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*Article*

# Clinical evaluation of surgical affections and postoperative outcomes in ruminants at a Veterinary Teaching Hospital Babugonj in Barishal, Bangladesh

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**Abstract:** Ruminants play a vital role in the livestock economy of Bangladesh; however, they are frequently affected by various surgical conditions that compromise productivity and animal welfare. A hospital-based cross-sectional study was conducted at the Veterinary Teaching Hospital, Babuganj, Barishal, Bangladesh from 1 December 2024 to 28 February 2025 to determine the incidence, pattern, and outcomes of surgical affections in ruminants. A total of 58 ruminants were examined, among which 19 animals were diagnosed with surgical conditions, giving an overall incidence of 32.75%. The incidence was slightly higher in cattle (34.37%) compared to goats (30.67%). The most frequently recorded surgical conditions included medial patellar fixation, umbilical hernia, atresia ani, knuckling, intramedullary bone pinning, caesarean section, hoof overgrowth, fractures, and subcutaneous cysts. Species-wise analysis showed a statistically significant association between species and type of surgical affection ($\chi^2 = 19.00$, $P = 0.015$). One-way ANOVA revealed a highly significant variation in body weight among different surgical conditions ($F = 118.57$, $P < 0.001$). Postoperative follow-up indicated successful recovery in all surgically treated cases with appropriate clinical management. The study provides baseline hospital-level data on the distribution of surgical affections in ruminants in the Barishal region of Bangladesh.

**Keywords:** incidence; veterinary surgery; ruminants; surgical approach; postoperative outcome

## 1. Introduction

Bangladesh, known for its strong agricultural foundation, heavily relies on livestock as a critical component of its rural economy. Livestock farming is the second most prominent sub-sector after traditional crop cultivation. It contributes significantly to the livelihood of rural households and plays a major role in meeting the country's nutritional needs, supplying nearly 36% of the total animal protein consumed by the population. However, the productivity of this vital sector is increasingly challenged by various health-related barriers. Among these, surgical affections in ruminants represent a critical yet underexplored issue (Islam *et al.*, 2021). If not diagnosed

and managed in a timely manner, these surgical disorders can lead to fatal outcomes, adversely affecting animal health, productivity, and ultimately the economic stability of livestock-dependent communities.

Surgical conditions in ruminants arise from diverse reasons, such as trauma, congenital abnormalities, infections, and poor management practices. Commonly reported conditions include hernias, myiasis, fractures, abscesses, and congenital defects like atresia ani (Das *et al.,* 2022). If not appropriately managed, these conditions can adversely affect animal health and productivity. In smallholder farming systems, where animals are often reared under extensive or semi-intensive conditions, high animal density and exposure to environmental hazards significantly increase the risk of injury and subsequent surgical complications (Nasrin *et al.,* 2024). These surgical affections not only compromise animal welfare but also result in considerable economic losses due to reduced productivity, treatment costs, and mortality (Khan *et al.,* 2023).

Among these species, cattle and goats appear to be more prone to surgical complications, which range from common issues like umbilical hernias, knuckling, and hoof overgrowth, to more complex procedures such as caesarean sections and orthopaedic surgeries (Miah *et al.,* 2017). Umbilical hernias, for example, are frequently observed in young ruminants and can be either congenital or acquired. While small hernias may resolve without intervention, larger or non-reducible hernias often require surgical correction to prevent complications such as strangulation (Amare and Haben, 2020).

One commonly encountered orthopaedic issue in large ruminants, particularly cattle and buffaloes, is upward fixation of the patella. This condition results in a mechanical locking of the limb in extension, severely impairing mobility and leading to lameness. Anatomically, the stifle joint's structure plays a vital role in this disorder. The patella is attached to the tibial tuberosity via three main ligaments, the medial, middle, and lateral patellar ligaments. Upward fixation occurs when the medial patellar ligament is displaced over the medial trochlear ridge of the femur. The most widely accepted treatment is Medial Patellar Desmotomy (MPD), which involves cutting the medial ligament to restore joint movement (Naveen *et al.,* 2013).

Small ruminants, particularly goats, are often presented with limb injuries and musculoskeletal disorders. In severe cases where restoring limb function is not viable due to extensive trauma or economic limitations, amputation of part or the entire limb may be considered a humane and cost-effective alternative to euthanasia (Desrochers *et al.,* 2014). Other congenital conditions such as atresia ani—where the anal opening is absent—require urgent surgical correction to establish normal defecation. Techniques such as cruciate incisions, rectal pull-through, or correction of recto-vaginal fistulas are often employed, with the choice of technique depending on the severity of the condition.

Caesarean sections are necessary for goats experiencing dystocia caused by oversized kids, abnormal presentation, or uterine inertia. Timely surgical intervention in such cases can save both the dam and the offspring. Similarly, hoof overgrowth is a frequent issue in goats, exacerbated by mineral deficiencies (especially zinc), poor hygiene, and inadequate trimming practices. Routine hoof care is essential for mobility and prevention of secondary infections. Subcutaneous cysts, commonly observed in goats, are generally benign but may need surgical removal if they grow large or interfere with normal activity.

