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Hernioplasty for treatment of ventral hernia using nylon mesh in ruminants

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Abstract

The present study was conducted in six animals having ventral hernias. In six animals one was calf and other 5 were female cattle. All the animals showed ventral hernia with the history of trauma and infighting between the animals except the calf which had congenital hernia which over a period increased in size. After confirming hernia the animals were prepared for surgery and incision was given and hernial contents were reduced and hernioplasty was done using double layer of nylon mesh. The mesh was placed subcutaneously outside the abdominal wall below the skin in subcutaneous manner to prevent any adhesions. The nylon mesh was sutured to the abdominal wall using double layer Silk No.2 in horizontal suture pattern. The skin was sutured using Nylon No.2. Post-operatively the animals were checked for complications like infection, inflammation, and edema. 3 cases showed edema for few days which was drained over successive days. Inflammatory swelling was noticed for few days which eventually subsided after giving anti-inflammatory. No infection was noticed post-operatively in any of the cases. All the animals recovered uneventfully. Nylon mesh was found to be cheap alternative to the costly propylene mesh and is economically feasible to use it in field conditions.

Keywords: calf, cattle, ventral hernia, hernioplasty, nylon mesh

1. Introduction

Hernia, a condition in which a part of organ of the abdomen or pelvic either displaced or protruded with the intact peritoneal layer through a natural or pathological weak opening in the thoracic or abdominal cavity containing peritoneal layer with intact skin. Hernias can be congenital or acquired. Ventral or abdominal hernias are usually acquired one. Congenitality of this hernia is rare and occurrence might be due to excessive pulling force on the musculature of calf resulting in weakening of abdominal musculatures^[1]. The most common cause of abdominal hernia might be due to severe trauma to the abdominal wall which results in hernia either in higher or lower flank region, sometimes behind the costal arch or between the last few ribs^[5]. The hernial content of the ventral hernia depends on the side of hernia. The most common herniated organs are the loops of intestine, part of rumen, spleen, urinary bladder. Earlier, ventral hernia repair and abdominal wall reconstruction were done with heavy suture materials to oppose and close the hernial defects^[2]. However such reconstruction often leads to complications of wound dehiscence, reoccurrence of hernia and non-healing of wound^[7]. Large defects of hernia usually require safe closures which should not interfere with normal athletic activity and with parturition^[1]. Repair of large defects of ventral hernia can be done using biomaterials like polypropylene mesh or steel mesh; however its heavy cost may hinder its use for application for the food animals. With the above notion, the presented study was conducted in 6 animals, one calf and 5 adult cattle to assess the locally available nylon (Mosquito) mesh for economical treatment of ventral abdominal hernia in cattle.

2. Materials and Methods

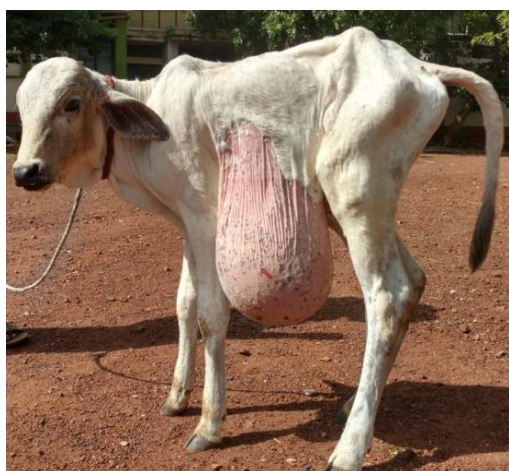
The present study was conducted in six clinical cases which had ventral hernia which were subjected to treatment with Nylon (Mosquito) Mesh (Fig.1). Among six one was calf (Fig.2) and rest were female cattle (Fig.3) with age group ranging from 3 to 6 years. Thorough history with respect to age, sex, cause of hernia, gestation length was collected. Most of the animals had history of trauma due to infighting between the animals. However, the calf had showed growth since birth, which increased in size with successive increase in the age of the animal. The details of animals with size and position of hernia is given in Table. 1

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Table 1: The details of animals with size and position of hernia

Sl. No.	Type of Animal	Sex	Age	Position of Hernia	Size of Hernial Ring (Aprox.)
1	Calf	Male	6 months	Parallel along the left last costal arch	20 Cm
2	Cattle	Female	3 years	Ventral right Para lumbar fossa	16 Cm
3	Cattle	Female	5 years	Parallel to mid ventral on rectus Abdominus muscle	12 cm
4	Cattle	Female	4 years	Left ventral paralumbar fossa	14 cm
5	Cattle	Female	6 years	Right Ventral para lumbar fossa	12 cm
6	Cattle	Female	6 years	Parallel to the milk vein	18cm

**Fig 1:** Nylon Mesh used for hernioplasty**Fig 2:** Calf Having Ventral Hernia parallel to left last costal arch**Fig 3:** Female cattle having Ventral hernia at left lower Para lumbar

3.1 Pre-operative preparation of patient

The animals were kept off feed and off water for 24 hours and 12 hours respectively. Prophylactically, the animals were given Streptopenicillin 2.5 gm and Meloxicam @0.3 mg/ kg

body weight. The operative site was clipped, shaved, scrubbed and prepared surgically for operation. For hernioplasty, Nylon mesh was used. The Nylon mesh was sterilized by keeping in boiling hot water for 15 minutes to remove any grease and dirt and then was sterilized using surgical spirit followed by Povidone iodine. The animals were sedated using xyalzine @0.05 mg/ Kg body weight and were restrained in lateral recumbence. The operative site was desensitized by infiltration of lignocaine hydrochloride.

