

Types Of Hernia And Surgical Management Approaches In Domestic Animals: Review

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Abstract: Hernia is bulging of abdominal contents in abdominal wall caused by naturally through canal (congenital) or traumatic (acquired). Hernias have several deleterious effects, such as lowering the productivity and re-productivity of the affected animals where, abdominal, inguinal and perineal hernias could entrap a fetus in their hernial sacs leading to dystocia in domestic animals. Therefore, the aim of this paper is to review on the different types of hernia and its surgical management in domestic animals. Hernia is classified as internal and external hernia. External hernia is a displacement of an organ, part of an organ, or a tissue outside the abdominal cavity through an abnormal opening in the abdominal wall which can be noted from the outside of animal's body and can be detected with external examination. It is the most common form of problems of domestic animals which can be umbilical, inguinal, scrotal, femoral, perineal, and ventral (or abdominal) hernias based on anatomic location. Umbilical hernia is usually occurs in calves due to failure to closed of the umbilical cord, while ventral hernia are usually present in cattle and horses because of trauma and heavy weight. It can causes decreases in reproductive performance, production loss and even leads to the death of animal depending on the types of hernias. External hernia was easy to diagnose by case history, inspection and palpation where it can be overcome by both surgical and non-surgical approaches to correct different types of hernias occurring in domestic animals. Moreover it can be prevented to a large extent by modifying the prevailing management practices. However, still information on the associated risk factors and its prevalence is not well studied. Therefore further studies are needed to identify the associated risk factors and farmers should be aware of the diseases and improve prevention approaches through implementing better management practices.

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1. Introduction

Hernia is defined as the protrusion of an organ or tissue through artificial or natural opening (Mcardle, 1997). This may be from accidental or normal anatomical opening, which does not completely fulfill its physiological function and the majority of hernia involves the protrusion of the abdominal contents through the part of the abdominal wall, diaphragm, or perineum, although herniations can occur elsewhere in the body (Sutradhar *et al.*, 2009).

A typical hernia always consist of the "hernia ring" or an opening in the muscle which may have been brought about as a result of an accident, or may have been present at birth; a swelling appearing below the skin "hernia sac", and the "hernia content" (Pollicino *et al.*, 2007). Depending on the anatomical site of herniation parts hernia classified as ventral or lateral abdominal hernia, diaphragmatic, inguinal, scrotal, umbilical, perineal and femoral hernia (Rahman *et al.*, 2001). Hernia causes may by congenital or acquired (Sabev and Kanakov, 2009). The type of the herniated tissue as enterocel containing portion of intestine, epiploce or

omentocele of omentum, enteroepiplocele of intestine and omentum, Gastrocele of stomach, vesicocele (of bladder), hepatocele of liver, hysterocele of uterus and it may be, external or internal hernia (Kilich, 2014).

External hernia is the most common form of diseases occur in domestic animals which is characterized by a displacement of an organ, part of an organ, or a tissue outside the abdominal cavity through an abnormal opening in the abdominal wall which can be noted from the outside of animal's body and can be detected with external examination (Das *et al.*, 2012).

Risk factors significantly associated with prevalence of hernia are: hereditary, environmental and/ or animal handling factors are the factors that enhance the occurrence of the problems (Bates and Straw, 2008).

Hernias have several deleterious effects, such as lowering the productivity and re-productivity of the affected animals. It can enlarge over time and if not repaired surgically, it may cause pain, anorexia, weight loss, or dystocia when a gravid horn is found in the hernial sac. For instance, abdominal, inguinal

and perineal hernias could entrap a foetus or foetuses in their hernial sacs leading to dystocia (Muggli *et al.*, 2014; Ruhil *et al.*, 2018). Therefore, the objectives of this review paper are:

- ✓ To review different types of hernia in domestic animals
- ✓ To review on non-surgical and surgical approaches for the treatment herniated domestic animal
- ✓ To provide information on prevention of hernia in domestic animals

