

A case report on ventrolateral herniorrhaphy in sheep: The novel way of using vest-over-pants closure technique

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Abstract

Objectives: To describe the surgical management of ventrolateral hernias by using the vest-over-pants closure technique.

Animals: On two local breed sheep that were kept under an extensive management system.

Study design: Case report.

Study methods: Patient history and clinical findings, diagnosis, and treatment.

Outcomes: After frequent follow-up and well post-operative care, the patient were recovered.

Conclusion: The herniorrhaphy and closure performed in both sheep were highly successful and effective in apposing hernial ring by maintaining equal tensions with minimal wound dehiscence, unlike other closure techniques.

KEYWORDS

hernia, herniorrhaphy, sedation, sheep, ventrolateral

1 | INTRODUCTION

Hernias are the passage of an organ or tissue through the natural or acquired opening (Jettennavar et al., 2010). The anatomical structures of hernia include hernia sac, ring, and content(s). It can affect both small and large animals consequently interfere with the reproduction, production, and productivity of the animals (Das et al., 2012). It can be divided according to the site/location into abdominal, umbilical, scrotal, inguinal, femoral, perineal, and diaphragmatic or according to the aetiology into congenital and acquired or clinically into reducible or irreducible (Sagar et al., 2010).

Complications of the hernia include strangulation, incarceration of the contents, adhesions, infection in addition to the effect of the general appearance of the animal (Al-Sobayil & Ahmed, 2007). A ventral abdominal hernia in sheep can pass through part of the abdominal wall ventral to the skin fold of stifle other than natural orifice due to mus-

cle weakness. But the sites can be anywhere from the lateral side of the thoracic cavity to the iliac cresting (Yasin, 2004). It is commonly acquired due to a defect in the abdominal wall musculature and can be caused by mechanical injury (kick, horn thrust or blunt trauma, abscess in the abdominal cavity, abdominal distention or straining during pregnancy and parturition, or occur without trauma due to weakness of the prepubic tendon) (Ghamsari et al., 2008).

The diagnosis of hernia requires thorough clinical examination and the use of diagnostic imaging such as ultrasonography apart from needle aspiration and biopsy (Sadan, 2019). Besides, ultrasonography is a non-invasive diagnostic imaging tool that enables the differentiation of most such swelling from the surrounding organs based on the alteration in echogenicity (Scott, 2012). The differential diagnosis of hernias from other superficial swellings is also important but is challenging for veterinarians, as different types of swellings may have similar clinical features. Thus, ultrasound can provide information

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FIGURE 1 Ventrolateral abdominal hernia and its repair in ram: (a) Clinical presentation, (b) ventral hernia repair in progression, (c) preplaced stay sutures, and (d) post herniorrhaphy

about the architecture of these swellings by differentiating solid from cystic structures and provide greater details that are not demonstrated on clinical and radiological examinations (Bellavance et al., 2010).

Most hernias enlarge over time and, if not repaired surgically, may cause pain, anorexia, weight loss, or dystocia when a gravid horn is found in the hernial sac. Incarceration and strangulation of the bowel are the most dangerous life-threatening sequela of herniation (Bellavance et al., 2010). Herniorrhaphy is among the most commonly performed operations in animal and human surgical practices. Thus, the repair of hernia should be managed early before the hernia ring becomes wide and hernia contents increase in number from the nearby structure and organs (Radostits et al., 2007). The case report aimed to describe the surgical management of ventrolateral hernia in two sheep.

2 | DESCRIPTION OF THE CASES

2.1 | History and clinical examination

2.1.1 | Case 1

An 18 kg, 4 years old local breed ram was brought to the Addis Ababa University Veterinary Teaching Hospital (VTH), College of Veterinary Medicine and Agriculture with a clinical presentation of large swelling on the right ventrolateral part of the abdomen on the caudal to the umbilicus and slightly cranial to inguinal unilaterally (Figure 1a-white

arrow). The anamnesis suggested that the ram had horn thrust on the site before 3 weeks and the swelling started growing in size but decreased appetite then after. The hernia was also palpated to detect pain, heat, presence of hernial rings and their width, reducibility of the contents, and the presence of infection. Accordingly, the clinical examination revealed that hernial content is slightly firm, non-painful, and reducible within the hernial ring. The ring was approximately about 3 cm in width. Similarly, the parameters such as heart rate, respiratory rate, and rectal temperature were within normal physiological limits. The other history of the case and information concerning the species, age, and gender of the animal, and the location of the hernia was recorded on a medical card. A thorough body examination was also carried out to identify the physical status of the animal and detect any defect in other parts of the body. Finally, based on history, physical examinations, and clinical findings, the case was diagnosed as ventrolateral hernia and suggested for surgical hernia repair.

