

Diagnosis and Treatment in a Patent Urachus Male calf



**A clinical report submitted for the partial fulfillment of the degree of Doctor
of Veterinary Medicine (DVM)**

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November 2022

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A clinical report submitted as per approved styles and Contents

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November 2022

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Abstract

A 19-day old Holstein Friesian male calf was noted with dripping urine from the umbilicus and came to the S.A.Q. Teaching Veterinary Hospital for treatment. Clinical history and signs revealed high fever and pus coming with urine from the umbilicus. By palpating and radiography, a connection between the urinary bladder and the umbilicus was revealed. The blood report also confirmed the presence of infection. Surgery was performed in order to break the connection between the umbilicus and urinary bladder along with the removal of the infected portion of that connection. A third-generation broad-spectrum antibiotic was prescribed along with a painkiller and antiseptic ointment for recovery. The calf recovered completely within 14 days without any complications and there was no urine leakage from the umbilical region.

Keywords: Fluoroquinolones, Male calf, Patent Urachus, Urachitis.

Introduction

A congenital condition known as persistent or patent urachus occurs when the embryonic connection between the urinary bladder and the allantoic sac, fails to close after birth. This causes functional urine drainage from the umbilicus even after birth. When compared to calves, foals are more frequently affected by this condition, which can also be caused by congenital urethral strictures or obstructions as well as by a normal, patent urethral opening (Weaver, 1966). At birth, the umbilical cord tears, causing the umbilical vessels to pull back and form ligaments (Lavery & Salisbury, 2002). Normally, a newborn's umbilical cord dries out within a week of delivery (Radostits *et al.*, 2000). Other congenital anomalies, such as urethral obstruction, urachal cysts, uroperitoneum, etc., can occasionally coexist with this disorder, which worsens the animal's condition and poses a life-threatening risk if not properly treated (Nikahval & Ahrari, 2013). Failure of urachal involution, neonatal omphalitis, umbilical abscess, and congenital urethral obstruction are just a few examples of acquired or inborn conditions that can cause patent urachus, which is the inability to close the urachal wound (McGavin *et al.*, 2001). In addition to having a wet umbilical region, calves with patent urachus exhibit symptoms of urine oozing from the urachus (Anderson & Rings, 2009; Divers & Peek, 2008). The syndrome is carried on by a membrane urethral diaphragm that persists in a female calf and hinders the closure of the urachus, causing urine to drip at the location of the umbilicus (Singh *et al.*, 2018). The difficulty to completely emptying the bladder was caused by the urachal fistula's width being larger than the urachal aperture at the bladder due to the liquid pressure created during urination (Seungmin *et al.*, 2018). This paper describes the diagnosis procedure, surgical correction, and treatment of patent urachus in a male calf.

Case History

A 19-day-old Holstein Friesian crossbred male calf brought to S. A. Qaderi Teaching Veterinary Hospital, Chattogram Veterinary and Animal Sciences University (CVASU), Chattogram, Bangladesh with its owner Abdul Bari from Pachgasia, Feni, Bangladesh. The owner's complaints were dripping of urine from the umbilicus for 9 days and high fever for 3 days.

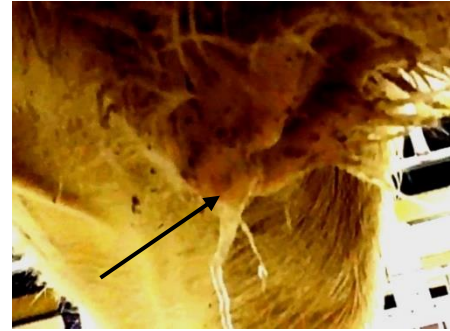


Fig 1: Urine dripping from the umbilicus

Clinical Observation

Clinical examination revealed that it had a high fever of 105.6°F and pus oozing from the umbilicus along with urine (Fig 1). Blood examination (Fig 2) revealed that there was an infection which caused the neutrophil percentage to be much higher (70%) than the normal range (15-45%) and the lymphocyte percentage to be lower (20%) than the normal range (45-75%). It confirmed that there might be a bacterial infection present in the urachus as no pus coming from urethra with urine. Other blood components like hemoglobin, total RBC count, total WBC count, packed cell volume etc. were at normal range. The serum creatinine level was also in the normal range. Moreover, radiography (Fig 3) was performed to confirm the diagnosis of the patent urachus. The urachus wall, which runs from the cranio-ventral aspect of the bladder to the umbilicus, was moderately dense, according to a lateral radiograph of the pelvis. The patient was referred for surgery.



