LEPTOSPIROSIS

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Synonyms: Weill's disease/Infectious Jaundice/Rice field worker's disease/Sugarcane worker's disease

- Traditionally(Serological reaction), *Leptospira* were divided into two groups i.e the pathogenic *Leptospira* (*L interrogans*) and the saprophytic *Leptospira* (*L biflexa).*
- On the basis of antigenic composition and serological reactions, more than 250 serovars in 23 sero-groups defined.
- They are usually visualized using *dark-field microscopy*. *Silver impregnation* and immunological staining techniques.
- Leptospirosis is an occupational disease.

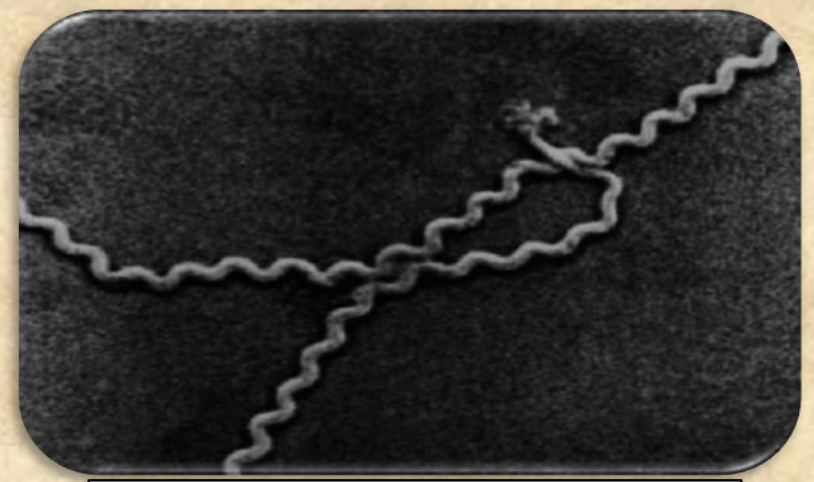
Host Affected: All domestic animals and human.

Transmission:

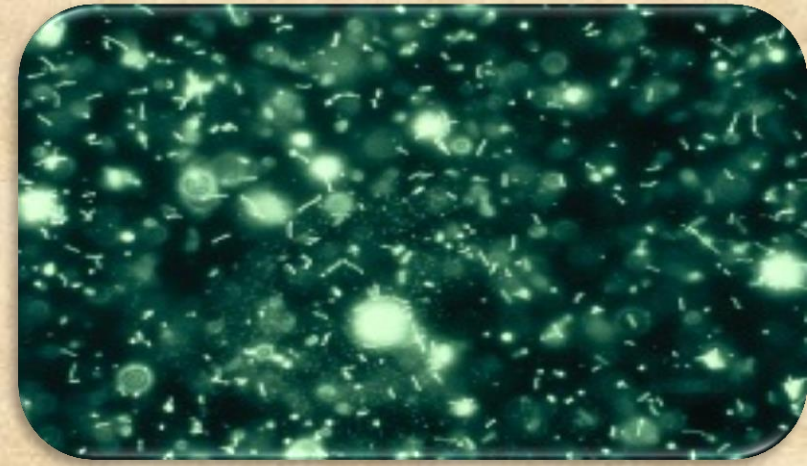
- The disease is common in areas where climate is warm, humid and alkaline soil with abundance of surface water.
- Pathogenic leptospires can persist in the renal tubules or in the genital tract of carrier animals.
- Although indirect transmission can occur when environmental conditions are favourable, these fragile organisms are transmitted most effectively by direct contact.

•Urine is the chief source of contamination.

•Pig and Cattle are may pass the organism after recovery for a longer duration.



Long, Thin, Highly Coiled



Dark Field Microscopy

- ***Maintenance hosts*** are the main source of environmental contamination and of natural transmission to other animal species which are termed incidental hosts.
- ***Incidental host*** species usually exhibit low susceptibility to infection, develop severe disease and are inefficient transmitters of leptospires to other animals.
- The source of infection is an infected animal which contaminates pasture, drinking water and feed by infected urine, aborted foetuses, and infected uterine discharges.

