

# MIXED BAG OF PARASITES IN A TIGER SNAKE (*Notechis scutatus*) (CASE 2175.1)

## CASE HISTORY

Adult male Tiger snake (*Notechis scutatus*) found to have a mildly ulcerated cloaca. Numerous caseous hemipenial plugs were expressed. Treated with topical and systemic antibiotics (Ceftazidime). Blood collected:

WCC	PCV	Hp	Lc	Bp	Az	TP
22.7x10 <sup>9</sup>	24%	25%	18%	4%	42%	92g/L

Reactive lymphocytes, vacuolated monocyte cytoplasm. Bacteria (bacilli and diplococci) seen within the cytoplasm of several monocytes. 1+ early red cells. Euthanasia elected due to suspected septicaemia, and severe cloacitis.

## GROSS PATHOLOGY

**External findings:** The margins of the cloaca are markedly erythematous, swollen and ulcerated. There is multifocal erythema of the ventral scales.

Dehydrated; Muscle mass: good; Fat deposits: abundant

**Internal findings:** Petechial haemorrhages are scattered throughout the subcutaneous tissues, abdominal fat, and mesentery. Numerous plerocercoids are scattered throughout the subcutaneous tissues.

The pulmonary parenchyma is thickened and erythematous. Multiple long nematodes are burrowed into infundibulae, with their bodies extending into the mesobronchus. Several, 3 - 4 mm, tan, caseous plaques exude from infundibulae. The subcapsular renal parenchyma is patterned with white streaks. The renal parenchyma is markedly oedematous. The subcutaneous tissues are markedly oedematous near the cloacal region. The left hemipenial sac is markedly distended, grey/brown, and foul smelling. The sac contains a fibrino-caseous, brown, foul smelling plug. The cloacal mucosa is thickened and erythematous, but the rectum appears normal.

The GIT is devoid of ingesta. The testes are fairly small and soft.

## HISTOPATHOLOGY

Lesions are not evident within the following tissues: trachea, skin, skeletal muscle, brain

**Spleen:** The splenic parenchyma contains abundant lymphoid tissue.

**Pancreas:** Pancreatic exocrine epithelial cells often have smudgy basophilic nuclei.

**Testis:** Spermatogenesis is evident within the spermatic cords.

**Myocardium:** The epicardium has a "washed out" eosinophilic appearance (euthanasia artefact).

**Liver:** The sinusoids contain scattered granulocytes and mononuclear cells.

**Cross section of hemipenes region:** The skin is coated with a thick layer of eosinophilic amorphous material, erythrocytes, and bacterial colonies. The hemipenial sheaths are distended with lamellae of eosinophilic amorphous material containing numerous colonies of fine bacilli. Branching chains and double chains of small cocci are also evident throughout the periphery of the material. Epithelial cells lining the sheaths segmentally exhibit ballooning degeneration. Colonies of bacilli are scattered throughout this region of the mucosa. The mucosa in both hemipenial sheaths is extensively ulcerated and the laminal propria and muscularis is segmentally replaced with macrophages and multinucleate giant cells. The normal architecture of the hemipenial sheaths has been replaced with granulomas composed of central eosinophilic material surrounded by a wall of macrophages. Macrophages extend from the margin of the granuloma into the surrounding skeletal muscle and coelomic soft tissue. A small number of amoebae are evident within the lumen of the granuloma. The coelomic membranes are thickened with mononuclear cells and multinucleate giant cells.

**Acid fast stain:** Acid fast organisms are not evident within the pericloacal tissues.

**PAS and gram stain:** The organisms within the cloacal abscesses that vary in morphology from groups of cocci to branched chains of beaded filaments are weakly PAS positive and strongly gram positive.

**Coelomic wall anterior to the cloaca:** The coelomic soft tissues contain multiple granulomas composed of central macrophages and smaller numbers of heterophils and small mononuclear cells at the periphery. Refractile, oval, yeast-like organisms are evident within the centre of the granuloma, but these were not obviously PAS positive upon special stained sections.

**Lung:** The pulmonary parenchyma is consolidated and there is diffuse perivascular oedema. Multifocal

infundibulae are flooded with proteinaceous fluid and erythrocytes. Segmentally infundibulae have tall cuboidal epithelium and the interstitium contains scattered granulocytes and clusters of granulocytes. The pleura is diffusely oedematous and contains variable numbers of granulocytes and mononuclear cells. A focal infundibulum is filled with a cross section of a nematode parasite. The nematode is gravid with larvated oval, ova. The base of the affected infundibulum has desquamated epithelium and contains an extensive infiltrate of mononuclear cells and granulocytes that extends into the pleura. Within another section of the lung there is a focal plaque within the mesobronchus. The plaque is composed of cellular debris and large bacterial colonies. A focal foreign body, similar to material seen in the lumen of the GIT is present within the infundibular lumen.