Fig 2: Collection of blood for hematological tests

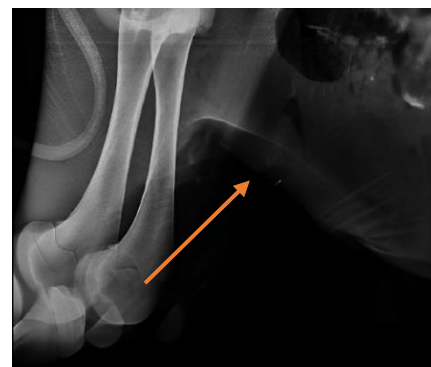


Fig 3: Plain radiograph of the lateral abdomen showing patent urachus

Surgical Procedure:

The calf's body weight was 36 kg. Initially the patient was prepared for surgery by shaving the umbilical region. The area was cleaned using povidone-iodine solution and 70% alcohol. Then the patient was placed on the operation table in the right lateral recumbency position for proper surgery. Again, the incision area was sanitized with 70% alcohol and iodine solution (Fig 5-6).

Diazepam [Inj. Easium® (10mg/2ml), Opsonin Pharma Limited., Dhaka, Bangladesh] was given at 0.5 mg/kg body weight intravenously as pre-anesthetic and another dose was ready for maintenance. Along with it, normal saline [Inf. Sodium Chloride 0.9%, ACME Laboratories Ltd., Dhaka, Bangladesh] started intravenously. Then, 2% Lidocaine Hydrochloride BP [Inj. G-Lidocaine® (1000mg/50ml), Gonoshasthaya Pharmaceuticals Ltd., Savar, Bangladesh] was given at 0.8 mg/kg body weight as a local anesthetic by the ring block method (Fig 4). A horizontal line incision was given 1 inch left lateral to the umbilicus (Fig 7). After opening the skin, linea alba was cut about 5 cm cranial to the umbilicus in order to secure the associated abdominal organs while the umbilical cord was being dissected. By separating the greater omentum from the bladder and the patent urachus (Fig 8-9) from the internal abdominal wall, the bladder was made accessible. Stay sutures were applied to the bladder before the umbilical cord and bladder were separated in order to stop urine from leaking into the stomach and to detect cystitis (Fig 10). Urachitis was seen, however there was no bladder irritation. At first two interlocking sutures were given with minimal gap for cutting above the infected part to occlude the urine coming from bladder and then cut between the sutures (Fig 11). Then at the umbilical region the same suture was given and cut the urachus. Both cutting ends were stumped by simple continuous suture pattern. Vicryl®-1 (Ethicon, Johnson and Johnson, Mumbai, India) with needle absorbable suture material used for suturing all organs except skin (Fig 12). Simple continuous suture was given for closing the linea alba and subcutaneous suture was given for close apposition of the surgical site. Finally, simple interrupted suture was given by nylon suture material for closing the incision site. The wound covered with gauze bandages to avoid contamination.

For post-operative care a third-generation fluoroquinolone antibiotic, Marbofloxacin BP [Inj. Marbo® Vet (10ml), Eskayef Pharmaceuticals Ltd., Narayangonj, Bangladesh] at 2mg/kg body weight for 7 days and painkiller Ketoprofen BP [Inj. Kop-Vet® (10ml), Square Pharmaceuticals

Ltd., Dhaka, Bangladesh] at 3mg/kg body weight for 3 days were prescribed to give intramuscularly. A dose of meloxicam at 0.5 mg/kg body weight [Inj. Mel-Vet® (50mg/10ml), Dhaka, Bangladesh] was given intramuscularly after surgery from the hospital. A 5% povidone-iodine ointment [Oint. Povin®, Square Pharmaceuticals Ltd., Dhaka, Bangladesh] was prescribed to apply on the surgical site regularly 3 times a day. Some suggestions were given to the owner for better management of the calf.

