apoptosis in symptomatic animals through TLR2 and TLR4 mediated activation of Caspase 8 and Caspase 3. These findings illustrate that L. interrogans drives both inflammation and apoptosis via the combination of TLR2 and TLR4 actions. When only TLR4 is activated, the immune response is insufficient, resulting in an asymptomatic disease course. This study provides novel insights into the differential roles of TLR receptors in leptospirosis, offering potential directions for targeted therapeutic strategies.
LANGUAGE OF ORIGINAL DOCUMENT: English

Graversen H.V., Larsen C.S., Jespersen S.

Jarisch-Herxheimer reaction in a patient with leptospirosis

(2024) Ugeskrift for laeger, 186 (47)
DOI: 10.61409/V06240398
ABSTRACT: In this case report, a 37-year-old female was admitted to hospital with fever and muscle pain two days after returning from Mauritius. Approximately two hours after first administration of intravenous ceftriaxone she suddenly developed respiratory and circulatory failure. Anaphylaxis and pulmonary embolism were considered and excluded. Initially she was treated as having sepsis and required respiratory and vasopressor support. She ended up testing positive for leptospirosis and it was concluded that the respiratory and circulatory failure was a Jarisch-Herxheimer reaction.
LANGUAGE OF ORIGINAL DOCUMENT: Danish

Chou L.-F., Liu Y.-C., Yang H.-Y., Tian Y.-C., Lai C.-H., Chang M.-Y., Hung C.-C., Wang T.-H., Hsu S.-H., Tsai C.-Y., Hung P.-Y., Yang C.-W.

Uncovering latent infections in kidneys: a novel molecular approach for differential Leptospira detection

(2025) Current Research in Microbial Sciences, 8, art. no. 100327
DOI: 10.1016/j.crmicr.2024.100327
ABSTRACT: Leptospirosis, a re-emerging zoonotic disease caused by Leptospira spp., poses significant global health and veterinary challenges. Long-term colonization of renal tubules by Leptospira in asymptomatic hosts highlights the need for sensitive detection methods. This study evaluates the chronic or latent Leptospira infections in kidneys using a novel molecular approach to examine individual immune responses differences. Digital PCR strategies employing newly developed primer-probe sets targeting the flagellar fliG gene were used to assess the presence of trace Leptospira in infected murine kidneys and urine samples from laboratory-confirmed leptospirosis patients. RNA-based digital PCR detected leptospires in 58 % (targeting lipl32) and 83 % (targeting fliG) of infected kidneys, demonstrating that the digital PCR strategy targeting the fliG gene offers superior sensitivity. Notably, the newly developed fliG-targeting assay detected as low as 20 fg of Leptospira DNA, offering ten-fold greater sensitivity than traditional qPCR for trace detection. This allows for differential detection of Leptospira species and facilitates monitoring of extremely low bacterial loads with greater

sensitivity than conventional methods. We also observed regenerating renal tubules with mitosis and elevated cytokine expression in kidneys with transcriptionally active Leptospira during chronic infection. This approach aids in identifying latent infections and offers insights into individual variations. Our research provides a powerful molecular tool for epidemiological studies and public health surveillance, contributing valuable insights into the prevalence and transmission dynamics of this pervasive zoonotic disease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Moustafa M.A.M., Schlachter S., Parveen N.

Innovative strategies to study the pathogenesis of elusive spirochetes and difficulties managing the chronic infections they cause

(2024) Annual review of microbiology, 78 (1), pp. 337 - 360
DOI: 10.1146/annurev-micro-100423-030847

ABSTRACT: The major human spirochetal pathogens (Leptospira, Borrelia, and Treponema) are difficult to diagnose and lack vaccines to prevent infections. Infection by these spirochetes does not generate general protective immunity, allowing reinfection by different strains to occur. These stealth pathogens have uncommon physiology, pathogenesis, and clinical presentations and possess unique immune evasion mechanisms to facilitate their host adaptation and persistence. Collectively, host-spirochete interactions orchestrate systemic infections in a manner distinct from organ- and tissue-specific diseases caused by many bacterial pathogens. Difficulties in growing and genetic manipulation of infectious spirochetes have hindered the full understanding of their virulence factors despite decades to centuries of research. This article highlights the current understanding of the intricacies of spirochetal pathogenesis and diseases. Our comprehensive review of the progress versus gaps in knowledge lays a foundation for researchers to direct their studies toward the development of effective diagnostics and vaccines to protect patients from serious, chronic spirochetal diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Chanchayanon B., Nilsuwan P., Petcharat S., Keawchana N., Yaprajan H., Suwannarat P., Thummatorn S., Ngasaman R.

Molecular detection of Leptospira infection in meat goat of Southern Thailand

(2024) International Journal of Veterinary Science, 13 (6), pp. 772 - 775
DOI: 10.47278/journal.ijvs/2024.168

ABSTRACT: Leptospirosis is a serious zoonotic disease causes by Leptospira spp. infection, and Thailand is an endemic area for both humans and animals. Infected animal such as cattle, sheep and goats can mostly be asymptomatic but can experience foetal abortions and stillbirths. Infected animals play a role in spreading the bacteria via urine. This study determined leptospirosis in meat goats of Southern Thailand by a molecular detection method. In total, 323 serum samples were collected from meat goats from representative provinces of Southern Thailand, namely Songkhla (179) and Yala (144), from April to June 2022 by the veterinarian of the Regional Livestock Health Unit 9, Songkhla, Thailand. Antibodies from previous infections were screened using the lepto-latex test. Polymerase chain reaction (PCR) targeted the LipL32 gene, and overall positivity was 76.47% (247/322). There was no statistically significant difference between the results from Songkhla (76.54%) and Yala (76.39%). The LipL32 PCR indicated an overall positivity of 9.29% (30/323), positive samples from Yala (18.75%) were significantly more abundant than those from Songkhla (1.68%) (P<0.00001).

This study indicates a low active infection with a high previous infection (seroprevalence) of leptospirosis in meat goats, suggesting the circulation of leptospirosis of meat goats in Southern Thailand. DNA sequencing for analysing the serovars distribution among goat is needed. Disease prevention via vaccination based on serovar in Thailand be considered. Moreover, molecular detection of leptospirosis be applied for surveillance at herd level, and farmers and persons in contact with goats should be aware of Leptospira infections.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tsai K.-H., Yen T.-Y., Tung H.-H., Ho A., Chien Y.-T., Wang C.-Y., Kang S.-W., Juan N.-N., Lin F.-L.
Surveillance of emerging rodent-borne pathogens in wastewater in Taiwan: a one health approach
(2024) Tropical Medicine and Infectious Disease, 9 (11), art. no. 282
DOI: 10.3390/tropicalmed9110282
ABSTRACT: Leptospirosis and hantavirus syndrome are two major rodent-borne diseases in Taiwan. Rocahepevirus ratii (RHEV), a virus closely related to hepatitis E virus (HEV, Paslahepevirus balayani), is emerging and has been reported to cause hepatitis in humans. We employed wastewater-based epidemiology to actively monitor rodent-borne pathogens, and the correlations with human cases were evaluated. Wastewater was collected using grab sampling at 11 sites along a sewer system including influents and effluents at a wastewater treatment plant in Tamsui, New Taipei City, Taiwan, monthly during June 2023 to May 2024. The presence of pathogens was examined by reverse transcription-polymerase chain reaction (RT-PCR). The result showed an overall positivity rate of 38.2% (50/131). Leptospira was detected most often (48/131, 36.6%), and RHEV and hantaviruses were found once each during the study period. Sequencing identified Leptospira interrogans close to isolates from rodents and human cases, while sequences of hantavirus and RHEV were most similar to isolates from rodents. No significant correlation was found with human cases or positive samples for rodent DNA. Here, we present an example of a One Health approach applying wastewater to environmental surveillance for the early detection and prevention of emerging diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Alayil A.L., Horwood P.F., Gummow B., Picard J.A., Joone C.J.
Leptospiral infection in domestic mares in North Queensland
(2024) Australian Veterinary Journal
DOI: 10.1111/avj.13395
ABSTRACT: Leptospira species are found worldwide, favouring tropical regions, and infect a wide range of animal species. Although renal persistence in infected individuals and excretion in urine is thought to be the primary mechanism of disease transmission, recent reports have suggested that persistence in the reproductive tract may be a feature in certain species, including the horse. The aim of this study was to investigate leptospiral infection, particularly within the reproductive tract, in healthy, non-breeding mares. Serum and endometrial swab samples were collected from 50 mares from the James Cook University Teaching Animal Herd, as well as, where possible, free-catch urine (n = 19). Sera were screened for antibodies to 24 Leptospira serovars, using the microscopic agglutination test (MAT). Endometrial and urine samples underwent real-time PCR testing, targeting the leptospiral rrs gene. Overall, the seroprevalence of leptospirosis was 48% (95% CI: 34%–62%), with serovars Arborea, Bratislava and Australis detected most frequently. PCR

positive results were obtained from 1 of 50 (2%) endometrial swabs and 2 of 19 (11%) urine samples. This is the first report of serovar Bratislava in horses in Australia.
LANGUAGE OF ORIGINAL DOCUMENT: English