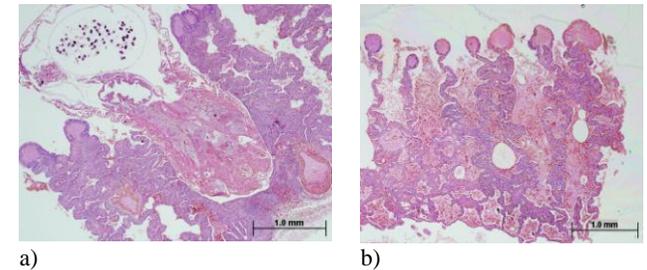


Fig 1. Lung. H&E, 4x

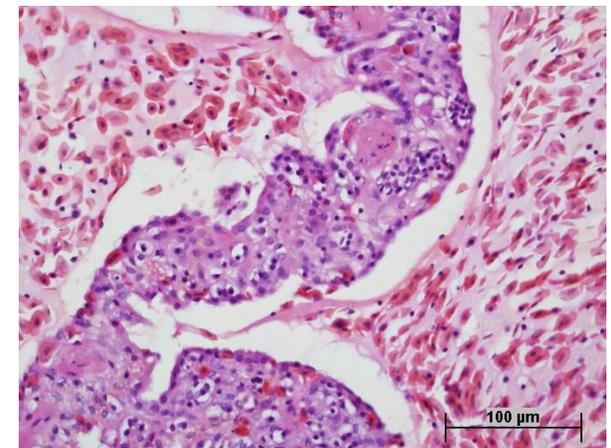


Fig 2. Lung H&E, 40x

**Kidney:** A distinctive sex segment is evident within the renal tubules. A small number of granulomas are evident within the renal parenchyma. These granulomas are composed of aggregates of macrophages and giant cells. Several smaller mononuclear cell infiltrates are evident within the renal interstitium. Within another section of kidney, there is a focal hilar granuloma. The granuloma consists of central bacterial colonies, erythrocytes and heterophils surrounded by a thick wall of macrophages with scattered heterophils. A cross section of a trematode parasite is focally evident within a markedly dilated renal tubule.

**Stomach:** Large numbers of cryptosporidial organisms are present along the apical surface of the gastric mucosa (Fig 3).

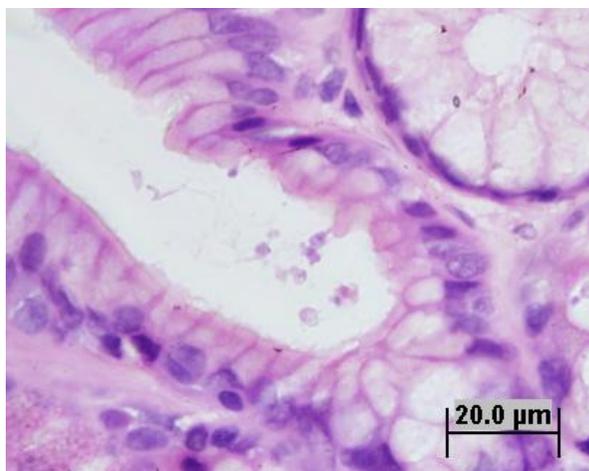


Fig 3. Gastric mucosa. H&E 100x

**Small intestine:** The intestinal lamina propria contains multifocal lymphoid aggregates and scattered heterophils. A focal granuloma is present within the muscularis externa. The granuloma is composed of a cluster of macrophages and multinucleate giant cells.

**Large intestine:** Multifocally within the lamina propria and serosa there are granulomas composed of central eosinophilic lamellar material surrounded by macrophages (Fig 4). The serosa is markedly oedematous and cellular. Variable numbers of lymphocytes, plasma cells and granulocytes are present within the serosa. Granulocytes

and mononuclear cells are scattered throughout the lamina propria. Small partially ciliate, cup-shaped organisms are multifocally present over the mucosal surface (Fig 5). These organisms have thin, oval nuclei. The surface of the organism adjacent to the mucosa is ciliate. Smaller, round protozoa, with very small, round, eccentric, basophilic nuclei are also present within the intestinal lumen. Within the superficial region of the mucosa there are multifocal round coccidial oocysts with eosinophilic amylopectin bodies and numerous schizonts composed of 2 - 8 banana-shaped trophozoites. These coccidial organisms are evident within vacuoles in enterocytes (Fig 5 and 6).

