A Case Report: Rapid Progression of Postpartum Uterine Rupture to Sepsis and Multi Organ Dysfunction (MOD) in a Boer Goat (*Capra aegagrus hircus*)

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Abstract

A two-year-old female Boer goat in Belait district, Brunei Darussalam died within 24 hours postpartum following abnormal vulvar discharge. Investigation into the cause of the death was conducted by post-mortem examination and targeted histological assessment of affected organs. Post-mortem revealed a ruptured and disintegrated uterus with dark, mucoid fluid, unilateral mastitis, pulmonary congestion, hepatic pallor, renal cortical discoloration, and myocardial striations. Histopathology demonstrated lymphocytic infiltration in the uterus, kidneys, and myocardium, alveolar oedematous hemorrhage, and fat accumulation in the epicardial space. The findings are consistent with peritonitis and sepsis leading to multi-organ dysfunction (MOD). The rapid progression from parturition to death highlights the peracute nature of postpartum uterine rupture and its systemic consequences in goats. Regular monitoring and preventive care during the postpartum period are essential to reduce the risk of complication and ensure the health of the animal.

Index Terms: goat, uterine rupture, multi organ dysfunction, postpartum mortality, Brunei Darussalam

1. Introduction

Postpartum complications in goats, particularly of dystocia, is sparsely reported due to their small herds and isolated individual locations. A review has reported variable incidence between 8 to 50% in both sheep and goats.[1] In the literature, postpartum complications can lead to rapid deterioration and death if not promptly identified and managed. Among these, uterine rupture is a critical condition that may occur due to dystocia, retained fetal membranes, or excessive uterine contractions.[2] Uterine rupture allows leakage of blood, placental tissue, and bacteria into the abdominal cavity, leading to peritonitis and, if systemic infection develops, sepsis. Sepsis triggers a systemic inflammatory response that can result in multi-organ dysfunction (MOD), including damage to the lungs, heart, liver, kidneys, often within hours of parturition.[3]

Although postpartum uterine rupture and its sequelae have been reported in small ruminants, few cases document the acute progression from uterine rupture to multi-organ dysfunction in goats. This case report describes a two-year-old Boer doe in Brunei Darussalam that developed rapid postpartum complications resulting in death within 24 hours. The clinical and pathological findings provide insight into the pathogenesis of postpartum sepsis and highlight the importance of early recognition and intervention in small ruminants.

2. Case History

On Sunday, 31st August 2025, at 11:48 am, the Veterinary Laboratory Services (VLS) received a report from a farm owner in Brunei Darussalam regarding a goat who was seen to have red, coarse, sandy-like material exuding from the vulva (see ***Figure 1*** and ***Figure 2***). The goat was a two-year-old, female Boer, who had given birth to a goat kid the day before, Saturday 30th August 2025. At 2:30 pm, 31st August 2025, the goat was reported deceased. The carcass was frozen and sent to Pathology Laboratory (PHL) of VLS for post-mortem examination and further investigation the next day, Monday 1st September 2025.

Figure 1. Swollen, red vulva of goat post-parturition.

Figure 2. Red, coarse, sandy material from the vulva.

3. Post-mortem Examination

The sample weighed 45.5kg with a body condition score of 3/5 and was placed on right lateral recumbency. On external examination, red discharge was observed dripping from the nostrils. The left side of the abdomen was distended and filled with gas. Thick, dark brown, mucoid discharge from the vulva was seen. Milk could be expressed from the right teat; however, the left teat was swollen and firm on palpation. When the left teat was expressed, white, thick, clumpy material was extruded.

Upon internal examination, there was a large amount of fat coverage at the mesentery and abdominal walls. The spleen and gastrointestinal mucosa were unremarkable. The upper and lower gastrointestinal tracts were observed to be filled with digestive content. The kidneys were uniform in size, however, both kidney cortices were observed to have a darkened purple outer cortex. The renal pelvis on both kidneys was noted to be pale pink with a friable texture. The liver was observed to have irregular, flat, pale brown discolouration throughout the liver surface. The uterine body was ruptured and disintegrated (see ***Figure 3***), revealing dark red, grainy, fetid, mucoid fluid and mucosal tissue (see ***Figure 4***). It is pertinent to note that the condition of the uterus was severely deteriorated and it was difficult to obtain a proper sample for histology. Incision into the mammary glands revealed unremarkable right mammary tissue, whereas the left mammary tissue was found to be severely inflamed.