The patient came to full sense after 6 hours. No urine dripped from the umbilicus after the surgery (Fig 13-14). Moreover, after 14 days, the skin suture was removed. Within the treatment period, there were no complications. The calf was on its regular diet within the treatment period. The wound healing of the calf was good, and it was also in good shape (Fig 15).



Fig 4: Anesthesia to the patient



Fig 5-6: Preparation of the patient for surgery

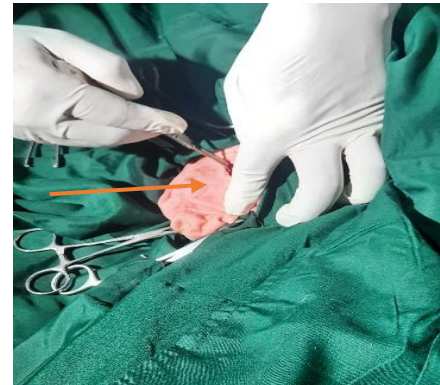


Fig 7: Incision to the site



Fig 8-9: Finding of the connection of bladder



Fig 10: Clamping of the connection for removing



Fig 11: Cutting the infected portion

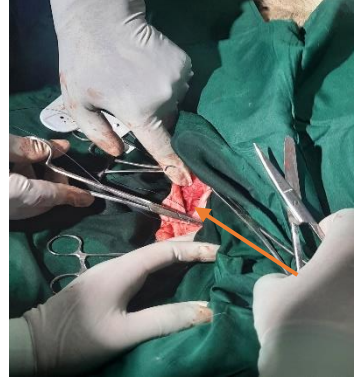


Fig 12: Closing the incision with suture

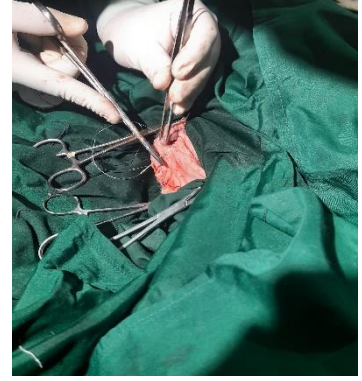


Fig 13-14: Completion of suture and complete surgery condition.

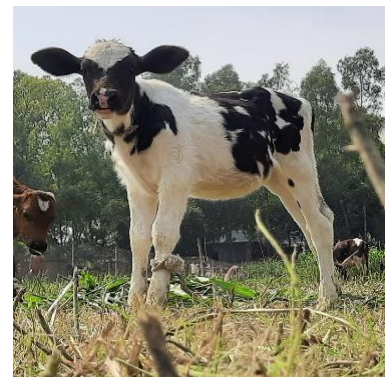


Fig 15: Fully recovered patient after surgery

Result and Discussion

Surgical correction of the umbilical remnants or topical intra-urachal application of cauterizing agents are typically used to treat patent urachus when the condition is complicated by the spread of the infection to intra-abdominal structures (Braun *et al.*, 2009; Grover & Godden, 2011). Prior to surgery, we established that urine discharged from the urethra and umbilicus, indicating that the urethra was healthy. The urachal remnant prevented the bladder from properly decompressing, which resulted in the frequent urination (Anderson *et al.*, 2008). With persistent urinary incontinence as well as urine scorching of the ventral belly, patent urachus frequently contributes to the formation of secondary bacterial urinary tract infections (Baird, 2008). Along the bladder's median ligament's border, urachal closure and deterioration are a typical occurrence. A vesicourachal diverticulum develops if the proximal urachus lasts at its connection with the bladder, resulting in a site of chronic cystitis, as opposed to a urachal umbilical sinus only when the posterior part of the embryonic allantoic stalk remains at the umbilicus (Noden & Lahunta, 1985). An ascending infection of intraabdominal umbilical remains complicated in patent urachus. The calf recovered without complications following surgical excision of the urachus and umbilical veins (Hunt & Allen, 1989). In this case the same thing was done during surgery. The infected portion was cut and closed the two cutting ends for recovery without complications. Different surgical options are available. One method is to transect between intestinal clamps that have been placed on the bladder's and the urachus' apex (Kersjes *et al.*, 1985). Another one is to use a syringe or suction to remove the urine from the bladder while inserting stay sutures on either side of the bladder at the apex (Anderson *et al.*, 2008). The third surgical procedure involves putting stay sutures on each side of the bladder's apex and clamping the bladder's apex cranial to the stay sutures using intestinal clamps (Langan *et al.*, 2001). After considering all the aspects the first procedure was followed and cutting down the parts between bladder and umbilicus and put a stay suture at both ends for avoiding possible contamination by urine.