2. Literature Review

Hernia is a protrusion of abdominal content/viscera, omentum, or abdominal organs through a natural or artificial opening in the abdominal wall to form a swelling covered by skin, subcutaneous tissue and peritoneum (Bayl *et al.*, 2017). This possibly will occur by accident or due to normal anatomical opening, which does not completely fulfill its functional (Planellas *et al.*, 2012). The common risk factor for developing hernia is sex, age difference and animal management system. Hernias of the abdominal wall are common in all domestic species and include umbilical hernias and inguinal or scrotal hernias (Niebauer *et al.*, 2005). Hernias may be direct (through a rent in the body wall) or indirect (through an already existing ring, such as the inguinal ring or umbilical ring) (Meylan, 2008).

2.1. Anatomy of Hernia

Hernial Ring: it's a rupture in muscles of the abdominal wall such as ventral hernia or widening of natural orifices of the umbilicus, or may be a natural passageway the inguinal canal (Petritz *et al.*, 2012). The ring is the actual defect in the limiting wall, and it may be a small as a few millimeters or up to several centimeters and spontaneous attempts at healing may be lead to thickening of the edge of the ring through the collagen maturation (Rings, 1995). As the sac, contracts the contents may become strangulated (Yasin, 2017).

Hernial Sac is a fold of skin surrounding contents of hernia with muscle fibers and fibrous tissue where peritoneum may be founded beneath the skin (Shaw *et al.*, 2003). In the cases of abdominal hernia the sac consists of three parts the neck, that part closest to the ring and the bottom a lower part of the sac and the body that is between them and it is composed of skin, subcutaneous tissue and peritoneum (Elkubli *et al.*, 2019).

The hernia sac consists of hernia content which is differ depending on the site may be part of the intestine called Enterocoele or the presence of omentum is called Omentocele (Liptak *et al.*, 2002). In a few cases, content is part of the stomach is called Gastrocele or bladder Vesicocele. In rare cases, the

content is the liver or spleen (Thas and Harcourt, 2013). The hernia either occur when there is a natural weakness in the inguinal canal and femoral or the umbilicus area caused widening in these canal and passing of viscera through it (Kumar *et al.*, 2013).

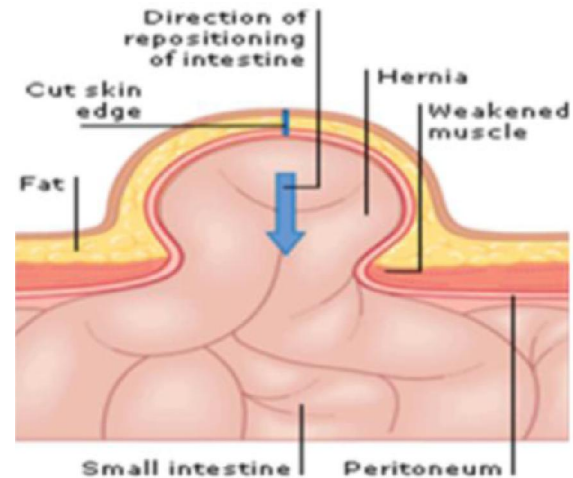


Figure 1: Anatomy of hernia
Source: Farman and Alhousseiny, (2018)

2.2 Types of hernia

There are different types of hernia depending on the nature of the reduction and locations as described below in detail.

2.2.1 According to nature of reduction

Reducible hernia: is the content can be manually or automatically return into the abdominal cavity and the size of the hernia is almost return back to its normal size or with no external protrusions (Wiedner *et al.*, 2008).

Irreducible hernia: is the content that cannot be easily reduced; may be due to the adhesion between the content and peritoneum (Lisciandro, 2013). This may leads to another complication like Incarcerated hernia where the content of hernial sac is too voluminous to pass through small hernia ring (Moll *et al.*, 1999). When incarcerated hernia form adhesion form between the contents and surrounding tissue, and the contents fixed in the abnormal location, the hernia is classified as incarcerated (Sagar *et al.*, 2010).