On thoracic examination, the lungs were found to have diffused, irregularly shaped dark red lesions, with a red-purple mottled appearance and multiple, pinpoint, white foci. Dark red fluid material was observed in the trachea and bronchi. While the pericardium of the heart was intact, there were small, thin, white striations on the outer muscular walls of the heart. Upon incision of the heart, more white striations were found within the endocardium of the ventricles.

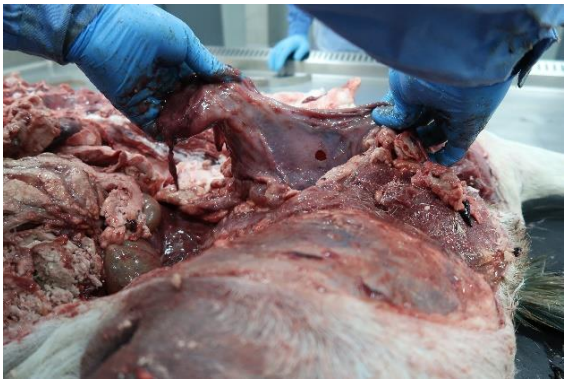

Figure 3. Ruptured uterine body.

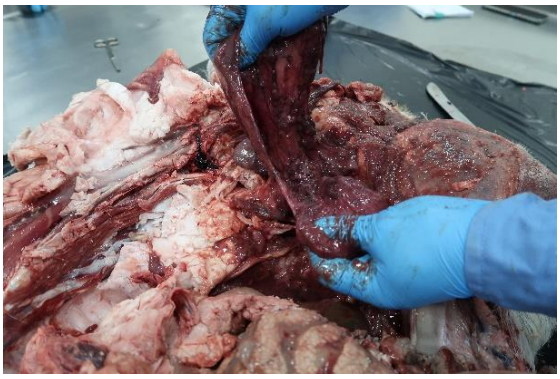

Figure 4. Dark red, grainy, fetid, mucoid fluid in mucosal tissue of uterine body.

4. Histological Examination

On histological examination, samples taken from the carcass were stained using Haemotoxylin & Eosin (H&E) stain. Interstitial red blood cells were observed within the lung alveoli (see ***Figure 5***) and hepatic tissue. Both kidney (see ***Figure 6***) and uterus (see ***Figure 7***) samples were observed to have inflammatory infiltrates in the form of mononuclear white blood cells, particularly lymphocytes within the parenchyma. Lymphocytic infiltration was seen within the myocardium of the heart, along with fat tissue accumulation concentrated near the epicardium (see ***Figure 8***).

5. Discussion

From the results of the post-mortem and histological examinations, it can be concluded that the cause of death of the goat is uterine rupture from severe metritis, resulting in acute septicaemia and multi-organ dysfunction. A recent retrospective study has stated that dystocia makes up 84% of parturient disorders in goats, thus subsequently leading to metritis and uterine rupture.[2]

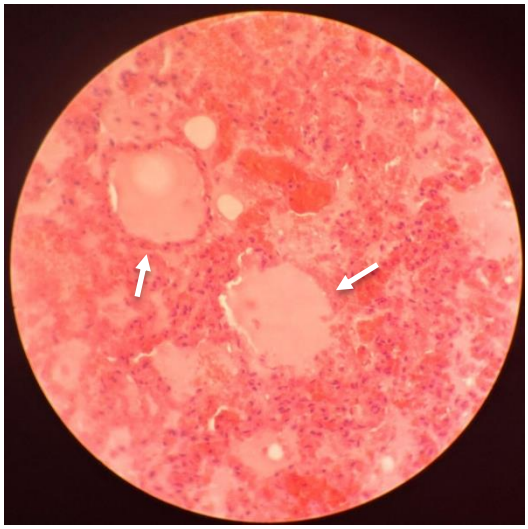

Figure 5. Histological examination of lung in H&E under 10x magnification displaying fluid filled alveoli of the lungs (white arrows).