2.1.2 | Case 2

A 4-year local breed ewe was brought to the Addis Ababa University Veterinary Teaching Hospital (VTH), College of Veterinary Medicine and Agriculture with a clinical presentation of large swelling on the ventral abdomen on the right just caudal to the umbilicus and slightly cranial to udder on right side unilaterally. The anamnesis suggested that the ewe had undergone herniorrhaphy before two months in the

same hospital and recurred in addition to growing in size and losing her appetite then after. The other history of the case and information concerning the species, age, and gender of the animal, and the location of the hernia was recorded on a medical card. A thorough body examination was also carried out to identify the physical status of the animal and detect any defect in other parts of the body.

The hernia was also palpated to detect pain, heat, presence of hernial rings, the reducibility of the contents, and the presence of infection. Besides, the hernia was documented by photographs. Accordingly, the clinical examination revealed that hernial content is slightly firm, non-painful, and reducible within the hernial ring. The ring was approximately about 2 cm in width. Similarly, the parameters such as heart rate, respiratory rate, and rectal temperature were within normal physiological limits. The presented case was diagnosed as a ventrolateral hernia and suggested surgery to correct the condition.

2.2 | Preoperative preparations

Before coming for operation, both sheep were withheld from feed and water for 24 h and 12 h, respectively, and for case 2 procaine penicillin (24 mg/kg) and dihydrostreptomycin sulphate (30 mg/kg) (Pen & Strep) were given intramuscularly before the operation and repeated for 3 days thereafter for both cases. Before hernia repairs were commenced, the incision site and its surrounding areas were aseptically prepared by (clipping, shaving the skin (Figure 1b for case 1) scrubbing with povidone-iodine and ethyl alcohol, and using sterile surgical instruments and drapes.

2.3 | Animal control and anaesthesia

Field block anaesthesia was performed by making circular infiltration of 2% lidocaine hydrochloride 20 mg/ml (manufactured by Jeil Pharma. Co. Ltd) enclosing the ventrolateral abdominal hernial borders @ 10 mg/kg for both cases. In addition to the local anaesthesia (case 2), the ewe was sedated with diazepam (manufactured by Intas Pharmaceutical Ltd.) @ 0.1 mg/kg I.V. However, case 1 was administered with xylazine @ 0.1 mg/kg I.M. before both were positioned in slightly dorso-lateral recumbence for operation.

2.4 | Surgical correction and treatment

Fortunately, the location of the hernia was almost the same except for the difference in the physiological stage and sex of the patients. After the animals positioned to dorsoventral recumbence with slightly tilted to the lateral direction, two elliptical incisions for both cases and lateral to previous skin incision was made through the centre of the hernial sac, starting 2 cm beyond the anterior border of the hernia and extended for 2 cm posterior to it and 1 cm far from the margin of the previous sutured incision site (case 2). The small skin flap in between the incision was removed and the bleeding was held with artery for-

ceps and transfixed accordingly. After skin and subcutaneous tissue dissection and excision, the underlying tissues were bluntly dissected to expose and open the hernial sacs. Thence, the condition of the hernial sac and ring was examined carefully to confirm the presence or absence of adhesions of the parts of abdominal organs, and the identified adhesions were excluded by blunt dissections. Especially in case 1, major small intestinal parts are adhered to the abdominal wall and bluntly detached, and few haemorrhages were encountered but ligated soon.

Thence, the herniated viscera were repositioned in the abdominal cavity by manual taxis (Figure 1b for case 1). In both cases, herniorrhaphy was achieved by using sterilized silk (2-0) as a vest-over-pants closure technique between the hernia ring and abdominal wall. During these, single stitches were preset and held with artery forceps as shown in Figure 1c for case 1 but also similar in case 2. Once all of the single sutures were positioned, then they were tied. The excess part of the sac was removed and the muscles and subcutaneous tissue were routinely sutured with vicryl 2-0 size with a simple continuous suture pattern. During subcutaneous suturing, proper care was taken to avoid the formation of dead space, and the skin was close apposed with interrupted cruciate mattress suture using silk (Figure 1d) for case 1 and in a simple interrupted for case 2.