3.2 Operative procedure: Incision was given on the hernial sac. Care was taken not to puncture any visceral organs lying beneath during incision. After incision the visceral organs were examined for any adhesions. If any, then they were broken down and were removed. In case of calf, the herniated organs were part of liver, spleen; loops of intestine and rumen (Fig.4) and with others, mostly there were loops of intestine. Followed by incision and removal of adhesions the herniated organs were repositioned to their anatomical site. Double layer of nylon mesh was put outside the abdominal wall in subcutaneous pattern along the edges of the hernial ring to prevent any adhesions with the visceral organs (Fig.5). The nylon mesh was anchored to the abdominal muscle wall by suturing with Silk No.2. The silk was double layered and was threaded through the eye of trocar pointed needle. The nylon mesh was anchored to the abdominal wall using horizontal mattress pattern using double layer silk (Fig.6). The subcutaneous fascia was covered over the nylon mesh to aide in early healing. The excessive edges of the nylon mesh were trimmed off and excessive hypertrophied skin resulting due to hernia was also trimmed off and sutured with silk or nylon with simple interrupted pattern.

**Fig 4:** herniated visceral organs



Fig 5: Placement of Nylon Mesh Subcutaneously to the abdomen wall

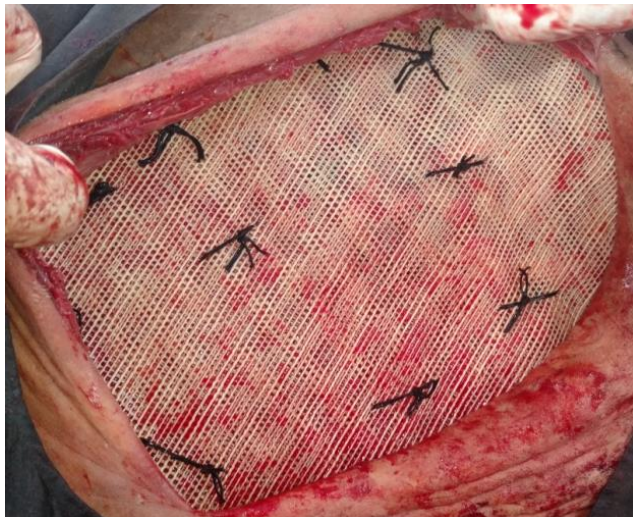


Fig 6: Anchoring of Mesh to the abdominal wall using double layer No. 2 Silk

3.3 Post-operative management and complications

Post-operatively the animals were given Streptopenicillin @ 2.5 gm for 8 days and Meloxicam @ 0.3 mg/kg for 5 days. Post-operatively the animals were checked for any inflammatory reactions, swelling, edema, infection and wound dehiscence.

4. Results and Discussion

All the animals in the study group were checked post-operatively. All the animals showed inflammatory swelling at the site of operation with tension on the suturing endings. In three cases, there was formation of edema for 6-7 days with subsequent reduction in quantity of edematous fluid which was drained on regularly basis. No infection was noticed at the site of neither infection nor any wound dehiscence. In the present study, all the animals has the history of trauma for the occurrence of ventral hernia in large animals except for the calf, which had ventral hernia which was congenital and might be due to less muscular strength which over the period got enlarged. The most common cause of ventral

hernia was due to blunt trauma to the abdominal wall [10, 4]. However, in younger calves, the cause of ventral hernia might be due to excessive external manipulation of calf during calving which might result in excessive load on the musculature causing weakening of the abdominal wall [11]. The suture pattern here adopted was simple horizontal pattern as in all cases the muscular edges of the hernia were deviated, contracted, thick and atrophied due to which the edges had low suture holding capacity. Similar findings of thick and atrophic hernial edges while treating large abdominal defects in horses and cattle [4]. The preferred positioning of the nylon mesh was outside of the abdominal wall in subcutaneous way. This way of anchoring of the Nylon mesh was not only easily, it also prevents formation of adhesions between the abdominal bowel and Nylon mesh and also prevents formation of fistulae by preventing formation of tracts in the abdominal wall. Similar findings were when polypropylene mesh and polytetrafluoroethylene mesh were placed subcutaneously outside the abdominal wall [6]. Post-operatively, there was inflammatory swelling and formation of edema at the surgical site which might be due to local inflammatory reaction of the mesh which acts as foreign body and formation of edema due to arterial and venous compromise. The mesh not only act as substitute to the abdominal wall, it also acts as a scaffold and stimulator for fibroblast proliferation and fibroblast migration which enables the latter to form thick fibrous tissue in and around the mesh, thereby correcting the abdominal defect and strengthening the abdominal wall. When prolene mesh was used for repair of abdominal wall in animals, and upon histology found that the prolene mesh was surrounded with delicate layer of fibrous tissue and collagen fibers which became dense [3]. In this study, all the cases necessitate the hernioplasty by use of cheap and economically feasible and easily available Nylon mesh that represented safe procedure in large hernial ring and avoiding over stretching of edges of wound assuring good healing with minimal complications. Application of autoclaved 4 layer nylon mesh (on lay) was technically easy to perform and provided excellent long term outcome in large abdominal hernias in bovines [8].

5. Conclusion

Nylon mesh is a cost effective, feasible and economic alternative to polypropylene mesh and other bio-materials for treatment of large hernial defects in bovines.

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