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Surgical Correction of Patent Urachus in a Female Calf: A Case Report

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Abstract

Patent urachus in calves is a congenital or acquired condition where the embryonic tube connecting urinary bladder to umbilicus fails to close after birth, causing urine to dribble from the navel. The study describes the anaesthetic protocol and surgical procedure for correction of patent urachus. The anaesthetic protocol was premedication with 0.2 mg kg^{-1} xylazine, induction and maintenance on 5.0 mg kg^{-1} ketamine with local infiltration of 5 mg kg^{-1} lignocaine. The procedure involved an elliptical incision around the umbilicus, followed by sharp dissection of subcutaneous tissues to expose and isolate urachus. Transfixation ligature was applied to urachus before transection and the urachal stump was sutured using simple continuous pattern. This study documents the successful surgical correction of patent urachus in a female calf.

Keywords: Calf, patent urachus, surgery, surgical correction, umbilicus

Introduction

Urachus is a canal which drains urinary bladder through the umbilicus into the allantoic fluid in the fetus. Usually, it closes at birth or very soon after birth to become scar at the apex of bladder. Patent urachus develops when the fetal urachus fails to close and forms a direct channel between bladder and umbilicus (Zachary & McGavin, 2012). It manifests as urine leaking from umbilicus. A patent urachus may be congenital, usually closing spontaneously within days if uncomplicated, or acquired, commonly linked to umbilical infections or systemic illness (Saitua et al., 2025). Left untreated, the condition could progress to urachitis, omphalophlebitis, septicemia, hepatic abscessation and cystitis; therefore, timely surgical intervention is important (Peek & Divers, 2018). The prevalence of umbilical infection in calves has been reported as 8.66 % in West Azerbaijan, Iran (Torkaman et al., 2025). However, to the best of authors' knowledge, no such prevalence data are currently available for Bhutan. This case report describes the surgical correction of patent urachus in a two-month-old female calf.

Materials and Methods

Case history and clinical examination

A two-month-old female jersey calf was presented with urine dribbling from umbilicus. According to the owner, a balloon-like swelling was observed at the umbilical region during parturition and urine started dribbling since then. The owner didn't report the case

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assuming it was a case of hermaphroditism. Upon physical examination the umbilicus was swollen with a skin pouch soiled with urine (Figure 1).

Diagnostic confirmation

For confirmation, a sterile macro-drip-set was cut and introduced through the opening at umbilical region and urine flow was observed upon application of negative pressure using a 10 ml syringe. This procedure helped distinguish patent urachus from peritoneal fluid leaking through an umbilical hernia.

Anaesthetic protocol

Following the confirmatory diagnosis an elective surgery was scheduled. The procedure began with fixation of intravenous cannula. Calf's ear was clipped, aseptically scrubbed and a tourniquet was applied at the base of the ear to facilitate the visualization of the auricular vein. Then a 22-gauge intravenous (IV) cannula was placed into the auricular vein. Later the tourniquet was removed and cannula was secured to pinna with adhesive tape and cotton padding from inner side of the pinna. The calf received 2.2 mg kg^{-1} flunixin meglumine IV 30 minutes prior to surgery to provide preemptive analgesia.

The calf was sedated with intramuscular (IM) injection of 0.2 mg kg^{-1} 2% xylazine. After 10 minutes, 5.0 mg kg^{-1} ketamine was administered IV slowly over 30 seconds. An infusion of Ringer's Lactate was administered at the rate of 10 ml kg^{-1} $hour^{-1}$ during the surgery. The calf was placed in right lateral recumbency. The hair around proposed surgical site was clipped and the surgical site was prepared by 4% chlorhexidine followed by 10% povidone iodine. The umbilical region was infiltrated with 5 mg kg^{-1} 2% lignocaine.

Surgical procedure

The surgical procedure began with an elliptical incision made around the umbilicus. The subcutaneous tissue was sharply incised until the urachus, a tubular structure, was identified and isolated. A sharp incision was made into the rectus abdominus muscle extending approximately 20 mm cranial and 20 mm caudal of the urachus with a scalpel blade. The urachus was gently pulled until the bladder's apex was visible. Transfixation ligature was placed approximately 20 mm from the bladder's apex on the urachus with poyglecaprone. Another transfixation ligature was placed on remnants of umbilical vessels. The urachus remnant and the umbilical vessels were clamped with straight artery forceps, held with Allis tissue forceps and cut with scalpel blade. The cut end was sutured with simple continuous pattern with polyglycolic acid (PGA) suture (Figure 2). Closure of abdominal muscle was performed using cruciate suture pattern with PGA, the subcutaneous tissue was closed with simple continuous pattern using PGA and skin was closed with simple interrupted pattern using polyamide (Figure 3).