Further irreducible hernia can cause Strangulation where incarcerated hernia may get strangulated. It is caused when the hernia ring exert pressure on the mesentery and obstructed the blood vessels to the contents. In this type pressure of the contents of the hernia leads to cutting blood supplying and leads to Ischemia in the part of viscera that entering through the hernial ring causing necrosis and Gangrene (Williams *et al.*, 2014).

2.2.2. According to nature of location

Umbilical hernia: The contents usually consist of omentum and small intestine the condition is common in foals, pigs, calves and pups but rare in lambs and kids (Venclauskas *et al.*, 2014). The disease can be congenital or acquired. Congenital umbilical hernias result from closure of the peritoneal ring but an incomplete closure of the body wall around the umbilicus in utero leading to apposition of the peritoneum to fascia and skin (Amle *et al.*, 2004). The acquired umbilical hernia occurs due to resection of the umbilical cord too close to the abdominal wall, excessive straining due to diarrhea and constipation and infection of umbilical cord preventing the natural closure of umbilical orifice (Greber *et al.*, 2013). Umbilical hernias in calves commonly secondary to failure of the normal closure of the umbilical ring, and which result in cutting of the umbilical cord near the body or when animals chewed the umbilical cord or contaminated handling with the umbilical cord during caesarean section, leading to Omphalitis and weaknesses making them convertible to hernia (Anderson, 2004). Umbilical hernias vary in size and may contain only fat or omentum, to more severe cases that contains intestinal loops (Weaver *et al.*, 2005).



Figure 2: Umbilical hernia in calf
Source: Kumar (2013).

Inguinal hernia: is protrusion of an abdominal organ through the inguinal canal (Al-sobayil and Ahmed, 2007). The incidence is common in bitches, horses, bulls and pigs (Merchav *et al.*, 2005). The cause of inguinal hernia is acquired or congenital where congenital inguinal hernias are rare in dogs and often co-exist with the umbilical hernia (Zama *et al.*, 2013). Congenital inguinal hernia develop more often in male dogs than in females, possibly due to delayed narrowing of the inguinal ring as a result of late testicular descent (Grunkemeyer *et al.*, 2010).

Traumatic inguinal hernia may occur as a result of congenital weakness of the musculature or

abnormality of the inguinal ring (Parizi, 2012). It is relatively common in dogs and most often involve the middle aged intact bitches and are mostly due to trauma that weakens the abdominal musculature resulting in abnormality of the inguinal ring (Wilderjans *et al.*, 2012). Obesity increases intra-abdominal pressure, forcing abdominal fat through the inguinal canals and furthermore, accumulation of fat around the round ligament may dilate the vaginal process and inguinal canal leads to the formation of hernia (Smeak, 2003).



Figure 3: Inguinal hernia in dogs
Source: Kumar *et al.* (2017)

Scrotal hernia: The hernia marks as extension of the inguinal hernia when viscera reaching to scrotum through the internal and external inguinal canal may be unilateral or bilateral (Du *et al.*, 2009). In some cases, a common occurrence in male dogs as well as horses and bulls and rarely in sheep and goats (Gilbert *et al.*, 2004). The causes of this type of hernia are genetic or acquired, in most cases scrotal hernia is acquired, usually caused by a trauma such as a horn injury (Tanko *et al.*, 2015).



Figure 4: Goat kid with big scrotal hernia
Source: Tanko *et al.* (2015)

Ventral hernia: Ventral or lateral abdominal hernia is the term used to describe a hernia through any part of the abdominal wall other than a natural orifice (Williams, 2010). This condition is common in horse, goat and cattle and it is generally acquired in nature where it is commonly seen along the costal arch, high or low in the flank between the last few ribs or in the ventral abdominal wall near the midline (Sarker, 2012). In animals ventral hernia occurs mainly due to any trauma such as a kick, blow, horn thrust or falling on blunt objects and rupture of pre pubic tendon (Hanson and Todhunter, 1986; William, Rao and Kumar, 2010). It is also observed in multiparous ruminants in advanced pregnancy with multiple fetus which leads to fragility of abdominal muscles or prepubic tendon (Vijayanand *et al.*, 2009).