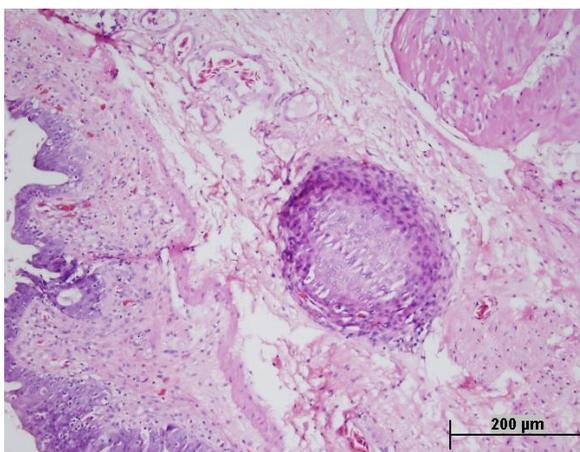


Fig 4. Large intestine. H&E 20x

#### BACTERIOLOGY

Organisms cultured from hemipenal caseous plug during clinical work-up: *Salmonella arizonae*, *Proteus* sp., *Pseudomonas aeruginosa*, *Clostridium* sp.

#### Post-mortem

Liver, kidney and hemipene: *Pseudomonas aeruginosa* 3+ (predominant growth). No anaerobes isolated.

Stomach scraping: Modified Acid Fast Stain:

*Cryptosporidium* present 1+

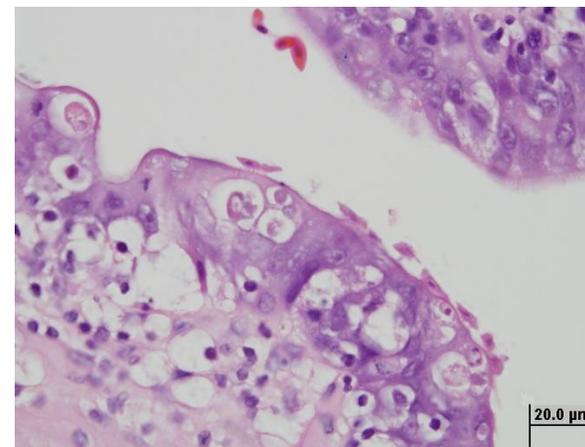


Fig 5. Large intestinal mucosa. H&E 100x

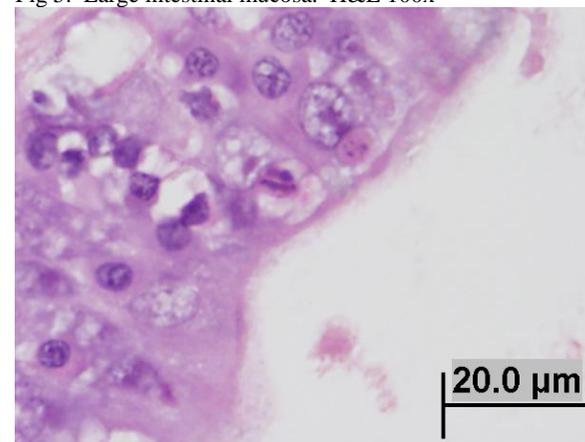


Fig 6. Large intestinal mucosa. H&E 100x.

#### MORPHOLOGICAL DIAGNOSIS

Euthanasia  
 Marked cloacitis and hemipenal granulomas - *Proteus* sp., *Pseudomonas* sp  
 Subcutaneous oedema  
 Multifocal caseous verminous pneumonia  
 Multifocal subcutaneous plerocercoids  
 Gastric cryptosporidiosis  
 Intestinal coccidiosis  
 Multifocal renal and intestinal granulomas  
 Focal renal trematodiasis

## COMMENTS

There is extensive evidence that the bacterial infection (*Pseudomonas* sp.) in the hemipenial sac had spread systemically. The gram negative bacteria seem to be the most significant pathogens, however there was also evidence of a gram positive bacterium with a morphology similar to *Dermatophilus* sp., *Nocardia* sp. or similar gram positive anaerobe, which may have been overgrown by the faster growing gram negative organisms. There were such a variety of potentially pathogenic organisms within the pericloacal granulomas (yeast, bacteria, amoebae) that it is difficult to determine which organism was most important in initiating the lesion. Organisms cultured from this site are common invaders in skin lesions (including scale rot and stomatitis), acting as primary or secondary invaders.

Predisposing causes include poor hygiene and a host immunocompromised by poor husbandry (e.g. temperature regulation or maladaptation after capture from the wild) or by parasitism. Both may have been involved in this case. Examination of the gastric tissue confirmed that the snake had Cryptosporidiosis. The snake had abundant parasites within the subcutaneous tissues and the lungs. The granulomas found within the kidney and intestinal tract (Fig 4) most likely represent previous parasite migration tracts (alternative interpretations of gross findings of pale tracts on the surface of the kidney might include ascending pyelonephritis or renal gout). The over-all high parasite burden is consistent with the animal being collected from the wild and perhaps mixed with snakes of dubious history. Any snakes kept in contact with this reptile should be considered at high risk of being infected with Cryptosporidiosis. Treatment of pulmonary nematodes should also be considered in other snakes since these parasites have the potential to cause tissue damage and secondary bacterial infections.

## REFERENCES

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