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Surgical management of ventral hernia in a calf by hernioplasty using non-absorbable Polypropylene mesh

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Abstract

A two month old male crossbred Jersey calf weighing 50 kg was presented to Veterinary Polyclinic, Perambra with a history of progressive swelling on ventral abdomen since birth. The animal had normal feed and water intake, stable vital signs, and a complete blood count with no abnormalities. A large swelling on the left lateral ventral abdomen with a soft hernial ring of approximately 6-7 cm, and a smaller swelling in the caudal abdomen with a hernial ring of about 2-3 cm noticed. After confirming the congenital hernia, the hernial ring in the ventral abdomen was corrected by Hernioplasty using a non-absorbable synthetic polypropylene mesh. The second hernial ring towards caudal abdomen was corrected by Herniorrhaphy. The whole procedure was under recumbency stun anaesthesia protocol. The calf had an uneventful recovery. The hernioplasty using non-absorbable synthetic Polypropylene mesh was found effective for correcting large ventral hernia in calves.

Keywords: Hernioplasty, ventral hernia, non-absorbable polypropylene mesh

1. Introduction

Weakening or tear in the abdominal wall or diaphragm, or from natural openings such as the inguinal or femoral canal leading to the protrusion of organs resulting in hernia (Venugopalan, 1992) ^[14]. Hernias can be reducible or non-reducible (Farman *et al.*, 2018) ^[7]. Abdominal hernias can be categorized into, external and internal hernias. External abdominal hernias can result from defects in the abdominal wall. In contrast, internal abdominal hernias occur through a hernia ring located within the abdomen or thorax. According to the location, abdominal hernias can be categorized as, ventral, prepubic, subcostal, and lateral hernias (Fossum, 2013) ^[8]. Trauma to the abdomen such as, kicks from cows, accidents, bite wounds, or congenital factors can increase the likelihood of developing an abdominal hernia. Young animals are mostly affected. A thorough examination of the herniated mass is important for the accurate diagnosis of the herniated contents and determining the appropriate method of correction. Hernia correction methods include the use of elastoplasts, blisters, ligatures, or clamps, as well as surgical options such as herniorrhaphy or hernioplasty (Salim *et al.*, 2015) ^[13].

2. Material and methods

The case presented here reports the presence of ventral hernia in a 2 month old male jersey calf and its successful surgical management using non absorbable synthetic polypropylene mesh. The herniated mass was found towards the caudo-ventral aspect of the abdomen with no external injuries over the swelling, animal showed normal physiological parameters, hematological values were normal (Table 1). The palpated mass was elastic in consistency, was reducible significantly. The mass was differentiated from abscess, hematoma, tumor and cyst through palpation.

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Table 1: Complete blood count of the animal

Parameters	Results	References
Total WBC Count	5.36 x10 ³ /μL	4.0-12.0 x10 ³ /μL
Lymphocyte Count	3.22 x10 ³ /μL	2.5-7.5 x10 ³ /μL
Monocyte Count	0.25 x10 ³ /μL	0-0.9 x10 ³ /μL
Total RBC Count	6.59 x10 ⁶ /μL	5.0-10.0 x10 ⁶ /μL
Haemoglobin	8.2 g/dL	8-15 g/dL
HCT	27.1 %	24-46 %
MCV	48.5 fL	40-60 fL
Total Platelet Count	618 0 ³ /μL	100-800 x10 ³ /μL

3. Management and Treatment

The animal was placed in the right lateral recumbency. Procedure was done under recumbency stun anaesthesia protocol, Inj.Butorphanol @ 0.1mg/kg body weight, Inj.Xylazine @ 0.05mg/kg body weight and Inj.Ketamine @ 0.5mg/kg body weight, intramuscularly. Anaesthesia was maintained under Ketamine-Diazepam combination @ 1:1 ratio, intravenously. The surgical site was aseptically prepared by clipping, shaving and scrubbed the site using povidone iodine solution. 2% Lignocaine was infiltrated over the site of incision. A curvilinear incision of about 10-11 cm was made above the hernial swelling using BP blade of size 22. The skin was detached from subcutaneous tissue by blunt dissection, exposing hernial contents (intestine). The skin and muscular layer were grasped using tissue holding forceps (Allis tissue forceps) to get sufficient surgical field and expose hernial ring (Fig 1). Hernial ring was about 8cm diameter and the herniated intestine was edematous with slight adhesion with the surrounding tissues. The adhesions were carefully detached and repositioned the hernial viscera back into abdominal cavity manually (Fig 2, 3). A non-absorbable polypropylene mesh (Ethicon; Johnson and Johnson, India) of size 15 × 10cm was placed over the hernial ring extending about 2cm beyond the margin of defect (Fig 4). The mesh was sutured to the muscle using Polyamide 1-0 in simple interrupted suture pattern (Fig 5). Skin was apposed using Nylon 1-0 in cross mattress pattern after trimming the intertemperate skin.