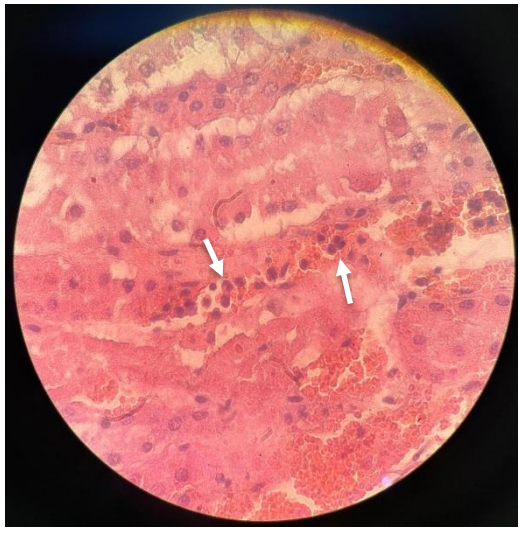

Figure 6. Histological examination of kidney in H&E under 40x magnification displaying white blood cell infiltration in the interstitial tissue of the renal medulla (white arrows).

After parturition, pathogens from the environment, such as in unhygienic surroundings, are highly likely to cause ascending infection due to the compromised physical barriers of the uterus.[4] In cases where the uterine body is already infected from such environmental factors, the risk of complications increases significantly. Infected uterine contents may be seen as the

grainy, red, fetid material observed by the owner and in post-mortem examination.[3,5] Leakage of these contents into the abdominal cavity creates an environment for bacterial proliferation and endotoxin release, eventually leading to acute inflammation and infection of the abdomen, *i.e.* peritonitis. Peritonitis occurs when the peritoneal cavity is exposed to nonspecific infectious or noninfectious agents associated with other conditions.[6] In ideal circumstances, this acute inflammation would activate inflammatory cells to clear the ongoing infection completely and then subside. However, this process itself can attack nearby healthy tissue and trigger another inflammatory response resulting in a continuous chain reaction affecting multiple organs systematically.[7] This type of peritonitis is often acute and can frequently progress to systemic disease resulting in acute sepsis.[6] Acute sepsis is defined as a dysregulation of inflammatory response, causing vasodilatation, hypotension, and shock, which impairs oxygen delivery to vital organs resulting in fatal multi organ dysfunction (MOD).[8] In periparturient goats, sepsis can develop rapidly, resulting in MOD and death if left untreated.[9]

In post-mortem examination, the lung was seen to be severely inflamed and congested, with lesions diffused throughout the parenchyma. This inflammation was confirmed by histology where haemorrhagic alveoli with white blood cell infiltrates were observed, aligning with a review conducted by Neumann *et al*.[10] As with the kidney sample, congestion was observed on gross examination, coupled with inflammatory infiltrates of lymphocytes and macrophages on histology. These findings have been described in a review by Stassi *et al*. and are consistent with acute lung and kidney injury secondary to sepsis.[11] Grossly, the heart sample displayed thin, white lines on the surface of the epicardium, with fat infiltration between the cardiac muscle fibers as well as significant lymphocytic infiltration histologically. Examination of the gastrointestinal system showed the liver to be pale brown with congestion of red blood cells within the hepatocyte interstitium, consistent with hypoxic hepatitis. The most common predisposing factors for this condition are cardiac failure, respiratory failure and septic shock,[12] all of which were present in this case. It can thus be concluded that multiple organs had been affected in the dam. Therefore, the sequence of events are as follows: uterine rupture from dystocia causing peritonitis, resulting in acute sepsis and septic shock, subsequently causing MOD involving the lungs, heart, kidneys and liver. The involvement of mastitis of the left mammary gland indicates an underlying condition which likely had developed prior to parturition.[13] The lack of post-partum monitoring of the dam, coupled with delayed intervention of the condition had caused the dam to succumb to the infection. In severe cases, this condition can lead to sepsis and, if untreated, it will result in the animal's death.[3] In this case, the cascade of events had ultimately led to the unfortunate death of the animal within 24 hours.

