Feline TB – a selection of references from a search in CAB Abstracts database

<1>
Accession Number
20163270595
Author
Morley, J.; Gunn-Moore, D.; Hope, J.
Title
Investigating vitamin D metabolism in cats with tuberculosis caused by infection with Mycobacterium bovis and Mycobacterium microti.
Source
Publisher
British Small Animal Veterinary Association
Location of Publisher
Quedgeley
Country of Publication
UK
Publication Type
Conference paper.

<2>
Accession Number
20163120989
Author
Title
Herd outbreak of bovine tuberculosis illustrates that route of infection correlates with anatomic distribution of lesions in cattle and cats.
Source
Publisher
American Association of Veterinary Laboratory Diagnosticians
Location of Publisher
Davis
Country of Publication
USA
Abstract
An outbreak of bovine tuberculosis (TB) in a Michigan dairy herd resulted in quarantine, depopulation, pathology, and epidemiologic investigations. This herd, compared to other TB-infected herds in Michigan, was unusual in the long-term feeding of waste milk to its replacement calves. The herd had 80 cattle with positive results on caudal fold test or gamma interferon testing, which were reclassified as suspects because the herd had never been known to be tuberculous previously. Autopsy revealed striking variation in the anatomic distribution of gross anatomic lesions, microscopic lesions, and culture-positive lymph nodes between the adult cattle, the calves, and the domestic cats present on the farm. Adult cattle had lesions and...
culture-positive lymph nodes predominantly within the thoracic lymph nodes, whereas cats had 50% of their lesions and culture-positive lymph nodes in their abdomens, and 50% of positive calves had culture-positive lymph nodes in their abdomens. This difference in anatomic distribution correlated with the likely routes of infection, which are believed to be by direct airborne transmission in adult cattle and indirect ingestion of contaminated milk in both calves and cats. Although TB literature over the past 100-plus years states that the route of infection may manifest itself in differences in lesion anatomic distribution, our team has been working with TB for over 20 years, and we have never encountered such striking variation between different groups of animals on the same farm.

Publication Type
Journal article.

In many federal states tuberculosis has sporadically been detected over the years in livestock, companion animals, zoo animals and wildlife. The present report summarizes cases which have been processed in the national veterinary reference laboratory for tuberculosis between 2002 and 2014. Furthermore, tuberculosis in red deer in Bavaria is mentioned. Bovine tuberculosis in cattle is excluded from these considerations. Mycobacterium (M.) bovis was detected twice in swine, in two cats, a psittacid bird, twice in wild boar and in different animal species in one animal park and two zoos. Red deer was identified as wildlife reservoir for M. caprae in the alpine region. Furthermore, M. caprae was isolated from one sheep and one pig. M. microti, the primary causative agent for tuberculosis in wild rodents was isolated from free ranging carnivorous and omnivorous animal species (marten, raccoon, fox, badger, wild boar) as well as four domestic cats having access to natural environment, furthermore in one domestic pig and different exotic species, e. g. squirrel monkey, coati, tapir and llama. M. pinnipedii, causing tuberculosis primarily in seals, was isolated in a zoological garden over several years from seals and other zoo animal species (camel, tapir). M. tuberculosis was isolated from a dog, a parakeet, a pony, an Asian elephant and a pig kept on a cattle farm with tuberculin skin test-positive cattle. The suspicion was confirmed in most cases by isolation of the pathogen post mortem.

Publication Type
Journal article.
20153071085
Author
Ramdas, K. E. F.; Lyashchenko, K. P.; Greenwald, R.; Robbe-Austerman, S.; McManis, C.; Waters, W. R.
Title
Mycobacterium bovis infection in humans and cats in Same household, Texas, USA, 2012.
Source
Emerging Infectious Diseases; 2015. 21(3):480-483. 15 ref.
Publisher
National Center for Infectious Diseases, Centers for Disease Control and Prevention
Location of Publisher
Atlanta
Country of Publication
USA
Abstract
Mycobacterium bovis infection of cats is exceedingly rare in regions where bovine tuberculosis is not endemic. We describe the diagnosis and clinical management of pulmonary M. bovis infection in 2 indoor-housed cats and their association with at least 1 M. bovis-infected human in Texas, USA, in September 2012.
Publication Type
Journal article.

