The Pharma Innovation Journal 2023; SP-12(10): 1435-1437

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(10): 1435-1437
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www.thepharmajournal.com
Received: 05-07-2023
Accepted: 19-08-2023

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Successful surgical management of cystorrhexis in a buck

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Abstract
A six-month-old male Attapadi black goat was presented to TVCC Mannuthy with clinical signs like pear- shaped abdomen, anorexia, and anuria for the past 3 days. Abdominal palpation revealed fluid thrill. From the history and clinical signs, the case was tentatively diagnosed as cystorrhexis and it was confirmed by ultrasonographic examination. Under general anaesthesia, the condition was surgically corrected by a tube cystotomy and the animal had an uneventful recovery.

Keywords: Cystorrhexis, uroperitoneum, tube cystotomy, surgical management

Introduction
Uroperitoneum is the accumulation of urine in the peritoneal cavity, with a higher incidence in males when compared to females. The main clinical sign is pear shaped abdomen. The abdominal distension can be present bilaterally or unilaterally. It is due to leakage of urine originating from the kidneys, ureters, urinary bladder, urethra, or may be due to ruptured persistent urachus. In female cattle, bladder rupture most commonly occurs after dystocia (Smith *et al*., 2009) [4]. The peritoneal membrane act as a semipermeable barrier, which readily allows the passage of low molecular weight solutes (Constable *et al*., 2017) [2], resulting in hyponatremia, hypochloremia, hyperkalemia, The condition is corrected by tube cystostomy, which includes inserting a foley catheter through the abdominal wall into the bladder to reroute urine flow and allow the urethral mucosa to heal, corrects the issue. (Pugh *et al*., 2020) [3].

Case history and observations
A six-month-old male Attapadi black goat, weighing 26 kg, was presented to TVCC, Mannuthy, Thrissur with the history of anuria, anorexia, and bilateral abdominal distension (Fig. 1). On abdominal palpation, fluid thrill could be detected without any pain. Ultrasonographic examination revealed anechoic fluid within the abdominal cavity. There was an elevated BUN (163.1 mg/dL), creatinine (5.354 mg/dL), and potassium level (17.12 mg/dL) on serum biochemical evaluation. Additionally, the complete blood count showed leucocytosis at 14 x 103/µl and monocytosis at 2.1 x 103/µl.

Treatments
Animal was Preanesthetic with butorphanol at a dose rate of 0.2mg/kg intramuscularly and xylazine hydrochloride at 0.05mg/kg dose rate. General anaesthesia was induced with ketamine hydrochloride at a dose rate of 3 mg/kg and diazepam at 0.1 mg/kg intravenously. Surgical site was prepared aseptically. The animal was placed in lateral recumbency. Surgical site was desensitized by using local anaesthetic 2% lignocaine hydrochloride by inverted L block on lower left flank region (fig. 3). An oblique lower flank laparotomy on the left side of the animal was done to enter abdominal cavity (fig. 4). Removed all the urine presented in the abdomen using suction and exteriorized the bladder and the site of the bladder rupture was identified. The ruptured area was sutured using Cushing followed by lemberts suture pattern by 2-0 catgut (fig. 5). A 16 Fr Foley's catheter was passed through the skin into the peritoneum. A stab incision was made on the healthy area between the vesical vessels, Foley's catheter was inserted and held in position with the help of purse string suture (fig. 5). The muscle layer was opposed with simple continuous suture pattern by polyglactin 910 size 1-0 followed by subcutaneous tissue apposition using subcutaneous suture pattern with polyglactin 910 size 1-0. The Foley's catheter was sutured to the skin using nylon (fig. 6).

Postoperatively the animal was administered with tetanus toxoid. Advised to give Tab. Cyclopam 10 mg at 5 mg/kg and Tab. amoxicillin at 12.5 mg/kg for 5 days. Oral administration of ammonium chloride @ 200 mg/kg and vitamin c @ 10mg/kg about 2 weeks was also recommended.