While advanced veterinary surgical procedures are readily available in developed countries, developing nations like Bangladesh face numerous limitations. These include a shortage of trained personnel, lack of surgical instruments, poor access to modern anaesthesia equipment, and inadequate field facilities. Despite these constraints, many field veterinarians continue to perform essential surgical interventions, especially on small and large ruminants in rural areas. However, such procedures require strict adherence to aseptic techniques to prevent postoperative infections and ensure favourable outcomes.

Notably, most surgical affections in calves are congenital, whereas acquired conditions are more prevalent in goats. Although some research has been done on surgical cases in Bangladesh, there remains a significant gap in geographically organized data (Islam *et al*., 2021). The Veterinary Teaching Hospital (VTH) in Babuganj, Barishal, has played a vital role in managing and studying these cases, making it a valuable resource for understanding the surgical landscape of the region. Despite the importance of livestock in Bangladesh's rural economy, there remains a lack of systematically organized hospital-based epidemiological evidence describing the incidence, pattern, and postoperative outcomes of surgical affections in ruminants, particularly in the Barishal region. This gap limits evidence-based clinical decision-making and restricts the development of targeted preventive and management strategies in veterinary practice. Therefore, the present study was designed to address this problem by evaluating the incidence and postoperative outcomes of surgical affections in ruminants presented to the VTH, Babuganj, Barishal, Bangladesh. The research question guiding this study was: what are the incidence, species-wise distribution, and postoperative outcomes of surgical affections in ruminants in the study area? Accordingly, it was hypothesized that there is a significant association between species, age, and body weight with the occurrence of surgical affections in ruminants, while also expecting variation in

disease distribution across species. Therefore, this study aimed to determine the incidence and postoperative outcomes of surgical affections in ruminants treated at the VTH in Babuganj, Barishal, Bangladesh.

The novelty of this study lies in generating one of the first structured clinical datasets from Babuganj, Barishal, Bangladesh integrating incidence patterns, species distribution, and postoperative outcomes of multiple ruminant surgical conditions under a single hospital-based framework. The study implication is that the findings may support improved early diagnosis, better surgical planning, and enhanced postoperative management in field veterinary practice, while also contributing baseline epidemiological evidence for future research and livestock health policy development in Bangladesh.

## 2. Materials and Methods

### 2.1. Ethical approval and informed consent

Ethical approval for this study was obtained from the Institutional Animal Ethics Committee of Patuakhali Science and Technology University. All procedures were conducted in accordance with established guidelines for the care and use of animals in research. Surgical interventions were performed by qualified veterinarians using appropriate anesthesia, analgesia, and aseptic techniques to minimize animal discomfort. Informed consent was obtained from the owners of all ruminants prior to inclusion in the study, with clear explanation of the procedures, risks, and postoperative care.

### 2.2. Study area and period

The study was conducted at the VTH in Babuganj Upazila, Barishal district, from December, 2024 to February, 2025 (Figure 1).

