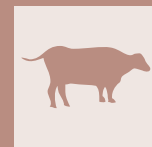


Clinical and radiographic diagnosis of sacrococcygeal agenesis in a one-day-old buffalo calf



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SUMMARY

Congenital anomalies are rare findings in calves. The present report describes the clinical and radiographic diagnosis of sacrococcygeal agenesis associated with taillessness and atresia ani in a buffalo calf that was survived for one week. The calf was admitted 12 hours following delivery with paresis, reduced motor, and proprioceptive response of both hind limbs, as well as absence of perineal reflex. Radiographic examination revealed absence of the sacral and coccygeal vertebrae with no detectable changes along the lumbar vertebrae. Marked distension of the rectum was also recorded, the ampulla of the rectum was located approximately 6 cm away from the outer skin surface at the perineal region. Palliative surgery was made to reconstruct an anal opening and the calf was discharged for suckling, nursing and kept under observation. One week following surgery, the calf was admitted for follow up. Urinary and fecal incontinence were apparent as indicated by the presence of pasty feces around the surgical site as well as the posterior thigh. The owner had troubles with nursing the calf, the dam refused suckling and bottle feeding was not practical as the calf was unable to stand or sit in sternal recumbency unaided. The calf started to lose weight and was euthanized based on its owner request. To the author's knowledge this is the first record of sacrococcygeal agenesis associated with taillessness and atresia ani in a buffalo calf.

KEY WORDS

Congenital; agenesis; vertebrae; radiograph; calf.

INTRODUCTION

Congenital anomalies are rare findings in calves accounting approximately 0.2-3.6%¹⁻³. Sacrococcygeal dysgenesis and agenesis (caudal regression syndrome) have been sporadically reported in veterinary literature including congenital anomalies of both bone and soft tissue of the lumbosacral, sacral, and coccygeal vertebrae. These conditions are usually associated with neural deficit including hindlimb paresis, urinary and fecal incontinence^{4,5}. Diagnosis is usually confirmed by autopsy findings of the missed vertebrae during post-mortem examination⁴. To the authors' knowledge, no previous records reported specific radiographic findings of sacrococcygeal agenesis in large animals or sacrococcygeal agenesis in buffalo calves. The present report describes a rare sacrococcygeal agenesis in a one-day-old buffalo calf with special emphasis to radiographic diagnosis.

CASE DESCRIPTION

A one-day-old male buffalo calf was presented to the Clinic of the Department of Surgery, Anesthesiology and Radiology- Faculty of Veterinary Medicine Cairo University 12 hr following delivery. Upon admission, the calf was reluctant to move, and

the abdomen was markedly distended. Clinical examination revealed the presence of an apparently short spine, presence of an orange-sized swelling at the perineal region with absence of the tail and anal opening. The calf was born through normal delivery that was the second for a 5-year-old dam. Maternal and paternal history did not record any apparent congenital similar or different abnormalities. The calf was lethargic with marked decrease in body weight (29.9 kg; reference range 36.1 ± 0.1 kg)⁶.

Orthopedic and neurologic examination revealed no remarkable changes within the head and forelimbs. Both hind limbs showed paresis, reduced motor and proprioceptive response, and absence of perineal reflex. Urination could not be judged as the calf was only admitted few hours following delivery.

Lateral and ventro-dorsal radiographs were made for the pelvis using conventional radiography (Fischer x-ray machine, Stuttgart, Germany). Radiographic examination revealed absence of the sacral and coccygeal vertebrae (Figure 1 and 2). The lumbar vertebrae were identified, no detectable changes were seen along the dorsal lumbar vertebrae or vertebral arches or bodies.

Radiographic examination of abdominal organs revealed marked distension of the rectum, the ampulla of the rectum was located approximately 6 cm away from the outer skin surface at the perineal region (Figure 1).

Palliative surgery was planned to reconstruct an anal opening. Surgery was performed under the effect of topical analgesia using 2% Lidocaine HCL (Xylocaine, Fresenius Kabi, USA). The calf was placed on lateral recumbency and the perineal region

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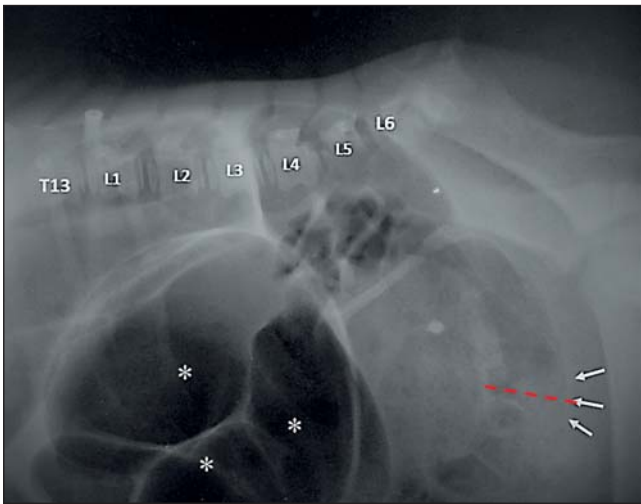


Figure 1 - Right lateral pelvic radiograph of a one-day-old buffalo calf demonstrating the absence of sacral as well as coccygeal vertebrae. Note generalized bowel distension with gases (asterisks) and distension of the rectum (dashed line) with presence ampulla of the rectum (white arrows) directed towards the perineal region.



