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Case report

A case-report on surgical correction of congenital pervious urachus in calf

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ABSTRACT

The most common congenital condition of urinary bladder is the pervious urachus in calf. Effective prompt treatment of this condition is crucial for preventing a number of complications. The purpose of this paper is to assess the efficacy of subcutaneous surgical method for managing pervious urachus in calf. A normal body condition four-day-old male calf weighing around 22 kg was presented at SAQ Teaching Veterinary Hospital, Chattogram Veterinary and Animal Sciences University, Bangladesh, with a history of swelling at the umbilicus, which resembles a horn-like structure with dribbling of urine from the umbilicus. Based on the history and physical findings, a tentative diagnosis of previous urachus with omphalitis was made. It was decided to investigate the umbilical area surgically, with the aim of correcting the urachal anomaly and excising the external swollen structure of umbilicus. The surgery was planned by a subcutaneous method, which is a safe and minimally invasive surgical method. A 2 to 3 inches vertical skin incision was made lateral to the umbilicus. After careful dissection of the cord, the cord was ligated proximally and severed. The incision was closed according to incision layer by layer. The calf recovered fully without any post-operative complications within 14 days of surgery. This study may guide surgeons in selecting subcutaneous method of pervious urachus correction.

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1.INTRODUCTION

The umbilicus is a remnant of fetal maternal connection. At birth, the structure is composed of the paired umbilical arteries, a single umbilical vein and the urachus. Before birth, the urachus is the connection from the fetal bladder to the allantoicsac. Following normal delivery, the smooth muscle that surrounds the umbilicus contracts in response to the stretching of the cord at parturition (Anderson et al., 2008). Separation of the umbilical cord allows theumbilical arteries and urachus retract toabdomen where they close by smooth muscle contraction (Anderson et al., 2008). Pervious urachus is the condition where urachus fails to close after birth results dribbling of urine from the umbilical region (Langan et al., 2001). Pervious urachus can be of two types congenital and acquired (Langan et al., 2001). Congenital or acquired factors such as failure of urachal involution, neonatal omphalitis, umbilical abscess and congenital urethral obstruction may result in failure of urachal closure, known as pervious urachus (McGavin et al., 2001). During the process of embryogenesis, congenital

anomalies often result from a combination of environmental or genetic factors (Begum et al., 2023). The urine dripping from the umbilical region or the persistent wetness around the small urachal opening at the umbilicus are the clinical signs (Divers and Peek, 2008). Pervious urachus may be occur alone or in association with urethral obstruction (Nair et al., 2017). Pervious urachus is common in foal but less common in calf (Holtgrew-Bohling, 2023). In the study of Van Camp et al., 2022 pervious urachus is rare in buffalo calves, common in foals and cattle calves with a prevalence of 26% in cattle calves. This condition is often treated with surgery. Without prompt treatment, the illness could worsen and cause potentially fatal complications like inflammation, abscess formation, and systemic sepsis (Sarangom et al., 2020). In this present study the surgeon decided to operate this patient in order to exclude the possibility of likely fatal complications. The aim of this report was to demonstrate the success of surgical intervention of congenital urachus.

2.CASE PRESENTATION

Case history: A four-days-old male calf weighing around 22 kg was presented at SAQ Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Sciences University (CVASU) with a history of persistent moisture around the umbilicus and associated omphalitis which had two horn like structure. According to the owner complaints this swollen structure was visible from it's birth.

Diagnosis of the condition: Physical examination revealed normal body temperature andfeeding habitsdribbling ofurine from swollen structure, and wetness evidence surrounding the umbilicus. The animal had mild omphalitis also. There was no urethral obstruction.Based on the clinical findings the condition wastentatively diagnosed as pervious urachus and decided to correct it through surgery to prevent further complications.

Surgical procedure

Preoperative management: The Umbilical region was prepared by shaving following cleaning the swollen structure with 0.9% normal saline to remove dirt, debris and hair. Intravenouscatheterizationwas performed in ear vein to have a secured access to blood vessels and for intraoperative fluid administration. Then the surgical site was scrubbed with savlon, povidone-iodine solution and 70% alcohol thrice with each of it (Figure 1A). External swollen structure of umbilicus was wrapped by gauze to prevent contamination of surgical site (Figure 1C).