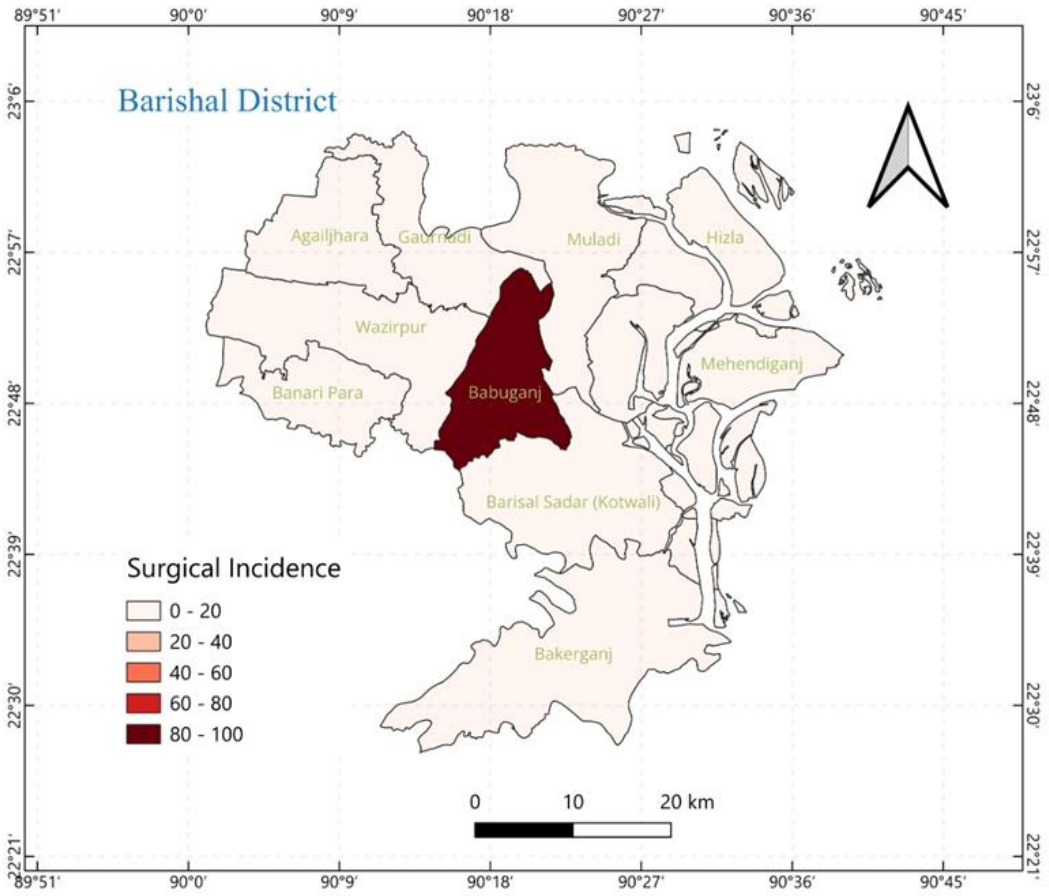


**Figure 1. The map of the study area.**

### 2.3. Study design

The VTH received a wide variety of animals, including cattle, dogs, cats, sheep, goats, chickens, and birds, suffering from both contagious and non-infectious diseases. The majority of cases were ruminants. Therefore, a hospital-based cross-sectional study was conducted on ruminants, such as cattle and goats. Following arrival at

the hospital, all necessary data were collected, including clinical parameters and history. Surgical conditions were identified and diagnosed based on the results of the clinical examination and history.

### 2.4. Surgeon preparation

The surgeon mentally prepared to perform surgery on the patient. After entering the operating room, the surgeon performed a sterile surgical hand scrub, donned appropriate protective attire (gown, gloves, mask, cap), and verified that all equipment and instruments were ready and functioning. The surgeon maintained proper sterile technique by keeping their hands above waist level and avoiding contact with non-sterile surfaces.

### 2.5. Patient preparation

Patient preparation occurred in the examination room. The surgical site was carefully shaved with a razor. The area was then dried with cotton. Povidone-iodine (Povisep) solution or Viodin was used to make the skin surface aseptic. For certain operations, a tourniquet was applied proximal to the surgical site.

### 2.6. Fluid therapy

Before the operation, dehydrated animals received intravenous fluid therapy with isotonic fluids (DNS/NS) for rehydration.

### 2.7. Animal control and anesthesia

For cattle, *diazepam* (Easium®, Opsonin Pharma Ltd.) was injected intravenously at 0.6 mg/kg body weight for sedation. Subsequently, *2% lidocaine hydrochloride* (Z-Lidocaine® – Ziska Pharmaceuticals Ltd) was infiltrated as a ring block. For goats, *diazepam* (Sedil®- Square Pharmaceuticals Ltd.) was injected intravenously at 0.8 mg/kg body weight for sedation, followed by the infiltration of *2% lidocaine hydrochloride* (Z-Lidocaine® – Ziska Pharmaceuticals Ltd) as a ring block (Khan *et al.*, 2023).

### 2.8. Statistical analysis

Data collected from hospital records and clinical examinations were entered into Microsoft Excel 2021 spreadsheets for initial cleaning and organization. Descriptive statistics were calculated for all parameters such as age, sex, body weight, surgical affection types, and incidence rates. The incidence of surgical affections was determined as the proportion of specific cases relative to total ruminant admissions. Statistical analysis of the data was performed using SPSS version 30.0 (Statistical Product for Service Solutions; SPSS Inc., IBM, Chicago, Illinois, USA). Data were also analyzed for Chi-square test and one-way analysis of variance (ANOVA) to assess the significant influence of parameters. *P*-values less than 0.05 were considered statistically significant.

## 3. Results

### 3.1. Medial patellar fixation

Diagnosis was based on a characteristic gait abnormality, wherein the affected hind limb remained extended and dragged due to stifle joint locking. On examination, an inability to flex the stifle was noted, accompanied by noticeable tension in the medial patellar ligament and a clicking sound upon patellar release. Subsequently, the medial patellar ligament was identified. A small incision was made over it, and careful dissection exposed the ligament. A portion of the ligament was then excised, allowing the patella to move freely. Afterward, the incision was closed with simple interrupted silk sutures (Figure 2).


**Figure 2. Upward Patellar Fixation in cow (a) before operation (b) after operation.**

### 3.2. Umbilical hernia

The condition is characterized by a soft, rounded, and often painless swelling at the navel (umbilicus), typically reducible upon palpation (the herniated contents can be gently pushed back into the abdominal cavity). After blunt dissection of the abdominal muscles, the diameter of the hernia ring is assessed. Loose connective tissue and fascia are then cut away to make room for the hernia sac incision. The hernia sac is severed at the neck, its stump inserted into the hernia ring, and then ligatured. The margins of the hernia ring are then cleaned and joined with a horizontal mattress silk suture. A simple continuous u-synth suture is used in the muscle, followed by a subcutaneous catgut suture. The skin is closed with a horizontal mattress or simple interrupted nylon suture. Povidone-iodine ointment is applied to the sutured skin, and a bandage is provided (Figure 3).


