



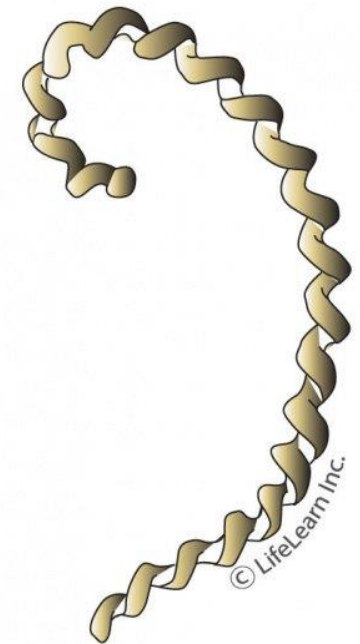
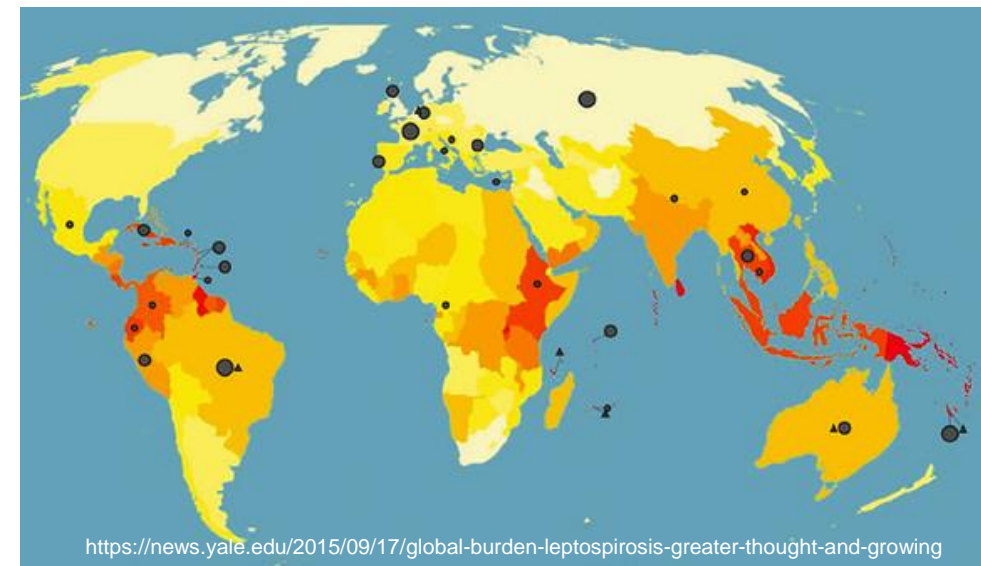
Leptospirosis: Urine trouble!

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What is Leptospirosis?

- First described in 1899
- All mammals are susceptible
- Leptospire:
 - Thin, flexible, motile, filamentous spirochete bacteria
 - Either pathogenic or saprochete
- Estimated >1 million cases worldwide each year = 59,000 deaths
 - 2017 - 92 cases reported in the UK
- Veterinary statistics:
 - UK - 2016 - 0.8 cases/10,000 dogs
 - USA - IDEXX 40,000 submitted samples (2009 – 2016) = 5% +