<5>
Accession Number
20153068443
Author
Murray, A.; Dineen, A.; Kelly, P.; McGoey, K.; Madigan, G.; NiGhallchoir, E.; Gunn-Moore, D. A.
Title
Nosocomial spread of Mycobacterium bovis in domestic cats.
Source
Publisher
Sage Publications
Location of Publisher
Thousand Oaks
Country of Publication
USA
Abstract
Five domestic cats were euthanased owing to confirmed or suspected Mycobacterium bovis infection. The initial source of infection remains unclear. Cat A was presented to a veterinary clinic in County Kildare, Ireland, with a discharging submandibular lesion. The infection appears to have been transmitted to four other cats through direct (cats B and C living in the same household as cat A) and non-direct (nosocomial spread during routine operations; cats D and E) contact over a 13.5-week period. Of the five cases, two (B and D) had post-mortem examinations in which gross changes consistent with tuberculosis were seen, moderate numbers of acid-fast bacteria (AFB) were seen on microscopy and M. bovis (spoligotype SB0978) was confirmed on culture. Of the remaining three cats, one had a swab taken from its draining ovariohysterectomy wound, which revealed large numbers of AFB with morphology consistent with M. bovis (cat E). Two cases were euthanased without diagnostic tests; however, their history and clinical presentations were highly suggestive of tuberculosis (cats A and C). To our knowledge, this is the first documented case of nosocomial spread of M. bovis in cats.
Publication Type
Journal article.
Accession Number
20153002254
Author
Pesciaroli, M.; Alvarez, J.; Boniotti, M. B.; Cagiola, M.; Marco, V. di; Marianelli, C.; Pacciarini, M.; Pasquali, P.
Title
Tuberculosis in domestic animal species. (Special Issue: Bovine tuberculosis.)
Source
Research in Veterinary Science; 2014. 97(Suppl.):S78-S85. many ref.
Publisher
Elsevier Ltd
Location of Publisher
Oxford
Country of Publication
UK
Abstract
M. bovis and M. caprae, members of the Mycobacterium tuberculosis complex (MTC), are the major causative agents of tuberculosis in domestic animals. Notably, M. bovis exhibits a wide host range; the infection has been reported in many domesticated animals and free or captive wildlife. Despite most of them acting as spill-over hosts in particular epidemiological scenarios, some domesticated species as pigs, camelids and goats may display high rates of infection and possibly play a role in the inter-species transmission of the disease. The aim of this review is to make an updated overview of the susceptibility and the role in the transmission of the disease of the most common domesticated animals species such as small ruminants, pigs, horses, camelids, dogs and cats. An overview of the diagnostic approaches to detect the infection in each of the species included in the review is also presented.
Publication Type
Journal article.

Accession Number
20143308154
Author
Gunn-Moore, D. A.
Title
Feline mycobacterial infections. (Special Issue: Feline infectious diseases.)
Source
Veterinary Journal; 2014. 201(2):230-238. many ref.
Publisher
Elsevier Ltd
Location of Publisher
Oxford
Country of Publication
UK
Abstract
Mycobacteria of feline importance include (1) obligate pathogens (tuberculosis), (2) mycobacteria that are difficult to grow, so the environmental niche is unknown (feline leprosy syndrome), and (3) facultative pathogenic opportunistic saprophytes (non-tuberculous mycobacteriosis). Most cats present with cutaneous
disease, although some have systemic involvement. Diagnosis is challenging because there are no pathognomonic histopathological changes and many mycobacteria fail to culture, so molecular diagnostics are required. Treatment can involve extended multidrug therapy and prognosis is variable. This article reviews the microbiology, clinical diagnosis, management and prognosis of feline mycobacterial infections.

Publication Type
Journal article.
<10>
Accession Number
20143082214
Author
Gunn-Moore, D.
Title
Feline mycobacterial infections - Part One: Causes and clinical signs.
Source
Veterinary Times; 2014. 44(10):11-13. 18 ref.
Publisher
Veterinary Business Development Ltd
Location of Publisher
Peterborough
Country of Publication
UK
Publication Type
Journal article.