The second hernia towards the caudal abdomen was corrected by herniorrhaphy. By a combination of blunt and sharp dissection, the hernial ring of about 3 cm diameters was exposed and the intestinal contents were replaced into the abdominal cavity before suturing. The hernial ring was then freshened and closed with a double-breasted suture pattern using absorbable polyglycolic acid 1-0. Excess skin was removed, and the wound was finally closed with a cross-mattress suture pattern using nylon 1-0.

Aluspray was topically applied over the suture site. Inj.Streptopenicillin @ 2ml/50kg bodyweight and Inj.Flunixin @ 1.1mg/kg body weight were given intramuscular postoperatively and continued the same for 4 more days. Advised complete rest and restricted feeding for 2 weeks.

**Fig 1:** Exposed hernia contents**Fig 2, 3:** Repositioning of hernia viscera back through hernia ring**Fig 4:** Non-absorbable polypropylene mesh of size 15x10 cm was placed over the hernial ring**Fig 5:** Mesh was secured using Polyamide 1-0 in simple interrupted suture pattern

4. Result and Discussion

The congenital ventral hernia in the calf was successfully repaired using a hernioplasty procedure with non-absorbable polypropylene mesh. The mesh was securely anchored to the muscle using polyamide 1-0 sutures in a simple interrupted pattern. The second hernial ring towards caudal abdomen was corrected by herniorrhaphy in double-breasted suture pattern using absorbable polyglycolic acid 1-0. Post-operatively, the calf exhibited a smooth recovery without any complications.

Ventral hernias results from the displacement of internal organs through a breach in the abdominal wall. More frequently observed in cattle and horses (Venugopalan, 1992) [14]. Congenital ventral hernia could be attributed to decreased muscle strength, which led to enlargement over time. Excessive manipulation of young calves during calving can contribute to ventral hernias. The strain on the calf's muscles can weaken the abdominal wall, making it more susceptible to herniation (Witte *et al.*, 2008) [16].

The use of mesh for hernia repair has gained popularity as it has been shown to reduce the risk of recurrence compared to suture repair (Mosbah *et al.*, 2014; Christoffersen *et al.*, 2015; Kaufmann *et al.*, 2018) [10], [5], [9]. Polypropylene mesh is a common prosthetic tool for reconstructing abdominal wall

hernias exceeding 3 cm in length (Ober *et al.*,2007; Vilar *et al.*,2009; Sadan *et al.*,2019) ^[11], ^[15], ^[12]. By reducing tension on the wound, this technique effectively lowers the likelihood of hernia recurrence compared to traditional suturing (Burger *et al.*,2004; Finan *et al.*,2009; Abouelnasr *et al.*,2017) ^[4], ^[6], ^[1].

Polypropylene is commonly used for large hernia defect correction due to its strong and flexible nature. Its unique properties, including ease of handling, tissue compatibility, and infection resistance, make it a popular choice among surgeons. The monofilament nature of the polypropylene facilitates fibrovascular ingrowths (Bilsel and Abci, 2012) ^[3]. The chance of recurrence is generally higher with herniorrhaphy compared to hernioplasty, which includes the use of mesh to reinforce the repair, usually provides a more durable repair and reduces the recurrence rate. Primary closure of congenital hernias can lead to minor complications such as wound infections, abscess, seromas, recurrence and risk of strangulation, particularly in umbilical hernias (Adam and Fessler, 2000) ^[2].

5. Conclusion

Non-absorbable synthetic polypropylene mesh proved effective in correcting large ventral hernias in calves. After the recommended rest period, the animals showed satisfactory recovery, with the suture site remaining intact. For optimal recovery, a light feeding regimen was advised for 1-2 weeks. Our results showed that polypropylene mesh was a viable option for large ventral hernias, while herniorrhaphy proved to be a better choice for smaller hernias in calf.

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7. Conflict of Interest

Authors declare no conflict of interest.

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Not available

9. References

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