

DIAGNOSTIC EXERCISE No. 35

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History:

Two-day-old foal. Severe haemorrhagic diarrhea and colic of 24 hr duration causing death.

Description:

The small intestine (jejunum and ileum) shows diffusely dark red serosa with a few darker and paler irregular foci (fig.1). The mucosa shown in the second photograph (fig.2; the segment is jejunum but there is no way to tell from the picture) shows multifocal to coalescing areas of orange discoloration (interpreted as pseudomembrane) and multifocal smaller and sunken red areas (interpreted as ulcers). The wall of the intestine is diffusely thickened (see the lower part of figure 2).

Morphological diagnosis:

Enteritis, necrotizing, pseudomembranous and ulcerative, multifocal to coalescing.

Most likely cause/s:

- a.) *Clostridium perfringens* type C
- b.) *C. difficile*
- c.) *Salmonella* spp.

In this case, the etiology was *C. perfringens* type C. The diagnosis was confirmed by detection of beta toxin and by isolation of *C. perfringens* type C from intestinal content. The disease is mediated by beta toxin, a trypsin-sensitive and highly necrotizing toxin that produces intestinal necrosis but is also absorbed into the systemic circulation and acts on distant tissues, including the brain. This infection occurs predominantly in new-born foals (and other animals) because during the first few days of life the colostrum has an inhibitory effect on intestinal trypsin (this is a mechanism to protect colostral immunoglobulins from enzymic destruction).

Confirmation of diagnosis:

- a.) *Clostridium perfringens* type C
 - (i) *C. perfringens* beta toxin detection in intestinal content. Detection of this toxin in the intestine associated with necrotizing enteritis in a newborn foal is diagnostic for *C. perfringens* type C.
 - (ii) Anaerobic culture of intestinal content and typing of any *C. perfringens* isolates. *C. perfringens* type C isolation (even in absence of beta toxin detection) is highly suggestive of *C. perfringens* type C enteritis, since this microorganism is very rarely isolated from the intestine of normal foals. This is an important consideration because beta toxin is very sensitive to the action of trypsin and other intestinal proteases, and in some cases it may get broken down before the sample is processed for toxin detection.
- b.) *C. difficile*
 - (i) Detection of *C. difficile* toxin A or B or both in intestinal content.
 - (ii) Culture of *C. difficile* in intestinal content (special media required). This is considered diagnostic (even in the absence of *C. difficile* toxin/s detection) because foals are not considered to be healthy carriers of this microorganism.
- c.) *Salmonella* spp.
 - Culture or PCR, followed by serogrouping and, if possible, serotyping (note: for serogrouping and serotyping, culture is needed, so if *Salmonella* is detected by PCR, culture should follow in order to have an isolate for serogrouping/serotyping).