Figure 2 - Ventro-dorsal pelvic radiograph of a one-day-old buffalo calf demonstrating the absence of sacral as well as coccygeal vertebrae.

was prepared for aseptic surgery. Circular incision was made at the site of anal bulge, the ampulla of the rectum was located deeply where it could be grasped for securing and incision. The meconium was evacuated, and the rectum was secured with the skin wound to ensure patency of the orifice. Securing of rectal mucosa with skin was made using series of interrupted sutures. The calf was discharged for suckling and to be kept under observation. Owner was instructed with routine post-operative wound care, and was advised to encourage the calf for suckling, monitor urination, defecation, and general health condition.

One week following surgery, the calf was admitted for follow up. Fecal incontinence was apparent as indicated by the presence of pasty feces around the surgical site as well as the posterior thigh. Urinary incontinence was indicated by constant dripping of urine. The owner had troubles with nursing the calf, the dam refused suckling and bottle feeding was not practical as the calf was unable to stand on both hind limbs and sit in sternal recumbency unaided. The calf started to lose weight, skin ulceration was detected regardless of providing soft padding and turning the calf from time to time. The calf was euthanized based on its owner request using an overdose of barbiturates (sodium pentobarbitone concentrated solution 350 mg/ml given intravenously via the jugular vein at a dose rate of 1 ml/2 kg body weight)⁷. The owner welcomed to include the clinical and radiographic findings of the calf in research purposes and signed a consent form indicating his approval.

DISCUSSION

The present study presented a rare case of congenital sacrococcygeal agenesis in male buffalo calf. To the authors' knowledge, this is the first report to include radiographic examination of sacrococcygeal agenesis in calves, and this is the first record of sacrococcygeal agenesis in buffaloes.

Although congenital anomalies in cattle and buffaloes are relatively rare, it is of great economic importance^{4,8}. Skeletal deformities, especially those involving the spine are the most common congenital malformations in cattle⁹ while those involving bone and joints of the distal limb are recorded in buffaloes⁸. In buffaloes, a calf with shortened spine, flattened and deformed pelvis, strongly flexed and ankylotic limbs with atrophy of the hind quarter resulted in dystocia necessitating a forcefully extracted with partial fetotomy¹⁰.

Spina bifida (absence of the dorsal portion of the vertebra or vertebral arch mostly in the lumbar or sacral vertebrae), *Perosomus elumbis* (congenital absence of lumbar, sacral and coccygeal vertebrae), *Perosomus acaudatus* (congenital absence of caudal vertebrae causing absence or shortening of the tail) are previously reported in calves^{4,9-11}. These spinal anomalies have been reported to be associated with urogenital anomalies (renal agenesis, testicular agenesis, cryptorchidism, vestigial penis, vaginal and vestibular deformities, absence of the penis) as well as intestinal anomalies (rectovaginal fistula, incomplete development of the rectum, absence or incomplete development of the anus)^{5,12}.

Congenital absence of the tail (taillessness) has been reported to be inherited and usually reported in association with the absence of anal sphincter (*Atresia ani*) and other congenital urogenital anomalies¹³. Such association between taillessness and atresia ani has been reported previously in an Omani crossbred cattle calf⁴ and in camel calf⁴.

The exact cause of sacrococcygeal agenesis is unknown. However, embryological and cellular development should be synchronized with gene regulation and expression⁴. Alterations that may occur at the stage of tail-bud development during organogenesis which may lead to neural tube deformity and faulty migration resulting in partial agenesis of the caudal spinal cord.

Both genetic and environmental factors could be incriminat-

ed in such altered development. Maternal and/ or paternal genes, inbreeding, chromosomal mutations, nutritional deficiencies, metabolic disturbance, toxins and chemicals, drugs, xenobiotics can lead to such skeletal anomalies^{4,5,11}.

The small body size and weight of the neonatal calf allowed accurate radiographic diagnosis of sacrococcygeal agenesis. Limitation of the present study may include the absence of parallel autopsy findings and post-mortem picture of the neural canal and spinal cord. The great economic loss that the calf's owner suffered preclude its decision to perform post-mortem examination.

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Conflict of interest

The authors declare that there were no conflicts of interest.

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