Saranya E., Vishwakarma A., Mandrekar K.K., Leela K.V., Ramya M.
A label-free DNAzyme-based colorimetric sensor for the detection of Leptospira interrogans
(2024) World Journal of Microbiology and Biotechnology, 40 (12), art. no. 401
DOI: 10.1007/s11274-024-04210-9
ABSTRACT: Leptospirosis is a neglected zoonosis caused by a pathogenic spirochete Leptospira. Diagnosis of leptospirosis in the early stage is difficult and can be easily confused with other infections. The existing detection methods are considered chronophagous and labor-intensive. Leptospira survives in the kidney tubules of reservoir animals such as rodents and shed into the environment through their urine. In this study, we developed an Aptamer-DNAzyme-based biosensor for detecting pathogenic Leptospira in environmental water samples. The cell-specific aptamer with an extensive affinity binds to the cell surface proteins to detect the Leptospira interrogans. The DNAzyme that mimics as a peroxidase enzyme, acts as a transducing agent in the colorimetric reaction positively conditioned by the presence of L. interrogans. The Leptospira-specific aptamer coupled with DNAzyme is coated onto carbon nanotubes, to provide a cost-effective nanomaterial-based detection platform. L. interrogans contamination in the samples is detected with a color change of a peroxidase substrate, ABTS. The dissociation constant of the aptazyme was found to be 356.6 nM. The aptazyme system was able to detect up to 119 CFU/mL of L. interrogans exhibiting a high range of selectivity towards the pathogenic spirochete. This simple detection methodology makes the system promising for the environmental monitoring of L. interrogans. Graphical abstract: (Figure presented.).
LANGUAGE OF ORIGINAL DOCUMENT: English

Yu L.-J., Ji P.-S., Ren X., Wang Y.-H., Lv C.-L., Geng M.-J., Chen J.-J., Tang T., Shan C.-X., Lin S.-H., Xu Q., Wang G.-L., Wang L.-P., Hay S.I., Liu W., Yang Y., Fang L.-Q.
Inter-city movement pattern of notifiable infectious diseases in China: a social network analysis
(2025) The Lancet Regional Health - Western Pacific, 54, art. no. 101261
DOI: 10.1016/j.lanwpc.2024.101261
ABSTRACT: Background: Co-existence of efficient transportation networks and geographic imbalance of medical resources greatly facilitated inter-city migration of patients of infectious diseases in China. Methods: To characterize the migration patterns of major notifiable infectious diseases (NIDs) during 2016–2020 in China, we collected migratory cases, who had illness onset in one city but were diagnosed and reported in another, from the National Notifiable Infectious Disease Reporting System, and conducted a nationwide network analysis of migratory cases of major NIDs at the city (prefecture) level. Findings: In total, 2,674,892 migratory cases of NIDs were reported in China during 2016–2020. The top five diseases with the most migratory cases were hepatitis B, tuberculosis, hand, foot and mouth disease (HFMD), syphilis, and influenza, accounting for 79% of all migratory cases. The top five diseases with the highest proportions of migratory cases were all zoonotic or vector-borne (37.89%–99.98%). The network analysis on 14 major diseases identified three distinct migration patterns, where provincial capitals acted as key node cities: short distance (e.g., pertussis), long distance (e.g., HIV/AIDS), and mixed (e.g., HFMD). Strong drivers for patient migration include population mobility and labor flow intensities between cities as well as the economic development level

of the destination city. Interpretation: Collaborative prevention and control strategies should target cities experiencing frequent patient migration and cater to unique migration patterns of each disease. Addressing disparity in healthcare accessibility can also help alleviate case migration and thereby reduce cross-regional transmission. Funding: National Key Research and Development Program of China.
LANGUAGE OF ORIGINAL DOCUMENT: English

Efriana S., Sutiningsih D., Agushybana F., Martini M., Fauzi M., Nur Muhammad Ansori A.
Epidemiology and characteristics of leptospirosis in patients in Demak Regency in 2018-2023
(2024) BIO Web of Conferences, 133, art. no. 00033
DOI: 10.1051/bioconf/202413300033
ABSTRACT: Demak Regency is an endemic area of leptospirosis. Cases of death due to leptospirosis in humans in Demak Regency in 2018-2023 with a CFR of >11%. Many deaths are found in leptospirosis patients who are hospitalized due to their poor prognosis. This study aimed to describe the characteristics of leptospirosis patients who are hospitalized in Demak Regency. This study used a quantitative descriptive design. Patients' data were taken from medical records at Sunan Kalijaga, Sultan Fatah, and NU Islamic Hospital in Demak Regency. The results of the study showed that of the 73 confirmed cases, 58.9% were male patients, and 69.9% were >40 years old. Of the 22 deaths, women exceeded men with 54.5%, and >40 years old at 81.8%. Based on laboratory examinations, the average platelet level was 110.18 cells/mm, creatinine level was 3.66 mg/dL, and urea level was 131.54 mg/dL. In the case of death, the patients' platelet level <100.000 cells/mm was 86.3%, creatinine level >3 mg/dL was 77.2%, and urea level >90 mg/dL was 86.3%. Symptoms that often appeared were myalgia. In this study, icteric and oliguria were not always symptoms in leptospirosis patients who died. Yet dyspnea and icteric symptoms have the potential to be predictors of death in leptospirosis patients. As many as 64.38% of patients did not have comorbidities. As many as 69.86% of leptospirosis patients were given a single type of antibiotic and 30.14% with a combination of antibiotics. Overall, 100% of the patients received antibiotics based on the severity of the disease. Detailed case description reports and patient prognosis need to be carried out to improve the handling of patients with leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Orlando S.A., Mora-Jaramillo N., León Sosa A., Rivera A., Calderon J., Guizado Herrera D., Orlando S.A., Zevallos J.C., Paredes-Núñez D., Rodriguez-Pazmiño A.S., Carvajal E., Garcia-Bereguiain M.A., Arcos F., Vera Loor L.E., López Rauschemberg M.K., Pérez Oyarvide E.V., Quimí López D.I., Guailla Ríos B., Benavides Yánez B., Morales García M.E., Intriago Alcivar E.G., Saltos Montes J.L., Medina A., Torres-Lasso P., Zambrano Gavilanes P., Oviedo M.C., González M., Jiménez-Valenzuela F.
Leptospirosis outbreak in Ecuador in 2023: a pilot study for surveillance from a One Health perspective
(2024) One Health, 19, art. no. 100948
DOI: 10.1016/j.onehlt.2024.100948
ABSTRACT: Leptospirosis is a neglected zoonotic disease that is endemic in tropical regions, including Ecuador. It is caused by spirochetes of the genus Leptospira, which can infect humans through animal reservoirs such as rats and dogs, or through contact with contaminated water or soil. In March 2023, public health authorities declared a concerning outbreak of leptospirosis in Durán Cantón, located in the Coastal region of Ecuador. For the first time in the country, a multidisciplinary approach involving physicians and

veterinarians was implemented for the surveillance and management of this leptospirosis outbreak. A total of 335 samples were collected, including suspected human cases, household contacts, household dogs, synanthropic rats, and water samples within the area of human cases. Samples were processed by qPCR targeting lipL32, secY, and rrs fragment genes and characterized further for Sanger sequencing. Overall, 26.2 % of human samples, 43.8 % of dog samples, 38.5 % of rat samples, and 39.4 % of water samples tested positive for Leptospira. Further, phylogenetic analysis shows that human, dog, and rat sequences are clustered within the pathogenic subclade P1, within the branch of L. kirschneri and L. interrogans. This study is the first of its kind in Ecuador, where an ongoing outbreak of leptospirosis was managed in real-time by using molecular diagnosis and not serological tools, and where the epidemiological surveillance was done following a One Health approach. This experience should inspire public and animal health authorities in Ecuador to promote a national One Health surveillance and control program for zoonotic diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Soares E.L., de Mello Schlemper S.R., Schlemper V.