Maintenance and incidental hosts for important serovars of *Leptospira interrogans*:

SEROVAR	MAINTANENCE HOST	INCIDENTAL HOST
bratislava	Pigs, hedgehogs	Horses, dogs
canicola	Dogs	Pigs, cattle
grippotyphosa	Rodents	Cattle, pigs, horses, dogs
hardjo	Cattle. (sheep occasionally)	Humans
icterohaemorrhagiae	Brown Rat	Domestic animals, humans
pomona	Pigs, cattle	Sheep, horses, dogs

Pathogenesis:

Enzymes capable of degrading host cell membranes

Organism enters to the body through mucous membranes and damaged skin

Affecting epithelial tissues through motility andchemotaxis(Hyalunornidase)

haematogenous spread with localization and proliferation in parenchymatous organs(Liver/Spleen/Kidneys/Eyes/Meninges/fetuses)

Affecting vascular endothelium leading to haemorrhages

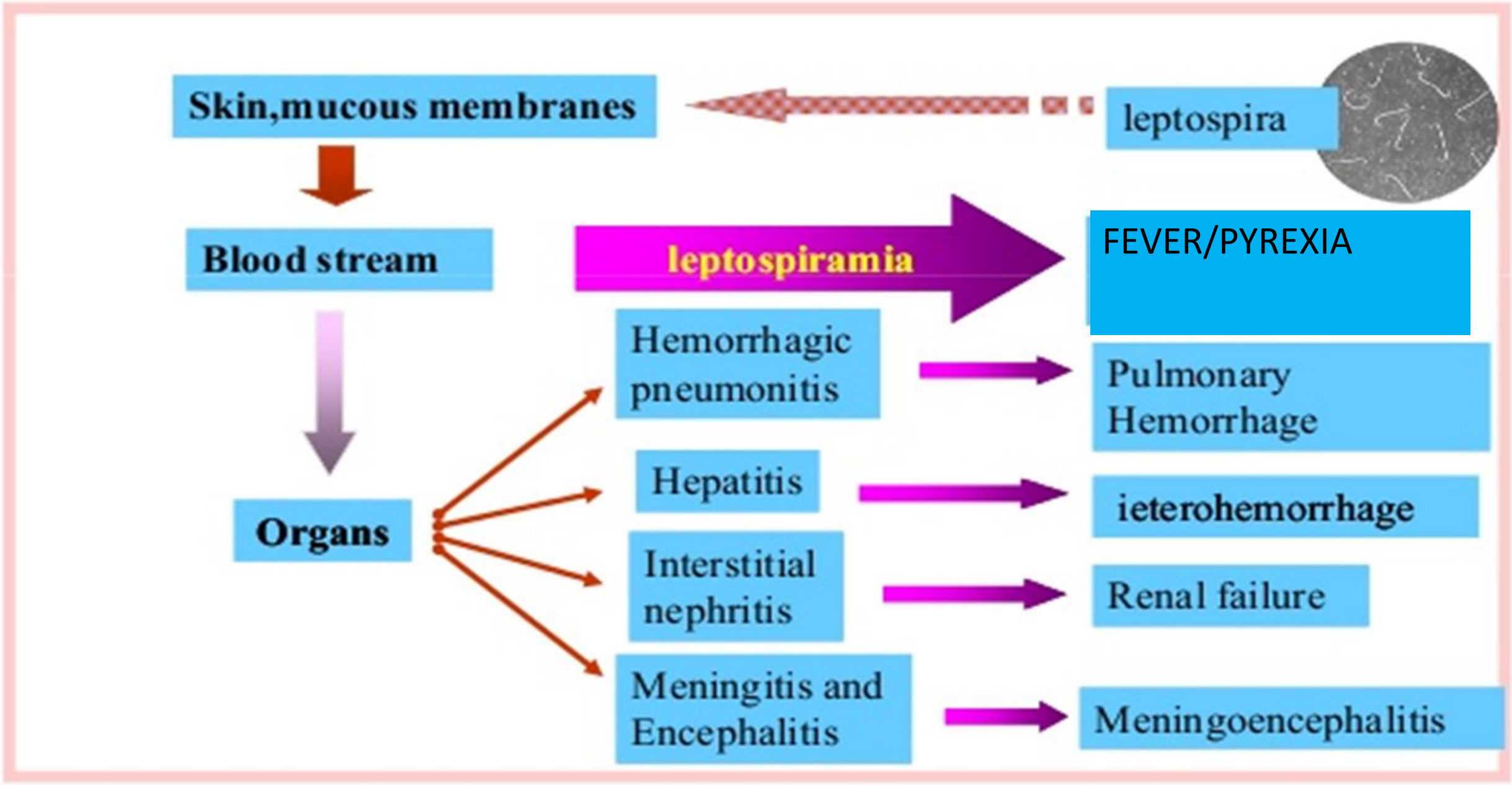
Due to production of haemolysin, it causes haemoglobinuria in young calves