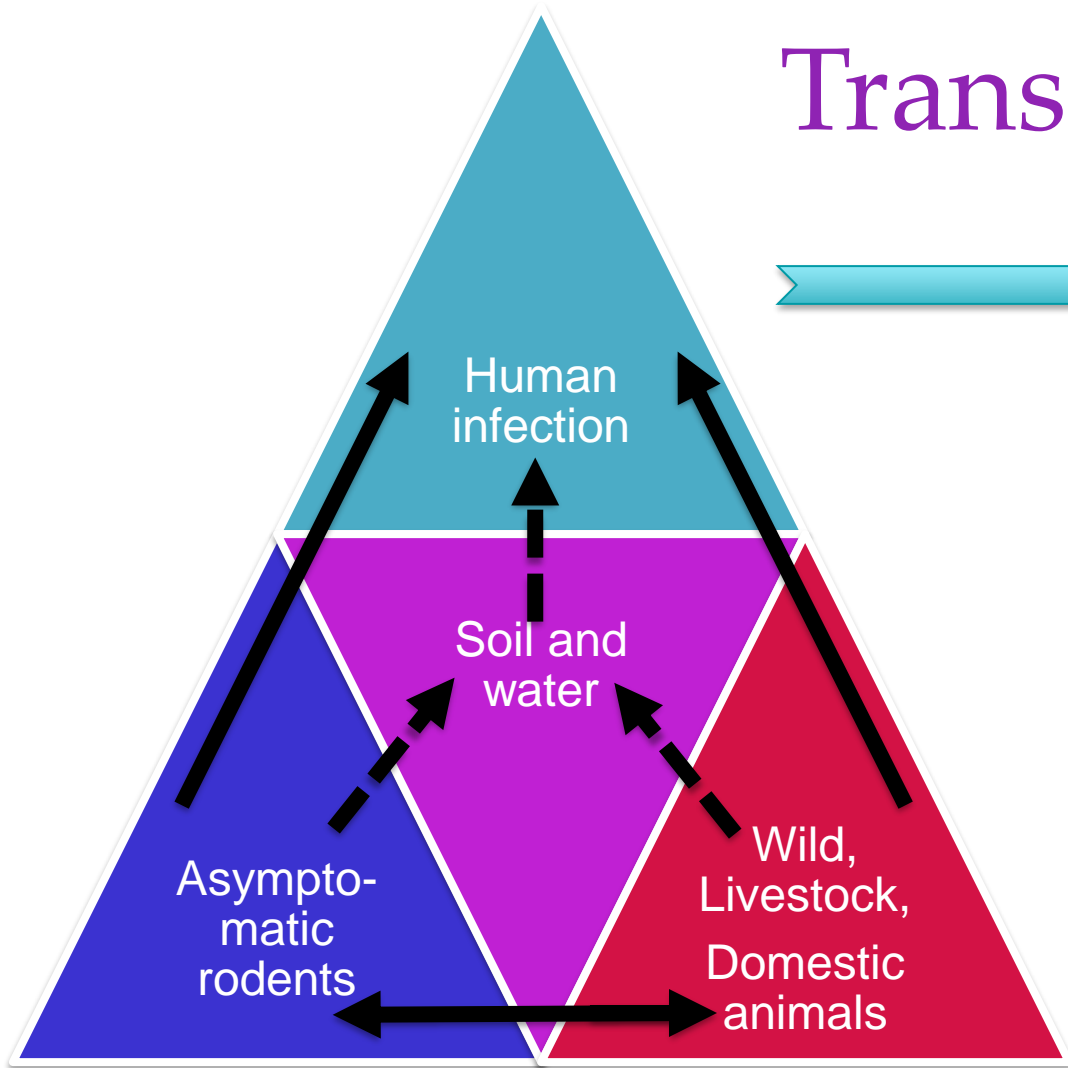
Leptospira

Different Serovars

Serovar	Reservoir hosts	Domesticated animal
Canicola	Dog	Dog, Cat, Horse, cow, pig
Icterohaemorrhagic	Rat	Dog, Cat, Horse, cow, pig
Bratislava	Rat, Pig, Horse	Dog, cow, horse
Pomona	Cow, Pig	Dog, cat, Sheep, Goat, Rabbit
Brataviae	Rat, mouse	Dog, Cat, Cow
Grippotyphosa	Vole, raccoon, skunk	Dog, cat, cow, pig, sheep, goat, rabbit
Autumnalis	Mouse	Dog, Cow
Hardjo	Cow	Dog, pig, horse, sheep

- > 100s of pathogenic serovars grouped in genotype-based classification
- > Each genotype is classified to one or more maintenance/reservoir host species
- > Genotypes causing clinical disease in dogs remain poorly characterised
- > Other factors determine disease