Behaviour of Moura breed pigs in silvopastoral systems [Comportamento de suínos da raça Moura em sistema silvipastoril]

(2024) Ciencia Animal Brasileira, 25, art. no. 79178E
DOI: 10.1590/1809-6891v25e-79178E
ABSTRACT: Animal production aims to reconcile sustainability and efficiency. In this context, silvopastoral systems emerge as a promising and little explored alternative. This exploratory study evaluated the behaviour of Moura pigs, raised in a silvopastoral system, in the middle of the Araucaria forest and native fields. Behaviour was assessed using an ethogram, to quantify the animals' habits in the forest. This made it possible to analyze the animals' activities, providing information about their social, feeding and general behaviour. As a result, the behavioural evaluation showed that the pigs were able to consume pasture and pine nuts in open areas under the araucaria trees. Furthermore, no anomalous behaviours or stereotypies were detected in animals raised in the silvopastoral system, indicating a better quality of life and well-being of animals raised in a free-range environment. Finally, the silvopastoral system proved to be an alternative for pig farming providing a more natural environment, with greater dietary diversity, a lower rate of negative behaviours and, consequently, improved well-being for the animals.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tufiño-Loza C., Gutiérrez-Hernández J.L., Palomares-Resendiz E.G., Musito-Moreno A.S., Guzmán-Ojeda M., Martínez-Pérez A., Díaz-Aparicio E.

Seroepidemiology and risk factors associated with Leptospira and Chlamydia abortus in goat herds in Guanajuato, Mexico

(2024) Veterinaria Mexico OA, 11
DOI: 10.22201/fmvz.24486760e.2024.1266
ABSTRACT: A cross-sectional epidemiological study was conducted from March 2022 to April 2023 to determine seropositivity for chlamydiosis and leptospirosis, as well as to identify risk factors associated with their transmission in goat herds in the municipality of Juventino Rosas, Guanajuato. A total of 741 samples were collected from 32 herds. For serological diagnosis, the microscopic agglutination test was employed for Leptospira, and an indirect ELISA was used for Chlamydia abortus. Logistic regression analysis was applied

to identify risk factors. The study found that 14.1 % and 52.5 % of samples were seropositive for chlamydiosis and leptospirosis, respectively. The primary serovar detected for leptospirosis was the national strain H-89 (Hardjo) at 40.8 %. A significant causal association for leptospirosis was observed (P < 0.0211) in herds with a history of abortions (OR = 8.88), in goats older than 6 years (OR = 6.91), with the loaning of bucks (OR = 5.6), in the buying and selling of animals (OR = 3.54), in herds with more than 60 animals (OR = 3.44), in the presence of rodents (OR = 2.86), and with humidity (OR = 1.79). For chlamydiosis, a significant causal association (P < 0.0456) was observed when pregnant females were not separated (OR = 4.28), when grazing areas were shared (OR = 3.4), and in herds with more than 60 animals (OR = 2.1). Given these findings, it is essential to enhance technical assistance to implement biosafety measures aimed at reducing the occurrence of these diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bolat İ., Bolat M., Kiliçlioğlu M., Yıldırım S., Sağlam Y.S., Çomaklı S., Gözegir B.
Cellular pathophysiology of Leptospira interrogans infection in canine testicular tissue: role of the TLR4/NF-kB/JNK pathway
(2025) Journal of Comparative Pathology, 216, pp. 10 - 19
DOI: 10.1016/j.jcpa.2024.11.001
ABSTRACT: Leptospirosis is a prevalent zoonotic disease in dogs. Although it is known that leptospires are primarily harboured in kidney tissues of dogs, it has been reported that they also infect testicular tissue. Leptospira interrogans causes various lesions in canine testicular tissues; however, the pathogenesis has not been clearly explained. In this study, 20 canine testicular tissue samples infected with L. interrogans were investigated for evidence of oxidative DNA damage, inflammation, apoptosis and autophagy. Ten samples of canine testicular tissue that were negative for L. interrogans were used as a positive control group. All tissues were examined by histopathological, immunohistochemistry (IHC) and immunofluorescence (IF) methods. Histopathological examination revealed that testicular tissues infected with L. interrogans had inflammation and oedema, and degeneration and necrosis of spermatocytes. In cases of severe disease, enzyme-linked immunosorbent assay, reverse transcriptase polymer chain reaction and IHC and IF indicated significant increases in levels of TLR4, NF-kB, IL-1β, TNF-α, 8-OHdG, JNK1/3, caspase-8, caspase-3, LC3A and LC3B but lower levels in milder cases. These results indicate that L. interrogans stimulated the immune system through the TLR4/NF-kB/JNK pathway in dog testicular tissues, leading to inflammation and apoptosis. The infection also caused oxidative DNA damage and autophagy.
LANGUAGE OF ORIGINAL DOCUMENT: English

Muyulema E., Moscoso M., Barragán G., Bustillos-Huilca R., Luna-Herrera J.
Prevalence and risk factors of bovine leptospirosis in the Ecuadorian Amazon
(2024) Veterinary World, 17 (11), pp. 2612 - 2618
DOI: 10.14202/vetworld.2024.2612-2618
ABSTRACT: Background and Aim: Leptospirosis is an infectious zoonotic disease that significantly affects animal health, particularly the reproduction of ruminants. However, some aspects of epidemiology and clinical characteristics have not been clarified. This study aimed to estimate the prevalence and identify risk factors of leptospirosis in female bovines at reproductive age in the Ecuadorian Amazon rainforest. Materials and Methods: A total of 213 bovines were studied in the Amazon province of Zamora Chinchipe, in which a

microscopic agglutination test was used to diagnose a panel of eight serovars of Leptospira borgpetersenii (Sejroe) and Leptospira interrogans, Australis, Bataviae, Canicola, Tarassovi, Icterohaemorrhagiae, Wolffi, and Hardjo. An epidemiological survey was conducted to identify risk factors by animal and herd and clinical symptoms associated with Leptospira spp. infection; and blood samples were collected to determine the differences between seropositive and seronegative animals regarding hematocrit, hemoglobin (Hb), mean corpuscular Hb concentration, total red blood cell count, total platelet count, leukocytes, total proteins, creatinine, and ureic nitrogen. Results: The prevalence of bovine leptospirosis was 12.21% (26/213), with positive reactions in the Australis, Sejroe, Bataviae, Canicola, and Tarassovi serovars. No variables were considered risk factors, nor clinical signs associated with the infection, nor were there differences in the hematological parameters between the seropositive and seronegative animals. Conclusion: These findings indicate the persistence of Leptospira on cattle farms in the Ecuadorian Amazon and highlight the interaction between domestic and wild species. It is crucial to implement control measures and improvements in management practices under the One Health approach to reduce accidental infections from contact with wildlife; the awareness of farmers is essential for effective prevention.
LANGUAGE OF ORIGINAL DOCUMENT: English

Oguntolu F.A., Peter O.J., Omede B.I., Balogun G.B., Ayoola T.A.

