



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; SP-10(7): 929-932  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 12-05-2021  
Accepted: 19-06-2021

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## Surgical management of umbilical hernia in a buffalo bull calf: A case report

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### Abstract

An organ or tissue protrudes through an opening in the body wall, causing a hernia. A tear in the abdomen wall or diaphragm may cause the aperture, or it may be a natural opening such as the inguinal canal or femoral canal. The protruded tissue is covered by the skin, unlike in a prolapse. A typical hernia has a hernial ring and a hernial sac through which the contents have migrated. The neck, body, and fundus make up the hernial sac, which encloses the hernial contents. A 3-month-old cross-bred buffalo bull calf was brought with a history of swelling in the umbilical region. Upon physical examination, the condition was diagnosed as umbilical hernia. The umbilical hernia was reduced and corrected by performing herniorrhaphy. The animal had an uneventful recovery.

**Keywords:** Hernia, buffalo bull, umbilical, herniorrhaphy

### Introduction

An organ or tissue protrudes through an opening, which can be created by a tear in the abdominal wall or diaphragm, or it might be a natural hole such as the inguinal or femoral canal. A typical hernia has a hernial ring and a hernial sac through which the contents have migrated. The neck, body, and fundus make up the hernial sac, which encloses the hernial contents. The hernial contents are frequently made up of portions of visceral organs such as the intestines, omentum, liver, spleen, urinary bladder and uterus (Angus and Young, 1972; Venugopalan, 2000) [1, 13]. Umbilical hernia is common in calves but uncommon in lambs and children. Females are more likely than males to develop the illness. With a 4-15 percent prevalence, it is one of the most common surgical pathologies in crossbred calves. Congenital or acquired umbilical hernias are also possible. A few weeks after delivery, an acquired hernia is discovered. Umbilical hernia can be caused by inherited causes such as low-penetrance dominant genes, autosomal recessive genes, or environmental factors (Brem *et al.*, 1985) [2]. In herniation, changes in the function of both the body cavity and the herniated contents might be significant. These alterations may appear small, but they can have profound pathophysiological effects, leading to acute severe sickness and, in extreme cases, death. These alterations may appear small, but they can have profound pathophysiological repercussions that can result in acute severe sickness and, in some cases, animal death (Hayes, 1974) [4]. The Urachus and Umbilical blood vessels can pass through the umbilical hole in the foetus. These structures are disrupted or severed at the time of birth, and the umbilical hole closes around the cord. The wound heals through cicatrization and later on represents the umbilicus. A defect may remain in the mid ventral line due to inappropriate closure due to developmental abnormalities and/or hypoplasia of abdominal muscles, resulting in a congenital hernial ring. Manual breaking or sectioning of the cord excessively close to the abdominal wall, as well as excessive straining from diarrhoea, constipation, and other causes, hinder the umbilical aperture from closing properly, which can lead to umbilical hernia (Knecht *et al.*, 1987) [5]. Umbilical hernia can be treated in a variety of ways, both conservative and surgical. Only minor reducible hernias are suitable for conservative therapies. The hernial ring can be closed using conservative treatments such as belly bandages/ abdominal bandages, injections, or the application of irritants around the hernial ring. When the hernia is big and unreducible, radical surgery is required (Kumar and Amresh, 1996) [6].

### 2. Materials and Methods

A cross-bred buffalo bull calf aged 3 months (Figure 1) was presented with a swelling on the

umbilical region (Figure 2), which was said to have been present since birth. The animal was active and alert. Feed and water intake, plus urination and defaecation was normal. No other abnormalities could be detected. Upon clinical examination, temperature was found to be 100.4<sup>o</sup>F, mucus membrane was brick red, respiration rate was 20 per minute and lymph nodes were palpable. Upon physical examination, Animal was quite active and alert. On examination of the swelling, soft elastic fluctuating mass and the hernia ring could be easily felt. The hernia contents were reducible and inflammatory signs were not detected. The condition was therefore diagnosed to be umbilical hernia and the surgical correction via herniorrhaphy using nylon was advised. The animal was fasted for 24 hours prior to the surgery. The animal was analgesed using Xylazine @ 0.1 mg/kg body weight as i/m. Pre-operative anaesthesia was given as Meloxicam @ 0.4 mg/kg body weight as i/m, Cefotriaxone @ 10 mg/kg body weight as i/m, multi-vitamin injection @ 3ml as i/m and Ringer Lactate as i/v. The patient was placed on

lateral recumbency & ventral abdomen was prepared for aseptic surgery. Mid ventral site was selected.



