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CASE REPORT

Fatal Obstructive Asphyxiation due to Rumen Content in a Cow

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INTRODUCTION

Asphyxia or oxygen deprivation is dangerous as it causes cell injury or death due to decreased oxidative respiration. It is caused endogenously by anaemia or pneumonia, through non obstructive suffocation due to entrapment or vitiated atmosphere and obstructive suffocation through strangulation and mechanical asphyxia (Sauvageau and Boghossian, 2010). Pulmonary aspiration in bovines is the inhalation of substances into the larynx and the lower respiratory tract while the abnormal effects of the inhaled substances are usually referred to as aspiration pneumonia (Shakespare, 2012).

Outcomes or lesions inflicted by such substances depend largely on the size and nature of the aspirate, the distribution within the respiratory tract and the defensive response instituted by the animal to the aspirated material (Marik, 2001). It may even lead to instant death due to rapid cerebral anoxia or hypoxia as a result of complete blockage of oxygen supply (Lopez, 2012; Shakespare, 2012; McEwen, 2016).

Aspiration pneumonia had been reported as the most common cause of death in human patients with dysphagia because of neurological disorders (Marik, 2001). In man and some animal species, anatomical and physiological variations determine the responses or injuries to asphyxia (Shakespare, 2012). Although overwhelming aspiration of regurgitated contents had been considered a potential cause of instant death in mature bovines (Lopez, 2012; Shakespare, 2012; McEwen, 2016) due to mechanical asphyxiation because of the size and position of the rumen, it has not been supported (to our knowledge) by any case report. We hereby present a case of asphyxial death due to aspiration of regurgitated rumen content in a cow.

CASE REPORT

A dead adult female Ndama cow belonging to the University farm was brought to the Department of Veterinary Pathology, Michael Okpara University of Agriculture, Umudike for post mortem examination. The farm attendant reported that the cow had showed no sign of illness when grazing in the morning and also in the evening when the flock was fed with concentrates the previous day. The cow was however found dead the following morning. The good body condition observed showed that the animal died late in the night or early in the morning indicating an acute incident.

Figure 1: Congested lung with frothy fluid - black arrow, and rumen content occluding the tracheal lumen-red arrow

Figure 2: Frothy fluid – black arrow, that filled the tracheal lumen anterior to the rumen content when the lung was compressed

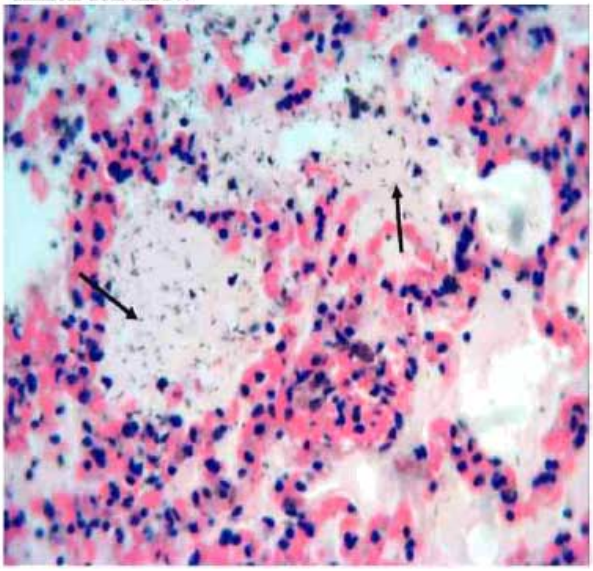

Figure 3: Lung tissue with pneumonia, congestion and edema fluid filled with regurgitated particles – arrows and infiltration of neutrophils and alveolar macrophages, H & E X 400

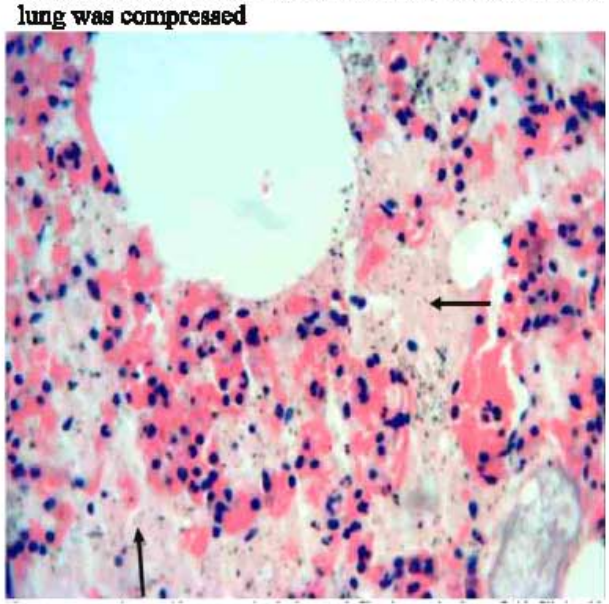

Figure 4: Lung tissue with pneumonia, leukocyte infiltration and edema fluid filled with regurgitated particles – arrows and mild infiltration of neutrophils and alveolar macrophages, H&E X 400

RESULTS AND DISCUSSION

Post mortem examination revealed mainly mild congestion of the lung with frothy fluid in the trachea, bronchus and bronchioles and a bolus of regurgitated rumen content that apparently occluded the tracheal lumen (Figures 1 and 2).

Tissue samples of the lung were collected, fixed in 10% formal saline, processed and stained with Hematoxylin and Eosin. Histopathology revealed pneumonia with edema fluid filled with particles from the rumen content (Figures 3 and 4). In mature bovines, aspiration of large regurgitated rumen content may cause instant death as a result of mechanical asphyxiation (Lopez, 2012; Shakespare, 2012) and presence of a

foreign body in the trachea or larynx in obstructive asphyxia is usually a straightforward diagnosis (Shakespare, 2012; McEwen, 2016) as against non-obstructive suffocation with no macroscopic lesions. Regurgitation is normal in ruminants but the occlusion could have resulted due to either the animal was kicked by another animal in the process and the sudden force and fright reaction caused the content to go the wrong way. It could also be due to some nervous complications (Marik, 2001).

Obstructive asphyxia results in series of events including immediate dyspnea with convulsions, bradycardia, apnea and terminates with cardiac arrest within 4 to 6 minutes (Suzuki, 1996; McEwen, 2016). However, the edema fluid, rumen content particles and infiltrated neutrophils and aveolar macrophages show that the animal did not die within minutes even though the aspirated material seemed to have completely occluded the tracheal lumen. The edema and presence of particles of the rumen content indicated that small quantity of air was still inhaled for some time before the animal eventually died. The edema observed was due to the severe hypoxia that was created by the obstruction. Hypoxia increases pulmonary microvascular hydrostatic pressure by constriction of pulmonary arterioles and postcapillary venules thereby changing Starling forces which favor fluid filtration into the lung (Mitzner and Sylvester, 1981). Also, arterial hypoxemia may stimulate the sympathetic central nervous system resulting in peripheral vasoconstriction and systemic hypertension thereby shunting blood centrally with the resultant overload of the vascular system (Theodore and Robin, 1975; Fletcher *et al.*, 1999).

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