**Figure 3. Umbilical hernia in calf (a) before operation (b) during operation.**

### 3.3. Atresia ani

The condition is diagnosed shortly after birth based on the complete absence of an anal opening, observed as a smooth skin surface where it should be. Affected calves typically present with signs of abdominal distension, discomfort, straining without passing feces, and restlessness within the first 1–2 days of life. First, the calf was restrained and anesthetized (local or general, depending on the situation). The perianal area was clipped and disinfected to maintain a sterile environment. Then, an incision was made through the skin and subcutaneous tissue, exposing the rectal canal. Care was taken to identify the rectal pouch and surrounding structures. Once located, the rectal pouch was carefully dissected and brought to the skin surface to create a new anal opening (stoma). After confirming proper alignment and patency, the incision was closed using a simple interrupted suture technique, ensuring the functionality of the new anal opening (Figure 4).


**Figure 4. Atresia ani in calf (a) before operation (b) after operation.**

### 3.4. Knuckling in calf

Characterized by abnormal flexion of two limb joints, such as the fetlock, this condition causes the calf to walk on the front of the pastern or the dorsal surface of the hoof. Clinically, the calf presents with difficulty standing or walking, and the affected limb appears flexed at an unnatural angle. Surgery generally involves making a

small incision over the dorsal aspect of the affected joint to expose and then cut or release the affected flexor tendon. After careful dissection, the surgeon assesses the joint's response to the tendon release and repairs any damaged structures, aiming to ensure proper post-surgical function. The incision is then closed with sutures, and a splint or bandage is applied to protect the area during healing (Figure 5).

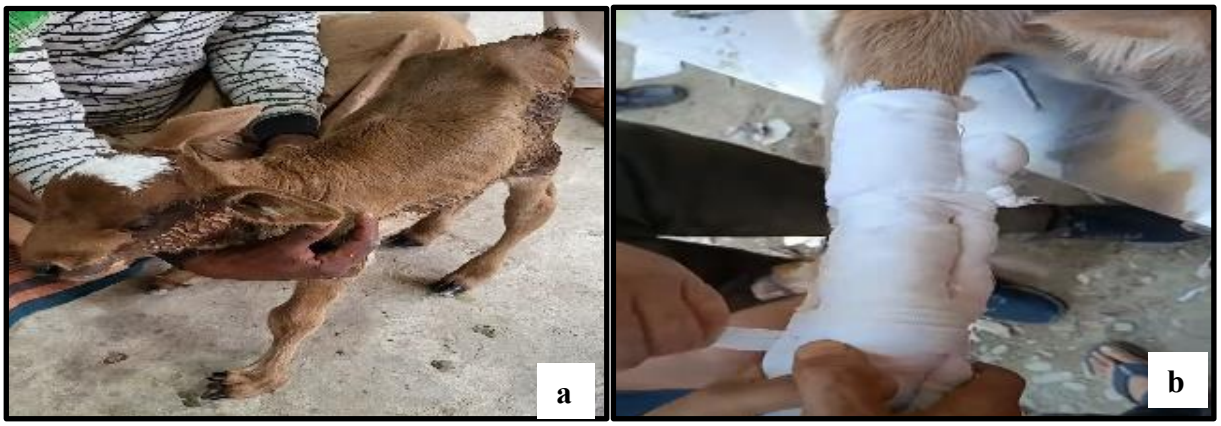


**Figure 5. Knuckling in calf (a) before operation (b) after operation.**

### 3.5. Intramedullary bone pinning

Long bone fractures in calves, commonly affecting the femur, tibia, or humerus, are characterized by sudden onset of severe lameness, inability to bear weight, limb deformity, abnormal mobility at the fracture site, swelling, and crepitus on palpation, with diagnosis confirmed by radiography. After a skin incision, the bone fragments were located and aligned. One or more intramedullary pins (usually Steinmann pins) were then inserted into the bone marrow cavity using an electric bone insertion machine to maintain alignment and promote healing. The muscle was subsequently sutured using a horizontal mattress technique, the subcutaneous layer was closed with a subcuticular suture, and the skin was closed with a simple interrupted suture technique (Figure 6).