**Fig 1:** Animal brought for surgery



**Fig 2:** Herniated Mass

### Surgical Technique

Since the animal was male, the prepuce, preputial diverticulum, and penis was reflected to one side. After aseptic preparation of the surgical site, xylazine hydrochloride @ 0.1mg/kg body weight as i/m and 2% lignocaine was infiltrated locally at operative site. After proper analgesia, an elliptical incision was made exactly on the swelling avoiding blood vessels and umbilicus. By blunt dissection muscles and peritoneum were separated. Intestines were found as hernia contents. There were no adhesions and contents were replaced into the abdominal cavity. Washed the abdominal cavity with Metrogyl and Normal Saline. The hernial ring edges were freshened and was closed by far near far and horizontal mattress suture pattern using prolene size 1-0. Excess skin was resected till the neck of the sac is in an

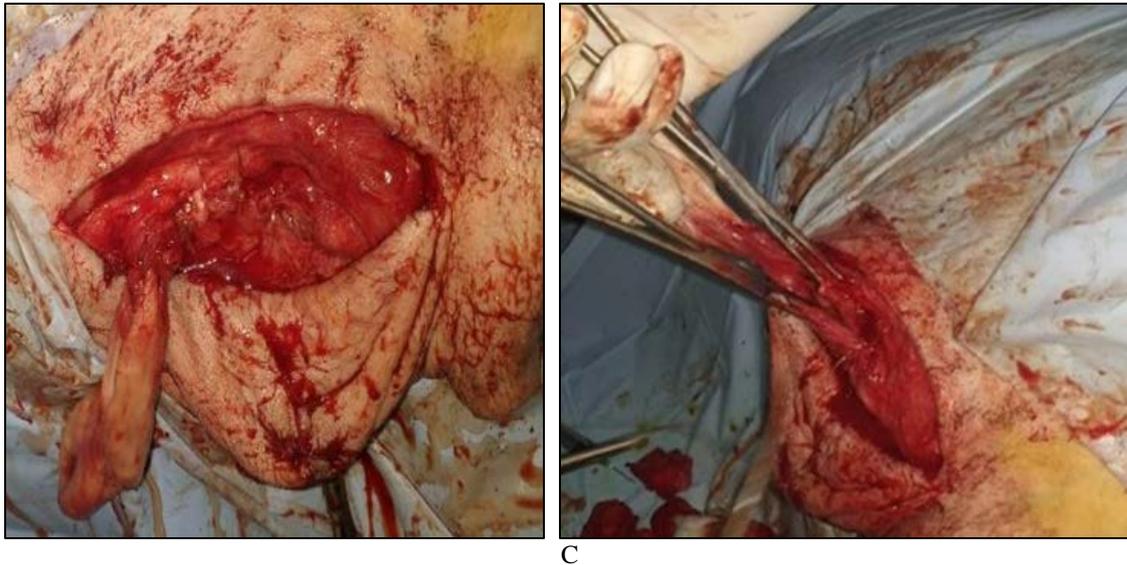
elliptical fashion. Subcutaneous tissue was opposed using PGA size 1-0 in subcutaneous suture pattern. Skin was closed with monofilament nylon in horizontal mattress pattern. A gauze stent was fixed over the suture line and applied Tincture Benzoin. A course of antibiotic (Ceftrizone as i/v), NSAID (Meloxicam 5ml as i/m) and multi-vitamin injection (Tribivet 4ml as i/m) were administered for a period of 3 days. Daily dressing of the wound was done using Betadine ointment. The owner was advised to feed only soft and fluidy diet for over 1 week and had to be kept as quiet as possible for two weeks until recovery. An abdominal bandage was advised to be put over the abdomen for few days to hasten the healing process, by reducing the pressure on the ventral aspect of the abdomen. The images with regard to conduct of surgery were shown as Figure 3.



**A**



**B**



**Fig 3:** (A) Exposing hernial sac (B) Hernial content + incised sac (C) Suturing of ring using prolene 1-0

### 3. Results and Discussion

Following herniorrhaphy, the bull calf showed an uneventful recovery. The animal was well managed by the owner. The skin sutures were removed on the 10<sup>th</sup> day.

An organ or tissue protrudes through an opening in the body wall, causing a hernia. A tear in the abdomen wall or diaphragm may cause the aperture, or it may be a natural opening such as the inguinal canal or femoral canal (Hayes, 1974) [4]. The protruded tissue is covered by the skin, unlike in a prolapse. A typical hernia has a hernial ring and a hernial sac through which the contents have migrated. The hernial sac is made up of the neck, body, and fundus, and it encloses the hernia contents. The neck refers to the area of the hernia sac closest to the hernia ring, the fundus to the lower portion, and the body to the area between the fundus and the neck (Kumar and Amresh, 1996) [6]. The parietal peritoneum creates the hernia sac.

### Etiology

Predisposing factors include incomplete closure of an embryonic defect or abdominal wall weakness due to contusion, local inflammation, and other factors. Increased intra-abdominal pressure from constipation, diarrhoea, violent coughing, gastric/intestinal tympany, during parturition, or direct violence from falling on a blunt object are all exciting causes (Williams, 2012) [14]. Umbilical, inguinal, and scrotal hernias all affect the abdominal wall. Umbilical hernias occur when the umbilical ring fails to close properly, allowing abdominal contents to protrude into the underlying subcutis (Fubini and Ducharme, 2004) [3]. The degree of the umbilical defect and the amount of abdominal contents enclosed within it determine the size. In both large and small animals, the aetiology is believed to be genetic; however, alternative reasons include excessive traction on an enormous foetus or cutting the umbilical cord too close to the abdominal wall. The diagnosis is usually simple, especially if the hernia can be reduced easily. The hernia must be distinguished from an umbilical abscess, which is prevalent in large animals, if it is irreducible (Samad *et al.*, 2002) [9]. In cattle and swine, umbilical hernia and umbilical abscess are frequently observed simultaneously. For confirmation, an exploratory puncture, such as a fine-needle biopsy with cytopathology, may be required. Correction is a surgical procedure. If the