<11>
Accession Number
20143035366
Author
Broughan, J. M.; Crawshaw, T. R.; Downs, S. H.; Brewer, J.; Clifton-Hadley, R. S.
Title
Source
Veterinary Journal; 2013. 198(2):346-351. many ref.
Publisher
Elsevier Ltd
Location of Publisher
Oxford
Country of Publication
UK
Abstract
Despite the large host range of Mycobacterium bovis, ante-mortem diagnostic tests for the infection mostly lack sensitivity/specificity and/or remain unvalidated in non-bovine species. The epidemiology and importance of M. bovis infection in these species are discussed in the first part of this two-part review. This second part focuses on the diagnostic options available to identify infected species such as sheep, goats, dogs, cats, and camelids, and highlights the significant challenges posed, both in establishing estimates of disease prevalence and in controlling infections in these species, in the absence of fully validated tests.
Publication Type
Journal article.

<12>
Accession Number
20143035365
Author
Broughan, J. M.; Downs, S. H.; Crawshaw, T. R.; Upton, P. A.; Brewer, J.; Clifton-Hadley, R. S.
Title
Source
Veterinary Journal; 2013. 198(2):339-345. many ref.
Publisher
Elsevier Ltd
Location of Publisher
Oxford
Country of Publication
UK
Abstract
Mycobacterium bovis, the causative agent of bovine tuberculosis (bTB), can infect a broad range of mammalian species in addition to domestic and feral cattle and badgers. Since legislation introduced in 2006 in Great Britain requires animal keepers, meat inspectors and veterinarians to notify the authorities of suspect bTB lesions or the isolation of M. bovis in any mammal excluding humans, the organism has been increasingly identified in domestic species other than cattle. Although in most cases 'spill-over' hosts, these remain a potential source of infection for cattle, wildlife, and possibly humans. In this first part of a two-part review of M. bovis infections in non-bovine domestic species, current knowledge of the epidemiology of such infections is presented along with novel data relating to diagnostic submissions for mycobacterial culture between 2004 and 2010. Over this period M. bovis infection was identified in 116 cats, 7 dogs, 34 llamas, 133 alpacas, 35 goats, 24 sheep and 85 pigs and wild boar. The risk that such infections pose to the control of bTB, and as zoonoses, is discussed. In part two, the options available to diagnose bTB in these species, as well as the challenges posed to disease detection and control will be discussed in depth.
Publication Type
Journal article.

Accession Number
20133262697
Author
Gunn-Moore, D. A.; Gaunt, C.; Shaw, D. J.
Title
Incidence of mycobacterial infections in cats in Great Britain: estimate from feline tissue samples submitted to diagnostic laboratories.
Source
Transboundary and Emerging Diseases; 2013. 60(4):338-344. 25 ref.
Publisher
Wiley-Blackwell
Location of Publisher
Berlin
Country of Publication
Germany
Abstract
The aim of this study was to estimate the incidence of mycobacterial infections in cats in Great Britain (GB). This was performed using the proxy measure of feline tissue samples submitted to diagnostic laboratories in GB that were found to have histopathological changes typical of mycobacterial infection ('MYC'). Sixteen primary diagnostic laboratories were asked for information on the number of feline samples submitted in
2009, the number with MYC, the number undergoing Ziehl-Neelsen (ZN) staining and, for comparison, the number diagnosed with lymphoma. Eight laboratories provided full data for the whole year: 11 782 samples; lymphoma 3.2% (mean, 95% CI: 2.89, 3.5), MYC 1.16% (0.98; 1.37) and ZN-positive 0.31% (0.22; 0.43). Data on 1569 samples from seven laboratories that provided partial data on samples for the whole year revealed similar results, although all changes were more frequent: lymphoma 5.42% (4.35; 6.66), MYC 2.36% (1.66; 3.23) and ZN-positive 0.77% (0.40; 1.33). One laboratory only provided data for part of the year (4.5 months), reporting all three types of histopathology less frequently: 18 232 samples; lymphoma 0.2% (0.18; 0.32), MYC 0.07% (0.04; 0.12) and ZN-positive 0.05% (0.02; 0.09). The reasons for low reporting rates in this high-throughput laboratory are unclear. In total, 187 samples were reported as having MYC. Five Reference laboratories were also contacted, reporting 174 feline tissue submissions in 2009, with mycobacteria being cultured from 90. The study shows that MYC are frequently reported in tissue samples from cats in GB, being reported in ~1% of samples, with confirmation as ZN-positive in ~0.3%. Lymphoma is recognized as a common disease in cats, being seen in ~3% of samples in this study. When compared against MYC, lymphoma was reported only twice as frequently. This confirms that far from being rare, clinically significant mycobacterial infections occur commonly in cats in GB.

