



Hernioplasty using nylon mesh for massive ventral abdominal hernia in adult bovine

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ABSTRACT

The study included 11 clinical cases of adult female bovines (6 cows, 5 buffaloes) weighing 325–410 kg, presented with ventral abdominal hernias. All the animals were non-pregnant and 7 animals (4 cows and 3 buffaloes) had the history of recent calving. Routine herniorrhaphy was not possible because of the massive size of the hernia ring and weak surrounding tissues. All the animals were operated for abdominal hernioplasty in dorsal recumbency under inhalation anesthesia. Autoclaved synthetic nylon mesh was used as an onlay graft in all the cases. Nine animals (4 cows and 5 buffaloes) showed uneventful recovery with minimal postoperative complications. It was concluded that nylon mesh may be used for the repair of large abdominal hernias in adult bovines as an economic alternative to the costly prosthetic meshes.

Key words: Bovine, Hernioplasty, Nylon mesh, Ventral abdominal hernia

Abdominal hernias may occur when the abdominal wall is severely traumatized and these hernias may be high or low in the flank, along the costal arch or between the last few ribs (Keown 1974). They are usually caused by violent force, such as from the impact of blunt objects, but they may also result from overstretching of the abdominal muscles (Tirgari 1979). Abdominal hernias are generally ignored by owners as they do not affect milk production. In the past, abdominal hernia repair and abdominal wall reconstruction were frequently done using tense sutures to approximate and close the hernia defects (Fahd *et al.* 2007) but such repair led to frequent complications of wound dehiscence, recurrent hernias and non healing of the wound (Ober *et al.* 2008). Large hernias in adult animals require safe closure because they interfere with the athletic activity or normal parturition (Elce *et al.* 2005). Repairing of large abdominal hernias using polypropylene mesh in horses and cows (Tulleners and Fretz 1983), with polyester mesh in a cow (Sagar *et al.* 2010) and nylon mesh (Kumar *et al.* 2002) were tried. However, the use of poly-propylene mesh for ventral abdominal hernia repair in bovines is restricted to a few cases due to high cost of the mesh. The present study aimed to assess the use of locally available autoclaved nylon mesh (used for mosquito net) for the cost effective surgical treatment of ventral

abdominal hernia and pre-pubic tendon rupture repair in bovines.

MATERIAL AND METHODS

Six adult cows weighing between 325 and 350 kg and 5 buffaloes, weighing between 400 and 410 kg, presented with large ventral abdominal swelling, were included in the present study (Table 1). Diagnosis of hernia in all the 11 animals was made by physical palpation in standing position or lateral recumbency. Physical palpation in standing position revealed hernia ring of 10 ± 2 inches $\times$ 8 ± 3 inches dimension on the lateral abdominal wall in 5 cases through which the intestinal loops were herniated. Hernial ring was not palpable in rest 6 cases in standing position. Examination in lateral recumbency confirmed ventral abdominal hernias in all the cases.

All the animals were fasted for 24 h and pre-medicated with midazolam 0.2 mg/kg bw intravenously. General anesthesia was induced with thiopental sodium (5%, 5 mg/kg, iv) as a bolus and endotracheal intubation was done. The anesthesia was further maintained with 1–2 % halothane/ isoflurane mixed with oxygen. The animals were positioned in dorsal recumbency and were aseptically prepared for surgery. The incision was made on the skin over the herniated mass. During each attempt the skin was opened and hernial contents were gently pushed back into the abdominal cavity. Hernial sac was bluntly dissected and the abdominal contents were reduced in the abdominal cavity through the hernial ring. The size of abdominal breach varies between 8 ± 3 inches $\times$ 6 ± 3 inches to 12 ± 3 inches $\times$ 8 ± 2 inches in all the cases. Hernioplasty in each case was done using a 4 layered

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Table 1. Signalment, duration of disease, clinical sign and hernia contents of the cases

Animal	Breed	Age (Years)	Duration of illness	Clinical Signs	side	Hernial contents
Cow	HF	8.2	5Weeks	Abdominal swelling	left	Small intestine
Cow	HF	7.5	6Weeks	Abdominal swelling and discomfort	left	Small intestine
Cow	Mixed	4.3	4Weeks	Abdominal swelling	left	Small intestine
Cow	Mixed	4.3	6Weeks	Abdominal swelling and discomfort	Right	Large intestine
Cow	Mixed	12	4Weeks	Abdominal swelling and discomfort, very weak and anorectic	Right	Large intestine
Buffalo	Mixed	4.4	2Weeks	Udder was hanging and discomfort in walking	Left pre pubic tendon rupture	Small intestine, Urinary bladder
Buffalo	Mixed	7.2	3Weeks	Udder was hanging and discomfort in walking	left pre pubic tendon rupture	Small intestine
Buffalo	Murrah	6.5	3Weeks	Udder was hanging and discomfort in walking	Right pre pubic tendon rupture	Small intestine, Urinary bladder
Cow	Mixed	6	3Weeks	Abdominal swelling and discomfort, very weak and anorectic	Right	Large intestine
Buffalo	Mixed	4.5	2Weeks	Udder was hanging and discomfort in walking	Left pre pubic tendon rupture	Small intestine, Urinary bladder
Buffalo	Neeli Ravi	4.4	3.5Weeks	Right Udder was hanging	Right pre pubic tendon rupture	Small intestine, large intestines