In horses, these are usually the result of trauma, associated with facility problems where the animal is maintained and trauma caused by kicks from other animals (Wilson *et al.*, 1995). The prevalence of ventral hernia was higher in bovine and ovine (32.3%) (Parsad, 2019) and in horses, the rate of hernia is as few as 5–10% (Gibson and Brisson, 2005). Ventral hernias are common, classically taught to occur in domestic animals with a prevalence of 2.83% when compared to other types of hernias (Hassen *et al.*, 2017).



Figure 5: Ventral hernia in doe
Source: Preethi *et al.* (2018)

Incisional hernia: Are a major problem following abdominal surgery, which occur when previous abdominal surgery has weakened the abdominal wall or an infection at the surgical site causes a breakdown of the wound closure (Paudel *et al.*, 2017). The skin is sometimes (that covers the hernia) very light and septic wounds after the operation, which is the most dangerous predisposing factor and metabolic disorders such as weight gain and kidney deficit, diabetes, lack of protein or vitamin C and the use of some treatments, such as steroids and

chemotherapy in addition to the increase in intra-abdominal pressure high percentage to causes incisional hernia (Niles and Williams, 1999; Klinge *et al.*, 2005).

Diaphragmatic hernia: Diaphragmatic hernias are not seen very often and it must be assumed that such spontaneous defects are extremely rare (Schuh, 1987). Accidental rupture usually occurs from abdominal crushing due to jumping from height seen in dogs, following blunt trauma or penetrating injuries to the abdomen and chest (Sullivan and Reid, 1990). It is caused by congenital or acquired and occasionally the clinical findings at presentation include lethargy, respiratory difficulties and exercise intolerance (Aref and Abdel-Hakim, 2013). The condition is rare in cattle but is likely to occur with traumatic reticulo peritonitis and although clinical symptoms can be variable, signs of anterior stenosis predominate (Mohindroo *et al.*, 2005).

The clinical signs of Diaphragmatic hernia were dullness, depression, tympany and scanty feces. Reticulum of cattle and buffalo with diaphragmatic hernia was detected at the level of 4th/5th intercostal space by ultrasonography (Kelmer *et al.*, 2008). The reliability of ultrasonography in diagnosis of diaphragmatic hernia was more reliable to detect the relation of reticulum to adjacent thoracic organs then, observe its motility inside the thoracic cavity (Abdelaal, 2005).

Femoral hernia: Drooping part of the intestine throw the passing region of the femoral vein and artery from the abdomen to the femora (Beittenmiller *et al.*, 2009). Diagnosis of this hernia is by making the animal standing on hind limbs and feel the bulging ventrally to Inguinal ligament and laterally to Pelvic brim this is a very rare condition in veterinary practice it is recognized as swelling on the inner aspect of the thigh between the sartorius and gracilis muscle due to the protrusion of abdominal viscera through the femoral canal. The content protrudes between the ligament and Sertorius muscle, lifting the facial covering the Sertorius and gracilis muscle (Noakes, 2009).

The treatment is usually not attempted but radical operation can be done in which skin is incised over the swelling and to facilitate reduction the incision may extend upward. Care is necessary to prevent injury to the femoral vessels (Slatter, 2002). After return of contents into the abdomen re-herniation is prevented by suturing the inguinal ligament to the Sertorius muscle (Maxie, 2007).

Perineal hernia: Is characterized by protrusion of the abdominal or pelvic organs through the ruptured pelvic diaphragm which supports the rectal wall (Spreull and Frankland, 1980). Due to weakened pelvic diaphragm, there is abnormal displacement of

these pelvic organs into the perineal region. Although, exact cause of muscle weakness is unknown but some factors have been proposed, such as neurogenic, congenital predisposition, prostatic disease, chronic constipation, myopathies and hormonal alterations (Henrique *et al.*, 2001). The incidence of perineal hernia is more common in aged intact dogs rarely in females, which may be due to weakness of pelvic diaphragm muscles that lead to the displacement of pelvic and/or abdominal contents such as small intestine, bladder, rectum, prostate and fat caudally to the perineal region (Morello *et al.*, 2015). Herniation usually occurs between the external anal sphincter and the levator ani muscles and occasionally between the levator ani and coccygeus muscle. Approximately 59% of the perineal hernia is unilateral while 41% are bilateral and Perineal hernia rarely reported in buffaloes and cows (Sharma *et al.*, 2018).