Publication Type
Journal article.

Accession Number
20133254345

Author

Title
Mycobacterioses in cats: ABCD guidelines on prevention and management. (Special Issue: Infectious diseases, Part 2.)

Source

Publisher
Sage Publications

Location of Publisher
Thousand Oaks

Country of Publication
USA

Abstract
Overview: Mycobacterial infections are important in humans and animals. Cats can be infected by several Mycobacterium species, which may cause different syndromes, mainly tuberculosis, atypical or non-tuberculous mycobacteriosis and leprosy. In recent years, awareness has increased about how to recognise and confirm these infections. More cases are diagnosed today, which probably means that the disease has escaped detection in the past. Infection: Most cases in cats are cutaneous, presenting as nodules in the skin and draining tracts, ulceration and local lymphadenopathy; however, systemic dissemination may also occur. Diagnosis: Definitive diagnosis is difficult when the bacterium cannot be detected by histology or culture. However, species confirmation is essential for treatment and prognosis, so material for culture and polymerase chain reaction should be submitted in every suspected case. Treatment: Treatment is challenging. A combination of two or three antibiotics is needed, and treatment must be continued for some months, which makes owner compliance especially difficult in cats. Zoonotic risk: There is a zoonotic risk associated with some mycobacterial species. Concerns should be communicated in every case of an immunocompromised owner in contact with an infected cat.

Publication Type
Journal article.
Domesticated cats with active mycobacteria infections have low serum vitamin D (25(OH)D) concentrations.

Vitamin D insufficiency is regularly observed in human patients with tuberculosis but it is unknown if spontaneous mycobacteria infections in other species are associated with suboptimal vitamin D status. Serum 25 hydroxyvitamin D (25(OH)D) concentrations were significantly lower in cats with mycobacteriosis than in healthy cats (P<0.001).

Comparative study of IFN gamma and antibody tests for feline tuberculosis.

This study describes the comparison of the cell-based interferon-gamma (IFN gamma) test with serological rapid antibody tests (STAT-PAK and DPP VetTB) for the ante mortem testing of tuberculosis in domestic cats. The antibody specificities of rapid antibody test-positive cats were further discerned using multi-antigen print immunoassay. A total of 62 cats with culture-confirmed Mycobacterium bovis, Mycobacterium microti, Mycobacterium avium and Mycobacterium malmoense, as well as negative controls and dangerous-contact cats were tested. Tests were also applied longitudinally to one further cat undergoing TB chemotherapy for suspected M. bovis infection. Our data from this small study show excellent test specificity (100% for all cats).
tests) and encouraging levels of test sensitivity for M. bovis and TB Complex infections (IFN gamma 70-100% depending upon test interpretation criteria; rapid tests both 90% for M. bovis infection and up to 46.2% for M. microti infection). The differential diagnosis of very pathogenic TB Complex (M. bovis, Mycobacterium tuberculosis), as opposed to less-pathogenic TB Complex (M. microti) was possible where positive responses to the protein cocktail ESAT6/CFP10 were observed (80% of M. bovis-infected cats in this study showed positive IFN gamma responses to ESAT6/CFP10, while 20% had antibody responses to ESAT6/CFP10 using MAPIA). Finally, preliminary data from a longitudinal study of one M. bovis-exposed cat with a positive IFN gamma test pre-treatment suggest that a decrease in bacterial burden may be reflected in the IFN gamma response, and thus the IFN gamma test may provide a monitor for TB chemotherapy.

Publication Type
Journal article.

Accession Number
20103330387

Author

Title
Comparison of three immunodiagnostic assays for antemortem detection of Mycobacterium bovis stimulation in domestic cats.