Marbofloxacin is a fluoroquinolone of the third generation with a broad range bactericidal antibacterial action against gram positive, gram negative, and mycoplasma bacteria. It is exclusively intended for veterinary use (Maris *et al.*, 2021). So, the medicine was prescribed for secondary bacterial infection and for the infection already present in the urachus. Painkiller was suggested for removing pain sensation after surgery and the ointment was prescribed for the

external contamination occurring. After 14 days the suture was removed, and no complications were seen within the period.

Conclusion

A case of patent urachus along with urachitis diagnosed in a 19-day old male calf and surgically corrected by clumping and cutting the part between bladder and umbilicus with suture. The animal recovered within 14 days of treatment.

References:

- Anderson, D. E. & Rings, D. M. (2009). Neonatal Urinary Disorders. In *Current Veterinary Therapy: Food Animal Practice* (5th ed.). Current Veterinary Therapy: Food Animal Practice, Saunders Elsevier. <https://doi.org/10.1016/B978-1-4160-3591-6.X0135-2>
- Anderson, D.E., Miesner, M.D., Abrahamsen, E.J., Allen, A.J., Baird, A.N., Barrington, G.M., Dawson, L.J., Desrochers, A., Ewoldt, J.M., Jones, M.L., Meylan, M., Morgan, G.L., Parish, S.M., Schulz, K. & Jean, G.S. (2008). Umbilical Surgery in Calves. In *Veterinary Clinics of North America Food Animal Practice Field Surgery of Cattle Part II: Vol. Volume 2* (2nd Editio, p. 473). Saunders.
- Baird, A. N. (2008). Umbilical Surgery in Calves. *Veterinary Clinics of North America: Food Animal Practice*, 24(3), 467–477. <https://doi.org/10.1016/J.CVFA.2008.06.005>
- Braun, U., Previtali, M., Fürst, A., Wehrli, M. & Muggli, E. (2009). Zystoskopie bei einem Rind mit Urachus persistens-Ruptur. *Schweizer Archiv Fur Tierheilkunde*, 151(11), 539–543. <https://doi.org/10.1024/0036-7281.151.11.539>
- Divers, T. J. & Peek, S. F. (2008). *Diseases of Body Systems: Rebhun's diseases of dairy cattle* (2nd editio). Saunders Elsevier.
- Grover, W. M. & Godden, S. (2011). Efficacy of a new navel dip to prevent umbilical infection in dairy calves. *The Bovine Practitioner*, 45(1), 70–77. <https://doi.org/10.21423/bovine-vol45no1p70-77>
- Hunt, R. J. & Allen, D. (1989). Treatment of patent urachus associated with a congenital imperforate urethra in a calf. *The Cornell Veterinarian*, 79(2), 157–160. <https://europepmc.org/article/med/2924579>
- Kersjes, A., Németh, F. & Rutgers, L. (1985). *Atlas of large animal surgery: The Abdomen*. Williams & Wilkins. https://www.academia.edu/download/61871500/atlas_of_large_animal_surgery20200123-52316-n75le5.pdf
- Langan, J., Ramsay, E., Schumacher, J., Chism, T. & Adair, S. (2001). Diagnosis and management of a patent urachus in a white rhinoceros calf (*ceratotherium simum simum*). [https://doi.org/10.1638/1042-7260\(2001\)032\[0118:dampoap\]2.0.CO;2](https://doi.org/10.1638/1042-7260(2001)032[0118:dampoap]2.0.CO;2), 32(1), 118–122. [https://doi.org/10.1638/1042-7260\(2001\)032](https://doi.org/10.1638/1042-7260(2001)032)
- Laverty, P. H. & Salisbury, S. K. (2002). Surgical management of true patent urachus in a cat.