Mathematical model on the transmission dynamics of leptospirosis in human and animal population with optimal control strategies using real statistical data

(2024) Quality and Quantity, art. no. 100413

DOI: 10.1007/s11135-024-02016-3

ABSTRACT: Leptospirosis poses a significant public health challenge, with a growing incidence in both human and animal populations. The complex interplay between reservoir hosts, environmental factors, and human activities complicates efforts to curb the spread of the disease. Consequently, this paper presents a deterministic mathematical model for the transmission dynamics of leptospirosis within the intertwined human and animal populations. A comprehensive examination of the model revealed that the disease-free equilibrium is globally asymptotically stable when the basic reproduction number is below one. Utilizing center manifold theory, we demonstrated that the Leptospirosis model displays forward bifurcation. Consequently, the epidemiological significance of this forward bifurcation suggests that eradicating leptospirosis from the community is feasible, provided the reproduction number remains below one. We conducted a sensitivity analysis on the basic reproduction number of Leptospirosis to identify parameters that contribute positively to the disease's spread. Furthermore, We validated our Leptospirosis model by fitting it with confirmed cases reported in Kerala State, India, covering the period from January 2021 to December 2022. This calibration process ensures the model's accuracy and reliability in reflecting real-world epidemiological dynamics within the specified region and timeframe. In addition, we enhanced the Leptospirosis model by incorporating three time-dependent control measures. These controls encompass the vaccination of animals, environmental sanitation, and preventive actions such as using hand gloves and goggles when handling animals, as well as wearing rubber boots during periods of flooding or heavy rainfall. Results obtained from numerical simulations indicate that implementing the vaccination of animals as a standalone control strategy has no discernible effect on the number of infected humans or the bacteria population. However, when the three time-dependent control measures are combined, there is a substantial and meaningful impact on reducing the number of infected humans, infected animals, and the overall bacteria population within a relatively short timeframe. This

underscores the effectiveness of the integrated approach in mitigating the spread of leptospirosis across both human and animal populations.
LANGUAGE OF ORIGINAL DOCUMENT: English

Foltran B.B., Teixeira A.F., Romero E.C., Fernandes L.G.V., Nascimento A.L.T.O.
Leucine-rich repeat proteins of Leptospira interrogans that interact to host glycosaminoglycans and integrins
(2024) Frontiers in Microbiology, 15, art. no. 1497712
DOI: 10.3389/fmicb.2024.1497712
ABSTRACT: Pathogenic spirochaetes of the genus Leptospira are the etiological agents of leptospirosis, a zoonotic infection worldwide. The disease is considered an emerging and re-emerging threat due to global warming, followed by heavy rainfall and flooding when outbreaks of leptospirosis occur. Adhesion to host tissues is mediated by surface/extracellular proteins expressed by pathogens during infection. Leucine-rich repeat (LRR) domain-containing proteins seem to be important for the virulence of pathogenic Leptospira and their role has been recently examined. Here, we report the characterization of two LRR-proteins encoded by LIC11051 and LIC11505. They present 7 and 17 LRR motifs, respectively. LIC11051 was found mainly in the P1 subclade, whereas LIC11505 was identified with higher identity in subclade P1, but was also found in subclades P2, S1, and S2. The recombinant proteins were recognized by antibodies in leptospirosis serum samples, suggesting their expression during infection. rLIC11505 contains a broad spectrum of ligands, including GAG and integrin receptors, whereas rLIC11051 showed limited binding activity. The attachment of proteins to ligands was specific, dose-dependent, and saturable. Compared to their role in adhesion, both proteins were shown to be secreted, with the ability to reassociate with the bacteria. Taken together, our data suggested that LIC11051 and LIC11505 participate in leptospiral pathogenesis. To the best of our knowledge, this is the first report showing leptospiral LRR-proteins exhibiting GAG and integrin receptor-binding properties.
LANGUAGE OF ORIGINAL DOCUMENT: English

Santiesteban-Lores L.E., Midon L.M., Franco T., de Oliveira L.M., Hibi S., Chiani Y., Meneses G., De Francesco Daher E., Fonseca D.M., Pontillo A., Isaac L.
Analysis of complement factor h gene polymorphisms and their association with clinical manifestations of leptospirosis
(2025) Immunogenetics, 77 (1), art. no. 4
DOI: 10.1007/s00251-024-01362-8
ABSTRACT: Leptospirosis is caused by pathogenic leptospires, posing a significant public health problem. Host susceptibility to Leptospira infection is a multifactorial trait, and the host's genetic background can influence both the establishment of infection and the severity of the disease. Complement Factor H (FH) plays a crucial role in the interaction between pathogenic bacteria and the host. Genetic variants in the FH gene CFH have previously been associated with non-infectious diseases. Here, we aimed to analyze the effect of CFH variants on individual susceptibility to leptospirosis and disease severity. To accomplish this, we sequenced CFH exons 7, 9, 21, 22, and 23 in a case/control cohort (184/162) from two endemic leptospirosis areas in Brazil and Argentina. We identified twenty-one single nucleotide variants (SNVs). In the Brazilian cohort, the intronic variant rs34815383 exhibited a higher frequency in patients than in controls, resulting in a significant association with leptospirosis (p = 0.032; OR: 0.32; 95% CI 0.1–1) and also renal disorder (p = 0.001; OR: 5.3; 95%CI 1.8–15.57). This SNV is reported to be a splicing variant, negatively impacting CFH

expression, and has previously been associated with Complement-driven renal disease. A second synonymous variant, rs61822181, was significantly less frequent in patients than in controls (p = 0.002; OR: 7.33; 95% CI 1.59–33.7), representing a protective factor against the development of leptospirosis. Our study represents the first documentation of the frequency of CFH SNVs in South America and identifies the variant rs34815383 T > C as a risk factor for leptospirosis and leptospirosis-related renal complications.
LANGUAGE OF ORIGINAL DOCUMENT: English

Morais D.A., Limeira C.H., Nunes B.C., Neto P.S.B., Falcão B.M.R., Brasil A.W.L., Santos C.S.A.B., Azevedo S.S., Alves C.J.

Analysis of cross-sectional studies of leptospirosis in donkeys: a systematic review and meta-analysis [Análise de estudos transversais da leptospirose em asininos: revisão sistemática e meta-análise]

(2024) Pesquisa Veterinaria Brasileira, 44, art. no. e07488
DOI: 10.1590/1678-5150-PVB-7488
ABSTRACT: Leptospirosis is a neglected zoonosis that infects donkeys and other animal species, with economic and public health concerns. Donkeys have an important role in the development of societies, the reduction of their effective population in recent years, and the little attention given to the diseases that affect them, reducing their productivity and performance. This study aimed to investigate the pooled prevalence of Leptospira spp. infection in donkeys worldwide through a systematic review and meta-analysis. Overall, 21 surveys met the eligibility criteria, with an overall combined prevalence of 34.90% (95% CI = 23.58% – 48.23%). Cochran's Q test (p<0.01) was used to identify heterogeneity between studies, classified as high heterogeneity by the Higgins and Thompson test (I2= 95.4%). Egger's test did not identify the presence of publication bias (p=0.9892). This scenario suggests the need for standardization of epidemiological studies for leptospirosis in this species, such as the use of probabilistic sampling, collection of minimal information on the animals used, and the establishment of a cutoff point for the serological diagnostic test (microscopic agglutination test – MAT) and essential serogroups to be used in serology to determine reliable epidemiological indicators. In addition, there is a need for molecular studies and isolation of Leptospira spp. in donkeys for better elucidation of the disease epidemiology.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ulsenheimer B.C., Tonin A.A., von Laer A.E., dos Santos H.F., Sangioni L.A., Fighera R., dos Santos M.Y., Pereira D.I.B., Pötter L., Avila Botton S.D.

Molecular detection and phylogenetic analysis of Leptospira interrogans and Leptospira borgpetersenii in cats from Central region of Rio Grande do Sul state, Brazil

(2025) Comparative Immunology, Microbiology and Infectious Diseases, 116, art. no. 102286
DOI: 10.1016/j.cimid.2024.102286
ABSTRACT: Leptospirosis is a zoonotic disease caused by the bacteria of the genus Leptospira, which is responsible for substantial impacts on the economy, animal health, and public health. This disease has a global distribution and is particularly prevalent in Brazil. While leptospirosis can affect different animal species, including domestic ones such as dogs and cats, the role of dogs in its epidemiology is established and well-understood. Conversely, the role of domestic cats in the epidemiology of leptospirosis remains unclear, with a significant lack of studies elucidating the roles they play in the transmission of Leptospira spp. and the bacterial species they can host. Therefore, this study aimed to evaluate the presence of Leptospira spp. DNA in

domestic cats and to assess the phylogenetic relationships of the identified microorganisms in the Central region of Rio Grande do Sul State (RS) in southern Brazil. The samples were evaluated for the presence of the gene lipL32 by polymerase chain reaction and sequencing of the amplified fragment, followed by phylogenetic analysis. DNA from Leptospira spp. was extracted from the kidney tissue of domestic cats. Pathogenic Leptospira spp. DNA was detected in 22.1 % (67/303) of the samples. Molecular analyses revealed the presence of L. borgpetersenii and L. interrogans in these animals. This study is the first to identify L. borgpetersenii and L. interrogans in domestic cats in RS, highlighting their potential role as bacterial reservoirs. Our findings provide valuable insights into the epidemiology of leptospirosis and can contribute to sanitary measures aimed at controlling and preventing the disease, ultimately protecting public health.
LANGUAGE OF ORIGINAL DOCUMENT: English

Robi D.T., Bogale A., Aleme M., Urge B.

