

CHAPTER – I

INTRODUCTION

Hernia is a protrusion of the content of a body cavity through an aperture of the body wall. It is a common defect in calves. Umbilical hernia is a defect in the abdominal wall that results in a round swelling at the point where the umbilical cord enters the body. Due to improper closure of the umbilicus opening at birth or from mal-development or hypoplasia of the abdominal muscles (Singh et al., 1989) a defect may remain in the mid ventral line to form a congenital hernial ring. The umbilicus is the remnant of the fetal-maternal connection. At birth, this structure consist of the paired umbilical arteries, a single umbilical vein, and the urachus. Prior to birth, the umbilical vein serves as the source of oxygenated blood to the fetus via the liver and the ductus venosus / portal vein. The paired umbilical arteries are branches of the internal iliac artery and carry waste materials and unoxygenated blood to the placenta. The urachus is the connection from the fetal bladder to the allantoic sac. Following a normal delivery, the smooth muscle that surrounds the umbilicus contracts in response to the stretching of the cord at parturition. Separation of the umbilical cord allows the umbilical arteries and urachus to retract into the abdomen, where they close by smooth muscle contraction (Rings., 1995). A number of problematic variations in the umbilical structures can occur, most commonly umbilical hernias, umbilical abscesses, and urachal fistulas (Baird et al., 1993). The most common congenital defects in cattle are umbilical hernias, which are seen in all breeds and have been reported to be related to heritable factors or in association with inflammation of the umbilicus. Shortened gestation and multiple births periods are two important risk factors for congenital umbilical hernia in calves (Herrmann et al., 2001). Umbilical infections may associated with risk of an umbilical hernia in calves during the first 2 months of life (Steenholdt and Hernandez., 2004). Congenital defect of the domestic animals causes economic loss of farmers.

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). There are several methods of the treatment of hernia, these are ligation of the hernia sac (herniorraphy), use of clamp, suturing of hernial sac and radical operation. Herniorraphy is the common method of hernia treatment in veterinary field (O’Cornnor., 1980). The first use of prosthetic mesh for ventral hernial repair in human was in the 1960s, when (Usher., 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, 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, 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).

Objective: The present study was aimed to evaluate the suitability of using polypropylene mesh for the correction of large sized umbilical hernia of calves in Bangladesh.

CHAPTER – II

MATERIALS & METHODS

2.1. Study animal:

The present study was carried out on a four month old female indigenous calf affected with umbilical hernia presenting to the SAQ Teaching Veterinary Hospital (SAQTVH), Chittagong Veterinary and Animal Sciences University (CVASU).

2.2 Diagnosis of hernia:

A tentative diagnosis was made from the history and by palpation of the umbilical region. Diagnosis of the case, however, was confirmed by palpation of the naval swelling and demonstration of intestinal contents by needle puncture which was differentiated with abscess and cyst. Detection of hernial ring with the index finger also aided diagnosis. Reducibility of the hernial contents was detected by pushing the contents back to the abdominal cavity.

2.3 Measurement of hernial swelling:

The diameter and width of the umbilical swelling was measured in cm with a measuring scale. The diameter and width were 13cm and 9cm respectively.

2.4 Surgical techniques:

2.4.1 Patient preparation:

Withdrawal of food was done for 12 hours prior to the operation. The operation site was clipped, shaved before taking the animal to the operation theater. The animal was placed on the operation table in dorsal recumbency and was restrained physically by the assistants and draped using sterile surgical towel. The site was finally painted with povidon iodine and 70% alcohol.

2.4.2 Anesthesia:

Sedation of the patient was performed with Diazepam (Sedil 2%; Square Pharmaceuticals, Bangladesh) at a dose rate of 0.4 mg/kg, intravenously. Ring block anesthesia was done around the swollen area of umbilical region using 2% lidocaine hydrochloride as the dose rate 1 ml/cm area.

2.4.3. Surgical correction:

The animal was positioned dorso-ventrally and stabilized with an intravenous catheter glucose saline was inserted into the left jugular vein. A linear incision was made over the dorsal aspect of the hernial sac and then abdominal content was separated from overlying muscles and fascia and mild adhesion of abdominal content was excluded by blunt dissections. The herniated viscera were repositioned in the abdominal cavity by manual taxis. After reducing abdominal content, a non-absorbable polypropylene mesh was used because of large dimension of the umbilical hernia. The hernioplasty was performed through the use of a polypropylene mesh with margins interposed between the parietal peritoneum and the muscle-fascial layer. The mesh was folded into 2 layers and sutured to the hernial ring edges, 5 mm along the hernial circumference. The suture was performed using a catgut (size 1-0). Excess part of the sac was removed and the muscles and subcutaneous tissue were routinely sutured with catgut (size 2-0). During

subcutaneous suturing, proper care was taken to avoid the formation of dead space and the skin was apositioned with horizontal mattress suture using silk.

2.4.4. Postoperative management:

The course of antibiotic, antihistaminic and Non-Steroid Anti-Inflammatory Drug (NSAID) was given for 5 days. The skin stitches were removed on 18 days after operation. The animals were kept under supervision for a month to observe and a simple complication was observed that was formation of pus which was dressing with povidon iodine. That animal was treated postoperatively with penicillin-streptomycin at the rate of 30,000 IU/kg for the penicillin and 10 mg/kg streptomycin, Pheniramine maleate at the rate of 0.5-1mg/kg body weight and NSAID like ketoprofen at the rate of 33.3mg/kg body weight for 5 days.