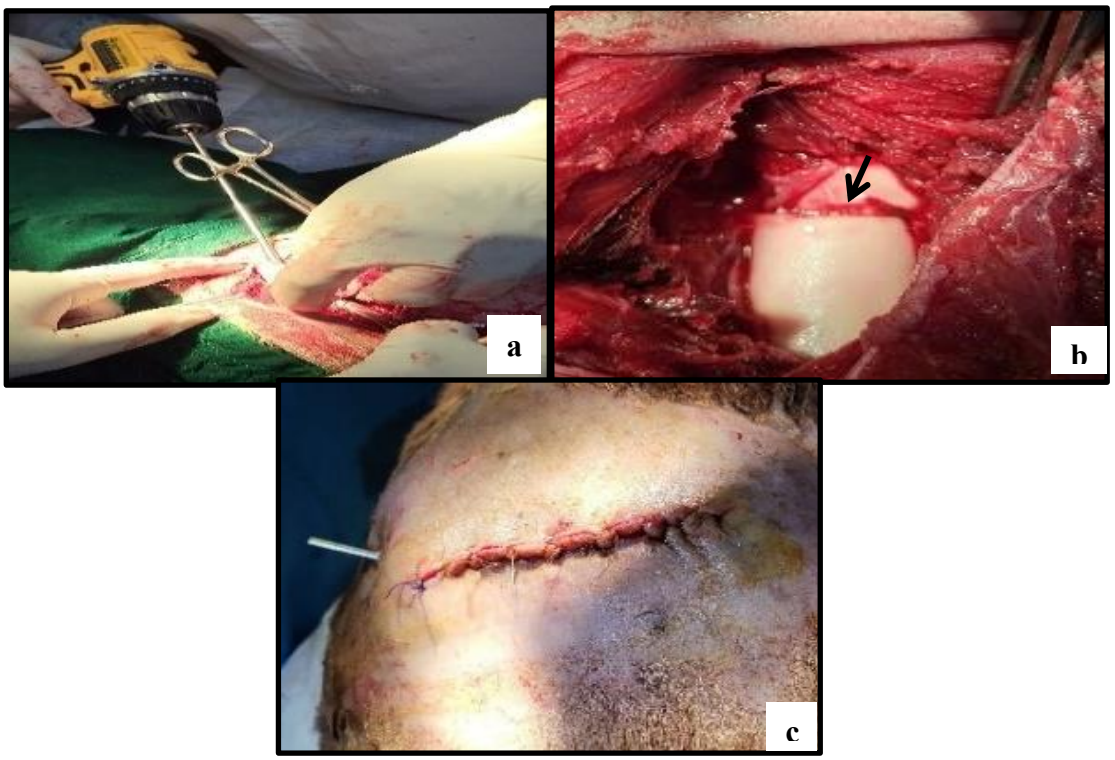


**Figure 6. Intramedullary bone pinning (a) intramedullary pin insertion; (b) apposition of bone (c) after successful operation.**

### 3.6. Caesarean section in goat

Dystocia was diagnosed when normal delivery became impossible, primarily due to factors such as an oversized fetus. The doe displayed prolonged, unproductive labor for more than 30–60 minutes, with strong contractions and visible straining yielding no progress. A vaginal examination confirmed the need for surgical intervention, revealing a failure to deliver despite full cervical dilation and a dry birth canal. The left flank was clipped and aseptically prepared. A vertical or oblique incision was made in the left paralumbar fossa to access the uterus, which was carefully exteriorized. A longitudinal incision was then made in the gravid horn to remove the kid(s), followed by cleaning the uterine cavity and checking for additional fetuses. The uterus was sutured in two layers using absorbable sutures, and the abdominal muscles and skin were closed in layers (Figure 7).