Herd and animal level seroprevalence and associated risk factors of Leptospira interrogans sensu lato serovar Hardjo in cattle in southwest Ethiopia

(2024) BMC Veterinary Research, 20 (1), art. no. 553

DOI: 10.1186/s12917-024-04418-9

ABSTRACT: Leptospirosis is a significant zoonotic disease that causes high economic losses in cattle production due to its association with abortions, stillbirths, infertility, and reduced milk yields. However, the epidemiology of bovine leptospirosis in Ethiopia is poorly understood. From October 2020 to October 2021, a cross-sectional study was conducted to investigate the seroprevalence of serovar Hardjo in cattle in southwest Ethiopia, as well as the associated risk factors. To test for the existence of L. Hardjo antibodies, blood samples were taken from 461 cattle. Indirect ELISA was used to identify the presence of antibodies against L. Hardjo in sera samples. We conducted a multivariable random-effect logistic regression analysis to identify potential risk factors associated with L. Hardjo seropositivity. An overall L. Hardjo seroprevalence of 24.7% (95% CI: 20.2–48.8) and 53.5% (95% CI: 45.7–90.5) was recorded at the animal level and the herd level, respectively, in the study areas. This study revealed six factors influencing L. Hardjo seropositivity in cattle herds. Large herds had twice the odds of seropositivity (OR = 2.0, 95% CI: 1.1–3.8) compared to small herds. Co-grazing cattle exhibited higher odds (OR = 2.2, 95% CI: 1.2–4.1) of seropositivity. Extensive management systems significantly increased the odds (OR = 10.3, 95% CI: 1.7–61.8) compared to semi-intensive systems. Highland cattle had higher odds (OR = 3.7, 95% CI: 1.4–10.3) than lowland cattle. Older cattle (OR = 4.6, 95% CI: 2.4–8.9) were more likely to be seropositive. At the herd level, extensive management (OR = 2.8, 95% CI: 1.3–5.8) and large herds (OR = 2.5, 95% CI: 1.3–4.7) increased the risk of seropositivity. Herds with sheep/goats (OR = 2.3, 95% CI: 1.3–4.1) were also at higher risk, highlighting significant L. Hardjo seropositivity risk factors in cattle herds. The study findings showed that leptospirosis was highly prevalent across the study areas. As a result, use proper management, raise zoonotic awareness for leptospirosis, and conduct molecular bovine leptospirosis research in study areas were recommended.
LANGUAGE OF ORIGINAL DOCUMENT: English

Silva-Ramos C.R., Lemaitre G P., Mejorano-Fonseca J.A., Matiz-González J.M., Aricapa-Giraldo H.J., Agudelo J.C., Pérez Cárdenas J.E., Hidalgo M.

Molecular evidence of Leptospira spp. infection among household dogs from 15 municipalities of the Department of Caldas, Colombia

(2024) Zoonoses and Public Health
DOI: 10.1111/zph.13204
ABSTRACT: Introduction: Leptospira spp. is a bacterial genus which includes pathogenic species that causes leptospirosis. Several animal species can harbour, shed and disseminate the bacteria through their urine. Although the circulation of Leptospira among homeless dogs may be common, the presence of Leptospira among household dogs is more important since they can act as important sources of infection for their owners due to the closer contact with humans. Aim: The aim of the present study was to detect the presence of Leptospira spp. among household dogs from 15 municipalities of the Caldas department. Methods: Between November 2015 and January 2017, an active household dog sampling was performed in 15 municipalities of Caldas department. Dog blood samples were tested through conventional PCR targeting a fragment of the Leptospira rrs and LipL32 genes. All obtained amplicons were purified and bi-directionally sequenced. Obtained sequences were assembled and edited for subsequent phylogenetic analysis. Results: A total of 196 dogs were sampled from 15 municipalities of Caldas department, of which 180 were screened for Leptospira spp. Ten (5.6%) dog blood samples from seven municipalities were successfully amplified for the Leptospira rrs gene. Two Leptospira rrs good-quality sequences were obtained which had a closer relationship with Leptospira interrogans and Leptospira santarosai. Conclusion: We confirm the presence of Leptospira spp. closely related with L. interrogans and L. santarosai among household dogs from seven municipalities of Caldas department. These results highlight the need to improve the care of household dogs in Caldas department since they could eventually become important sources of infection of leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sengupta M., Latha T., Mandal S., Mukhopadhyay K.

Foetal outcome of Leptospira and Rickettsia infections during pregnancy: a systematic review

(2024) Transactions of the Royal Society of Tropical Medicine and Hygiene, 118 (12), pp. 814 - 828
DOI: 10.1093/trstmh/trae053
ABSTRACT: Background. Leptospirosis and rickettsial infections are bacterial zoonoses prevalent in different geographical locations and presents with overlapping symptoms. Objective. To identify foetal outcomes in pregnant women diagnosed with rickettsial infections, including scrub typhus and leptospirosis, along with their associated factors. Methods. A comprehensive search was conducted in MEDLINE/PubMed, Scopus, CENTRAL (Cochrane), Web of Science, PsycINFO, Academic Search Premier, CINAHL, and Embase using defined search terms. Studies involving pregnant women with diagnosed leptospirosis and rickettsial infections, including scrub typhus, were selected. Two independent reviewers screened titles and abstracts using the Rayyan Web interface. Data extraction was performed in Microsoft Excel, with Zotero for reference management. Study quality was assessed using Joanna Briggs Institute Critical Appraisal tools. Data synthesis included narrative analysis. Results. Fifty-four studies were included: 22 on scrub typhus, 14 on rickettsial infection, 16 on leptospirosis, and 2 on all three infections. Of 176 scrub typhus cases, 53 resulted in foetal loss and 3 in neonatal death. Among 38 rickettsial infection cases, 4 had foetal loss. Out of 63 leptospirosis cases, 13 experienced foetal loss. Six maternal deaths occurred due to scrub typhus and one due to Rocky Mountain spotted fever. Conclusion. Leptospirosis and rickettsial infections, including scrub typhus, are important causes of pregnancy loss. Further research is needed to better understand and mitigate these risks in pregnant women.
LANGUAGE OF ORIGINAL DOCUMENT: English

Mendu C., Rashid S.A., Nur Atirah Wan Mohd Azemin W.S., Philip N.

Current antibiotics for leptospirosis: are still effective?

(2025) Heliyon, 11 (1), art. no. e41239

DOI: 10.1016/j.heliyon.2024.e41239

ABSTRACT: Leptospirosis is a recurring zoonotic disease of global significance. Leptospirosis is curable, and antibiotics are available for its treatment. However, little is known about the effectiveness of the currently used antibiotics against different Leptospira species, serovars, and strains. This review aimed to give insight into the anti-leptospiral activities of the currently available antibiotics towards Leptospira strains and their effectiveness in treating and preventing leptospirosis. Anti-leptospiral activities from natural resources were also reviewed. The literature search was conducted using several databases. The majority of Leptospira strains were sensitive to the current antibiotics. Antibiotics can accelerate the defervescence and reduced the occurrence of leptospirosis cases, nevertheless, there is no affirmative evidence on the beneficial effects of the antibiotics compared to placebo in preventing death. Adverse reactions like Jarisch-Herxheimer reactions (JHR) in patients treated with the current antibiotics were also reported. Plants, marine actinobacteria and propolis are shown as potential sources of new anti-leptospiral compounds. Although leptospirosis can still be adequately treated with current antibiotics, continuous susceptibility testing and the development of novel antibiotics especially from natural resources are highly encouraged.

LANGUAGE OF ORIGINAL DOCUMENT: English

Silva I.R.M., Takahashi M.B., Teixeira A.F., Nascimento A.L.T.O.

Evaluation of binding activities of a putative lipoprotein LIC_13355 of Leptospira spp.