autoclaved nylon mesh and the mesh size was adjusted as per the hernial defect. The mesh was sutured to the muscle surrounding the ring using #3 braided silk in horizontal mattress pattern in an onlay pattern. The edges of the mesh were embedded with the musculature using simple continuous sutures pattern with chromic catgut (No.2). The subcutaneous tissue was sutured using catgut (No.2) in a simple continuous pattern. The skin was closed with silk No.3. Post operative care included antibiotics injection ampicillin and cloxacillin 10 mg/kg BID intramuscular, injection gentamicin @4 mg/kg BID for 5 days. Analgesic included injection meloxicam @0.2 mg/kg once in a day for 3 days. Light green fodder and water intake was advised in immediate postoperative period. In the animals where possible a pressure bandaging were also applied using broad cotton tape to reduce pressure on the suture line and to avoid accumulation of fluid in the dead space. The antiseptic dressing of the wound was advised with povidone iodine and flies repellent ointment. The skin sutures were removed on 14th post operative day. Telephonic follow-up was made on different post operative days to know the status of each animal.

RESULTS AND DISCUSSION

Respiratory rate, heart rate, rectal temperature, pulse rate and colour of mucous membrane were found within the normal physiological range in 7 cases. One cow was not clinically healthy and was in hide bound state. Routine hematological parameters were within the normal limits. In 7 cases (4 cows and 3 buffaloes) the abdominal defects occurred within 15–20 days of parturition and in 4 (2 cows and 2 buffaloes) the cause was due to a blunt trauma. Blunt

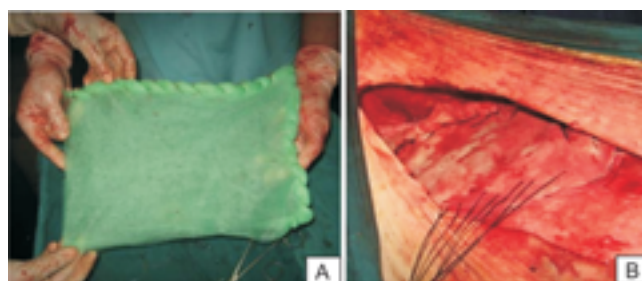


Fig. 1. Autoclaved nylon mesh (A) before application and onlay placement of mesh with silk sutures in an animal.

trauma and pressure during parturition is a common etiology of abdominal hernia in bovines (Ober *et al.* 2008).

In present study we used 4 layered autoclaved nylon mesh (Fig. 1.A, costs US\$ 1/case) prepared from locally available nylon mosquito-net in all the 11 cases to facilitate the cost effective reconstruction of hernial defects (Fig. 1.B). Nine animals (4 cows and 5 buffaloes) showed uneventful recovery with minimal postoperative complications.

Two cows (no. 5 and 9) were very weak before operation and did not stand after operation and died on third and fourth post operative day, respectively. Sub-cutaneous accumulation of seroma was seen in all the rest 9 cases for 2–7 days after surgery. The seroma was drained by opening a most ventral skin suture post operatively and by application of pressure bandaging with broad cotton tape. Stercoral fistula was observed in 1 case clinically. Post operative follow up to 9–18 months post surgery did not report any complications in rest of the cases. In 18 month of follow up study, 1 buffalo and 2 cows had delivered healthy calves at full term without any recurrence of the hernia.

Mesh implants are used to repair large hernias that cannot

be closed by direct apposition of the body wall. A large number of surgical meshes are available for abdominal wall defect reconstruction. They all differ concerning tissue in growth, chances of infection, cost and rate of reoccurrence. The benefits of mesh implants include strength, non-bioreactivity, lack of degradation, and elasticity that allow a more even distribution of load (Hilbert *et al.* 1978), but most of the prosthetic meshes available in market are very costly for dairy farmers.

The authors had earlier successfully used costly polypropylene mesh for the repair of ventral abdominal hernia in a cow (Singh *et al.* 2011). The nylon mesh was used in the present study to have economical and effective alternative to other commercially available synthetic meshes which were very costly. Although the chances of infections are higher after mesh application (Elce *et al.* 2005), fortunately only 2 cases of present study showed mild infection. Tulleners and Fretz (1983) also reported that the primary complications following mesh herniorrhaphy were post-operative infection and adhesions. In present study infection was checked after proper antibiotic therapy. Strict aseptic technique, hemostasis, elimination of dead space during surgery, and peri-operative antibiotics were used to prevent potential post-operative infection. Most frequent complications reported by contact of prosthetic mesh are formation of adhesions and stercoral fistulas (Mathews *et al.* 2003) but only in 1 case from the present study developed stercoral fistula clinically.

Application of autoclaved 4 layer nylon mesh (onlay) was technically easy to perform and provided excellent long term outcome in large abdominal hernias in bovines. Nylon mesh is a cost effective alternate to polypropylene mesh for use in bovines.

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