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A review of surgical cases of newborn calves

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ABSTRACT

Objective: This study aimed to retrospectively evaluate the diseases of calves. Surgically encountered diseases, causes, indicated treatment methods, and possible complications were evaluated and it was thought to contribute to scientific and clinical studies on this subject.

Material-Methods: The material of this study consisted of a total of 150 calves of different breeds, ages, and sexes brought to Aksaray University Faculty of Veterinary Medicine Animal Hospital Surgery Clinic between December 2017 and 2023.

Results: In terms of surgical diseases, 37.3% of 150 calves were soft tissue, 56.6% orthopedics, 2% ophthalmology, and 4% neurology cases. Congenital anomalies were found in 44.65% of 56 patients with soft tissue disease. Orthopedic examination revealed, 57.1% of the cases had fractures, 23.8% had arthritis and 19% had tendon diseases. In addition to soft tissue diseases, there were 5 ophthalmologic cases, including orbital mass (n=2) and dermoid cyst (n=3)

Conclusions: Finally, while cattle breeding has great economic importance in our country, calf losses occur due to economic conditions such as artificial insemination errors, irregular registration systems, lack of standardization of care and housing, incorrect intervention of the patient owner, and treatment costs. It is envisaged that economic losses will be minimized with early diagnosis, early intervention, appropriate medical treatment, and surgical treatment options.

Keywords: *Calf diseases, Congenital Atresia ani, Fracture, Cyst Dermoid*

INTRODUCTION

According to Turkish Statistical Institute (TurkStat) data for June 2023, the number of cattle in Türkiye was 16,688,000. This rate decreased by 2.0% compared to December of the previous year (Anonymous, 2023). This decreases, even at a low rate, has a serious negative impact on the country's economy and animal husbandry. In Türkiye, most losses in cattle breeding are caused by newborn calves. Faulty interventions cause calf losses during pregnancy examinations and delivery, inadequate care and feeding conditions, and failure to prevent contamination. These losses have a negative impact on the economy of cattle farms and consequently on the national economy due to complications encountered during treatment as well as treatment costs.

Umbilical lesions are a common problem in newborn calves. The rate of infections and complications that cause it varies between 1.3-29.9% (Wielan et al., 2016). Short-cutting or rupture of the umbilical cord after birth, lack of proper wound care, unhygienic housing conditions, and hereditary diseases are the causes of umbilical

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lesions. Omphalitis, omphalophlebitis, omphaloarteritis, umbilical abscess, eventration umbilicalis, and hernia umbilicalis are among the umbilical lesions encountered in newborn calves (Yurdakul et al., 2021).

Umbilical lesions can also cause infection in the joints via a hematogenous route (Hosie, 2007). Infection carried hematogenously via the portal vein usually causes septic arthritis in the joints (Marchionatti et al., 2016; Alkan et al., 2019). Arthritis, which is characterized by pain, swelling, and temperature increase in the joint area, is a common disease resulting in lameness (Goodarzi et al., 2015; Jesse et al., 2017).

Calves need to receive colostrum in the neonatal period. Colostrum has a laxative effect in neonatal calves and facilitates meconium excretion by accelerating bowel movement (Mejer, 2015). In cases where colostrum cannot be received sufficiently, obstructions may be seen due to the inability to expel meconium. Another reason for failure to expel meconium is atresia cases. It occurs as a result of congenital complete or partial closure of the intestinal lumen or the intestinal lumen is not formed at all. Atresia can occur in the colon, rectum, and anus. This condition causes calf losses and economic losses. Atresia cases are also known to be hereditary (Belge et al., 2000; Azizi et al., 2010). In addition to these, another problem that affects both the patient owner and the country's economy is extremity fractures. As a result of faulty interventions or blunt trauma during birth, fractures of the extremities, especially the metatarsus and metacarpus, are frequently encountered (Arıcan et al., 2014; Yurdakul et al., 2021).

This study aimed to retrospectively evaluate the diseases of calves brought to Aksaray University Faculty of Veterinary Medicine Animal Hospital Surgery Clinic between 2017 and 2023. Surgically encountered diseases, causes, indicated treatment methods, and possible complications were evaluated and it was thought to contribute to scientific and clinical studies on this subject. In addition, it is aimed to be a guide for our colleagues in the development of clinical services and treatment methods by evaluating calf losses caused by care and nutrition errors.

MATERIALS and METHODS

Permission for sample collection and the conduct of the study was obtained from Aksaray University Experimental Animals Local Ethics Committee (Letter date 19.12.2023 and approval no: 2023/11/63).