Transmission



infection

Asymptomatic/mild

Severe

Early immune response = maintenance of homeostasis

Delayed and sustained inflammatory response = cytokine storm

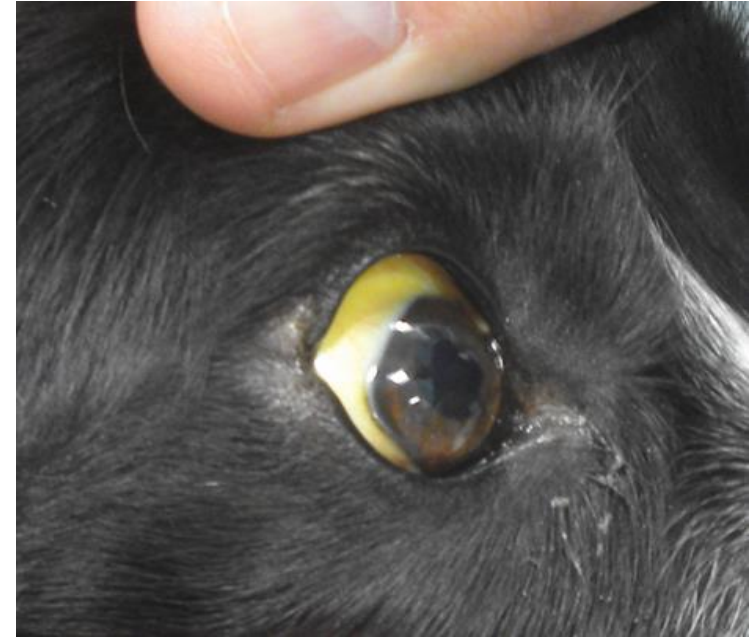
Mild symptoms and no organ damage

Sepsis-like phenotype, MODS, haemorrhage and death

People	Dogs
Vocation, watersports, urban children	Rural area, farmland animal access, rodent contact

History and clinical exam

- Signalment
- Risk factors
- Vaccination history
- General signs:
 - Anorexia
 - Vomiting
 - Abdo pain
 - PU/PD
 - Dehydration
 - Icterus



Blood work...

Haematology

- Leukocytosis with a left shift
- ↓ platelets

Biochemistry

- Azotaemia
- ↑ ALT, ↑ ALP, ↑ bilirubin
- ↑ CK activity

Electrolyte abnormalities

- ↓ Na⁺, ↓ Cl⁻, ↓ K⁺, ↑ PO₄²⁻

Coagulation profile

- Often WNL
- May have ↓ fibrinogen + ↓ platelets

Blood gas analysis

- Metabolic acidosis

Urinalysis

- Urinestix:
 - Glucosuria, proteinuria, and bilirubinuria
- Urine sediment:
 - leukocytes, casts, and erythrocytes
- Urine specific gravity:
 - <1.020 common



Leptospirosis identification

Microscopic Agglutination Test (MAT)

- Most frequently used test
- Detects serum antibodies against leptospire in the dog's blood
- Titers can be negative in the first 10 days therefore a second sample should be obtained

In house assays

- ELISA snap test
- Detect IgM or IgG antibodies to leptospire
- Bedside – quick result
- Cannot differentiate between serovar

Polymerase Chain Reaction

- Best performed on blood and urine
- Identify infection earlier than routine serologic testing, but high sensitivity may result in occasional false-positive diagnoses

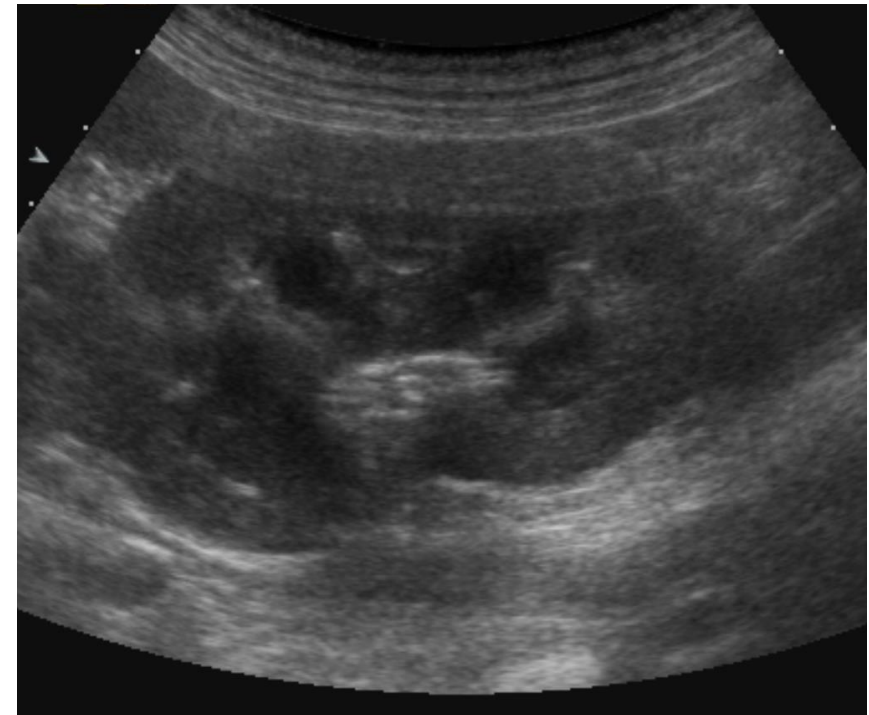
Imaging

➤ Thoracic Radiographs

- Pulmonary haemorrhage

➤ Abdominal Ultrasound

- Increased renal cortical echogenicity
- Renomegaly, hepatomegaly
- Pyelectasia
- Medullary band sign



