



Using of Polypropylene Mesh for Hernioplasty in Calves

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ABSTRACT:

In this study polypropylene mesh was used to facilitate reconstruction of large tissue defects by tension-free repair in 5 crossbred calves with hernial ring sizes ranging from 4-9 cm. The mesh was anchored subcutaneously to strong supportive musculature with interrupted pattern using No. 3 polypropylene sutures. The results revealed that polypropylene mesh proved alternative for hernial repair when fixed subcutaneous in large hernial ring in male and female calves without complications. Therefore, prosthetic mesh represents a safely procedure in large hernial ring to avoid over-stretching on the edges of the wound which hinders wound healing.

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1- INTRODUCTION:

A hernia is a protrusion of the contents of a body cavity through a weak spot of the body wall. This may be from accidental or a normal anatomical opening, which does not completely fulfill its physiological function. It is a common defect in calves (Rings, 1995). Congenital umbilical hernias are of concern for heritability, although many umbilical hernias are secondary to umbilical sepsis. Multiple births and shortened gestation lengths are two important risk factors for congenital umbilical hernias in calves. Sire and umbilical infections are associated with risk of an umbilical hernia in calves during the first 2 months of life (Steenholdt and Hernandez, 2004).

In the past, hernial surgery and abdominal wall reconstructions frequently have used tense suture to approximate and close a hernial ring or defect. Large hernia requires safe closure to avoid wound dehiscence, recurrent hernias and no healing of the wound due to tissue

ischemia with the sutures cutting through the soft tissue (Matthews et al., 2003). The first use of prosthetic mesh for ventral hernial repair in human was in the 1960s, when Usher (1959) and (1970) presented the advantages of knitted polypropylene mesh for the repair of anterior abdominal wall hernias. The successful repair of an abdominal wall defect is based on a tension-free closure to allow wound repair, a better collagen restoration and prevention of recurrence. Polypropylene mesh is strong, has excellent tissue incorporation, and is relatively inexpensive. Unfortunately, it has been found to be associated with a high rate of adhesion formation to the abdominal muscles and underlying viscera (Matthews et al., 2003). Simple apposition of hernial ring with minimal or complete avoidance of tension at the healing suture line is essential for ideal healing (Mc Farland, 1980 and Fubini and Ducharme, 2004). This may not be possible for hernias with large ring, unless the use of prosthesis is employed. The mesh helps in reducing

recurrent rate of hernia and also allows faster recovery. Hernia repair is one of the most frequently performed surgical procedures worldwide, especially in industrialized countries where alloplastic (commercial) meshes are routinely used for tension-free repair of hernias. In less developed countries however, those meshes are neither readily available nor affordable (Wilhelm et al., 2007).

Visceral adhesions can result in intestinal obstruction, pain, and fistula formation. Another complication includes implant or problems associated with anesthesia (Tulleners and Fretz, 1983 and Van der Velden and Klein, 1994).

Anyway repairing of large abdominal wall defects using prosthetic meshes in bovine calves is a good option. Knitted polypropylene mesh being reportedly successful in over 80% of calves (Tulleners and Fretz, 1983; Van der Velden and Klein, 1994 as well as Blood and Studdert, 1997). Correction of hernia could simply be done by suturing the body tissues (Herniorraphy) or by implantation of foreign materials to give a greater strength (Hernioplasty). Choice of suitable technique to be employed depends on the size of the hernial ring. When a large defect makes the approximation of tissues impossible without undue tension, prosthetic implants are used and the most commonly used synthetic material is a mono-filament plastic mesh made of polypropylene or polyethylene (Zimmerman, 1968). The present study aimed to evaluate from a clinical point of view the umbilical hernia surgery in calves by using polypropylene mesh and investigate any possible complications following subcutaneous placement of the mesh.

2- Materials and Methods:

Five cases of umbilical hernia in calves were collected from veterinary clinic at Surgery Department, Faculty of Veterinary Medicine, Alexandria University and from private clinics of Veterinary Medicine in Kafr El-Sheikh governorate. These 5

cases included 1 female and 4 male calves.

The animals were prepared routinely for aseptic surgery after a preoperative fasting for 24 hours. The calves were physically controlled in dorsal recumbancy and Xylazine hydrochloride (Xylaject, Adwia - Egypt) was used as sedative in dose of 0.1mg/kg body weight intra muscular. Local infiltration anesthesia using 7-10 ml of 2% Lidocaine hydrochloride (Hospira, INC, USA.) was infiltrated subcutaneously around the swelling in ring block.

