CASE REPORT
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SURGICAL CORRECTION OF PERVIOUS URACHUS AND IMPERFORATE URETHRA IN A TWO-DAY-OLD CROSS BRED JERSEY CALF

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ABSTRACT

A two-day-old female cross bred Jersey calf was presented with history of dribbling of urine through the umbilicus, but not passing urine through the natural urethral opening since birth. The condition was diagnosed as persistent urachus and congenital imperforate urethra based on the history, clinical signs, radiographic and ultrasonographic findings. Under general anaesthesia, the stalk of pervious urachus was identified, carefully ligated and separated through a ventral mid-line laparotomy. The patency of the external urethra was accomplished by gentle digital pressure. The animal had an uneventful recovery.

Keywords: Patent urachus, Pervious urachus, Imperforate urethra, Umbilicus

INTRODUCTION

Persistent urachus is a congenital defect where a functional foetal urachus, which communicated the urinary bladder with the allantois during the prenatal life, failed completely to get atrophied and cicatrized even after birth (Osborne *et al*., 1987). Neonatal omphalitis, umbilical abscess and congenital urethral obstruction might also lead to the development of this condition (Mc Gavin *et al*., 2001). The condition occured commonly in foals, but was infrequently reported in calves (Fazili *et al.,*1998; Mendoza *et al*., 2010). Pervious urachus occured either alone; or in association with urethral obstruction or other congenital abnormalities (Nikahval and Khafi, 2013; Nair *et al*., 2017). The condition was usually accompanied by complications such as omphalitis, rupture

of urachus and uroperitoneum (Hylton and Trent, 1987; Braun *et al*., 2009; Mendoza *et al*., 2010); and immediate treatment if not attempted might deteriorate the condition of the animal, develop potential complications and could be life threatening. The present case, reports the diagnosis and successful surgical management of persistent urachus and congenital imperforate urethra in a two-day-old female cross bred Jersey calf.

CASE HISTORY AND OBSERVATION

A two-day-old female cross bred Jersey calf was presented to the outpatient unit with the history of not passing urine through natural urethral opening but draining through the umbilicus since birth (Fig. 1). On clinical examination, the animal appeared active and alert. Frequent leakage of urine through the umbilicus was observed along with mild omphalitis. Catheterisation of the umbilical opening revealed the presence of a tubular tunnel along with leakage of urine through the catheter when progressed anteriorly. Radiographic examination of the abdomen in orthogonal views after catheterisation through the umbilical orifice confirmed the presence of the metallic catheter within the urinary bladder which entered through its caudo-ventral border (Fig. 2A). Abdominal ultrasonographic examination (3-5 MHz convex transducer, Mindray Bio-Medical Electronics Co., Ltd., Shenzhen, China) showed normal urinary bladder margins and reverberation within due to the metallic catheter (Fig. 2B). At the other end, a probing catheter could not be progressed beyond the external urethral orifice. Based on the history, clinical signs, radiographic and ultrasonographic findings, the condition was diagnosed as patent urachus and congenital imperforate urethra. The haematological and serological parameters were normal. Hence, surgical correction was resorted to.

TREATMENT AND DISCUSSION

The calf was fasted six hours prior to surgery. Pre-operatively, Ceftriaxone sodium (Intacef pet, Intas Pharmaceuticals Ltd., Ahmedabad) at the rate of 25 mg/kg body weight, meloxicam (Melonex, Intas Pharmaceuticals Ltd., Ahmedabad) at the rate of 0.3 mg/kg body weight and butorphanol (Butrum-1, Aristo Pharmaceuticals Pvt. Ltd., Raisen) at the rate of 0.05 mg/kg body weight were administered intravenously. The ventral abdomen extending from the xiphoid to the pubis was clipped, shaved and scrubbed with one per cent chlorhexidine solution. General anaesthesia was induced with intramuscular injection of ketamine hydrochloride (Aneket, Neon Laboratories Ltd., Mumbai) administered at the rate of 3 mg/kg body weight followed by diazepam (Calmpose, Ranbaxy laboratories Ltd.,

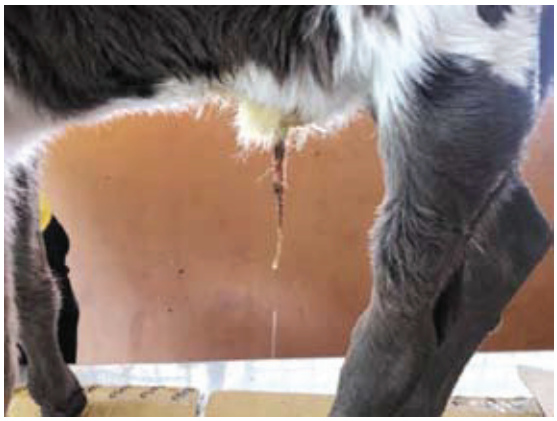

Fig. 1. The calf presented with dribbling of urine through the umbilicus

Fig. 3. The calf voiding urine normally during the immediate postoperative period

Baddi) at the rate of 0.2 mg/kg body weight intravenously. Anaesthesia was maintained with a mixture of ketamine hydrochloride and diazepam (1:1 v/v) along with intravenous infusion of normal saline. Local analgesia was achieved by infiltration of two per cent lignocaine hydrochloride solution (Xylocaine two per cent, Astra Zeneca Pharma India Ltd., Dundigal) around the umbilicus.