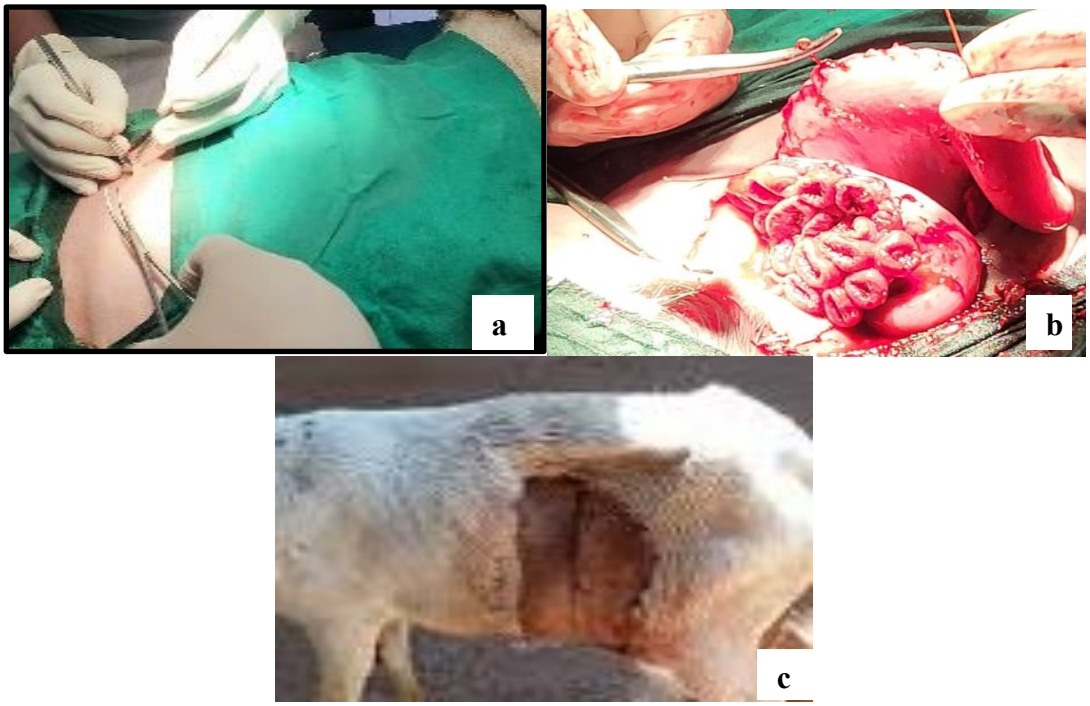


**Figure 7. Caesarean section of goat (a) incision of skin (b) suturing of uterus (c) after successful operation.**

### 3.7. Hoof overgrowth

Diagnosis was based on physical examination. The hooves appeared elongated, curled, or uneven, often causing abnormal posture or lameness. After the goat was restrained, the hooves were thoroughly cleaned to remove dirt and debris. Using sharp hoof trimmers, the overgrown hoof wall was carefully trimmed to restore its natural shape, taking care not to cut too deeply and cause bleeding. The sole was also levelled to ensure even weight distribution (Figure 8).


**Figure 8. Subcutaneous cyst of goat (a) before operation; (b) after successful operation.**

### 3.8. Fracture

Diagnosis was based on sudden lameness, swelling, pain, and abnormal limb positioning or movement. Affected animals typically refused to bear weight on the injured leg and showed signs of distress when the area was touched. On palpation, crepitus (a crackling sound), instability, or deformity was noted. The fracture was managed in two ways: either by using plaster of Paris or by inserting an intramedullary bone pin. For management with plaster of Paris, a padded cotton bandage was first applied to protect the skin. Then, Plaster of Paris bandages were wrapped evenly around the limb and molded to maintain correct positioning. The cast was then allowed to set and harden, forming a rigid support (Figure 9).

**Figure 9. Fracture management of goat of goat.**

### 3.9. Subcutaneous cyst

A smooth, round, non-painful, and movable swelling was present under the skin in the neck. The area was clipped and aseptically prepared. A small incision was made directly over the cyst, and careful dissection was performed to separate the cyst wall from the surrounding tissues without rupturing it. Once the entire cyst was removed, the area was flushed with an antiseptic solution. The incision was then closed with nylon suture material (Figure 10).

**Figure 10. Hoof overgrowth of goat.**

### 3.10. Post-operative management

Antibiotics were administered for 5-7 days, anti-inflammatory drugs for 5 days, and antihistamines for 7 days. Wound dressings were applied on alternate days until complete healing. Skin stitches were removed 7-10 days post-operation. The animals were kept under supervision for one month to observe for any complications.

### 3.11. Incidence according to species

The findings describe the occurrence and distribution of surgical conditions among ruminants in a defined population, revealing significant epidemiological meaning and practical implications. This case study reported a surgical affection rate of 32.75% among 58 ruminants, indicating that approximately one in three ruminants required surgical attention during the study period. The incidence of various surgical affections was 34.37% in cattle and 30.67% in goats within Babuganj Upazila, Barishal (Table 1).

**Table 1. The incidence of various surgical affections in ruminants.**

| Species | No. of animals examined | No. of affected animals | Incidence (%) |
|---|---|---|---|
| Cattle | 32 | 11 | 34.37 |
| Goat | 26 | 8 | 30.67 |
| Total | 58 | 19 | 32.75 |

### 3.12. Outcome of surgical management

The statement indicates that all recorded surgical cases in ruminants had a favourable outcome, demonstrating an overall curability rate of 100% in the study conducted in Babuganj Upazila, Barishal. On the surface, this suggests excellent clinical success, but it also deserves a careful, critical interpretation (Table 2).

**Table 2. The overall treatment outcome of various surgical affections in ruminants**.

| Species | No. of surgically affectionate animals | No. of treatment animals | Prognosis (%) |
|---|---|---|---|
| Cattle | 11 | 11 | 100 |
| Goat | 8 | 8 | 100 |
| Total | 18 | 18 | 100 |

### 3.13. Incidence of surgical affections according to age, sex and body weight

Incidence of surgical affections in ruminants according to age, sex, and body weight categories. Management-related factors influence the likelihood of animals developing conditions that require surgical intervention, such as hernia, atresia ani, C-section, and fractures (10.52%). Other surgical affections account for 5.26% (Table 3).