- Journal of Small Animal Practice*, 43(5), 227–229. <https://doi.org/10.1111/j.1748-5827.2002.tb00064.x>
- McGavin M. Donald, William Carlton, James F. Zachary & R. G. Thomson. (2001). *Thomson's special veterinary pathology: The Urinary System* (3rd editio). Mosby, St. Louis. <https://www.worldcat.org/title/44461988>
- Maris, A. S., Mody, P., Brewer, D. J. & Humphries, R. M. (2021). The Fluoroquinolones: An Update for the Clinical Microbiologist. *Clinical Microbiology Newsletter*, 43(12), 97–107. <https://doi.org/10.1016/j.clinmicnews.2021.06.001>
- Nikahval, B. & Ahrari, K. M. (2013). Congenital persistent urachus, urethral obstruction and uroperitoneum in a calf. *Iranian Journal of Veterinary Research, Shiraz University*, 14(2), 158–160. <https://www.sid.ir/FileServer/JE/102320134313.pdf>
- Noden, D. M. & Lahunta, A. de. (1985). The embryology of domestic animals. Developmental mechanisms and malformations. In *The embryology of domestic animals. Developmental mechanisms and malformations*. Williams & Wilkins.
- Radostits, O., Gay, C., Blood, D. & Hinchcliff, K. (2000). *A textbook of the diseases of cattle, sheep, pigs, goats and horses*. (9th Edition). W.B.Saunders.
- Seungmin, H., Sooyoung, K., Seongmin, K., Sookyoung, P., Soochan, L., Kihwa, J., Euntae, K., Seokjin, G. & Taeseok, H. (2018). Diagnosis and treatment of a calf with patent urachus. *Korean Journal of Veterinary Service*, 41(1), 47–49. <https://doi.org/10.7853/kjvs.2018.41.1.47>
- Singh, N. K., Kumar, A. & Kumar, P. (2018). Surgical correction of atresia ani et recti along with pervious urachus in sahiwal cow calves. *Journal of Natural Science, Biology and Medicine*, 9(2), 88–90. <https://search.proquest.com/openview/f56a1db300c472558e30e59250d7ff30/1?pq-origsite=gscholar&cbl=2035653>
- Weaver, M. E. (1966). Persistent urachus — an observation in miniature swine. *The Anatomical Record*, 154(3), 701–703. <https://doi.org/10.1002/AR.1091540315>

Acknowledgement

In order to thank God—the universe's creator and supreme ruler—for enabling me to complete this task successfully, I would want to convey my sincere appreciation and compliments to him.

The author wishes to express his genuine appreciation, respect, and heartfelt thanks to my internship supervisor, Dr. Mohammad Lutfur Rahman, Professor, Department of Anatomy and Histology, Chattogram Veterinary and Animal Sciences University, for his academic supervision, gracious collaboration, sincere assistance, insightful recommendations, and inspiration. I will always be grateful to him.

Special heartfelt thanks and respect to Dr. Bibek Chandra Sutradhar, Professor, Department of Medicine and Surgery, CVASU and his team for helping and insightful recommendation and performing surgery of the patient. Also, thanks to Dr. S.K.M. Azizul Islam, Professor, Department of Physiology, Biochemistry and Pharmacology for supporting author with hematological tests,

The last acknowledgement and expression of thanks go to my loving family who helped me to come along this road and managed to function without me. They were a constant source of support and encouragement, and without their thoughtful help, it would have been very challenging to spend so many days away from home.

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November, 2022

Biography

I am Subrata Kumer Paul, son of Mr. Satyendra Nath Paul and Mrs. Basona Rani Paul. I passed my Secondary School Certificate (SSC) examination from Bera B.B. Pilot High School, Bera, Pabna in 2014 and Higher Secondary Certificate (HSC) examination from Alhera Academy (School & College) in 2016. I enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University (CVASU), Chattogram, Bangladesh in 2016-17 session. At present I am doing my internship program which is compulsory for awarding my degree of Doctor of Veterinary Medicine (DVM) from CVASU. In the near future, I would like to work and have a massive interest in Gastro-intestinal surgery, Epidemiology and Molecular biology.