The material of this study consisted of a total of 150 calves of different breeds, ages, and sexes brought to Aksaray University Faculty of Veterinary Medicine Animal Hospital Surgery Clinic between December 2017 and 2023 due to various problems. Clinical findings and treatment protocols were recorded following the detailed anamnesis obtained from the patient owners. Routine clinical examinations were performed by taking body temperature, pulse, and respiratory counts. Parenteral antibiotics (benzylpenicillin procaine 1ml/20kg IM, Reptopen®, Ceva, Türkiye) were administered conservatively for 1 week, especially in septic arthritis cases with increased body temperature.

After routine clinical examinations, those requiring surgical intervention were evaluated for suitability for anesthesia. In cases with dehydration, parenteral fluid was administered in the preoperative period. In cases of fracture and atresia, radiographic examination was also performed after clinical examination. Two-way radiographs, mediolateral (ML) and anterioposterior (AP), were taken at 80 kV, 0.2 mAs dose. An indirect radiographic examination was performed for the diagnosis of obstruction in cases of intestinal atresia. Radiopaque material (Sodium diatrizoate, Urografin® 76%, Bayer Pharma, Germany) diluted one-to-one with saline was administered through the rectum via Foley catheter or rectal catheter at a dose of 10 ml/kg. Immediately after administration of the contrast agent, the bowel was evaluated by radiography in the laterolateral (LL) position.

In all cases in which atresia recti and coli operations were decided, xylazine hydrochloride (0.2 mg/kg IM, SantaVet®, Türkiye) was administered and 0.5-1 ml 2% Lidocaine HCL (Vilcain®, Vilsan, Türkiye) was administered every 1-2 cm along the incision line in the right fossa paralumbalis (Figure 1). Epidural anesthesia was provided with lidocaine simplex in cases of atresia ani, prolapsus recti, and prolapsus coli. In cases of atresia ani, a “+” shaped incision was made in the area where the anus should be located, and the

rectum was brought to the anatomical position where it should be located and fixed by applying purse-string suture.

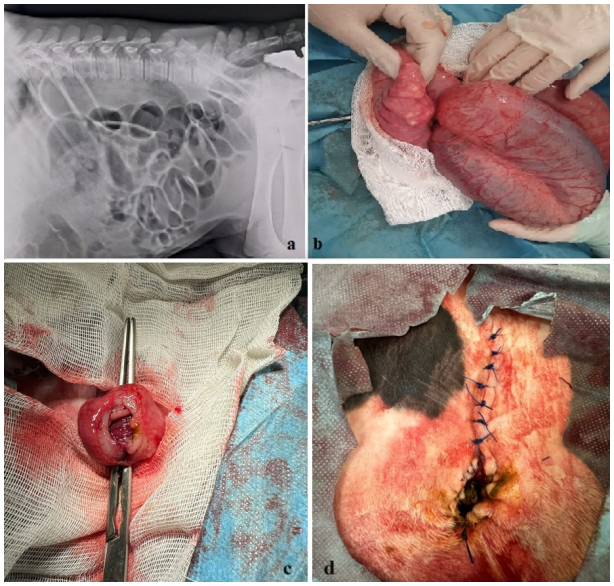

Figure 1. Congenital atresia coli. a. LL abdominal radiography, b. Operative view of the secum, c. Positioning the colon to the fossa paralumbalis region, d. Postoperative view.

Figure 2. a. Bilateral Arqure-Bouleture in a calf, b. Preoperative view, c. Image of accordion tenotomy operation, d. Postoperative view.

For orthopedic surgery, Xylazine hydrochloride (0.2 mg/kg IM, SantaVet®, Türkiye) was administered followed by Ketamine hydrochloride (0.3 ml IV, Keta-control®, Doğa İlaç, Türkiye), and general anesthesia was achieved. In cases with fractures, fracture reduction was achieved by retrograde intramedullary pin application in the related extremities. In cases where there was no indication of operation, a PVC bandage was applied. In one patient with arqure-bouleture, treatment was performed with the accordion tenotomy method. A supported bandage was applied in the other cases (Figure 2).

Local lidocaine HCl (Jetocaine Simplex®, Adeka, Türkiye) was applied to the conjunctival region, and Proparacaine HCl 0.5% (Alcaine®, Novartis, UK) was applied as corneal topical anesthesia in cyst dermoid cases. The cyst was removed with a dermoid corneal scalpel.

RESULTS

In terms of surgical diseases, 37.3% of 150 calves were soft tissue, 56.6% orthopedics, 2% ophthalmology, and 4% neurology cases (Figure 3). Congenital anomalies were found in 44.65% of 56 patients with soft tissue disease. Atresia coli (n=5), atresia ani (n=2), and atresia recti (n=3) were among the most common congenital anomalies. In addition to these, meconium ileus was detected in 6 cases. Congenital anomalies including hernia umbilicalis (n=3), anuria (n=2), agenesis of the soft palate (n=1), and eventration (n=1) were detected (Table 1) (Figure 4).

Table 1. Distribution of the soft tissue diseases.