(2024) FEBS Open Bio

DOI: 10.1002/2211-5463.13942

ABSTRACT: Pathogenic Leptospira is the etiological cause of the zoonotic life-threatening infection called leptospirosis. The disease is spread worldwide with higher risk in tropical regions. Although leptospirosis represents a burden to the health of humans and animals, the pathogenic mechanisms of Leptospira infection are yet to be clarified. Leptospirosis infection is multifactorial, involving functionally redundant proteins with the capability to invade, disseminate, and escape the host's immune response. In this work, we describe a putative lipoprotein encoded by the gene LIC_13355, genome annotated as hypothetical of unknown function. The coding sequence is conserved among pathogenic Leptospira spp. with high percentage of coverage and identity. The recombinant protein, rLIC_13355, was expressed in Escherichia coli host system in its insoluble form. The circular dichroism spectrum of the refolded protein showed it containing a mixture of secondary structures. rLIC_13355 interacts with extracellular matrix (ECM) component laminin and binds plasminogen (PLG), generating plasmin (PLA), thus possibly participating during the adhesion and dissemination processes. The rLIC_13355 has the ability to interact with Ea.hy926 and HMEC-1 endothelial cells either in monolayer or suspension. The binding of rLIC_13355 with monolayer cells is dose-dependent on protein concentration. Taken together, our data suggest that this is presumably an adhesion lipoprotein that may play diverse roles in host–Leptospira interactions by mediating the interaction with host components and with endothelial cell.

LANGUAGE OF ORIGINAL DOCUMENT: English

Acosta-España J.D., Romero-Alvarez D., Luna C., Rodriguez-Morales A.J.

Infectious disease outbreaks in the wake of natural flood disasters: global patterns and local implications

(2024) Infezioni in Medicina, 32 (4), pp. 451 - 462

DOI: 10.53854/liim-3204-4

ABSTRACT: Climate change is an urgent global health challenge, with floods becoming increasingly frequent and exacerbating the spread of infectious diseases. With its diverse climates and recurring natural disasters, Latin America is particularly susceptible to outbreaks following floods. These events disrupt ecosystems and create ideal conditions for the spread of waterborne and vector-borne pathogens. Floods also damage infrastructure, displace populations, and restrict access to clean water and healthcare services, further compounding public health risks. This review assesses the impact of floods on infectious disease outbreaks in Latin America, focusing on key epidemiological trends, vulnerabilities, and strategies for mitigation. This narrative review aims to analyse the incidence and transmission of infectious diseases during and after floods in Latin America. Particular emphasis is placed on waterborne diseases, such as cholera and leptospirosis, vector-borne diseases, including dengue and malaria, and respiratory infections in displaced populations. The review also considers how socioeconomic factors, healthcare limitations, and climate vulnerabilities amplify the public health risks in flood-affected regions. We extensively searched PubMed, Google Scholar, Scopus, Science Direct, and Web of Science from 2010 to May 2024, examining articles in English, Spanish, and Portuguese. The search focused on original descriptive studies on flooding and infectious diseases, particularly in Latin America. Keywords such as ‘flooding,’ ‘waterborne diseases,’ ‘vector-borne diseases,’ ‘skin and soft tissue infections,’ ‘respiratory infections,’ and specific disease names like leishmaniasis and malaria were employed. A descriptive analysis of the relevant articles was performed to synthesise the key findings. The results show a clear association between floods and infectious disease outbreaks in several countries. Waterborne diseases, especially cholera and leptospirosis, are frequently reported following floods due to contaminated water. Vector-borne diseases like dengue and malaria see increased transmission as stagnant water forms ideal breeding grounds for mosquitoes. Respiratory infections are also prevalent in overcrowded, unsanitary shelters for displaced populations. Additionally, fungal infections and skin diseases are notable concerns, especially in areas with prolonged exposure to floodwaters. Floods disproportionately affect vulnerable populations, particularly low-income areas with insufficient infrastructure and limited healthcare access. Climate change is likely to intensify the frequency and severity of floods further, increasing the health risks. Finally, this review underscores the critical need for improved disaster preparedness, enhanced healthcare infrastructure, and better water and sanitation systems in flood-prone regions. Strengthening public health interventions and implementing climate adaptation strategies are essential to mitigating the impact of infectious diseases in future flood events.

LANGUAGE OF ORIGINAL DOCUMENT: English

Sa'adatar Rohmah N., Aryanto S., Wiratama B.S., Ibrahim A.H.

Examining the mpact of rainfall patterns on leptospirosis cases in Bantul District, Indonesia: a four-year ecology study 2020-2023

(2024) BIO Web of Conferences, 132, art. no. 03002

DOI: 10.1051/bioconf/202413203002

ABSTRACT: Leptospirosis, a zoonotic illness induced by the pathogenic Leptospira bacteria, is a noteworthy public health issue, especially in regions with tropical climates. The primary objective of this investigation was to delve into the connection between precipitation patterns and the frequency of human leptospirosis cases in Bantul District, Indonesia, spanning the years 2020 to 2023. Employing an ecological approach, the study scrutinized instances of leptospirosis obtained from the Health Department of Bantul District, alongside rainfall data trends from the Meteorology, Climatology, and Geophysics Agency (BMKG) specifically from Climatology Station with the ID WMO 96851. The outcomes disclosed a total of 489 instances of leptospirosis over the specified four-year duration, with a conspicuous upsurge in recent times. Through the application of linear regression analysis, a substantial affirmative correlation between rainfall and leptospirosis occurrences was unveiled, underscoring the impact of environmental elements on disease manifestation. These findings enrich comprehension regarding the nexus between precipitation patterns and the risk of leptospirosis in tropical areas, underscoring the necessity of incorporating environmental aspects into strategies to prevent and manage diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Chaurasia R., Kamaraju S., Thresiamma K.C., Jayaprakash C., Eapen C.K., Sritharan M.

Urinary leptospiral sphingomyelinases as diagnostic markers of leptospirosis in dengue patients co-infected with leptospirosis

(2025) Diagnostic Microbiology and Infectious Disease, 111 (3), art. no. 116647
DOI: 10.1016/j.diagmicrobio.2024.116647
ABSTRACT: The study aims to evaluate the diagnostic potential of pathogen-specific leptospiral sphingomyelinases, LipL32, LipL41, and HbpA in human patients with dengue-leptospirosis coinfection. Patients (n-86), upon clinical evaluation, were categorized into Group I (n-37; leptospirosis), Group II (n-39; dengue-leptospirosis coinfection), and Group III (n-10; negative for both dengue and leptospirosis). ELISA identified significant levels of the four leptospiral antigens in the urine of Group I and II, but not in Group III patients. Immunoblot analysis of the urinary proteins with specific antibodies identified the tissue-damaging true sphingomyelinases Sph2 and pore-forming SphH. Urinary leptospiral antigens identified patients with leptospirosis and with dengue-leptospirosis coinfection. Patients with renal damage and proteinuria showed high urinary excretion of anti-leptospiral antibodies, with markedly low values in the serum. Proteinuria resulted in the loss of the circulating proteins, reflected by the low levels of anti-leptospiral antibodies in serum, with urine showing albumin and high levels of anti-leptospiral antibodies. IMPORTANCE: The study highlights the diagnostic potential of all four leptospiral antigens. Since early detection of urinary sphingomyelinases is possible, their diagnostic and prognostic potential can be evaluated on a larger sample size. Non-invasive, point-of-care diagnostic devices can be developed for use in endemic regions, particularly during monsoon seasons.
LANGUAGE OF ORIGINAL DOCUMENT: English

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

Leptospira seroprevalence and associated risk factors among slaughterhouse workers in Western Bahr El Ghazal State, South Sudan