Source

Publisher
American Association of Veterinary Laboratory Diagnosticians

Location of Publisher
Davis

Country of Publication
USA

Abstract
Mycobacterium bovis causes disease in numerous mammalian species including humans, thus making research, surveillance, and control important in the eradication of tuberculosis. Domestic cats are susceptible to multiple mycobacterial species including Mycobacterium bovis; however, their role in the epidemiology of bovine tuberculosis is not fully documented. The current study was an evaluation of the immune response in specific pathogen-free (SPF) cats stimulated with sensitinogen, a heat-killed M. bovis product, using the rapid test, multiple antigen print immunoassay (MAPIA), and bovine-purified protein derivative (bPPD) single skin test. Six cats were inoculated with sensitinogen subcutaneously on days 0 and 24; 2 noninoculated cats and 49 non-SPF cats were controls. Serial serum samples were collected during 135 days and assayed for M. bovis antibodies by rapid test and MAPIA. On day 123, bPPD skin test was performed and read at 48 and 72 hr. The bPPD test at 72 hr had a mean skin thickness of 0.3 mm for stimulated cats and 0.1 mm for controls. Rapid test identified 4 of 6 stimulated cats after bPPD injection. The MAPIA detected antibody against MPB83, 16/83, 16 kDa, and M. bovis culture filtrate (MBCF) antigens. All assays differentiated between stimulated and control cats; however, 7 of 49 non-SPF control cats had a reaction for either antigen MBCF or 16/83. These preliminary studies show potential for antemortem detection of M. bovis among domestic cats. Additional studies to better characterize virulent M. bovis infection in cats would be of value.

Publication Type
Journal article.
There are currently no reliable immunodiagnostic tests for feline tuberculosis. Infection of domestic cats in the UK is thought to occur via their contact with the relevant reservoir of infection, e.g. cattle and badgers for Mycobacterium bovis, and rodents for M. microti. In the African National Parks, where M. bovis infection of Bovidae is an increasing problem, transmission to big cats is occurring via their ingestion of infected carcasses. We have adapted feline ELISA and ELISPOT assays to potentially provide the first cell-based diagnostic test for the detection of tuberculosis in cats. We tested peripheral blood mononuclear cell antigen-specific IFN-gamma responses of 18 cats suspected of mycobacterial infection for which biopsy material was co-submitted to the Veterinary Laboratories Agency for mycobacterial culture and identification.

Seventeen cats were tested by ELISA while seven cats were tested by ELISPOT (six cats were tested by both ELISA and ELISPOT). Six healthy control cats provided baseline data for these tests. Responses to bovine and avian tuberculins (PPDB and PPDA) and a protein cocktail of ESAT6 and CFP10 were measured, together with positive mitogen (PMA and calcium ionophore) and negative (medium) controls. Overall, both ELISPOT and ELISA tests were found to be suitable for generating rapid results (2 and 4 days, respectively), which provided good predictive information for M. bovis and M. microti infections, but were unable to reliably discern M. avium infection.
a pinhead and those in the kidneys were 0.2-0.5 cm in diameter. The mediastinal lymph nodes were observed to be enlarged, and their cut surfaces displayed nodules of a similar appearance and size. Microscopic examination revealed typical tubercles in the cerebrum, cerebellum, kidneys, and mediastinal lymph nodes. The presence of Mycobacterium tuberculosis either free or located within the cytoplasm of macrophages was demonstrated by means of the avidin-biotin complex peroxidase method.

Publication Type
Journal article.

<20>
Accession Number
20083079135
Author
Rhodes, S. G.; Gruffydd-Jones, T.; Gunn-Moore, D.; Jahans, K.
Title
Interferon- gamma test for feline tuberculosis.
Source
Publisher
British Veterinary Association
Location of Publisher
London
Country of Publication
UK
Abstract
An interferon- gamma ELISPOT assay for the diagnosis of Mycobacterium bovis infection in cats is described.
Publication Type
Journal Article.