Soft Tissue			
Acquired		**Congenital**	
Hernia abdominalis	4	Uracus fistula	2
Abomaso-umbilical fistula	1	Atresia coli	5
Prolapsus recti	3	Atresia ani	2
Prolapsus coli	1	Atresia recti	3
Omphalitis	4	Hernia umbilicalis	3
Phlegmon	1	Anuria	2
Wound	3	Soft palate agenesis	1
Soft tissue injury	12	Meconium ileus	6
Vesica urinaria rupture	1	Eventration	1
Peritonitis	1		
Total	**31**	**Total**	**25**

Orthopedic examination revealed, 57.1% of the cases had fractures, 23.8% had arthritis and 19% had tendon diseases. In the fracture cases, it was determined that the fractures were caused by the excessive application of force during the intervention of the patient owners to the birth and the incorrect application of the calf birth ropes. 19

of 47 fracture cases were metacarpal fractures (Table 2) (Figure 5).

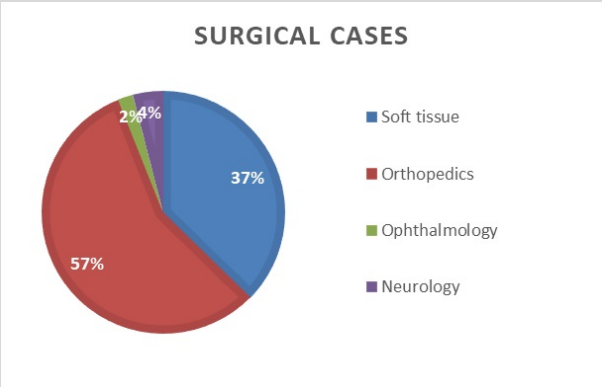

Figure 3. Schematic distribution of the diseases encountered in 150 newborn calves.

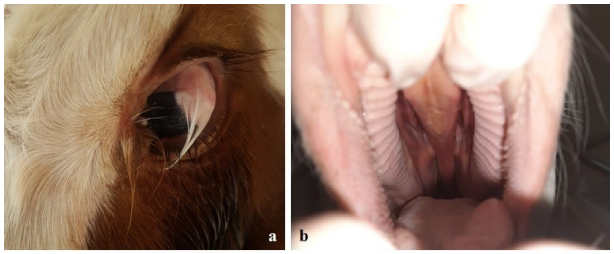

Figure 4. Image of congenital calf diseases. a. Cyst dermoid, b. Soft palate agenesis and cleft palate.

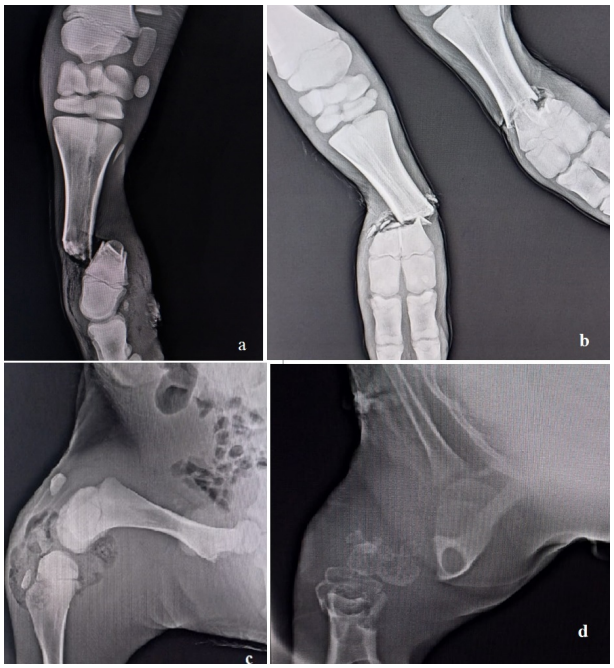

Figure 5. Radiographic appearance of fracture cases. a. ML appearance of metacarpal transversal fracture, b. Bilateral metacarpal 3 transversal fracture, c. ML appearance of septic arthritis, d. Congenital agenesis of the humerus.

In two cases with metacarpus fractures and one case with femur fracture, reduction was achieved with multiple intramedullary pins. However, during the postoperative care process, inadequate attention of the animal owner, and pin migration occurred as a complication. Improper antibiotic administration and lack of hygiene in the housing conditions caused infection in the operation area. Treatment of other fracture cases was provided with a supported bandage.

Table 2. Distribution of bone and joint diseases.