(2024) PLoS neglected tropical diseases, 18 (12), pp. e0012700

DOI: 10.1371/journal.pntd.0012700

ABSTRACT: BACKGROUND: Leptospirosis is a neglected re-emerging and occupational zoonotic disease worldwide. In Africa, contact with livestock is postulated as a potential source of environmental contamination and a source of human Leptospira exposure, though pathways remain unknown. Recently, we confirmed Leptospira exposure and shedding among slaughtered cattle in Western Bahr El Ghazal. In the current study, we sought to determine corresponding occupational leptospiral seropositivity, associated risk factors and the prevalence of febrile illness among slaughterhouse workers. METHODS: Between 27th February and 30th March 2023, we collected blood and interviewed 250 consenting slaughterhouse workers of the same facilities from which the cattle samples were collected. The workers were screened for leptospiral antibodies using the Microscopic agglutination test (MAT), based on a panel of 12 including those previously reported in livestock in South Sudan and the East African Region. RESULTS: Of the 250 participants, 16 were seropositive 16/250, (6.4%, 95% CI = 3.2-10.2). Two seropositive individuals 0.8% (2/250) had MAT titers ≥ 800, indicative of probable recent leptospiral infection. Moreover, 42.4% (106/250) of the respondents reported experiencing fever in the past one month and 36.0% (90/250) sought medical attention. Among those seeking medical care for febrile illnesses, diagnostic tests revealed 9.2% (23/250) with malaria, 7.6% (19/250) with typhoid, 16.8% (42/250) with both malaria and typhoid coinfections, 1.6% (4/250) with brucellosis, and no cases of leptospirosis had been considered. Most seropositive individuals reacted to serovar L. borgpetersenii Tarassovi 2.4% (6/250) and L. interrogans sv Australis 2.4% (6/250). The factors associated with seropositivity included flaying, with persons who flay animals having 14.9 times, (95% CI, 2.5-88.9) greater odds of being seropositive than persons who do not flay animals (P = 0.003), people who wore an apron/overall were 10.6 times (95% CI, 1.6-67.6) more likely to be seropositive than people who did not wear an apron/overall (P = 0.012). An increase in the number of carcasses handled per day by one increases the odds of exposure by 2.7 times (95% CI, 1.6-4.5), (P = 0.001). CONCLUSION: Finding seropositive workers in cattle slaughter facilities in Western Bahr El Ghazal, South Sudan, and similar serogroups as previously found in the cattle slaughtered at these facilities implies activities like animal slaughter that bring humans into close contact with animals could be one pathway for human Leptospira exposure in South Sudan. This could also highlight leptospirosis as a potential public health threat to those in frequent contact with cattle, including farmers, those in animal transportation, and veterinarians. The role of leptospirosis in cases of undifferentiated fever in South Sudan may also be worth investigating, especially in cases where occupational exposure is suspected. Further research including animals, the general public, farmers, and hospitalized patients is proposed to fully understand the burden of human leptospirosis. Including the serovar and serogroup Tarassovi and Australis in future vaccine development and serodiagnostic panels for South Sudan is highly recommended.

LANGUAGE OF ORIGINAL DOCUMENT: English

Ruiz R.M.P., Rodríguez R.V., Sánchez R.S., Licea B.M.S., Navarro A.R., Aguilera L.M.P., Navarro A.R., Galano A.Á., Domínguez-Horta M.C.

Compassionate use of Jusvinza in the treatment of a patient with severe Leptospirosis associated with the Jarisch Herxeimer reaction [Uso compasivo de Jusvinza en el tratamiento de un paciente con leptospirosis grave asociada con la reacción de Jarisch Herxeimer]

(2024) Revista Cubana de Medicina Militar, 53 (3), art. no. e024059934

ABSTRACT: Introduction: Approximately 10% of human leptospirosis cases progress to severe forms, among which Weil syndrome stands out. This condition can be aggravated by complications associated with

antibiotics, such as the Jarisch Herxeimer reaction (JHR) that intensifies inflammation. Treatment with Jusvinza may be an option for these states mediated by hyperinflammation. Objective: To describe the clinical evolution of a patient with leptospirosis and Weil's syndrome who developed the JHR and was treated with Jusvinza. Case Report: 50-year-old male patient was diagnosed with Leptospirosis, which progressed to a serious condition and Weil syndrome and received treatment with ceftriaxone, as result he developed JHR, which led to the use of mechanical ventilation and the compassionate use of Jusvinza. The clinical, radiological, and humoral improvement was evident 48 hours after starting treatment. Conclusions: Treatment with Jusvinza induced a decrease in several biomarkers of systemic inflammation and contributed to the patient's recovery. These results indicate that Jusvinza may be an effective option for the treatment of severe forms of Leptospirosis and its complications, associated with hyperinflammation.
LANGUAGE OF ORIGINAL DOCUMENT: Spanish

Tumiat, Mukhibin A., Maula A.W.

Performance evaluation of EWARS (early warning and response system) for leptospirosis cases in Kebumen district health office in 2023

(2024) BIO Web of Conferences, 132, art. no. 03003
DOI: 10.1051/bioconf/202413203003
ABSTRACT: This study aimed to evaluate the performance of the early warning and response system (EWARS) in the Kebumen District Health Office in 2023, with a focus on the early detection of leptospirosis cases. This descriptive evaluation study used secondary data from the EWARS platform. The data was retrieved from the website web.skdr.surveilans.org. The timeliness of EWARS reporting at community health centers and hospitals in 2023 was 95.42% and 96.23%, respectively. The completeness of EWARS reports at community health centers and hospitals in 2023 was 100%, respectively. Community health centers reported 314 alerts, while 413 were reported from hospitals during 2023. The most frequently reported alert from hospitals was leptospirosis. In the EWARS, 66 cases of leptospirosis were reported at week 11. Alerts from hospital reports from week 1 to week 11 were increasing. An alert from the health center report appeared in the 9th week. The response that has been made is improving health awareness of leptospirosis around the affected community health centers and hospitals in the Kebumen area. The verification of cases from hospitals was 93.46% and verified within 24 hours. The timeliness and completeness of EWARS reporting in Kebumen District have surpassed the national targets of 80% and 90%, respectively. In the case of leptospirosis, community health centers need to increase early detection of symptoms and risk factors for leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Vista F.E.S., De Galicia B.P.D.

Antibacterial activity of crude Momordica charantia, Cassia alata, and Allium sativum methanolic extracts on Leptospira interrogans serovar Manilae

(2024) Acta Medica Philippina, 58 (22), pp. 29 - 34
DOI: 10.47895/amp.vi0.8362
ABSTRACT: Background and Objective. Leptospirosis is a disease caused by pathogenic Leptospira prevalent in tropical countries like the Philippines. Some studies have shown that the role of currently used antibiotics for leptospirosis is unclear since trials have found no significant benefit to patient outcomes compared to placebo. This signals the need for alternative therapies, such as herbal medicines, which may provide effective

therapeutic regimens in treating this infection. In this study, we characterized the antibacterial potential of three Philippine herbal medicines against Leptospira interrogans. Methods. Crude methanolic extracts of Momordica charantia, Cassia alata, and Allium sativum were subjected to an optimized broth microdilution assay against L. interrogans, utilizing the resazurin-resorufin reaction as a cell proliferation and viability indicator. Results. The respective minimum inhibitory concentrations of the plants were found to be as follows: 1.25 mg/mL (M. charantia), 2.5 mg/mL (C. alata), and >5 mg/mL (A. sativum). Conclusions. Among the three herbal medicines, M. charantia and C. alata proved to have antibacterial activity against L. interrogans. Given the promising potential of two of these plant extracts, exploring the use of other solvents to extract natural compounds from these plants, and discovering possible synergistic effects between these plants and conventional antibiotics may be worthwhile.
LANGUAGE OF ORIGINAL DOCUMENT: English

Chen J.-J., Lv C.-L., Wang T., Wang Y.-H., Che T.-L., Xu Q., Hong X.-G., Teng A.-Y., Tian S., Zhang Y.-Y., Liu M.-C., Wang L.-P., Hay S.I., Yang Y., Fang L.-Q., Liu W.

Small mammals and associated infections in China: a systematic review and spatial modelling analysis

(2025) The Lancet Regional Health - Western Pacific, 54, art. no. 101264
DOI: 10.1016/j.lanwpc.2024.101264
ABSTRACT: Background: As natural reservoirs of diverse pathogens, small mammals are considered a key interface for guarding public health due to their wide geographic distribution, high density and frequent interaction with humans. Methods: All formally recorded natural occurrences of small mammals (Order: Rodentia, Eulipotyphla, Lagomorpha, and Scandentia) and their associated microbial infections in China were searched in the English and Chinese literature spanning from 1950 to 2021 and geolocated. Machine learning models were applied to determine ecological drivers for the distributions of 45 major small mammal species and two common rodent-borne diseases (RBDs), and model-predicted potential risk locations were mapped. Findings: A total of 364 small mammal species collectively carrying 155 small mammal-associated microbes (SMAMs) combined with 215,791 human cases of eight RBDs were reported in 2484 counties in China. Murid rodents (Family: Muridae) including the brown rat (Rattus norvegicus), the house mouse (Mus musculus), and the striped field mouse (Apodemus agrarius) are the most widespread species, while Rattus norvegicus harbored the highest variety of SMAMs (75 species), followed by the tanezumi rat (Rattus tanezumi) (68 species). The top three SMAMs that infest the highest variety of small mammal species are Yersinia pestis (58 small mammal species), Bartonella grahamii (36 species), and Orientia tsutsugamushi (33 species). The 45 major species of small mammals were grouped into six ecological clusters based on their ecological niche, mainly driven by annual mean temperature, temperature seasonality, total precipitation, and elevation. Model-predicted presence areas for the 45 major small mammal species and two RBDs were 1–499% larger in geographic size than observed. Interpretation: The extensive intersection between small mammals and microbes with pathogenic potential in humans poses imminent threats to public health. Active field surveillance should be prioritized for potential high-risk areas identified in this study to prevent zoonotic transmission of SMAMs. Funding: National Key Research and Development Program of China; Natural Science Foundation of China; The U.S. Centers for Disease Control and Prevention.
LANGUAGE OF ORIGINAL DOCUMENT: English

Priyankara D., Ruwanpathirana P., Rambukwella R., Perera N.