<21>
Accession Number
20063221307
Author
Buick, W.
Title
TB in domestic species other than cattle and badgers. (Special Issue: Bovine TB.)
Source
Publisher
Department for Environment, Food and Rural Affairs (DEFRA)
Location of Publisher
London
Country of Publication
UK
Publication Type
Journal article.
Feline mycobacterial syndromes include tuberculosis, leprosy and opportunistic mycobacteriosis. The decision to treat a cat with tuberculosis is always controversial especially when Mycobacterium tuberculosis or Mycobacterium bovis infection are recognized. When treatment is considered, the owner must know the zoonotic risk and that it is a long and expensive procedure. The current chemotherapy recommendation is composed of an initial phase of two months involving a combination of three drugs: clarithromycin (5-10 mg/kg b.w. given orally twice daily), rifampicin (10-20 mg/kg b.w. given orally once daily) and enrofloxacin (5 mg/kg b.w. given orally once daily), followed by a continuation phase (two drugs) of rifampicin and clarithromycin/enrofloxacin (same dosages). When disseminated Mycobacterium avium-intracellulare complex (MAC) infection is diagnosed, chemotherapy with clarithromycin and rifampicin (dosages as above) or clarithromycin and clofazimine (8-10 mg/kg b.w. given orally once daily) should be started. Moreover, doxycycline (5-10 mg/kg b.w. given orally once daily) can be used instead of rifampicin or clofazimine, or can be administered as a third compound. Older fluoroquinolones such as enrofloxacin or ciprofloxacin are not recommended in feline MAC infections due to resistance. In feline leprosy, surgical removal of the infected tissues is the recommended treatment. Adjunctive chemotherapy should include two or three drugs such as clofazimine (8-10 mg/kg b.w. given orally once daily), rifampicin (10-15 mg/kg b.w. given orally once daily) or clarithromycin (10 mg/kg b.w. given orally twice daily). In feline opportunistic mycobacteriosis, especially when rapidly growing mycobacteria (Mycobacterium smegmatis or Mycobacterium fortuitum) are identified, chemotherapy should be based on the results of in vitro antibiotic sensitivity testing. However, enrofloxacin and doxycycline should be administered to the cat while waiting for diagnostic results. After the final diagnosis and obtaining results of bacterial isolate susceptibility, monochemotherapy can be started in a cat only when isolated mycobacteria are highly susceptible but if they show intermediate susceptibility, at least two drugs should be used.
Veterinary Times; 2004. 34(13):10. 8 ref.
Publisher
Veterinary Business Development Ltd
Location of Publisher
Peterborough
Country of Publication
UK
Publication Type
Journal article.

Accession Number
20043021211
Author
Moretti, L. d'A.; Pinheiro, S. R.; Paes, A. C.
Title
A review concerning tuberculosis in dogs and cats. [Portuguese]
Source
Clinica Veterinaria; 2004. 9(48):54-62. 63 ref.
Publisher
Editora Guara
Location of Publisher
Sao Paulo
Country of Publication
Brazil
Publication Type
Journal article.

Accession Number
20023197524
Author
Title
Epidemiologic investigation of Mycobacterium bovis in a population of cats.
Source
Publisher
American Veterinary Medical Association
Location of Publisher
Schaumburg
Country of Publication
USA
Abstract
Objective: To determine whether cats exposed at a residence were infected with Mycobacterium bovis, whether the tuberculin skin test can identify cats infected with M. bovis, and whether an ELISA could identify tuberculosis-infected cats. Animals: 20 domestic cats exposed to a cat with laboratory-confirmed
disseminated M. bovis infection. Procedure: Cats were administered a tuberculin skin test and monitored for 72 h. Blood and faecal samples were collected. Cats were then euthanatized, and postmortem examinations were performed. Tissues were examined grossly and histologically for signs of mycobacteriosis. Pooled tissue samples and faecal samples were submitted for mycobacterial culture. Blood samples were examined for evidence of tuberculosis by use of a comparative ELISA. Results: 4 cats had positive responses for the ELISA, and 2 cats had suspicious responses. All tuberculin skin tests yielded negative results. No gross or histologic lesions of tuberculosis were detected in any tissues, and mycobacteria were not isolated from tissues or faeces obtained from the 20 cats. Conclusions and Clinical Relevance: All cats that had positive or suspicious responses for the ELISA were offspring of the cat with tuberculosis. Evidence of tuberculosis was not seen in other cats at the residence, the owner, or the attending veterinarian. The most likely source of tuberculosis for the infected cat was through the consumption of M. bovis-infected wildlife carcasses or offal. Because M. bovis is endemic in wildlife in northeastern Michigan, there is a risk of exposure to tuberculosis in companion animals, their owners, and attending veterinarians.

Publication Type
Journal article.
loss and general listlessness for 4 to 6 weeks before death. One had also shown a cervical swelling from which a sinus discharged thick yellow pus and another had shown respiratory difficulties. Seven other cats in the household were clinically normal; 4 were positive for feline immunodeficiency virus.

Publication Type
Journal article.