Treatment

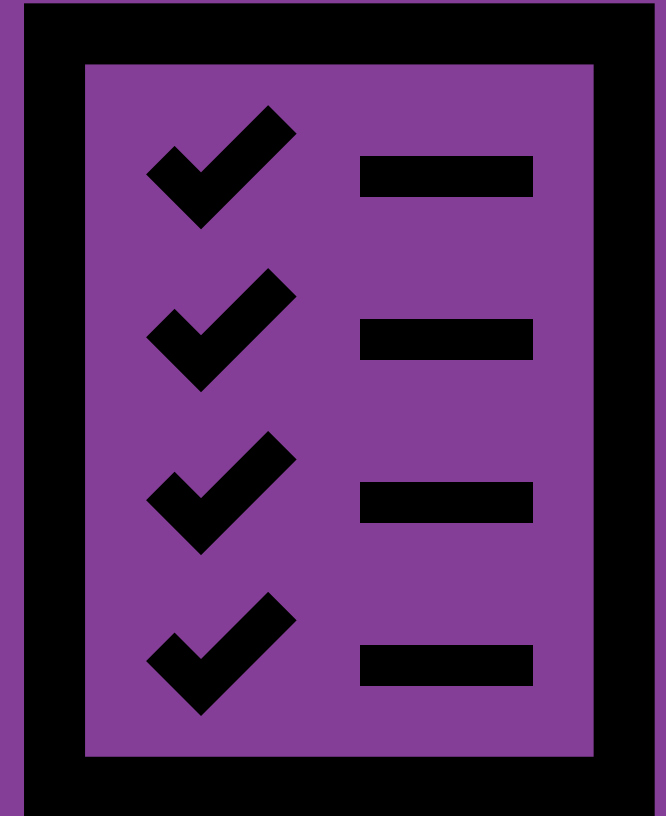
Antibiotic Therapy

- Immediately inhibit multiplication and reduce fatal complications
- Penicillins (Ampicillin) are the antibiotics of choice 14 days
- Eliminated mostly via renal tubules
 - may need to be adjusted accordingly in azotaemic animals
- Once penicillin therapy is completed, other antibiotic classes should be administered to eradicate the carrier state

Nursing considerations

- CV monitoring
 - Perfusion parameters
 - Management of hypertension
- Adjusting fluid therapy
 - Dehydration and shock
 - Match ins with outs – urinary catheter/UOP
 - Monitoring for fluid overload
- Management of IV catheter and central line
- Liver support
 - Antioxidants
 - Ursodeoxycholic acid / Destolit

Kirby's Rule of 20





Nursing Considerations

- Managing vomiting, gastric dysmotility and diarrhoea
- Monitoring of acid base and electrolyte abnormalities
- Monitoring for signs of bleeding and DIC
- Nutrition
- Pain management

Oliguric/anuric kidney injury

- Signs of overload
- Cease IVFT
- Consider frusemide

- Consider CRRT



Prevention

> Eliminate carrier state – doxycycline/fluoroquinolone 4 weeks

Personally:

- Education
- Hygiene
- Vaccination and prophylactic treatment?

In the clinic:

- Infection control plan – isolation, barrier nursing, disinfection
- Contaminated urine is highly infectious to humans

In the environment:

- Pest control, hand hygiene, vigilance if in the high risk category
- Vaccination – dogs, cattle, pigs and horses

Vaccination



- Vaccines against canicola and icterohaemorrhagiae available since the mid-1980s
- New vaccines that include serovars canicola, icterohaemorrhagiae, *bratislava* and grippotyphosa
- Annual vaccination recommended - gives 84% protection in clinical state and 88% against renal carrier status
- Anaphylactic reactions can occur

Recovery and Prognosis

- 70% Recovery = Resolution of azotaemia and other associated electrolyte, metabolic, and biochemical abnormalities
- Clinical recovery is usually complete
- Dogs that recover may have permanent renal insufficiency
- All recovered patients should be monitored closely for development of/complications associated with chronic kidney disease

Questions?



- <http://www.iris-kidney.com/guidelines/grading.html>
- <https://bvajournals.onlinelibrary.wiley.com/doi/abs/10.1002/vetr.452>
- <https://pubmed.ncbi.nlm.nih.gov/25754092/>
- <https://www.cdc.gov/leptospirosis/pets/infection/index.html>
- <https://www.who.int/publications/i/item/human-leptospirosis-guidance-for-diagnosis-surveillance-and-control>