



Vegetative valvular endocarditis in a calf: a clinical report

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Abstract

A one month old male Brangus calf with a history of navel ill was referred to the veterinary hospital at University Putra-Malaysia. The calf was pyrexia, dull and depressed with increased respiratory and heart rates. The calf did not respond to the treatment and died. Grossly, the carcass was emaciated and pale. Post-mortem examination revealed oedematous lungs with frothy tracheal exudates, congested kidneys and cauliflower like lesions on both valves of the heart. Histopathologically, necrosis and haemorrhage were observed in the cardiac valves with infiltrations of bacterial colonies. Degeneration and necrosis of many renal tubular cells with evidence of detachment of these cells into the tubular lumen and septic emboli were also seen. In the brain, there were neuronal degeneration, necrosis and vascular injection of small vessels. All findings confirmed the diagnosis of septicemic and vegetative valvular endocarditis sequel to navel ill caused by *E. coli* infection.

Keywords: Calf; navel ill; cauliflower valve; septicaemia; brain; *E. coli*

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Introduction

Navel ill or omphalophlebitis is a severe septicaemia of newborn calves caused by pus-producing bacteria which get entry into the body through umbilical cord or opening and is typically indicated by arthritis accompanied by generalized pyemia, speedy debilitation and joint ill pyosepticemia (Radostits et al., 2000; Andrews and Williams, 2004; Ganga et al., 2011). Septicemia is a systemic illness with toxicity due to invasion of the bloodstream by virulent bacteria coming from a local seat of infection (Biss et al., 1994). Bacteria-induced vegetative valvular endocarditis is one of the main cardiac disorders in cattle (Healy, 1996; Andrews and Williams, 2004; Bexiga et al., 2008; Sébastien and Bélanger, 2010). Bacterial endocarditis is often linked to a primary source of infection and the presence of other infectious

lesions, such as mastitis, metritis, arthritis, or liver abscesses (Maillard et al., 2007). The most frequent pathogens isolated from cardiac valves or the blood-streams of cows with endocarditis are *Arcanobacterium pyogenes*, *Streptococcus sp.*, and numerous *Enterobacteriaceae* (Reef and McGuirk, 1996; Maillard et al., 2007). In the present clinical report, the most striking events were the severity of the disease, the presence of neutrophils and bacterial colonies in the brain.

Case presentation

A male Brangus calf, aged one month, weighing approximately 30 kg, was referred to the Veterinary Hospital at Faculty of Veterinary Medicine, University Putra-Malaysia. The calf had history of navel ill. The bedding of the farm was moderately clean but, the floor had cracks indicating possible potential source of infection.

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On physical examination, the calf had high body temperature (42.1°C), pale mucous membrane, increased respiratory and heart rates and swollen joints. The calf was lethargic, dull and depressed.

Laboratory findings

The haematological findings revealed leucocytosis with neutrophilia. Multiple bacteriological samples from internal organs (Heart, lung, kidney and liver) were also sent for bacteria isolation and identification. *E. coli* was isolated from all the examined organs.

Treatment

The calf was treated with Oxytetracycline (20mg/kg) and 5 ml of Fercobsang (Ammoniacal ferrous citrate) via intramuscular route. Unfortunately, the calf did not respond to the treatment and died on the next day.

Post-mortem findings

Post mortem examination of the carcass revealed emaciation, open wound at the joint region with maggot infestation. Grossly, it was observed that the elbow joints were swollen. Frothy exudates within the trachea (Fig. 1B), embolic pneumonia (Fig. 1C), suffusion haemorrhage on the surface of the lung lobes and pleuritis were also observed. Variable sizes of whitish and reddish growth were found on the valve leaflet (Fig 1A), generalized congestion and hepatomegaly were also observed.

Microscopic findings

Multiple specimens of the affected lung, heart valve, liver and kidney were obtained and immediately fixed in 10% buffered formalin while, the brain sample was fixed in 40% buffered formalin. Paraffin-embedded sections were then routinely stained with haematoxylin-eosin (H&E). There were fibrin strands and haemorrhage in the alveolar lumen (Fig. 2A). In the brain, there were neuronal degeneration, necrosis and vascular injection of small vessels (Fig. 1D). The kidney showed severe congestion, degeneration and necrosis of many renal tubular cells with evidence of detachment of these cells into the tubular lumina. Bacterial emboli were also seen in the blood vessels of the kidney (Fig. 2B). *E. coli* colonies with characteristic metallic sheen were seen on the EMB agar media (Fig. 2E).