hernia is modest in small animals, surgical repair is frequently done at the same time as sterilising operations. Applying a large adhesive bandage (10 cm width) on calves for 3–4 weeks has shown some success. Manual breaking or sectioning of the cord excessively close to the abdominal wall, as well as excessive straining from diarrhoea, constipation, and other causes, hinder the umbilical aperture from closing properly, which can lead to umbilical hernia (Rahman *et al.*, 2011) [8]. Umbilical hernia can be treated in a variety of ways, both conservative and surgical. Only minor reducible hernias are suitable for conservative therapies. The hernial ring can be closed using conservative treatments such as belly bandages/ abdominal bandages, injections, or the application of irritants around the hernial ring. When the hernia is big and unreducible, radical surgery is required.

### Correction of umbilical hernia

**Reduction and retention by bandage:** The hernia is reduced by local manipulation and bandage is applied around the abdomen to prevent its return. An ‘elastoplast’ bandage is better to avoid interference with breathing. The bandage is retained for two to three weeks.

**Application of blisters or injection of irritant solutions:** This procedure done close to the hernial ring after reducing the hernia causes inflammatory swelling which is sometimes sufficient to prevent recurrence of small hernia and to facilitate closure of the hernial orifice.

**Ligature or hernial clamp:** a hernial clamp or through-and-through mattress sutures may be applied at the base of the hernial sac after reducing the hernia to facilitate the sloughing off of the sac and simultaneous closure of the hernial ring.

**Radical operation for hernia:** Incisions are made in the hernial sac in an elliptical or linear pattern (If the peritoneal sac is present it is separated from the neck by blunt dissection and incise through peritoneum). The hernial ring is used to restore the contents of the hernia (Venugopalan, 2000) [13]. The hernial sac's neck is ligatured, and the stump is forced through the hernial ring. The hernial ring's boundaries are then freshened, sutured together, and closed (Sharma, 2003) [10]. Herniorrhaphy is the suturing of the hernial ring. Suturing is made easier by removing a triangular portion of tissue from either end and transforming it to an elliptical shape if the hernial ring is circular. When closing the hernial opening,

'double breasting' is sometimes favoured. This is accomplished by suturing the superficial and deep muscle sheaths of the Rectus abdominis muscle in such a way that the muscular bellies of both sides slightly overlap at this point. Overlapping sutures are another way to repair the hernial ring. It is impossible to suture the borders of a hernial ring if it is too large. In such circumstances, hernioplasty is performed by suturing fascia lata or stainless-steel wire mesh to the margins and closing the space with it (Sutradhar *et al.*, 2009) [12]. After suturing the skin margins and eliminating any extra skin, the hernial ring is closed.

#### Herniorrhaphy

▪ In the present case, the animal had a large umbilical hernia which was simple in nature. The hernial ring was large and rounded. The intestinal contents were protruding into the hernial sac. Herniorrhaphy could be performed easily as the contents were not strangulated or incarcerated. Local, epidural or general anaesthesia may be used and the animal could be placed in lateral or dorsal recumbency. As it was difficult in reducing the contents back into the abdomen when placed in the lateral recumbency and also due to the ruminal gas distension, animal was restrained in the dorsal recumbency. The animal was approached ventrally and a long incision was made longitudinally on the hernia. Thus, incision had to be placed over the hernia longitudinally. After placing the incision, the contents of the hernia was pushed back into the abdomen. The ring was then differentiated and it was freshened using the scalpel blade. The edges were then sutured using size 1-0 prolene by overlapping vertical mattress sutures (Rahman *et al.* 2001) [8] and far near far sutures. Excess skin was then resected close to the body. Size 1-0 Relyon PGA was used to put subcutaneous sutures to avoid dead space. Skin was then closed using Nylon. A tincture benzoin pad of cotton was applied over the suture line. Intensive post-operative care along with antibiotic therapy was employed. On the 10<sup>th</sup> post-operative day, stitches were removed and uneventful recovery was noticed. Sushanta (2007) [11] and Sutradhar *et al.* (2009) [12] suggested closed herniorrhaphy to be better than the commonly used open method for the correction of reducible umbilical hernia in calves. They also suggested that incidence of umbilical hernia is more on case of female calves than the male calves.

#### 4, Conclusion

In this present case, the animal had a large umbilical hernia which was simple in nature. The hernial ring was large and rounded. The intestinal contents were protruding into the hernial sac. The umbilical hernia was reduced and corrected by performing herniorrhaphy. Herniorrhaphy could be performed easily as the contents were not strangulated or incarcerated. The animal had an uneventful recovery.

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