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Correction of a Patent Urachus in a Sahiwal Cattle Calf by Subcutaneous Method in Pakistan – a Case Report

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Summary

A 15-day-old male Sahiwal cattle calf from Pakistan was presented at the farmer's home with a history of urine dribbling from the umbilicus, swelling in the umbilical region, a temperature of 40.5 °C and anorexia for the past 2 days. After confirming a patent urachus, surgery was performed by a subcutaneous method. A 2-inch dorso-ventral skin incision was made, starting from the terminal part of the umbilical stumps. The urachus was accessed close to the neck of the urinary bladder, ligated at the bladder neck using an absorbable suture material (chromic catgut no. 2) and resected. The calf recovered fully without any urine leakage or post-operative complications within 10 days of surgery. The subcutaneous method was a safe and minimally invasive surgical procedure to correct patent urachus and thus preferable to the laparotomy method.

Zusammenfassung

Korrektur eines persistierenden Urachus mittels eines subkutanen Zugangs bei einem Sahiwal Kalb in Pakistan

Ein fünfzehn Tage altes männliches Kalb der Rasse Sahiwal aus Pakistan wurde im landwirtschaftlichen Betrieb mit den Symptomen Harnträufeln aus dem Nabel, Schwellung der Nabelregion, 40,5 °C Fieber, und seit 2 Tagen bestehender Futterverweigerung vorgestellt. Nach der Diagnose eines persistierenden Urachus wurde mit einem subkutanen Zugang operiert. Dazu wurde ein ca. 5 cm langer Hautschnitt vom Ende des Nabelstumpfs ausgehend angelegt. Der Urachus wurde bis zur Mündung in die Harnblase verfolgt und der Mündungsbereich mit Chromcatgut Nr. 2 ligiert. Danach wurde der Urachus abgesetzt. Das Kalb erholte sich innerhalb von 10 Tagen vollständig, ohne Harnträufeln oder post-operative Komplikationen. Der subkutane Zugang erwies sich im Vergleich zu einer Laparotomie als eine sichere und minimal-invasive Methode zur Korrektur eines persistierenden Urachus.

Introduction

The urachus, also called the median umbilical ligament, is a tube that connects the umbilical cord to the anterior dome of the urinary bladder during the 1st trimester of pregnancy until the end of the gestation period (Severson 2011). It facilitates the removal of nitrogenous wastes through the placenta via the umbilical cord. The urachus normally closes at birth and regresses to a scar at the apex of the urinary bladder. If it fails to close at birth due to the failure of involution of normal embryologic tissues connecting the developing

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bladder to the umbilical cord, it is referred to as a patent urachus (Briggs & Rentea 2023). Unlike other urachus anomalies, such as an umbilical-urachal sinus, a vesicourachal diverticulum or a urachal cyst, a patent urachus may be symptomatic and can cause urine dribbling (Wilson et al. 2019). A patent urachus occurs alone or together with other anomalies such as urethral obstruction (Nair et al. 2017).

Although rare in buffalo calves, a patent urachus is fairly common in foals and cattle calves, with a prevalence of 26 % in cattle calves (Van Camp et al. 2022). It leads to urine dribbling from the umbilicus in both male and female calves, and urine may also discharge from the penis or vulva. There are both surgical and conservative methods to correct a patent urachus. In the conservative method, a cotton swab dipped in 90% alcohol is applied to the urachus towards the urinary bladder to stop urine dribbling by promoting the development of adhesions. Although dribbling of urine stops over time, complications such as inflammation and abscess formation may arise (Singh et al. 2020). For this reason, surgical methods are often used to treat a patent urachus. The most common approach involves an incision over the umbilicus in a cranio-caudal direction. The abdominal cavity is entered and the urachal opening ligated using absorbable suture material (Niwas et al. 2020). If treatment is not immediate, the condition might lead to complications such as abscess formation and systemic sepsis, which may be fatal (Sarangom et al. 2020). The current case relates to the surgical correction of a urachus in a 15-day-old male cattle calf.

Materials and Methods

A 15-day-old male Sahiwal breed cattle calf from Pakistan, weighing 30 kg, was presented at the farmer's home with a history of urine dribbling from the umbilicus, edematous swelling at the umbilical region, a temperature of 40.5 °C and anorexia for the past two days. Minor debris and inflammatory exudates were observed on the umbilical region, prompting an immediate decision to perform surgery. During clinical examination, a cord-like structure was palpated caudal to the umbilicus. Blood examination revealed an increase in neutrophils, indicating bacterial involvement. Other blood parameters, including red blood cells, white blood cells, haemoglobin, serum blood urea nitrogen and serum creatinine were within the reference range, as shown in Table 1. Based on the clinical findings, surgical correction of the patent urachus was advised.

