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## Retrograde iohexol urethrography and cystography for diagnosis and surgical management of persistent urachus in a female Sahiwal calf

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### Abstract

An 18 days old female Sahiwal calf with dribbling of urine from umbilicus region was presented. On clinical examination, a lump like structure were seen and palpated at the umbilicus along with loss of hairs around the umbilical region. Physiological parameters were within normal range. The haematological parameters observed were Hemoglobin (Hb) 10.3 g/dl, total leucocytic count 16.19 m/mm<sup>3</sup> and thrombocyte count 971 m/mm<sup>3</sup>. There was decrease in hematocrit value i.e. 23.0%. Biochemical analysis of urine revealed pH 7, specific gravity 1.020, protein 100 mg/dl, ketone 5 mg/dl and urobilinogen 0.2 mg/dl. Retrograde cystography with Iohexol @ 10 ml/kg body weight was performed by passing an infant feeding tube (#6) from vagina towards the urinary bladder. Surgical resection of the persistent urachus was done under the anesthetic combination of Diazepam @ 0.5 mg/kg and ketamine HCl @ 5 mg/kg body weight. After 60 days of surgical correction retrograde contrast urethrography and cystography reveals the obliteration of the cord but there was an occurrence of umbilical hernia which was again managed surgically.

**Keywords:** Iohexol, retrograde cystography, persistent urachus and Sahiwal

### Introduction

During the fetal life the urachus remain as a tubular fibrous cord which were connected to the urinary bladder (Blichert-Toft and Vagn Nielsen, 1971) [1] and responsible for excretion of the waste materials from foetus (Niwas *et al.* 2020) [12]. The urachus get atrophied and degenerated after birth (Niwas *et al.*, 2020) [12]. Various changes take place in the urinary system during the intrauterine development of the foetus which sometimes can give rise to different anomalies including that of the Urachus (Nix *et al.*, 1985) [11]. In new borns, intact urachus can lead to continuous dribbling of urine from the umbilicus along with omphalitis, wet umbilicus, hair loss in and around the umbilicus and ascending infection leading to cystitis. This condition is called Patent Urachus or Pervious Urachus. Persistent urachus are the most common congenital disorder associated with urinary bladder and mostly reported in foals (Dwivedi and Kushwaha, 2020) [5] followed by cow calves and occasionally in buffalo calves (Muhammad *et al.*, 2017) [9]. This congenital condition can be managed conservatively as well as surgically. In Conservative treatment, a cotton swab dipped in 90% phenol is pushed inside the urachus towards the urinary bladder (Niwas *et al.*, 2020) [12]. And when conservative method fails, surgical intervention is necessary (Singh *et al.*, 2020) [13].

The contrast radiography is one of the most important diagnostic tools used for diagnosis of disorder associated with urinary system in bovine patients. Iohexol a non-ionic, low osmolar positive contrast agent, which are filtered and eliminated exclusively by the kidneys. The binding ability of Iohexol with protein is less than 2% which makes it an ideal marker for glomerular filtration rate (GFR) (Bäck *et al.* 1998 and Langlois, 2008) [6, 7]. It has a versatile route of use such as oral route, intravenous (Mutzel and Speck, 1980) [10] and spinal cord for myelography (Wheeler and Davies, 1985) [17]. It has also been used in contrast enhancement computed tomography and arteriography (Mutzel and Speck, 1980 and Ding *et al.*, 2018) [10, 4]. It has lower potentiality for allergic instances in comparison to iothalamate which has similar kinetic characteristic (Langlois, 2008 and Su *et al.* 2014) [7, 15]. Therefore it is considered as a safest contrast agent for to be used in pediatric patients (Langlois, 2008) [7].

The present case report takes an opportunity to describe about the diagnostic and therapeutic approach undertaken in an 18 day old female calf suffering from pervious/persistent urachus.

## Materials and Methods

An 18 day old female Sahiwal calf was presented to Department of Surgery and Radiology, College of Veterinary Science, AAU, Khanapara, Guwahati-22, Assam with the history of dribbling urine from umbilicus, and the area around the umbilicus was wet and muddy. The calf was sucking milk normally, had normal respiration, heart rate, temperature and showed no signs of infection. There was no pain on palpation, however hair loss was seen around the umbilicus without ulceration.

The urine analysis revealed, it is opaque in transparency, pH 7, protein 100 mg/dl, ketone 5 mg/dl and urobilinogen 0.2 mg/dl. Haematological studies revealed Hemoglobin i.e. 10.3 g/dl however there were increase in total leucocytic count 16.19 m/mm<sup>3</sup> and thrombocytic count 971 m/mm<sup>3</sup>. The hematocrit value was 23.0%.