2.5 | Post-operative care and outcome

In the post-operative period, antibiotics procaine penicillin (24 mg/kg) and dihydrostreptomycin sulphate (30 mg/kg) (Pen & Strep) were administered intramuscularly for 3 days in both cases. Besides, the suture line was dressed after 2 days of interval. The healing process was also clinically evaluated and the surgical wound was almost healed after 15 days of operation in case 2 and 10 days in case 1 but the skin stitches were removed after 20 and 17 days to be sure for complete healing in case 1 and case 2, respectively. Post-operative complications and follow-up information were obtained from the owners through phone calls, and after 3 months, the hernia was slightly swelled due to the progression of pregnancy in case 2 and finally the ewe gave birth to two live lambs. After parturition, the condition was regressed to non-life-threatening. In case 1, it was completely healed without recurrence and the ram even increased in body weight since then and seen over 20 days (Figures 2a,b). The incision site was completely healed adequately to remove the suture material.

3 | DISCUSSION

A ventrolateral abdominal hernia is common in sheep (Al-Sobayil & Ahmed, 2007; Hassan, 2008; Yasin, 2004). The case was mainly occurred due to horn thrust in the flock and is acquired in nature which also agreed with the study of Das et al. (2012). A reducible ventral hernia is commonly presented than an irreducible one which is in agreement with the report by Hassan (2008) because the animals with reducible hernias have good general health than those with irreducible



FIGURE 2 Outcome of the ventrolateral herniorrhaphy in local breed Ram: (a) Observation at glance, (b) incision site closely visualized before removing suture

hernias that appear riskier making the owners sell or slaughter them to avoid the cost and risk of the operation.

Several techniques of herniorrhaphy were applied in veterinary clinical practice (Al-Sobayil & Ahmed, 2007; Jose et al., 2011). One of them and most commonly used in sheep is the vest-over-pants closure technique of the hernial ring and nearby structural layer by layer due to less holding capacity of muscles and fascias, which will contribute to recurrence and complications. In case 2, the ewe had a recurrent hernia on the prior incision site which may be due to the weakness in the abdominal wall leading to culling from the breeding pool which can, in turn, agree with the study of Noakes et al. (2009).

The abdominal hernia was successfully reduced in the presented cases. The exact cause of the present case report could not be revealed, it might be due to the weakening of the abdominal muscles or violent trauma with a blunt object such as horns. These findings were supported by the findings of Vebclauskas et al. (2008), Vijayanand et al. (2009), and Villar et al. (2011). In the presented case, the hernia ring was <8 cm in width and that type of hernia was corrected by using an overlapping interrupted horizontal mattress pattern and non-absorbable sutures. A similar finding was reported by Vebclauskas et al. (2008) where hernial ring size was measuring >3 cm and recovered. In the presented case, there were no encountered complications of the contents except for mild adhesions especially in case 1 which was corrected by gentle detachment and blunt dissections. But in the study of Villar et al. (2011), complications such as adhesions and hydrocele of hernial sac, incarcerations, and torsions were found, and in the study of Jettennavar et al. (2010), the abscess was found. Herniorrhaphy was commonly used in the case of medium to large-sized hernia rings, and in the case of very large hernia ring, hernioplasty was more effective. These were described by the study of Jahromi et al. (2009). In the presented cases, sterilized silk was used to suture the hernial ring and abdominal wall, and the excess part was removed to avoid further complications besides improving for proper healing.

4 | CONCLUSION

The herniorrhaphy performed in both sheep were highly successful and animals recovered without any significant complications at different intervals of follow ups. Furthermore, unlike other suture patterns and techniques it is an effective in apposing and closing the low to medium hernial rings by maintaining equal tension. This indicates as the surgical repair performed is novel way and found to be promising for similar cases.

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CONFLICT OF INTEREST

The authors declare no conflict of interest

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Addis Ababa University, College of Veterinary Medicine and Agriculture Research Ethics Review Committee approved this research before actual data collection. A consent sheet was prepared in English and attached to the tool on separate page regarding the purpose, description, anticipated benefits, other relevant aspects of the study and signed informed consent was taken from the animal owner of above

18 years of age. Thus, authors declare that all methods were performed in accordance with the relevant guidelines and regulations.

AUTHOR CONTRIBUTIONS

All authors contributed to the manuscript to final submission. Conceptualization, and writing the original draft were performed by Jiregna Dugassa Kitessa. Investigation, methodology, validation, and supervision were majorly done by Abebe Fromsa Merga, while visualization, reviewing, and editing were done by Abebe Wirtu Afata. Finally, all authors read and approved the final manuscript submission.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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