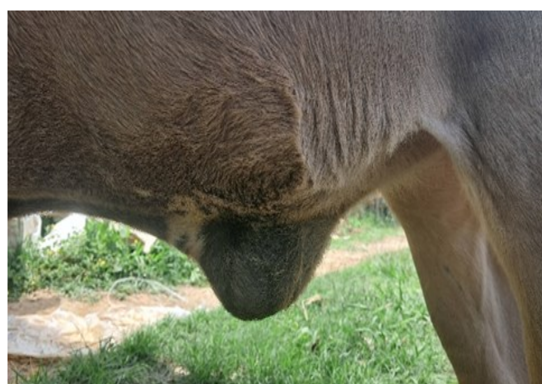

Figure 1: Swollen umbilicus with skin pouch soiled with urine

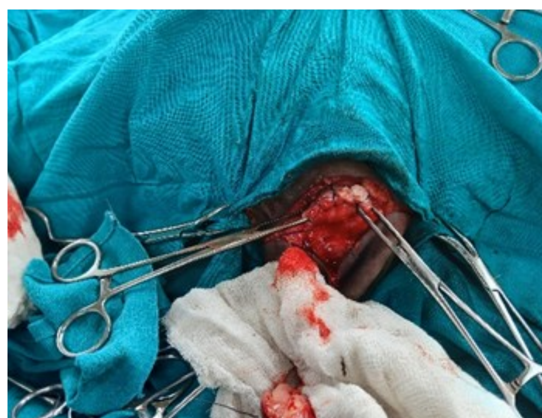

Figure 2: The stump of urachus sutured using simple continuous pattern with polyglycolic acid.

Postoperative care

The calf received flunixin meglumine at a dose of 1.1 mg kg^{-1} once daily for three days following surgery. The owner was instructed to clean the surgical site daily with 10% povidone–iodine and to apply a topical wound spray containing gamma benzene hexachloride (0.1% w/v), proflavine hemisulfate (0.1% w/v), and cetrimide (0.45% w/v) twice daily. The calf recovered with no evidence of surgical site infection or postoperative complications, and complete healing was achieved within 10 days.

Figure 3: Skin sutured with simple interrupted suture pattern using polyamide

Figure 4: Recovery after 10 days without any surgical site infection

Discussion

In cases of patent urachus, urine leakage from umbilicus has been reported to range from continuous stream during urination to constant or intermittent dribbling or continuous moistening of umbilical (Constable et al., 2016). Continuous stream of urine from umbilical stump during urination was observed in the present case. The condition was diagnosed based on clinical sign.

Offinger et al. (2012) compared three anesthetic protocol for umbilical surgery in calves: (1) induction with 0.1 mg kg^{-1} xylazine IM and 2 mg kg^{-1} ketamine IV followed by maintenance on isoflurane; (2) high-volume caudal epidural anesthesia with 0.2 mg kg^{-1} xylazine diluted to 0.6ml kg^{-1} with 2% procaine; (3) induction with 0.2 mg kg^{-1} xylazine IM and 5 mg kg^{-1} ketamine IV with maintenance dose of ketamine (2.5 mg kg^{-1}) every 15 minutes or as required. All the anesthetic protocols provided adequate anesthesia for surgery with minor difference in cardiopulmonary and hormonal responses. For the present case, anesthesia was achieved using xylazine (0.2 mg kg^{-1}) and ketamine (5 mg kg^{-1}), supplemented with local infiltration of lignocaine at the surgical site. This protocol was selected based on availability of anesthetic agents and its previously documented suitability for umbilical surgery.

There is no mention of the fluid administration during the surgical procedure in the published literature we have gone through. In our case, we have administered balanced crystalloid solutions at the rate of 10 ml kg^{-1} $hour^{-1}$. A balanced crystalloid solution is preferred in case of patent urachus; where there is no evidence of bladder rupture or urethral obstruction, because balanced solution composition resembles that of extracellular fluid (Lin & Walz, 2014). The authors recommend a fluid rate of 3-10 ml kg^{-1} $hour^{-1}$ during anesthesia to replace insensible water loss, counteract the hypotensive effects of anesthetics, and maintain tissue perfusion (Lin & Walz, 2022).

An elliptical incision was made around the umbilicus, followed by extension of the body wall incision as described by Baird (2008). This approach is recommended when the swollen umbilical mass measures approximately 3 cm in diameter (Baird, 2008). In contrast, the subcutaneous technique is more appropriate for male calves, where an elliptical incision may

not be feasible due to the close proximity of the preputial opening to the umbilicus. In case of urachal abscess, urachus and tip of bladder is resected, and the bladder is closed with absorbable suture to prevent cystitis (Baird, 2008). However, in our case, since there was no urachal abscess, we applied transfixation ligature close to bladder's apex without resection of the bladder.

The prophylactic antibiotic was not given in this case. When performed under aseptic condition, surgical correction of patent urachus have low risk of postoperative infection, and prophylactic antibiotics is not necessary. In the 90 calves undergoing surgery for the first time, 60 without prophylactic antibiotics, and 30 with antibiotics, no postoperative infections were observed (Klein & Firth, 1988).

Conclusion

This case describes the successful surgical correction of a patent urachus in a two-month-old female calf using an elliptical incision technique under xylazine–ketamine anesthesia, supported by balanced crystalloid fluid therapy and preoperative analgesia. Research on the prevalence of patent urachus, the potential complications associated with untreated cases, and the clinical outcomes of surgical correction is essential for improving evidence-based management of the condition.

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