Retrograde contrast cystography with Iohexol @ 10 mg/kg (Jeong *et al.*, 2008)<sup>[6]</sup> through urethra using an infant feeding tube (No. 6) was done. The radiograph revealed increased radiographic density at the urinary bladder that continued as a continuous cord from the apex of urinary bladder to the umbilicus (Fig: 1) and recoiling in circular manner at the umbilicus. The same radiographic density was not observed anywhere in the peritoneal cavity, thereby confirming pervious/ persistent urachus. Surgical resection of the patent urachus was decided via mid ventral celiotomy approach.

The calf was anesthetized with a combination of Diapezam @ 0.5 mg/kg and Ketamine HCl @ 5 mg/kg body weight taken in same syringe and injected through the jugular vein (intravenously), and maintained throughout the surgery with the same combination of anesthesia. Then infiltration of lignocaine HCl (2%) was performed in diamond shape around the area. Preoperatively Ceftriaxone and Meloxicam @ 10 & 0.3 mg/kg body weight respectively were given intravenously (IV).

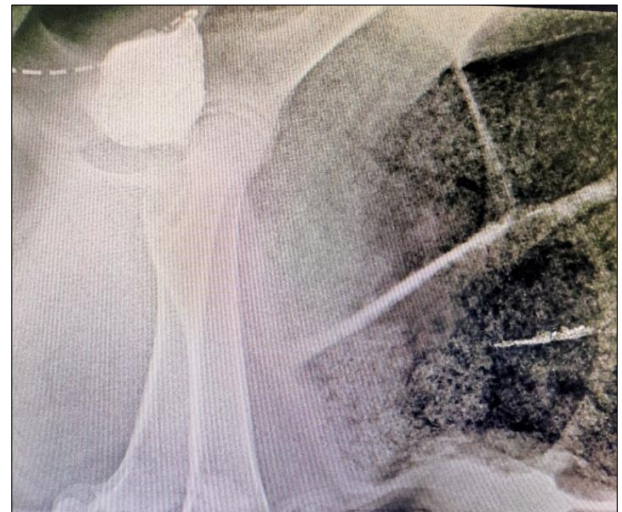
Ventral abdominal area was prepared aseptically. Mid ventral celiotomy was performed by giving incision caudal to umbilicus. The caudal end of the cord was identified at the vertex of the urinary bladder and resected after ligating the cranial and caudal end (Fig: 2) with polyglactin 910 (#0). The mid ventral celiotomy wound was closed with simple continuous suture pattern using polyglactin 910 (#0). This was followed by sub-cutaneous sutures with polyglactin 910 (#2-0) and the skin was closed with interrupted cross mattress sutures with polyamide (#2-0). Post operatively Ceftriaxone and Meloxicam @ 10 mg & 0.2 mg/kg body weight intramuscularly (IM) were given for 5 days & 3 days respectively. After 60 days of surgical correction retrograde contrast urethrography and cystography was done which reveals the obliteration of the cord (Fig: 3) but there was an occurrence of umbilical hernia which was again managed surgically.



**Fig 1:** Cystography confirming



**Fig 2:** Resected Urachus



**Fig 3:** Obliteration of the cord

## Results and Discussion

The pervious/persistent urachus in the Sahiwal calf was managed surgically by resecting the cord to the closest possible nearby the urinary bladder. 60 days post-surgery retrograde contrast urethrography and cystography reveals the obliteration of the cord and on physical examination no hard cord like structure was palpable caudal to umbilicus as earlier. The calf was passing urine normally from the natural orifice, wet area around the umbilicus was not observed post-surgery. Dribbling from the Urachus has stopped. The hairs around the umbilicus started growing gradually and normal appearance of the area was regained with no signs of infection. Similar technique of managing pervious urachus and result was also reported by Anjaneya S.N *et al.*, 2016<sup>[14]</sup> and Vadalía *et al.* 2017<sup>[16]</sup>. Anjaneya S.N *et al.* 2016<sup>[14]</sup> have observed uroperitoneum, cystitis, umbilical cord infection and urinary obstruction in calf with Pervious Urachus which was not seen in the present study as there was no perforation or obstruction in the course of pervious urachus. Conditions like hernia, peritonitis and abscess formation are the possible complications after the umbilical surgery as mentioned by Lopez and Markel, 1996<sup>[8]</sup>. And in this case study too approximately after 60 days of surgery there was occurrence of umbilical hernia in the calf which was may be due to early

absorbance of the suture material used as polyglactin 910 gets completely absorbed by 60th day (Conn *et al.*, 1974)<sup>[3]</sup>, suture rupture due to pressure from the abdominal organs or over excitation of the animal post-surgery. Loosening of the suture knots may also be the cause. The umbilical hernia was also managed surgically.

### Conclusion

In this article, retrograde iohexol urethrography and cystography for diagnosis and surgical management of persistent urachus in a female sahiwal calf is discussed. The calf had recovered uneventfully by 10<sup>th</sup> week after surgery following regular dressing and antimicrobial therapy.

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