Anesthetic procedure: The calf was premedicated with diazepam (Inj. Easium®, OpsoninPharma Ltd., Dhaka, Bangladesh) @0.5 mg/kg body weight intravenously to sedate the patient.General anesthesia was induced with intravenous injection of ketamine hydrochloride (Inj. Kain®, Renata Ltd., Dhaka, Bangladesh) @2mg/kg body weight followed by diazepam. Normal saline was administered at a surgical maintenance rate 10ml/kg/hourthrough intravenous catheterization in ear vein. The animal was placed in lateral recumbency. Local analgesia was ensured by infiltrationof 2% lidocaine hydrochloride solution (Inj. Jasocaine 2%®, Jayson Pharmaceuticals Ltd., Dhaka, Bangladesh) around the umbilicus (Figure 1B) and at the incision site.

Correction technique: Subcutaneous method was adopted to correct the condition instead of common laparatomy method. After drapping the surgical site, a 2 to 3 inches vertical skin incision was made lateral to the umbilicus (Figure 1D). After opening the skin subcutaneous fascia is dissected bluntly. Umbilical cord is separated from surrounding structure by blunt dissection. External swollen structurewas excised to prevent contamination ascending to the surgical site (Figure 2A). Whole umbilical cord was ligated through vicryl 2-0 (Ethicon®, Johnson & Johnson Private Ltd., India) and resected the portion of umbilical cord outside the abdominal cavity after clamping through artery-forceps (Figure 2B). The subcutaneous incision was closed by simple continuous suture using absorbable suture material vicryl 2-0 (Ethicon®, Johnson & Johnson Private Ltd., India) (Figure 2C). After subcuticular suturing skin was closed with horizontal mattress suture using nylon, a non-absorbable suture material (Figure 2D).

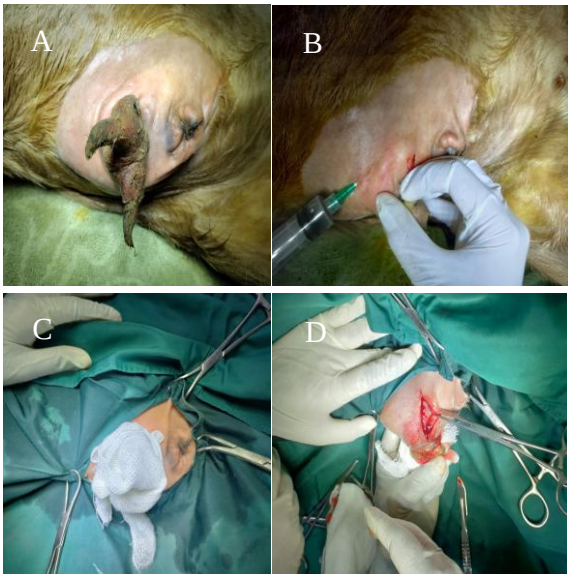

Figure 1. Preoperative and anesthetic management for surgical correction of pervious urachus in a male calf A: Swollen horn like structure at umbilicus B: Local anesthetic given by ring block method C: Aseptic preparation of the surgical site D: Skin incision to locate umbilical cord.

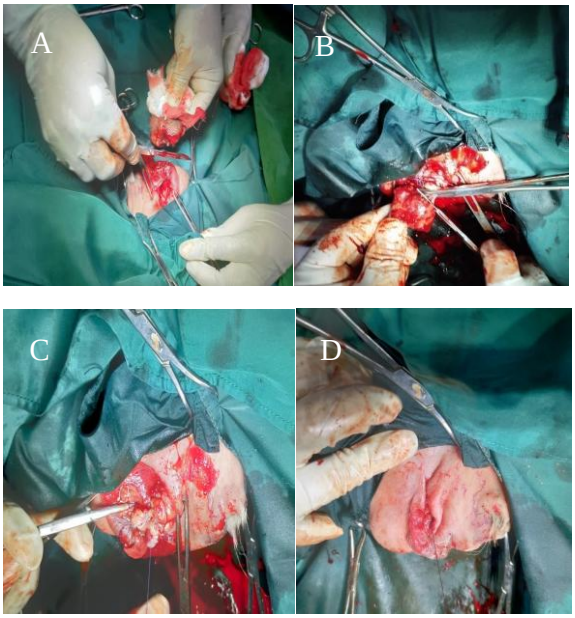

Figure 2. Surgical correction of pervious urachus in male calf by subcutaneous method A: Excision of swollen umbilicus outside the skin B: Resection of umbilical cord after ligation C: Suturing the subcutaneous muscle layer by simple continuous suture pattern D: Subcuticular suturing before closing skin of incision site.