Tab. 1: Blood parameters of Sahiwal cattle calf before surgery of a patent urachus / Ergebnisse der Blutuntersuchung des Sahiwal-Kalbes vor der chirurgischen Entfernung des persistierenden Urachus

Blood Parameters	Results	Reference Range (Susan 2022)
Red blood cells	6.5×10^{12}/l	5–10 × 10^{12}/l
White blood cells	9.4×10^{9}/l	4–12 × 10^{9}/l
Neutrophils	**41 %**	15–33 %
Haemoglobin	9.3× 10 g/l	8–15 × 10 g/l
Blood urea nitrogen	3.9 mmol/l	3.6–8.9 mmol/l
Creatinine	1.1 mg/dl	0.5–2.2 mg/dl

Surgical Procedure

A subcutaneous approach was adopted to resolve the patent urachus. The surgical site was prepared by clipping hair with scissors and clearing debris with a gauze dipped in 5 % methanol (Methylated Spirit®, Oval Pharma®, Pakistan) around the umbilical region. The animal was placed in lateral recumbency. Local anaesthesia (10 ml) was ensured by infiltration of the umbilical stump and the surgical site with 2 % lignocaine plus epinephrine (Medicain®, Huons Co. Ltd®, South Korea). The anaesthetic action of lignocaine alone lasts for 1–2 hours and it can be increased to 2–6 hours when used in combination with adrenaline (Collins et al. 2013). General anaesthesia was achieved by the intravenous application of ketamine 5 mg/kg (Ketasole®, Indus Pharma®, Pakistan), xylazine 0.2 mg/kg (Xylaz®, Farvet®, Netherlands), and atropine sulphate 0.02 mg/kg (Atrovet®, Selmore Pharmaceuticals®, Pakistan) via the jugular vein. A 2-inch dorso-ventral skin incision was made, starting from the terminal part of the umbilical stump. Cutaneous blood vessels were ligated using electric cauterization and blunt dissection of the subcutaneous fascia was performed using mayo scissors. The urachus was traced up to the urinary bladder and ligated close to the neck of the bladder using chromic catgut no. 2 (Chromic Gut®, Ethicon Inc®, Scotland), an absorbable suture material. After confirming proper ligation without any urine leakage, the urachus was resected. The subcutaneous incision was closed with a simple continuous pattern with chromic catgut no. 2 and the skin incision closed using a simple interrupted pattern with silk no. 2 (Silk®, Ethicon Inc®, Scotland), a non-absorbable suture material. Surgery was completed within 30 minutes.

Post-operative care was performed with povidone-iodine (Pyodine®, Brooks Pharma®, Pakistan) as an antiseptic solution, intramuscular injection of amoxicillin (Almox LA®, Star Labs®, Pakistan) at a dose of 20 mg/kg body weight (Smith 2015) and of a non-steroidal anti-inflammatory drug, meloxicam (Dyclostar®, Star Labs®, Pakistan) at a dose of 0.5–1 mg/kg body weight (Melendez et al. 2019) for three consecutive days. Surgical procedures are shown in Figures 1A–1E.

Fig. 1: Correction of a patent urachus in a male calf by a subcutaneous approach. A: Skin incision to locate umbilical cord; B: Locating the umbilical cord; C: Ligation of patent urachus and blood vessels; D: Closure of skin incision; E: Healing of skin incision after 15 days of surgery / Korrektur eines persistierenden Urachus bei einem Stierkalb mittels eines subkutanen Zugangs. A: Hautschnitt zur Auffindung des Nabelstrangs; B:LokalisierendesNabelstrangs;C:Ligaturdes persistierenden Urachus und der Blutgefäße; D: Verschluss der Hautwunde; E: Heilung des Hautschnitts 15 Tage nach der Operation.

Results and Discussion

The surgical management of the patent urachus was considered the therapeutic option of choice. After the surgical correction of the patent urachus, urine dribbling stopped immediately and the wound healed within 10 days of surgery. All health parameters such as vital signs, urination, feed intake and behavior were normal after 10 days.

Dribbling of urine from the umbilical region immediately after birth is a common symptom of calves with a patent urachus (Muhammad et al. 2017). Early treatment of a patent urachus is associated with a good prognosis, while later treatment may have a poor outcomes because of septicemia and omphalitis (Langan et al. 2001). Correction of a patent urachus by the subcutaneous method is effective, with less trauma to the vascular supply of the umbilical region. There is no risk of recurrence and the surgery is easy. It requires up to 30 minutes, which is very feasible (Khan et al. 2020). The laparotomy method of treatment requires more time, is invasive surgery and has many complications, such as omphalitis and abscess formation (Fazili et al. 2010).

We undertook the procedure on a single calf and a thorough evaluation of the method would require more cases. For veterinary practitioners, the subcutaneous method of treatment could be an easy, safe and minimally invasive procedure with no complications and with a favourable outcome. The calf needed close monitoring for two weeks of post-operative care.

Conclusion

A patent urachus is a congenital anomaly in newborn cattle calves, characterized by dribbling of urine from the umbilicus. A subcutaneous method to correct the patent urachus was found to be easy, safe and minimally invasive and thus preferable to common laparotomy methods. Additional cases of patent urachus are needed for a comprehensive assessment of the procedure.

Fazit für die Praxis:
Ein persistierender Urachus ist eine angeborene Anomalie, die bei neugeborenen Kälbern auftritt und durch Harnträufeln aus dem Nabelstumpf gekennzeichnet ist. Ein subkutaner Zugang zur Korrektur der Anomalie erwies sich im Vergleich zur üblichen Laparotomie als leicht vorzunehmender, sicherer und minimal-invasiver Eingriff. Für eine umfassende Bewertung dieser Methode ist deren Einsatz bei weiteren Fällen erforderlich.

Conflict of interest: The authors declare no conflict of interest.

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