Discussion

Navel ill is a condition in which the navel segment of the calf becomes infected due to bacterial contamination of the umbilicus after parturition. The infection gets widely spread and affects many organs



Fig. 1A: Photograph of the cardiac valve showing endocarditis and cauliflower-like growth

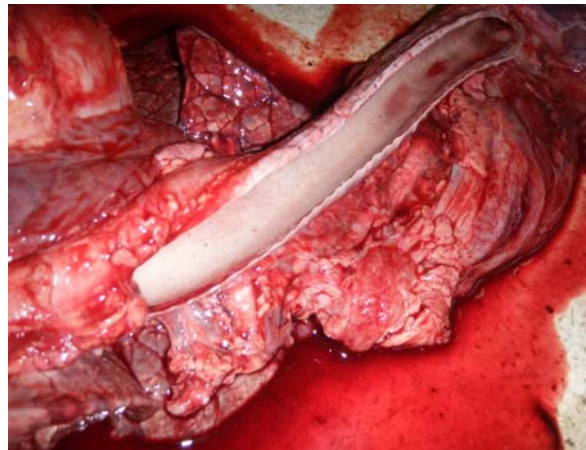


Fig. 1B: Photograph of the lung showing copious frothy tracheal exudates

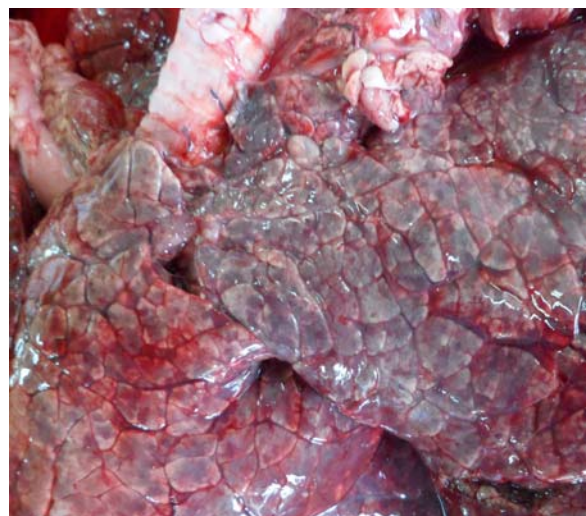


Fig. 1C: Photograph of the lung showing embolic pneumonia (arrow)



Fig. 1D: Photograph of the brain showing congestion of the submeningeal vessel

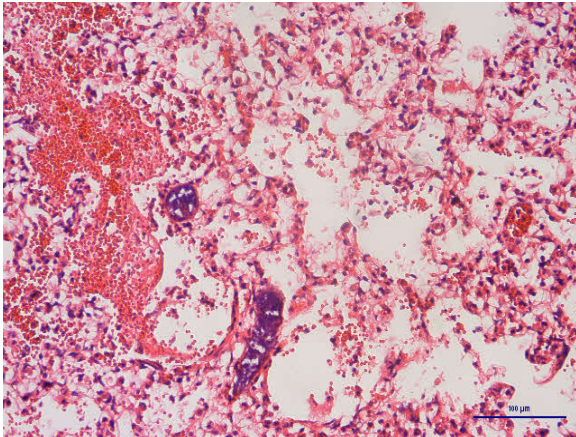


Fig. 2A: Photomicrograph of a section of the lung showing septic emboli (arrows). Note bacterial emboli in a blood vessel and fibrin in the alveolar lumen (H & E. X 200)