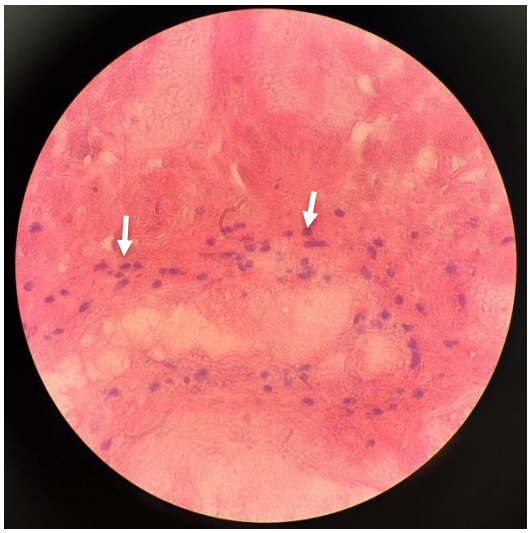

Figure 7. Histological examination of uterus in H&E under 40x magnification displaying white blood cell infiltration in the submucosal layer (white arrows).

This report encountered the first record of uterine rupture causing sudden death in a goat discovered by post-mortem examination Brunei Darussalam. It is significant to note that there has not been any previous report of caprine uterine rupture within the Pathology Laboratory, VLS, which may be attributed to several factors such as the under-reporting of deaths of goats on farms

and the lack of samples sent to the VLS for post-mortem diagnosis.

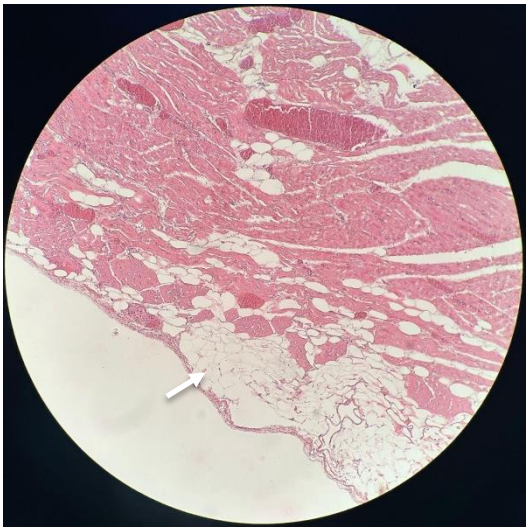

Figure 8. Histological examination of heart in H&E under 10x magnification displaying fatty deposits within the epicardium (white arrow).

6. Recommendations

This case describes a condition of goats in parturition that is preventable with the correct interventions. One of the most significant factors of healthy parturition is peripartum hygiene of the goat herd. Clean, dry and well-drained kidding pens are important in ensuring ascending infection into the uterus is prevented. This can be done by regularly cleaning and disinfecting the pens and replacing the bedding, especially before and after a kidding is done. It is also pertinent to ensure the proper training of staff to assist in kidding in the case of prolonged parturition by reducing stress on the animal and avoiding excessive traction that may lead to trauma to the uterus. Another important aspect is postpartum care of the dam and kid which encompasses ensuring no retained membranes within the dam as well as close daily monitoring for appetite, discharge and any spike in temperature. Consultation with a veterinarian should be considered when the health of either dam or kid is compromised. Throughout gestation, balanced nutrition of the dam is significant to ensure the dam is able to carry through the periparturient period and deliver a healthy kid. This can be done by ensuring balanced energy and food ratios, supplementation with selenium, calcium, phosphorus and vitamin E in the feed as well as ensuring clean and drinkable water.

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