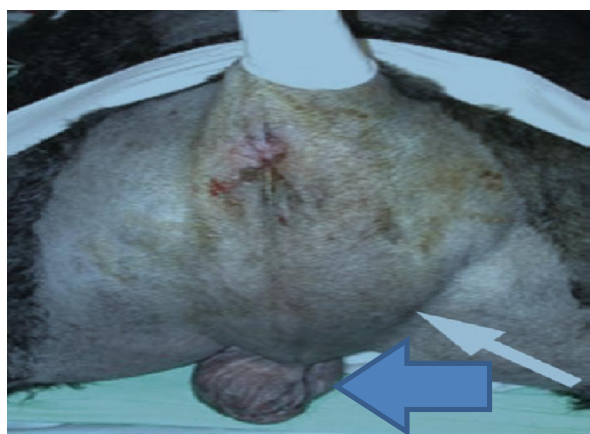


Figure 6: Perineal hernia in male dog
Source: Henrique *et al.* (2001)

2.3 Clinical Signs of Hernia

There are physical symptom and functional symptoms: Physical symptoms include presence of hernial swelling which is the classic sign of herniation and the swelling varies in size and shape (Burns *et al.*, 2013). In uncomplicated hernia no pain is elicited on palpation, and has consistency of the doughy if the content is intestine (Ellison *et al.*, 1987). Inflammation due to trauma or infection can be superimposed on these sign, making palpation difficult (Steenholdt, 2004). The site of a swelling may be some distance from the hernial ring, because of the migration of the contents in the subcutaneous space (Velguth *et al.*, 2009). Functional symptoms are ordinary absent in reducible hernia and may be severe pain, rise of temperature and colic are pronounced in strangulated hernia (Karen, 2010).

In case of umbilical hernia, a discrete spherical swelling is obvious at the umbilicus (Jena and Ahmed,

2015) Inguinal hernia strangulation is not common but may occur rapidly and affected animal shows signs of intestinal obstruction including abdominal pain, and decreases fecal output (Rossignol *et al.*, 2014). The condition must be distinguished from intussusceptions and volvulus of the root of mesentery (Formaggini *et al.*, 2008). The hernia may be contained entirely within inguinal canal without visible scrotal swelling. In ventral or lateral abdominal hernia, the hernial swelling is very prominent (Abdin-Bey and Ramadan, 2001). Systemic symptoms are usually absent, the contents usually omentum or intestines or both and may be reducible or irreducible and strangulation is rare (Venugopalan, 2000).

2.4 Diagnosis of Hernia

A primary diagnosis was made from the history and by palpation of the hernial region (Burns *et al.*, 2013). Diagnosis of the cases, however, was confirmed by exploratory puncture of the swelling and demonstration of intestinal contents (Misk *et al.*, 2016). Either, the reducibility of continent after placed animal in dorsal recumbency and the contents were pushed back into the abdomen (Atkinson *et al.*, 2017). In case of reducible hernia, the contents went back to the abdominal cavity and the hernial ring became evident (Salim, *et al.*, 2015). In diaphragmatic hernia, a lateral and a ventrodorsal radiography of the thorax may help to confirm the diagnosis (Kumar and Saini, 2011). Condition like hydrothorax, aspiration pneumonia, cardiac diseases, and foreign bodies in the esophagus should differentiate from diaphragmatic hernia (Pratschke *et al.*, 1998). Exploratory laparotomy used to diagnosis the defect and X-ray is also used differentiates abdominal wall hernias from fibrino cystic, abscess, and inflammatory swellings in bovine animals (Muggli, *et al.*, 2014).