Fracture		Other	
Antebrachium	2	Arthritis	12
Metacarpus	19	Septic arthritis	6
Femur	8	Polyarthritis	2
Tibia	4	Tendinitis	1
Coxa	1	Actinomycosis	1
Metatarsus	4	Arqure	6
Madibula	1	Bouleture	5
Sacroiliac	2	Arthrogryposis	4
Humerus	3		
Other	4		
Total	**48**	**Total**	**37**

Mandibular, sacroiliac, and coxa fractures could not be treated because the owner could not afford the operation cost. In the musculoskeletal system diseases, arthritis (n=20) was the most common disease in neonatal calves. Septic arthritis (n=6) was among the most common arthritis cases. In septic arthritis cases, the pus was removed by puncture and the joint was lavaged. In addition to cases with omphalitis, polyarthritis was seen in two cases. Surgical cases due to tendon injuries were determined as arqure and bouleture (n=11). According to the anamnesis, it was learned that the cases with tendon damage were examined for pregnancy in the 6th month of the embryonic period and pregnancy was achieved by artificial insemination. It was determined that four cases having musculoskeletal diseases were due to arthrogryposis. In addition to these cases, actinomycosis was observed in one case. Among the neurologic cases, paraplegia in the hind limbs in four cases due to compression in the birth canal, and radial paralysis in two cases due to excessive force applied to the forelimb during intervention for difficult delivery were observed.

It was determined that 37.3% of the surgical cases were soft tissue-related. Among these cases, the most common cause was the inability of the animal to stand up due to soft tissue injury (n=9). This was followed by hernia abdominalis (n=4), omphalitis (n=4), wound (n=3), urinary bladder rupture (n=1), phlegmon (n=1), peritonitis (n=1) and abomaso-umbilical fistula (n=1). According to the anamnesis taken from the owner, it was concluded that the rupture and fistula were caused by the unconscious intervention of the owner. Prolapsus recti (n=3) and prolapsus coli (n=1) were determined due to neonatal calf diarrhea. In these cases, the rectum and colon were rejected, and the purse-string suture was applied.

In addition to soft tissue diseases, there were 5 ophthalmologic cases, including orbital mass (n=2) and dermoid cyst (n=3).

DISCUSSION

Umbilical lesions are among the most common diseases in newborn calves. In the studies conducted, 28.57% of diseases due to umbilical lesions were detected (Yurdakul et al., 2016; 2021). Omphalophlebitis and urachus fistula are among the most common surgical cases of umbilical infections. Kılıç et al. (2005) reported that they encountered 25.2% omphalophlebitis and 28.4% urachus fistula. Moscuzza et al. (2014) reported that omphalophlebitis was the most common case. Yurdakul et al. (2021) reported that omphalophlebitis was seen in 35% and hernia umbilicalis in 25% in their retrospective study. In our study, umbilical lesions constituted 10% of 150 cases; however, it was determined that soft tissue cases constituted 27.78% of the cases. Although umbilical lesions were determined as the most common disease in calves according to previous studies, the patients were mostly referred to our clinic for long extremity fractures. The reason for this is thought to be that the owners apply empirical treatment methods for umbilical infections and do not bring the patient for examination due to economic reasons or transportation difficulties.

The narrow pelvic canal of the mother, large litter size, or use of semen of different breeds during artificial insemination are some of the reasons that cause difficult delivery. During difficult parturition, fracture lesions are formed because of ignorant and incorrect intervention of animal owners (Nuss et al., 2011). Yurdakul et al. (2021) reported that fractures were the most common lesions after umbilical lesions and arthritis. In our study, musculoskeletal system diseases constituted 56% of all cases. Fractures occur due to incorrect tying of nylon-like ropes to the metacarpal region of the calf and pulling with disproportionate force, especially during delivery. In our study, metacarpal fractures were detected in 39% of cases and this supports our views.

Intestinal atresia cases have an important place in terms of calf losses. It has been reported that rectal examinations performed before day 42 for early diagnosis of pregnancy may cause intestinal atresia cases (Syed et al. 1992; Atiba et al. 2016; Yurdakul, 2019). In our study, early pregnancy examination was performed in all cases with intestinal atresia. Studies have reported that the most common anorectal congenital anomaly is atresia ani (Carraro et al., 1996; Belge et al., 2000; Aslan et al., 2009). In our study, 31.25% of intestinal atresia cases were atresia coli, while 12.5% were atresia ani. At the same time, in cases of atresia ani, the unconscious intervention of the patient owner with sharp objects caused calf losses and a decrease in the number of patients brought to the clinic. Aslan et al. (2009) reported that surgical treatment was successful in anorectal anomalies. In our study, it was reported that the animal continued to live until it reached slaughter weight, especially in cases of atresia coli.

CONCLUSION

Finally, while cattle breeding has great economic importance in our country, calf losses occur due to economic conditions such as artificial insemination errors, irregular registration systems, lack of standardization of care and housing, incorrect intervention of the patient owner, and treatment costs. It is envisaged that economic losses will be minimized with early diagnosis, early intervention, appropriate medical treatment, and surgical treatment options, and awareness will be raised by educating the patient owners about the diseases and thus animal welfare will be increased.

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