Infection is cleared within 10 days after bacteraemia due to phagocytosis by macrophages in presence of Ab production but, some may escape and tend to persist in sites such as ***renal tubules***, ***eyes and uterus*** where Ab action in minimal

Important:

1. *Equine recurrent uveitis(Moon blindness or periodic opthamia) is thought to involve the production of antibodies against leptospiral antigens, probably membrane proteins, which cross-react with ocular tissues and abortion is the common manifestations .*
2. *In canine leptospirosis manifestations are septicaemic, hepatic and renal disease.*
3. *In cattle and Swine septic illness is confined to young and abortion is main manifestation in Adult.*

Pathogenesis:



Clinical Signs:

CATTLE	PIGS	DOGS	HORSES	SHEEP
• Subclinical with or without leptospiruria • Milk-drop syndrome, with or without any other clinical signs (often Hardjo) • Abortion and neonatal mortality: abortion 'storms' (Pomona) and sporadic abortions (Hardjo) • Haemoglobinuria, jaundice and fever in calves, and less commonly, in young adults. • Serovars commonly involved are Pomona, Grippotyphosa and	• Subclinical, often with leptospiruria (especially Pomona) • Fever and focal non-suppurative mastitis and leptospiruria • Infertility, abortions and stillbirths (Canicola, Pomona,Icterohaemorrhagiae or Bratislava) • Fever, anorexia, jaundice, haemoglobinuria and high mortality in young pigs (often Icterohaemmorhagiae	• Subclinical with leptospiruria (often Canicola) • Acute haemorrhagic disease: high fever, vomiting, prostration and often early death (usually Icterohaemorrhagiae) • Acute renal failure (many serovars including Canicola, Icterohaemorrhagiae, Grippotyphosa and Bratislava) • Infertility, abortions and stillbirths (Bratislava)	• Recurrent iridocyclitis ('periodic ophthalmia' or 'moon blindness') which can result in blindness • Occasionally abortion with foetuses of six months to term • Rarely fever, anorexia, depression and icterus	• Mainly subclinical infections with leptospiruria (serovars such as Hardjo) • Occasionally, acute leptopirosis with depression, dyspnoea, haemoglobinuria, anaemia and high mortality in lambs (often Pomona

Diagnosis:

- Clinical signs, together with a history suggestive of exposure to contaminated urine, may suggest acute leptospirosis.
- Organisms may be detected in fresh urine by dark-field microscopy, which is relatively insensitive.
- Serological tests:

✓Microscopic agglutination test (MAT)

✓ELISA: Tests for the detection of both IgM and IgG are available and include rapid tests which can be performed ‘in the field’.

✓Complement fixation test

✓Fluorescent antibody procedures are often used for the demonstration of leptospires in tissues.

- Animal inoculation:Weanling gerbils, hamsters and guinea pigs can be inoculated intraperitoneally with 0.5–1.0 mL of neutralized urine, unclotted blood or a 10% tissue suspension in EMJH or 1% BSA.
- Molecular diagnosis and typing(PCR)

Treatment and control: To be save the liver and Kidney before irreparable damage.

- Doxycycline and tetracycline, agents.
- Streptomycin@12mg/Kg IM /Penicillin@44000 IU/ Kg IM.
- Antibiotics + Corticosteroids used to remove urea and shedding of organism.
- In haemolytic anaemia, blood transfusion.

Prevention/Control:

- Isolation of diseased animals for at least 2 weeks and premises, tool etc. should thoroughly disinfected.
- The animal who continued shedding of organism should preferably be slaughtered and buried/burnt.
- To control carrier (Rodents) chemical (Zinc phosphide) is effective.
- The animal sheds should be covered with wire nets to check entry of carrier animals.
- Use microscopically fresh water/Ponds and KMnO4 may be used.
- Use vaccination; *L. canicola* and *L. icterohaemorrhagica* is used against canine leptospirosis.