An elliptical skin incision (in case of female calf) was made over the external hernial sac and V-shape incision (in case of male calves) was made. The internal hernial sac was bluntly dissected and freed down to the hernial ring (Fig., 4). After reduction of the hernial contents, the hernial ring was repaired with polypropylene mesh (Fig., 3) (PMS 3, 6 cm X 11 cm Johnson-Johnson gntl) using mattress suture pattern. The mesh extended 1.5 - 3 cm beyond the margins of the defect and is anchored subcutaneously to strong supportive structures with interrupted sutures (Fig., 5). Fixing of the prosthetic mesh in musculature was realized using No. 3 polypropylene sutures in simple interrupted patterns, in "U" upright according to the method described by Bellas (1987). Application of sutures was made under fingers protection, avoiding puncture of the bowel. The subcutaneous tissue was mobilized and sutured above the mesh, using No. 2 Vicryl (Braided coated Glycolide Homopolymer violet- UNIMED, K.S.A.) according to Elce et al. (2005). The skin was closed by interrupted patterns using surgical silk No. 2 (Fig., 6 & 7) (Pearsalls Limited, England). The surgical site was sprayed with allamycin spray (oxytetracycline, Norbrook Laboratoies (GB) Limited).

Postoperative care consisted of administration of flunixin meglumine as a nonsteroidal anti inflammatory (Finidyne

- Arabcomed) as 1.1 mg/kg body weight given IM in addition to streptopenicilline (Pen and Strep, Norbrook) as 1mg / 25kg body weight given IM.
- Daily dressing of suture line with 5% povidone iodine (BECTOSEPT Solution: Ranbaxy Laboratories Limited, 11th Floor, Devika Tower, 6 Nehru Palace, New Delhi, India). Feed concentrates were offered in normal quantities, but the roughage was restricted for first week and then gradually placed on the normal diet. The skin sutures were removed 10th to 15th days postoperative depending upon the wound condition. To evaluate the long-term results these calves were observed for six months. The owners were asked about status of the repair, patient's condition and complications.

3- RESULTS and DISCUSSION

Examination of the cases in this study revealed that both cases No. 1 and 3 were congenital umbilical hernias while cases No. 2, 4 and 5 were acquired umbilical hernias where the abdominal wall defects had a traumatic origin.

The age of the examined calves ranged from 3-9 months. All cases were reducible

hernias without adhesions or systemic reactions.

Male calves showed more incidence than female calves; 4 male versus 1 female calf (Table, 1).

Size of the hernial ring varied between 4 and 9 cm (diameter). There was correlation between age and size; the largest size was encountered in oldest calf (9cm diameter in 9 months old calf) (Table, 1).

Fixing of the polypropylene mesh outside the abdominal wall defect, using interrupted mattress sutures was easier and proved effective in closing the ring.

Minor post surgical complications were observed after 2-3 days in 2 cases in form of inflammatory swelling in navel region. They were completely subsided within 2 weeks with the usage of antibiotics and non-steroidal anti inflammatory.

Healing was achieved in good condition.

All treated calves recovered without major complications or recurrence.

Table (1): Number, age, sex and size of hernial rings in calves.

Case No.	Age (Month)	Sex	Ring diameter (Cm)
1	3	Female	5
2	6	Male	6
3	3	Male	9
4	5	Male	4
5	7	Male	8



Fig. (1): Umbilical hernia in female calf.



Fig. (2): Umbilical hernia in male calf.



Fig. (3): Polypropylene non absorbable mesh.



Fig. (4): 9 cm hernial ring in male calf.



Fig. (5): polypropylene mesh sutured over the muscular layer and peritoneum along the hernial ring circumference.

A tension free mesh technique has drastically reduced recurrence rates for all hernias compared to tissue repairs and has made it possible to reconstruct large ventral defects that were previously irreparable. During this study, the umbilical hernias were

recorded in both sexes of calves; however, a higher incidence was noticed

in males than females. This comes in agreement with Herrmann et al. (2000), while disagrees with Müller et al. (1988). Although, hernial wound in male calves were complicated by presence of the proximity of the penis in the field of hernial wound which made it harder to maintain the postoperative bandage than in female calves. In addition to continuous moistening

by urine which hinders wound healing, no cases of recurrence were recorded.

In this study, the congenital hernias usually discovered early in life but due to the owner's culture and the fear from surgical complications, they are usually met with delayed to the age of 9 months as in case No. 3.

Placement of the polypropylene mesh outside of the abdominal wall in subcutaneous position was preferable. The fixation was easier and there was no complications similar to the findings of Van der Velden and Klein (1994) for placing the polypropylene mesh outside of abdominal wall defect because the mesh being placed superficially. This fixation ensured preventing the most important complications induced by the contact of prosthetic meshes of polypropylene and abdominal bowels, formation of adhesions and fistulas (Matthews et al., 2003). Although the technique used by Elce et al. (2005) is classic, with doubled sheet of mesh placed, this study allowed good results using a single sheet placed outside of the hernial ring. It was therefore, of economic importance.

Because an "ideal mesh" is not available yet, the foreign body induced some minor local complications in form of local inflammation observed at the surgical site after few hours from surgical interference. That may be due to the effect of local venous or arterial compromise. They disappeared after one week with the usage of antibiotics and non-steroidal anti-inflammatory. Although, Freeman (2005) and White (1996) reported that not all abdominal wall defects require surgical repair and require conservative treatment using compressive elastic abdominal bandages and restricted activity until fibrous tissue bridges the defect, all cases in this study necessitated the hernioplasty by polypropylene mesh that represented a safely procedure in large hernial ring and avoiding over-stretching on edges of the wound ensuring good wound healing.

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