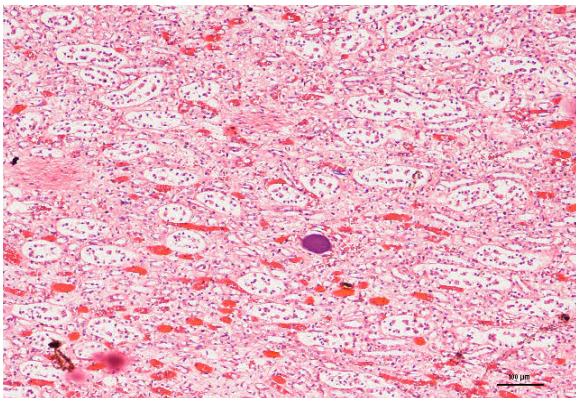


Fig. 2B: Photomicrograph of a section of the kidney showing degeneration and necrosis of many renal tubular cells with evidence of detachment of these cells into the tubular lumina. Bacterial emboli were also seen in the blood vessels of the kidney (arrow) (H & E. X 100)

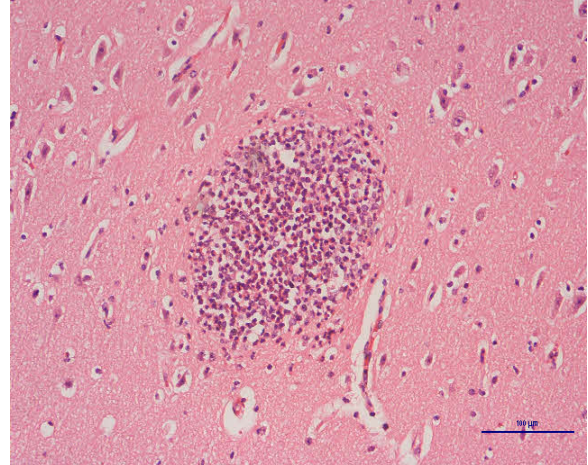


Fig. 2C: Photomicrograph of a section of the brain of the calf showing focal infiltration with neutrophils and necrosis of neurons in the brain (arrow). H & E. X 100

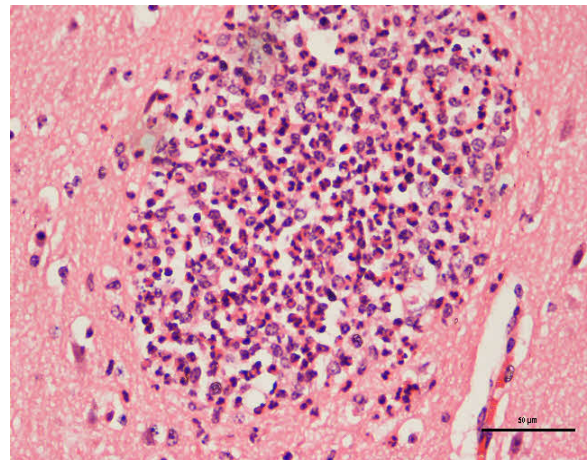


Fig. 2D: Photomicrograph of a section of the brain showing focal infiltration with neutrophils (H & E. X 200)



Fig. 2E: Photograph of the colonies of *E. coli* (EMB agar media with metallic sheen)

notably, the lungs, kidneys, blood vessels, heart, liver and the brain thereby causing septicemia, vegetative valvular endocarditis, pulmonary embolism, brain and hepatic necrosis.

Bacteriological findings revealed the presence of *E.coli* in all the samples. Histopathological findings indicated infiltrations of neutrophils in the valves, with the presence of bacterial colonies, necrosis and haemorrhages. In the lung, both septic emboli and bacterial colonies were present in the blood vessels. Fibrin strands and haemorrhages were also observed in the alveoli lumen. In the kidney, there were presence of septic emboli and congestion. There were also hepatic necrosis and the presence of neutrophils in the sinusoids. In the brain, there were neuronal degeneration and necrosis. These findings are in agreement with the findings of earlier researchers (Reef et al., 1996; Andrews and Williams, 2004; Maillard et al., 2007). Infective endocarditis always results in embolization, which leads to organ infarction and metastatic infection (Calvert, 1982; Ellison et al., 1988; Miller and Sisson, 1999). Embolization is a frequent cause of clinical signs, clinical deterioration and death where emboli are usually present in many organs and tissues (Calvert, 1982; Anderson and Dubielzig, 1984; Sisson and Thomas, 1984; Kittleson, 1998). In the present clinical report, the novel aspect of the results is the presence of neutrophils and bacterial colonies in the brain.

In conclusion, navel ill caused by *E.Coli* in calves could be a fatal disease due to severe damage to heart, lungs, liver, kidneys and brain.

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