2.5 Differential diagnosis of hernia

A hernia should be differentiated from abscess, tumor, hematoma and cyst (Ali and El-Hakim, 2012). Abscess, tumor and cyst develop slowly whereas hernia is of sudden occurrence and in developing abscess, there are symptoms of local inflammation and it does not fluctuate under the skin. In hematoma, the collection of blood may feel like free fluid or may give a slight crepitating sound on palpation (Misk *et al.*, 2010). A cyst fluctuates uniformly and has no tendency to point and pain or functional symptoms' are absent (Hodgkis *et al.*, 2015). Exploratory puncture or radiography may also be done for confirmation (Aboulnasr *et al.*, 2016).

2.6. Types of Treatment

2.4.1. Surgical treatment of hernia

Most hernias enlarge over time and, if not repaired surgically, they may cause pain, anorexia, weight loss, or it may cause dystocia when a gravid horn is found in the hernial sac. The only effective

treatment of hernia is surgery to restore integrity of the abdominal wall and prevent incarceration and strangulation of herniated contents (Jahromi *et al.*, 2009).

A. Hernioraphy

A primary repair (Hernioraphy) a surgical repair of simple hernia done with sutures placed in a straight line in the abdomen (Abou *et al.*, 2004). Most hernias are best approached by elliptical incision over the sac or ring (Baird, 2008). Adequate surgical exposure and access to the hernia contents are essential, and the tissue may be friable requiring gentle handling. It may be necessary to enlarge hernia ring (keletomy) to achieve proper access. The hernial ring is closed by overlapping suture or horizontal mattress by approximation of local tissue (Salim *et al.*, 2015).

B. Hernioplasty

A mesh repair (Hernioplasty) surgical repair of large and complex hernia by using networks and may be using a laparoscope (Rahman *et al.*, 2001). Using mesh provides additional support to weakened or damaged tissue (Zinther *et al.*, 2010). The majority of surgical mesh devices currently available for use are constructed from synthetic materials or animal tissue (Hjort *et al.*, 2012). Mesh is used in some complex abdominal wall defects and hernias can be repaired by a primary closure while massive defects, including irreducible hernia, need special attention, since they cannot be treated by simple methods of reduction (Wilderjans *et al.*, 2012).

This type of hernia requires surgical procedures to rectify the defect by the use of biomaterial for the repair of abdominal wall defects has gained an increasing recognition in achieving a tension-free repair, resulting in a significant reduction of postoperative pain, shortening the recovery period, and the frequency of recurrence (Bellows *et al.*, 2006). The mesh is placed beneath the muscle, bigger than the hernial opening. The body will create tissue that will adhere to the mesh, combining the mesh with the abdominal wall (Scheidbach *et al.*, 2004). This new growth tissue keeps the mesh in place (Klosterhalfen, 2012).

Types of mesh

Synthetic Mesh: which is made of nylon may be used for the repair of large abdominal hernias with adequate strength in adult bovines as an economic alternative to the costly prosthetic (Kiranjeet *et al.*, 2012). The synthetic materials are divided into non-absorbable and absorbable mesh. Non-absorbable synthetic mesh is one of the most widely used prosthetic material for reconstruction of abdominal wall hernias (Zinther *et al.*, 2010). This material allows for a tension free repair, which significantly reduces the hernia recurrence rate compared with primary suture repair. Synthetic mesh like sterilized

nylon mosquito net is less traumatic uses as hernia repair and has started to gain popularity because they induce less tissue damage and less postoperative pain (Burger *et al.*, 2004). The absorbable mesh includes fewer materials, namely, polyglycolic acid, polyglactin, and Bulgarian antimicrobial polyamide. The less traumatic use of surgical adhesives rather than sutures for mesh fixation in hernia repair has started to gain popularity because they induce less tissue damage and less postoperative pain (Pascual *et al.*, 2017).

