



Approach to Ambiguous Genitalia in a Native Calf: A Case Report

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ABSTRACT

Ambiguous genitalia in a calf refers to genitals that are not distinctly male or female, often indicating an obstructive or structural issue in the urinary system. An 8-month-old native calf weighing 80kg was presented with anuria and abdominal swelling at the Large Animal Hospital, Faculty of Veterinary Medicine, Chiang Mai University, Chiang Mai, Thailand. Physical examination revealed the absence of external genitalia, abdominal distension, and 8% dehydration, though vital signs were normal. Soft tissue edema extended from the prepubic to the xiphoid region, with fluid seeping from the swollen area. Only an orifice on the lower abdomen was observed. Radiographs confirmed fluid accumulation in the abdominal area. A voiding urinalysis and ultrasonography were performed to locate the bladder. A perineal urethrostomy was then conducted, and a Foley catheter was inserted to dilate the urinary opening before closing the bladder. A Penrose drain was placed to release subcutaneous fluid. Post-operative care included a 7-day course of antibiotics, 5 days of NSAIDs, and stitch removal after 14 days. The patient recovered well, resuming normal feeding and urination through the newly created opening.

Keywords: Ambiguous genitalia; Anuria; Calf; External sex organ; Perineal urethrostomy

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INTRODUCTION

Ambiguous genitalia in calves, characterized by genitalia that do not distinctly conform to typical male or female anatomy, represents a significant diagnostic challenge in veterinary medicine. Disorders of sexual differentiation (DSDs) are relatively rare in cattle compared to other species, with a limited number of studies addressing the spectrum of anatomical abnormalities affecting both internal and external genitalia. These abnormalities can manifest in various forms, including hermaphroditism, pseudohermaphroditism, and gonadal dysgenesis (Abuabara et al., 2006; Thundathil et al., 2016; Almeida et al., 2021), each presenting unique diagnostic and management challenges.

Recent studies have expanded our understanding of

DSDs in bovines. For instance, a case of male pseudohermaphroditism in a calf born with an acardius amorphus cotwin highlighted the complexity of such conditions and the potential involvement of chromosomal chimerism. Similarly, a Holstein calf exhibiting trisomy 26 presented with perineal hypospadias and bilateral abdominal cryptorchidism, underscoring the role of chromosomal abnormalities in sexual development disorders. Additionally, XX/XY chimerism has been documented in a virilized heifer, further illustrating the genetic intricacies associated with DSDs (Szczerbal et al., 2022; Freick et al., 2024). The limited literature on these disorders underscores a knowledge gap in understanding the full spectrum of anatomical abnormalities that can affect both internal and external genitalia in calves. Such conditions can lead to a variety of clinical problems,

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including urinary dysfunction and reproductive failure, complicating herd management. Anatomical defects, such as urethral malformations or underdeveloped genital structures, may result in severe clinical issues like anuria and urinary incontinence (Han et al., 2008). These conditions can indicate underlying obstructive or structural problems within the urinary system, necessitating surgical intervention in many cases (Nogueira et al., 2013).

Surgical interventions, such as perineal urethrostomy, have been employed to address urinary complications arising from these anomalies. For example, a crossbred calf diagnosed as a female pseudohermaphrodite underwent successful surgical correction of a urethral diverticulum, resulting in the resolution of urinary incontinence. Furthermore, studies have demonstrated the efficacy of urethrostomy in treating congenital urethral dilatation in cattle calves, emphasizing its role in managing such urogenital anomalies (Maiti et al., 2018; Ali et al., 2020).

This case report offers valuable insights into the successful resolution of urinary incontinence through perineal urethrostomy in a calf with specific urogenital anomalies. By detailing the clinical approach and outcome, this report contributes to the growing body of knowledge on the management of ambiguous genitalia in veterinary practice, providing a useful reference for similar cases in the future.

Case Description

An 8-month-old native calf weighing 80kg showed clinical signs, including anuria and abdominal swelling. Physical examination revealed the absence of external genitalia, with only an orifice on the lower abdomen. No urine was found, and the abdominal area was enlarged, as shown in Fig. 1 and 2.



Fig. 1: No external genitalia presented.

The physical examination indicated normal vital signs, including heart rate, rectal temperature, and respiratory rate. However, the calf exhibited a body condition score of 1 / 5 and 8% dehydration. Soft tissue edema was evident, extending from the prepubic to the xiphoid process and spreading laterally. Fluid was observed seeping from the swollen area, and radiographic examination revealed increased radiopacity, indicating fluid accumulation throughout the affected region, as shown in Fig. 3.



Fig. 2: The only orifice observed was the one on the lower abdomen (arrow).