Gallery

Surgical procedure



Fig 1: Saving of operation area



Fig 2: Stabilizing the calf for operation



Fig 3: Ring block by local anesthesia



Fig 4: Large hernial ring found

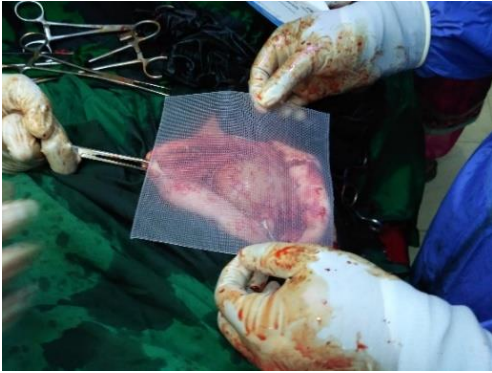


Fig 5: Setting of polypropylene mesh

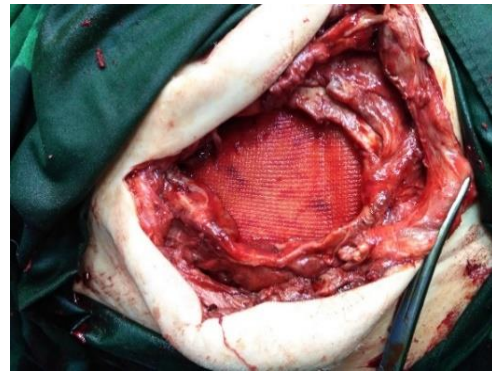


Fig 6: After suturing of mesh



Fig 7: After skin suture



Fig 8: After complete healing

CHAPTER – III

RESULTS AND DISCUSSION

In this case study, the umbilical hernia is corrected by surgery with synthetic polypropylene mesh. After reducing abdominal contents, a non-absorbable polypropylene mesh was used for large (9 cm) dimension of umbilical hernia ring. The hernioplasty was performed through the use of a polypropylene mesh with margins interposed between the parietal peritoneum and the muscle-fascial layer. 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. The polypropylene mesh application was easy to perform which is mostly applied specially for large (13cm) umbilical hernial ring. The mesh never lost stability, nor was there the presence of infection or abscesses. The use of absorbable suture materials provided no complications, and reducing the absorbable suture holding seemed unremarkable for the strong fibroblastic capacity of the polypropylene mesh. The umbilical hernia was successfully reduced without any major postoperative complication observed between 7th days to 3 months postoperatively. The umbilical swelling was completely subsided with the usages of antibiotics, antihistaminic, non-steroidal anti-inflammatory drugs. A telephone survey carried out up to 90 days postoperatively indicated that the calf was good healthy with normal appetite and performing well. Healing was achieved in good condition.

The use of polypropylene mesh were less complication in female calves than male calves because of the proximity of the penis of male calves to the umbilicus which made the bandage moisten which delayed in healing (Sutradhar et al., 2009). Ventral hernia is common surgical problems in large animals and it may occur due to midline or paramedian incision or wherever the abdominal wall is severely traumatized (Wintzer., 1962, Tirgari., 1980, Kawcak and Stashak., 19965). Generally, the prognosis of ventral hernia repair with a tension-free mesh implantation is associated with a fair

to good prognosis even for defects up to 30 × 20 cm (Tulleners and Fretz., 1983, Elce et al., 2005, Bemard et al., 2007, Whitfield-Cargile et al., 2011). Complication occurred in four calves one week later with swelling, myiasis and stitch abscess at the site of operation and other complications included abscess, inflammatory swelling, accumulation of serous fluid, secondary bacterial infection were found in the study of (Salim et al., 2015). The study of (Haile et al., 2017) in and around Gondar Town, North Gondar, North West Ethiopia found that one calf showed abscess and another calf developed seroma around the incision site. Complications in and around the operation site occurs due to improper handling of owners their calves after surgery and contamination of surgical wound by pathogenic organism from the surrounding environment, this is in accordance with (Rebhun., 1995), who opined that the various conditions originating from contamination of surgical wound are localized abscess, seroma formation, wound dehiscence, peritonitis which have to be managed accordingly. Polypropylene mesh is one of the most commonly used prosthetic materials for large ventral hernia repair in large animals (Tulleners and Fretz., 1983, Finan et al., 2009).

In our case this procedure was safe, cost effective and was not associated with any complications. Therefore, this method may be a viable alternative to other methods of mesh hernia repair.

CHAPTER – IV

CONCLUSION

Umbilical hernia was treated successfully with hernioplasty (by using polypropylene mesh) in a calf. Prompt surgical intervention is the only treatment of choice for correction of this defect to prolong the life of the patient. Delayed response and ineffective treatment may lead to serious complications which may ultimately lead to death of the animal. In these clinical cases, the polypropylene mesh has improved the effectiveness of hernioplasty and postoperative monitoring. From the results of this study, it was concluded that, for mesh hernioplasty, implantation of the mesh on the inside of the hernial ring is a simple and very suitable technique. It was believed that this material is the most suitable for the treatment of large abdominal wall defects.

CHAPTER-V

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Brief biography of the author

I'm **S. M. Abdus Salam**, an intern student at Chittagong Veterinary and Animal Sciences University (CVASU), originate from Pabna, Rajshahi. After completing one year intern period, I will receive my Doctor of Veterinary Medicine (DVM) degree with lots of real life experiences. As an intern student I've received clinical training from Madras Veterinary College and Veterinary College & Research Institute, Namakkal, Tamilnadu, India. I've a great enthusiasm in research and have done some clinical research works. I've published one scientific paper in **Journal of Veterinary Science & Technology** titled by "Comparative Study on Newcastle Disease and Infectious Bursal Disease in Chicken Submitted to Upazilla Veterinary Hospital, Bogra Sadar, Bangladesh". I have more interest on pathology, microbiology, medicine, surgery, theriogenology and epidemiological field area.