Sequential pulmonary functions in survivors of leptospirosis pulmonary haemorrhage syndrome: a prospective cohort study

(2024) Tropical Medicine and Health, 52 (1), art. no. 96

DOI: 10.1186/s41182-024-00665-6

ABSTRACT: Background: Leptospirosis, a spirochaete infection, can lead to Leptospirosis Pulmonary Haemorrhage Syndrome (LPHS), which requires intensive care admission and has a high mortality. Although data on short-term outcomes are available, the long-term respiratory sequelae of LPHS survivors are not known. We aimed to identify the post-discharge pulmonary functions and functional limitations in survivors of LPHS. Methods: We conducted a prospective cohort study from January to December 2022 at the Medical Intensive Care Unit (ICU) of the National Hospital of Sri Lanka to assess the sequential changes in the spirometry parameters in patients who survived LPHS. The Forced Vital Capacity (FVC) and Forced Expiratory Volume in 1 s (FEV1) were measured on the day of discharge from the ICU (D0), 7th day after discharge (D7) and 28th day after discharge (D28). The predicted lung volume was calculated using the gender, age and height as per standard protocol. Physical and functional role limitations were assessed on D28 using the modified Medical Outcomes Study Questionnaire Short Form 36 Health Survey (SF-36). Results: Twenty-one patients with a mean age of 44 years (SD 16.07) were enrolled for the study. The majority were male patients (n = 19, 90.5%). Leptospirosis was serologically confirmed in all individuals. Seventeen (81%) patients had reduced FEV1 and FVC on D0, indicating a restrictive lung abnormality. FVC and FEV1 improved during the first 7 days ($p < 0.01$) but did not change significantly afterwards. Only seven individuals (33.3%) achieved a normal FVC (exceeding 80% of the predicted volume) at D28. However, 19 (90.5%) individuals achieved a normal FEV1 (exceeding 80% of predicted volume) by D28. In our study, administering corticosteroids during ICU stay did not impact lung recovery in FVC ($p = 0.521$) or FEV1 ($p = 0.798$). The participants did not have significant physical, functional, and role limitations at D28. Conclusions: The spirometry measurements of individuals diagnosed with LPHS significantly improved during the first 7 days. Most survivors did not have a functional impairment despite the FVC not recovering to normal by D28.

LANGUAGE OF ORIGINAL DOCUMENT: English

McCreight K.A., Barbosa L.N., Odoi A., Reed P., Rajeev S.

Leptospira seroprevalence in dogs, cats, and horses in Tennessee, USA

(2024) Journal of Veterinary Diagnostic Investigation

DOI: 10.1177/10406387241299880

ABSTRACT: We estimated the Leptospira seroprevalence in dogs, cats, and horses from Tennessee, USA, using the microscopic agglutination test (MAT) against 12 Leptospira serovars. We observed Leptospira seropositivity in 110 of 374 (29.4%) dogs, 21 of 170 (12.4%) cats, and 42 of 88 (47.7%) horses. The highest seroprevalence was observed for serovars Autumnalis (74.6%) in dogs, and Bratislava in cats (42.9%) and horses (95.2%). We found a significant level of potential cross-reactivity between multiple Leptospira serovars tested, with highest cross-reactivity to serovar Autumnalis in dogs. Leptospira seroprevalence was significantly higher in vaccinated dogs (45 of 98 [46%]) compared to unvaccinated dogs (14 of 86 [16%]; $p < 0.001$). A significant difference in seroprevalence was observed in vaccinated and unvaccinated dogs to all 4 serovars included in canine leptospiral vaccines ($p < 0.001$). We also evaluated the Leptospira testing results from our diagnostic laboratory submissions from 2021–2023; 103 of 252 (40%) canine serum samples were positive,

with the highest positivity rate for serovar Autumnalis. On Leptospira real-time PCR, 35 of 325 (10.7%) urine samples and 15 of 257 (5.8%) blood samples were positive. The cross-reactivity between the Leptospira serovars used in the MAT and vaccination status should be considered when estimating seroprevalence.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ribeiro P.D.S., Stasko J., Shircliff A., Fernandes L.G., Putz E.J., Andreasen C., Azevedo V., Ristow P., Nally J.E.
Investigations into the growth and formation of biofilm by Leptospira biflexa at temperatures encountered during infection
(2025) Biofilm, 9, art. no. 100243
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ABSTRACT: The genus Leptospira comprises unique atypical spirochete bacteria that includes the etiological agent of leptospirosis, a globally important zoonosis. Biofilms are microecosystems composed of microorganisms embedded in a self-produced matrix that offers protection against hostile factors. Leptospires form biofilms in vitro, in situ in rice fields and unsanitary urban areas, and in vivo while colonizing rodent kidneys. The complex three-dimensional biofilm matrix includes secreted polymeric substances such as proteins, extracellular DNA (eDNA), and saccharides. The genus Leptospira comprises pathogenic and saprophytic species with the saprophytic L. biflexa being commonly used as a model organism for the genus. In this study, the growth and formation of biofilms by L. biflexa was investigated not just at 29 °C, but at 37 °C/5 % CO2, a temperature similar to that encountered during host infection. Planktonic free-living L. biflexa grow in HAN media at both 29 °C and 37 °C/5 % CO2 but cells grown at 37 °C/5 % CO2 are longer (18.52 μm ± 3.39) compared to those at 29 °C (13.93 μm ± 2.84). Biofilms formed at 37 °C/5 % CO2 had more biomass compared to 29 °C, as determined by crystal violet staining. Confocal microscopy determined that the protein content within the biofilm matrix was more prominent than double-stranded DNA, and featured a distinct layer attached to the solid substrate. Additionally, the model enabled effective protein extraction for proteomic comparison across different biofilm phenotypes. Results highlight an important role for proteins in biofilm matrix structure by leptospires and the identification of their specific protein components holds promise for strategies to mitigate biofilm formation.
LANGUAGE OF ORIGINAL DOCUMENT: English

Griebsch C., Kirkwood N., Ward M.P., Norris J.M.
Serovar Australis replaces serovar Copenhageni as the most common cause of canine leptospirosis in New South Wales, Australia
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ABSTRACT: Highly fatal canine leptospirosis emerged in urban Sydney dogs in 2017, and serovar Copenhageni, against which a registered monovalent vaccine is available, was predominant until 2020. This study was conducted to (1) determine serological characteristics of canine leptospirosis in New South Wales (NSW) between 2021 and 2023; (2) describe the geospatial distribution of leptospirosis; and (3) evaluate if clinicopathological abnormalities and outcome differ between the dominant infecting serovars, Copenhageni versus Australis. Cases were identified through referral or direct veterinarian contact and included if clinical and clinicopathological findings confirmed leptospirosis. Between 2021 and 2023 leptospirosis was confirmed in 61 dogs in NSW. In 2022 two major outbreaks occurred in the local government areas of Shoalhaven (n =

23) and Lake Macquarie (n = 7). The most common serovar identified by microscopic agglutination test (MAT) was Australis (n = 23) followed by Copenhageni (n = 8), Pomona (n = 2), Robinsoni (n = 2) and Bratislava (n = 1). In 16/18 cases from Shoalhaven in which serological results were available, serovar Australis was identified. Dogs infected with serovar Copenhageni were significantly ($P < 0.05$) more likely to have hepatic involvement with significantly higher liver enzyme activities, bilirubin concentration and icterus, whereas dogs with serovar Australis were significantly ($P < 0.01$) more likely to have glucosuria. Overall case fatality rate was 40% and was not different between infecting serovars. There are regional differences of infecting serovars with distinct leptospirosis hotspots, and differences in clinicopathological findings. The apparent emergence of serovar Australis highlights the need for bi- or multivalent vaccines and ongoing case surveillance of causal serovars is needed. Glucosuria should prompt leptospirosis testing in endemic areas.
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