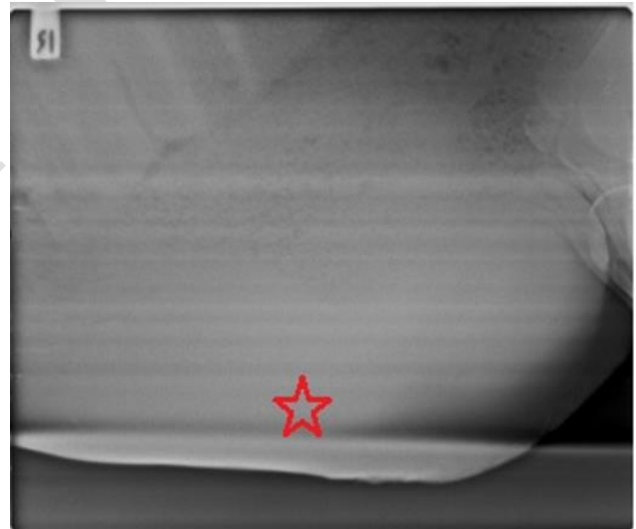


Fig. 3: There was fluid throughout the area where the swelling occurred (asterisk).

Before surgery, antibiotics and NSAIDs were administered for 3 days. Intravenous fluid (10% Dextrose saline solution) was also given. Urine was observed dripping from the orifice on the lower abdomen in this period. The calf was prepared for surgery by withholding food and water at least 24 hours before surgery. The calf was sedated with an intramuscular injection of 0.1mg/kg of xylazine. Anesthesia was induced using 4% isoflurane and maintained with 2-3% isoflurane. According to the procedure, a left flank approach was performed to locate the urinary bladder and make an incision to drain the urine. Subsequently, an attempt was made to insert a

urinary catheter into the bladder through the urethra, but it was unsuccessful. Therefore, a perineal urethrostomy was performed, as shown in Fig. 4. The urethra was carefully identified and resected. The urethral layer was sutured to the skin using a simple interrupted pattern. Urine was observed leaking from the new opening in the perineal area. The Foley catheter was inserted to dilate the urethral opening.



Fig. 4: A perineal urethrostomy was performed.

Additionally, a Penrose drain was inserted through a subcutaneous incision to facilitate fluid drainage, as shown in Fig. 5. Antibiotics were continued for 7 days post-surgery, while NSAIDs were administered for 5 days. Stitches were removed 14 days later. Following the procedure, the calf exhibited a good appetite and urinated through the newly created opening, as shown in Fig. 6.



Fig. 5: The area where the Penrose drain was implanted is indicated by the arrow.



Fig. 6: The newly created opening.

DISCUSSION

In this case, the calf exhibited abnormalities in the external genitalia of both sexes, along with edema in the lower abdomen and clinical signs of anuria. This condition likely arises from the accumulation of urine in the subcutaneous layer of the abdomen due to the attachment of the penis and preputial sheath (Maiti et al., 2018). Irregularities in the genetic system, cell division process, hormone system, enzyme activity, or tissue formation can all contribute to such anomalies, disrupting the development of reproductive organs (Parrah et al., 2012). To address the anuria resulting from the absence of external reproductive organs, a perineal urethrostomy was performed, allowing the animal to urinate regularly post-surgery. This surgical intervention was proven effective in resolving similar urinary issues (Parrah et al., 2012; Maiti et al., 2018).

Recent studies have further supported the efficacy of perineal urethrostomy in managing complex urogenital anomalies in various species. For instance, a case involving a female pseudo-hermaphrodite crossbred calf demonstrated successful surgical correction of a urethral diverticulum through perineal urethrostomy, with no postoperative complications reported until one year after surgery. Similarly, in equine practice, perineal urethrostomy has been effectively utilized in managing urethral obstructions, with postoperative complications being manageable and not significantly affecting long-term outcomes. And there have been reports of successful outcomes and no complications with this surgical procedure in a kitten suffering from urinary incontinence due to a suspected congenital urethral deformity (Maiti et al., 2018; Henry et al., 2021; Maurer et al., 2022).

However, a potential complication of perineal urethrostomy is urinary tract infection (UTI). Any surgical procedure involving the urethra has the potential to disrupt the natural defense mechanisms of the uroepithelium. (Connery and Spotswood, 2012). Studies have indicated that postoperative UTIs are a common complication following perineal urethrostomy. For example, in a study involving 56 cats undergoing various urethrostomy techniques, short-term complications were reported in 60% of cases, with UTIs being among the most common. Similarly, in canine cases, postoperative UTIs have been observed, emphasizing the need for careful postoperative monitoring and management (Papazoglou et al., 2020; Seneviratne et al., 2021).

Furthermore, an incision was made in the edematous lower abdomen, and a drain was inserted to remove the accumulated fluid in this case. Alternatively, the fluid under the skin can be drained using aspiration (Maiti et al., 2018). Effective management of such postoperative complications is crucial to ensure optimal recovery and long-term health of the patient.

Conclusion

Ambiguous genitalia in calves can present a significant challenge, particularly due to obstructive urinary complications, as demonstrated by an 8-month-old calf with anuria and abdominal swelling. Comprehensive diagnostic and surgical interventions successfully resolved the condition, including radiography, ultrasonography, and perineal urethrostomy. Post-operative management with antibiotics, NSAIDs and careful monitoring ensured recovery, with the calf resuming normal feeding and urination.

DECLARATIONS

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Data Availability: The data that supports the findings of this study are available from the corresponding author upon reasonable request.

Ethics Statement: All procedures involving animals were reviewed and approved by the Institutional Animal Care and Use Committee (IACUC) of the Faculty of Veterinary Medicine, Chiang Mai University. All methods were carried out in accordance with relevant guidelines and regulations.

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