**Table 3. Incidence of surgical affections in ruminants according to age, sex and body weight.**

| Species | Name of surgical affection | Affected cases (n) | Age (day/month) | Sex | Body weight (kg) | Incidence (%) |
|---|---|---|---|---|---|---|
| | Medial patellar fixation | 3 | 36 | F | 200 | 5.26 |
| | Hernia | 2 | 2 | M | 40 | 10.52 |
| | | | 2.5 | F | 35 | |
| Cattle | Atresia ani | 2 | 2 (days) | M | 25 | 10.52 |
| | | | 3 (days) | M | 28 | |
| | Knuckling | 1 | 7 (days) | M | 23 | 5.26 |
| | Intramedullary bone pinning | 3 | 1 | M | 43.5 | 5.26 |
| | C-section | 2 | 36 | F | 30 | 10.52 |
| | | | 26 | F | 28 | |
| Goat | Hoof overgrowth | 1 | 25 | F | 25 | 5.26 |
| | Fracture | 2 | 2 | M | 12 | 10.52 |
| | | | 2.5 | M | 15 | |
| | Subcutaneous cyst | 5 | 15 | F | 24 | 5.26 |

F=Female; M=Male

### 3.14. Association between species and surgical affection

The association between animal species and the occurrence of different surgical affections was evaluated using the Chi-square ($\chi^2$) test. The analysis revealed a statistically significant association between species and the type of surgical affection observed ($\chi^2 = 19.00$, df = 8, $P = 0.015$) (Table 4). This indicates that the distribution of surgical affections varied significantly between cattle and goats, with certain conditions more frequently observed in cattle, while others were comparatively more common in goats.

**Table 4. Association between species and surgical affection.**

| Test | Chi-square ($\chi^2$) | df | *P*-value | Interpretation |
|---|---|---|---|---|
| Species vs Surgical affection | 19.00 | 8 | 0.015 | Significant association |

df = degree of freedom

### 3.15. Comparison of body weight among different surgical affections

A one-way analysis of variance (ANOVA) was performed to evaluate differences in body weight across various surgical affections in ruminants. The results revealed a highly significant difference in body weight among these surgical conditions ($F = 118.57$, $P < 0.001$), indicating a strong statistical association between body weight and the surgical affection (Table 5).

**Table 5. Comparison of body weight among different surgical affections (One-way ANOVA).**

| Test | F-value | *P*-value | Interpretation |
|---|---|---|---|
| One-way ANOVA | 118.57 | <0.001 | Highly significant |

*=Significant at 5% (p<0.05) level of probability
**=Significant at 1% (p<0.01) level of probability

## 4. Discussion

Surgery-related conditions, including complications from viral diseases and gynaecological issues, along with other factors, can impact the normal health of animals. It is necessary to identify typical surgical cases that hamper normal growth, cause serious injury or complications, and diminish the profitability of small-scale farmers. Therefore, the main purpose of this case study was to demonstrate the prevalence of common surgical issues in the Barishal district. The overall incidence of surgical affections observed in this study was 32.75%, with a slightly higher incidence in cattle (34.37%) compared to goats (30.67%). This overall incidence was comparatively moderate when contrasted with earlier reports documenting higher prevalence under intensive and semi-intensive management systems (Farghali *et al.*, 2020). These findings are consistent with previous studies indicating a significant prevalence of surgical conditions in ruminants across various regions of Bangladesh. In a study by Sarker *et al.* (2014), the prevalence of surgical diseases in cattle was reported to be higher in free-ranging systems (53.2%) compared to stall-fed systems (37.5%). This suggests that management practices significantly influence the occurrence of surgical affections. Similarly, Islam *et al.* (2016) reported various surgical conditions in calves and goats, including umbilical hernia (59.5%) and gid disease (36.4%), indicating a substantial burden of surgical affections in these species.

The age-wise distribution of surgical affections in the present study supports the established understanding that congenital abnormalities predominantly affect neonates, while acquired conditions increase with age. Conditions such as atresia ani and knuckling were confined to young animals, which is consistent with earlier findings (Boonwittaya *et al.*, 2025). In contrast, orthopaedic conditions, including fractures and medial patellar fixation, were more common in growing or adult animals, likely due to accidents or owner mismanagement. Telila and Dugassa (2022) reported successful outcomes using the closed technique under local anaesthesia with minimal complications and early ambulation. However, a minor maggot infestation occurred in cases involving umbilical hernia and intramedullary bone pinning, attributable to owner mismanagement. This was treated immediately with dressing, and the infestation was successfully cured under proper guidance and supervision. Radiographic examination confirmed the type, location, and alignment of the fracture, thereby helping to determine the suitability for intramedullary pinning (Kumar *et al.*, 2026). Yadav *et al.* (2024) observed successful union of long bones using Steinmann pins in small ruminants.

Among the recorded cases, cattle were the most affected species, accounting for the majority of surgical affections. The most prevalent conditions in cattle and goats included hernia, abscess, atresia ani, amputation, and C-section, each representing 10.52% of the total surgical cases. These findings suggest that congenital and infectious conditions are commonly encountered in young animals, as evidenced by the presence of atresia ani in neonates (2-3 days old)—where palpation of the perineal area confirmed the lack of an anal orifice (Kumar *et al.*, 2026)—and abscess formation in slightly older calves (4–5 months). Kavanya and Rajendran (2020) described the successful surgical correction of atresia ani in neonatal kids using staged rectal pull-through techniques.