Postoperative management: Postoperatively, a third generation fluroquinolone antibiotic marbofloxacin (Inj. Marbo vet®, Eskayef Pharmaceuticals Limited, Narayangonj, Bangladesh) @ 2mg/kg body weight at 24 hours interval for 5 days, flunixinemeglumine @ 2.2 mg/kg body weight and Pheniramine maleate @1mg/kg body weight for 3 to 7 days respectively were administered. A 5% Povidone iodine ointment was prescribed to apply on surgical site thrice daily. Other post-operative management advice for the owner included to keep the surgical site clean and dry and providing a comfortable bedding and stress-free environment. The skin sutures were removed on the 14th postoperative day.

3. RESULTSAND DISCUSSION

Umbilical dribbling was surgically managed by dissection of the infected cord after ligation. After the surgical correction urine dribbling stopped immediately and the incision site healed within 14 days of surgery. All health parameters like feeding habit, temperature, urination etc. were restored to normal after 14 days of surgery. Extra-cavitary infection, omphalitis was observed in the case we studied. A common issue in cattle, especially in calves, is infection of the umbilicus and related structures, which can result in intracavitary or extra-cavitary infectious processes (omphalitis) (De Souza et al., 2021). Infections of the urachus occur more frequently, with umbilical veins showing higher susceptibility than arteries because of their larger lumen and thinner walls (De Souza et al., 2021).The goal was to ligate the pervious urachus and excise the external swollen remnant of umbilicus so that further complications can be prevented. For the satisfactory and effective treatment of umbilical infections, reduction of bacterial load and removal of infected structures likely to have low antimicrobial penetration are indispensable as they significantly improve the prognosis of these diseases (Monteiro et al., 2022). A persistent illness increases the risk of ascending infection through the urachus and umbilical vessels, contaminating nearby structures and organs such as the liver and bladder and leading to sepsis (Monteiro et al., 2022). No such infections were happened in our studied case as early treatment was provided by surgical correction.

Usually pervious urachus may be accompanied by urethral obstruction, omphalitis, urachitis, rupture of urachus, peritonitis etc. (Sarangom et al., 2020; Nair et al., 2017; Nikahval et al., 2013). Omphalitis was only complication that was seen in present case. Although cauterizing agents such as povidone iodine and silver nitrate were also used, surgical intervention is the preferred course of treatment (Sarangom et al., 2020). However, cauterization may lead to urachal abscess by confining bacteria in the urachus (Anderson and Rings, 2009). Compared to laparatomy, the subcutaneous approach causes less trauma to the umbilical region's vascular supply, making it more effective in correcting pervious urachus (Langan et al., 2001). The subcutaneous method was therefore selected in our studied case to correct the pervious urachus. According to Rehman et al., 2023 subcutaneous method is easy safe and minimally invasive. With early intervention, the prognosis is good to fair; however, if septicemia and extensive omphalitis are present, it may be guarded to poor (Dwivedi et al., 2021). By receiving early intervention, the calf in the current study recovered without incident. Third generation fluroquinolone antibiotic marbofloxacilin prescribed post-operatively for suppress secondary bacterial infection and infection already present in urachus. For the confirmatory diagnosis of pervious urachus, abdominal radiography and ultrasonography demonstrating the presence of a metallic catheter within the urinary bladder are necessary, and these images were not included in this report. To use the findings of this report, a comparative case series analysis between the subcutaneous method and laparatomy method is further suggested.

4. CONCLUSION

A case of pervious urachus along with omphalitis was corrected by subcutaneous method of surgical intervention which is a minimally invasive and relatively easier recommended approach. The calf recovered uneventfully without any postoperative complications. This study highlighted the efficacy of the surgical management of pervious urachus in calf. A series of cases are however required for the comprehensive assessment of this surgical management.

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