Biologic Mesh: Is derived from the hard skin of human cadavers and from porcine (pig) or bovine (cow) sources. The advantage of biologic meshes is that they are more resistant to infection and they promote tissue growth for healing and closing the hernia defect (Scheidbach *et al.*, 2004). Bovine fetal collagen was found to effectively support component repairs and undergo an assimilation process including rapid revascularization and repopulation with host cells followed by gradual extracellular matrix (Cornwell and Zhang, 2015).

Implantation techniques of mesh

Most surgical meshes used currently are chemically and physically inert, non-toxic, stable and non-immunogenic (Ławniczak *et al.*, 2011). There are three techniques are known for implantation of biomaterials to bridge an abdominal wall defect. These techniques include “onlay” (a superficial technique) in which the fascial suture is reinforced by placing a mesh over it, “inlay” sewing the mesh into the fascial defect and the “underlay” positioning of the mesh in the retromuscular space, posterior to the rectus abdominis muscle and indirect contact with viscera after omentalization (Schumpelick *et al.*, 2004). The “inlay” technique is preferred in the repair of large ventral incisional hernia, in which the mesh is sewn to the margins of the defect by simple continuous suture or interrupted only at the corners are sutured. Although, the inlay technique is the simplest form of repair, it has a disadvantage of lacking fixation of the implant by intra-abdominal pressure, due to minimal surface area of contact between the implant and the adjacent tissue, leading to higher frequency of relapse (Geldere *et al.*, 2004).

The “onlay” technique of implantation has the advantages of easiness in implanting the mesh, the easiness in removal of infected stitches, and the decreased strain on the suture line due to the spread of the tension across the mesh (Karrouf *et al.*, 2016). However, it has minor ability to relieve tension and may cause local discomfort and erosions of mesh through the subcutaneous tissue and skin (Hjort *et al.*, 2012). The “onlay” hernia repair has several disadvantages including tenderness of the abdominal wall, seroma formation, and highest rate of surgical

site infection as well as mesh displacement from the intra-abdominal pressure (Sharma, 2013).

The “underlay” retromuscular position has the advantage of excellent incorporation into the abdominal wall with sufficient protection of the viscera, although an extensive tissue dissection is required (Sharma, 2013). The “underlay” technique is considered the best method because of its relatively low hernia recurrence rates. Intraperitoneal placement of polytetrafluoroethylene mesh has several advantages over other techniques, including minimal dissection, providing better fixation and possibly a decreased risk of infection. The disadvantage of intraperitoneal placement of mesh grafts is the contact of the prosthesis with viscera, which could lead to inflammatory response, resulting in intra-abdominal adhesion, for which omental inter positioning as a physical barrier is recommended (Ferzoco *et al.*, 2015). This technique needs a covering of the mesh with a fascial flap derived from the hernial sac, to provide an additional strength to the wound and to reduce the serous effusion. In addition, it was stressed that a belly bandage should be applied to counteract seroma formation and to prevent soiling of the incision (Lantz, 2006).

3. Conclusion And Recommendations

Hernia is the problem encountered in all domestic animals including cattle, horse, goats, pig, dog and sheep under all age and sex categories related to different attributable causes, site and severity. Majority of the hernias that accounts in domestic animals are abdominal hernia followed by scrotal hernia and umbilical hernia. Cattle and sheep were known to be frequently affected by hernial problems, due to traumatic hernia which seem to happen in most of the cases like horn puncture and falling on blunt materials. Both surgical and non-surgical treatment approaches are applied to correct the defects or problems which usually involve the use of both biological and synthetic mesh. Moreover hernia is also prevented by modifying the management practices. However, it is still three problems of domestic animals where the associated risk factor and further study on its prevalence and economic importance is not well studied. Therefore, based on the above conclusive ideas the following recommendations are forwarded;

- ❖ Awareness should be created on the management practices to minimize the occurrence of the diseases.

- ❖ Cattle and small ruminants should be kept separately this is to reduce horn thrust/gore.

- ❖ Aggressive cattle should be dehorned

- ❖ More research has to be carried out on the identification of risk factors, prevalence and economic importance.

- ❖ Modern techniques for hernia diagnoses and corrections should also be employed.

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