Hernias were observed in both male and female calves at around 2 to 2.5 months of age, typically associated with body weights of 35–40 kg. The hernia ring or opening was felt as a defect in the abdominal wall at the umbilical site (Kumar *et al.*, 2026). Fatima *et al.* (2022) demonstrated the efficacy of mesh repair in large hernias in calves. Abscesses, similarly, occurred in 4–5-month-old calves, indicating a susceptibility to bacterial infections during the early growing phase. Notably, amputations and cases requiring intramedullary bone pinning were reported in male calves, often linked to trauma or severe musculoskeletal deformities, such as knuckling, observed in a 7-day-old calf. These cases also highlighted the need for early orthopaedic

interventions to prevent permanent disabilities, including an initial evaluation of the joint's range of motion. Sato *et al.* (2020) reported a high success rate of surgical correction in neonatal calves.

Caesarean sections (C-sections) were exclusively performed in adult female cattle (26–36 months old), suggesting dystocia in smaller breeds or undernourished animals. Additionally, dystocia may also arise from nutritional deficiencies. Adugna *et al.* (2022) reported favourable maternal and fetal survival rates using local anaesthesia and appropriate techniques.

In goats, surgical affections were less frequent but equally varied. Fractures were the most common surgical issue (10.52%), observed in young male goats (2–2.5 months) and likely resulting from trauma or accidents. Gülaydin and Sarierler (2018) documented successful healing in long bone fractures using POP casts and splints. Subcutaneous cysts were also notable, often formed due to parasitic infestation, especially with a high load of *Sarcocystis* or *Coenurus*. These cysts were typically filled with fluid or semi-solid material, and the overlying skin appeared normal or slightly stretched (Toaleb *et al*., 2025). Wounds were another significant concern, particularly in females between 6 to 15 months of age, indicating chronic conditions or environmental injuries. Sato *et al.* (2023) also investigated successful removal of dermoid cysts in goats, with no recurrence when properly excised.

Hoof overgrowth, though less frequent (5.26%), was observed in goats and is suspected to be due to mineral deficiency, especially zinc deficiency. This emphasizes the importance of regular hoof trimming and care, particularly in confined or stall-fed animals. Overall, goats in this study showed a higher occurrence of subcutaneous cysts, fractures, and hoof-related problems. These findings are broadly consistent with previous reports that identified fractures and soft tissue conditions as common surgical problems in ruminants (Farghali *et al.*, 2020). However, the relatively low diversity of conditions reported in the present study may indicate limitations in case detection, diagnostic capacity, or the short duration of the study period.

The significant association between species and surgical affection ($\chi^2 = 19.00$, df = 8, $P = 0.015$) indicates that the pattern of surgical conditions is not uniformly distributed between cattle and goats. This variation may be attributed to inherent species differences in anatomy, body size, biomechanics, and management systems. Cattle are more frequently exposed to large body mass-related mechanical stress and handling-associated injuries, which may predispose them to conditions such as fractures and patellar fixation, whereas goats, often managed under different feeding and housing conditions, may be more susceptible to trauma-related and soft tissue disorders (Valkova *et al*., 2021). The highly significant variation in body weight among different surgical affections ($F = 118.57$, $P < 0.001$) indicates that certain surgical conditions are strongly associated with specific weight categories of ruminants. This may reflect underlying age-related physiological development, where lighter animals are more prone to congenital conditions, while heavier or more mature animals are more susceptible to traumatic and musculoskeletal disorders due to increased mechanical load and environmental exposure (Li *et al*., 2024).

## 5. Conclusions

The study demonstrated that a wide range of surgical affections in ruminants can be effectively managed through timely diagnosis, appropriate surgical intervention, and proper postoperative care. Most cases healed successfully, with only a few complications observed, highlighting the importance of early treatment and good management practices. Routine veterinary care, improved nutrition, hygienic housing, and increased farmer awareness are essential for reducing surgical problems and improving livestock productivity in rural areas. The study does not fully address long-term survival, recurrence, or detailed risk-factor analysis across diverse management systems, highlighting a major gap in the current literature. Therefore, further large-scale and long-term studies are needed to evaluate these aspects and identify specific risk factors associated with surgical affections in ruminants under low-resource farming systems.

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## Data availability

The data supporting the finding of this study are included in this manuscript.

**Conflict of interest**
None to declare.

**Authors' contribution**
Mohammad Lalmoddin Mollah: supervision, conceptualization, study design, disease diagnosis, writing of the original draft, editing, and revision of the manuscript; Robin Bapary: data collection, organization, data finalization, data analysis, manuscript writing; Prateeti Roy: data finalization, data analysis, manuscript writing; Dipa Rani Pal: revision of the manuscript and editing; Mohammad Rohul Amin: revision of the manuscript. All authors have read and approved the final manuscript.

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