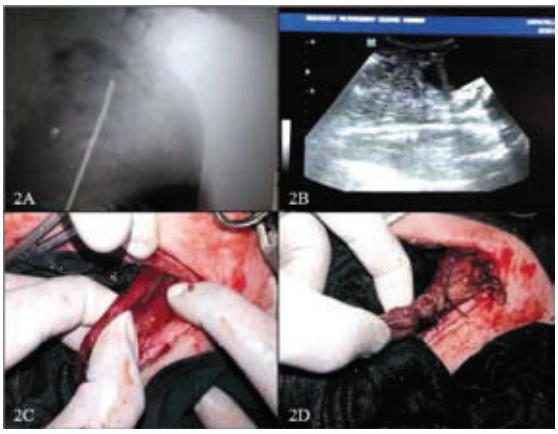

Fig. 2. Lateral abdominal radiograph showing presence of metallic catheter within the urinary bladder with the entry point at the caudo-ventral border (A). The normal bladder margin and reverberation due to the metallic catheter observed in diagnostic ultrasound (B). The patent urachal cord with attachment on the caudo-ventral border of urinary bladder (C) and the stalk double ligated close to the bladder wall (D).

A standard mid-ventral approach was taken for the repair. The calf was positioned in dorsal recumbency and the surgical site was aseptically prepared with povidone iodine (5 per cent) solution and was draped. A 10 cm long elliptical incision was made around the umbilicus extending caudally along the ventral midline region towards the pubis. The incision was deepened along the *linea alba* to enter the peritoneal cavity. The cord of the pervious urachus was identified. The cord was used to trace the stalk that attached the caudo-ventral border of urinary bladder (Fig. 2C). The stalk of the pervious urachus was double ligated close to the bladder using No. 1 Polyglactin 910 (Vicryl, Johnson and Johnson Ltd., Aurangabad, India) and was resected (Fig. 2D). The stump

of the cord was apposed by purse string suture pattern using No. 2-0 Polyglactin 910. The resected urachus along with the umbilical cord were bluntly separated and removed. The abdominal cavity was meticulously explored to rule out any concurrent abnormalities and presence of adhesions. The mucosal adhesion on the external urethral orifice was separated by gentle digital pressure and the patency of urethra was confirmed with the help of a urinary catheter. The abdominal cavity was lavaged with sterile normal saline solution (0.9 per cent). The *linea alba* was apposed in simple continuous suture pattern using No. 1 Polyglactin 910. The skin wound was closed in simple interrupted suture pattern using No. 1 polyamide (Trulon, Sutures India Pvt. Ltd., Bangalore, India). The calf started voiding urine through the external urethral orifice normally during the immediate postoperative period (Fig. 3). Postoperatively, antibiotics (ceftriaxone sodium) were continued for five more days and analgesics (meloxicam) for three more days. Antiseptic wound dressing was done regularly using 5 per cent povidone iodine solution and the skin sutures were removed on the 12th postoperative day. Postoperative complications were not observed and the animal had an uneventful recovery.

The history and clinical signs in the present case were similar to that reported previously. Dribbling of urine through the umbilicus, the consistent sign previously reported by Nikahval and Khafi (2013) and Nair *et al*. (2017), was observed in the present case also. Usually, the pervious urachus may be accompanied by omphalitis, rupture of urachus and uroperitoneum and may subsequently lead to cystitis, urachitis, urinary incontinence, peritonitis and urine scalding during the time of presentation (Hylton and Trent, 1987; Braun *et al*., 2009; Mendoza *et al*., 2010; Nikahval and Khafi, 2013; Nair *et al*., 2017). Such complications were not observed in the present case. Radiography and diagnostic ultrasound assisted in assessing the patency of the urachus, ruling out potential complications and in making a definitive diagnosis. Also, the normal physiological and haemato-biochemical parameters indicated non-existence of any concurrent systemic illness. But, the urachus was accompanied by the presence of urethral obstruction due to a membranous diaphragm occluding the external urethral meatus as reported by Hylton and Trent (1987). Congenital urethral stricture and other congenital anomalies have also been reported (Nikahval and Khafi, 2013; Nair *et al*., 2017). Although topical application of intra-urachal cauterizing agents is a treatment option for patent urachus, surgical ligation and removal of umbilical remnants were attempted to avoid ascending infection to the intra-abdominal

structures through leakage of urine from intra-abdominal umbilical remnants or by rupture of urachus (Baird, 2008; Braun *et al*., 2009; Mendoza *et al*., 2010; Grover and Godden, 2011).

The animal recovered uneventfully without any postoperative complications and the successful outcome could be attributed to the early presentation, good body condition, absence of any concurrent anomalies or systemic illness, presence of an intact urinary bladder and urachus, careful ligation and removal of umbilical remnant close to the bladder without any spillage of urine into the abdominal cavity, meticulous postoperative care and the concern of the owner.

SUMMARY

The diagnosis and successful surgical management of persistent patent urachus and congenital imperforate urethra in a two-day-old female cross bred Jersey calf is discussed.

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Ethics statement: This study does not involve animal experimentation and was conducted on cases reported in the hospitals, following standard operating protocols of animal handling and sample examination, upon informed consent of owners.

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