Fig 1: Animal with distended abdomen

Fig 2: Anechoic fluid filled abdomen with floating intestinal loops

Fig 3: Inverted L block on left lower abdomen

Fig 4: Incision made on lower flank region

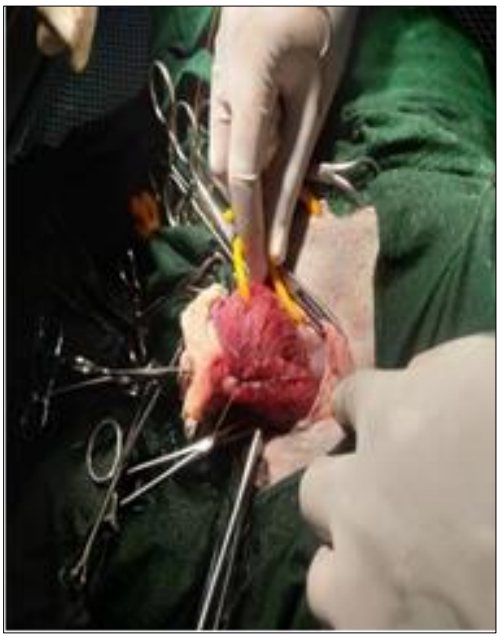

Fig 5: Bladder is sutured by inversion suture

Fig 6: Foley's catheter is attached to the skin and skin suture

Fig 7: Animal after removal of Foley's catheter

Discussion

The accumulation of urine in the peritoneal cavity is known as uroperitoneum. It is mainly due to rupture of bladder. There are two types of bladder ruptures: discrete bladder wall tears or many pinpoint perforations in necrotic areas. Urethral rupture and bladder rupture are caused by total urethral blockage. The location of leakage is always on the dorsal side of the abdomen, and the classic clinical symptom that is commonly observed is a pear-shaped belly because of urine buildup in the peritoneal cavity. In a few rare cases, a significant internal haemorrhage results in immediate mortality following bladder rupture (Constable *et al*., 2016) [2]. Urination could be normal, absent, or stranguria.

The abdominal wall is weak, and succussion produced a splashing sound. Because it is empty or contains little urine, intraabdominal fluid may prevent transrectal palpation of the rumen and bladder; instead, fluid splashing is felt (Braun *et al*., 2015) [1]. A fluid wave is detectable on tactile percussion and the abdomen soon becomes distended. In steers, a per rectum fibrin accumulation can be felt along the dorsal surface of the bladder

Clinical signs metabolic changes

The peritoneum was a selectively permeable membrane, which allow the diffusion of solutes and osmosis of water across it. Due to urine's two to three times higher osmolarity than that of interstitial fluid, water flows down the osmotic gradient from the interstitial space into the peritoneal fluid. Dehydration, decreased skin turgor, Enophthalmos, and haemoconcentration are the results of this. Since the concentration of these electrolytes in the peritoneal fluid is lower than in the urine or blood, sodium and chloride migrate into it. This result in hyponatremia and hypochloremia. Urea and creatinine travel down a concentration gradient from the peritoneal fluid into the extravascular space (Braun *et al*., 2015) [1].

Uroperitoneum ultrasonography revealed a huge accumulation of fluid throughout the entire abdomen, including organs that appeared to be suspended in the fluid. A ruptured bladder may be detected by transrectal ultrasonography; it may be flaccid and deflated, contain little to no urine or contain varied amounts of urine. (Braun *et al*., 2015) [1].

The fluid retrieved from the abdominocentesis was clear, pale yellow or colorless, and only occasionally smells of urine. Urea and creatinine concentrations are typically very high, but specific gravity and protein concentration are typically very low (Braun *et al*., 2015, Mohsin AG, 2014) [1, 5].

Surgical treatment of uroperitoneum

In a tube cystotomy, a foley's catheter is inserted through the abdominal wall into the bladder to allow urine to flow without crossing the healing urethral mucosa. The tube's size should be sufficient to prevent obstructions from small blood clots passing through it. (Pugh *et al*., 2020) [3]. Three more days after the patient can urinate without restriction, the catheter is removed, enabling the cystostomy site to heal on its own. Simply cut any retention sutures, inflate the bulb, and insert the catheter through the skin to remove the foley's catheter from the bladder.

Conclusions

Uroperitoneum is distension of abdomen by urine. Based on the history, clinical signs, ultrasonographic evaluation and serum biochemical evaluation the case was diagnosed as uroperitoneum. Rupture of bladder is effectively corrected by tube cystostomy where a 16 Foley's catheter used to bypass urethra so that the rupture of bladder can heal easily there is not much urine accumulate in the bladder. The animal had an uneventful recovery on fourteenth postoperative day.

Acknowledgement

Authors are thankful to the Dean, College of Veterinary and Animal Sciences, Mannuthy and Professor and Head, Teaching Veterinary Clinical Complex, Mannuthy, Thrissur for providing necessary resource and facility for the completion of the work.

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