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A Review On: Impaction In Horse

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Abstract: Impaction is blockage of the intestine with feeds stuff or other material. Though the exact causes of impaction is not really known, there are risk factors of impaction such as dental problems, high grain based diets, lack of water consumption and sand indigestion. There are different types of impaction each with specific cause, clinical sign, diagnosis and treatment. These include gastric, illeal, cecal, large colon, small colon and pelvic flexure impaction. Even though, impaction is management problem and may have a serious ending, there is less attention given to it especially in equine family. Most of the time impaction occurs in mature horses than young ones and this is probably due to the chance of getting feeds freely and higher dental problems in adults. Impaction is a management problem it could be prevented by improving management practices such as adequate parasite control, feeding large quantity of forage, dental care and providing clean water.

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1. INTRODUCTION

Ethiopia has the highest equine population in Africa and 3rd in the world. There are about 1.91million horses, 6.75 million donkeys, 0.35milloin mules in the country (CSA, 2013). Equine has prominent position in the agriculture system of many developing countries. In Ethiopia, the low level of development of the road transport network and the rough terrain of the country make equines the most valuable, appropriate and affordable pack animals under the small holder farming system. They can be used for such applications as riding, driving, crop threshing (Fielding and Pearson 1991) and essential modes of transport to take holder and their family's long distance to transport their agricultural products to the market places and bring back their domestic necessities (CSA, 2013).

Equines are prone to painful, debilitating and often fatal illness and conditions. Disease of the digestive system is among the most common problems affecting horse. Colic is the most common clinical disorders and the leading cause of the horse death. Among disease and that causes colic, impaction is the most frequent. Impaction can occur anywhere throughout the digestive tract though sometimes some sites are common (Frazer, 2015).

Identification of types of impaction is important for subsequent treatment and prevention measures. Therefore, the objectives of this paper are to review:

- Risk factors of impaction.
- Types of impaction, their diagnosis and treatment.

2. DIGESTIVE SYSTEM IN HORSE

The digestive system consists of muscular tube with external skin at mouth and at anus. It consists of mouth, pharynx, esophagus, stomach, small intestine, rectum and the accessory gland (salivary gland, liver and pancreas) (Frandson *et al*., 2009).

In horses, small intestine is approximately 22m long in the average horse and is divided grossly and histologically into distinct areas i.e. duodenum, jejunum and ileum. The large intestine is 7.5 to 8m has again three main parts; cecum, large colon is 3 to 3.7m, small colon is 3.5m and rectum is 30cm (Coumbe, 2001).

An impaction is blockage of the intestine with feed stuff or other material. Although impaction can occur anywhere throughout the intestine, some sites are common. The pelvic flexure portion of the large intestine is a common site of impaction in the horse because of the decreasing lumen diameter between the left ventral colon and pelvic flexure (Frazer, 2015).

3. RISK FACTORS OF IMPACTION

The specific causes of the impaction is not always apparent but these factors consists of parasite infestation, high grain based diets or low forage diets, abrupt change in feed, lack of water consumption, sand indigestion, dental problems and long term use of Non steroidal anti inflammatory drugs (NSAIDS) **(**Edward, 2003**).**

3.1 Parasite Infestation

This is one of the causes of impaction. Here best example is ascarid impaction. Ascarid impaction is caused by *Parascaris equorum* which typically occur in foals under six months of age that have been on poor deworming program and have a heavy parasite burden (Reed *et al.,* 2004).

3.2 Lack of Water Consumption

The needs of individual horses will differ greatly. Things that affect the amount of water horse need are: work load, feed, pregnant or nursing mare, size and health (Blocksdrof, 2015).

Impaction is resulted if the horse becomes chronically dehydrated over a period of time. This is because the body reserves are lowered and both the feed material during digestion as well as the fecal contents after digestion must maintain adequate moisture level (Marteniuk, 2011).

3.3 Sand Ingestion

Horses may ingest sand while grazing or eating hay from the ground. Horses on closely grazed pastures in areas with a sandy soil are at great risk. The ingested sand settles to the bottom of the large colon where it may accumulate in large quantities and cause obstruction (Higgins and Snyder, 2006).

3.4 Dental Problems

Regular dental care is thought to be important component in preventing colic impaction. Poor mastication can lead to mal indigestion, esophageal and intestinal impaction. For these reason (and others) it is advisable that the horse receive dental care (Bentz, 2014).

3.5 Diets

Hay is a popular forage choice for horses, but this too has been associated with impaction colic development. Consuming large portion of poor quality forage can increase the risk of impaction colic, as well as making abrupt change. It could actually cause impaction colic due to its high protein level which can create a digestive tract environment that promotes intestinal stone formation. Once again a sudden change in the concentrate normally consumed elevates the impaction colic considerably (Larson, 2012).

3.6 Use of Drugs

Impaction colic in horses and ponies follows topical or IV administration of amitraiz, a formamidine acearicide. The condition was characterized by rapid cessation of intestinal sounds, stasis, extensive impaction and timpanyi of the large colon. A reproducible colic and reversible impaction colic syndrome could be induced by a 1mg amitraiz /kg/body weight in solvent. There were immediate CNS and intestinal signs. Large intestinal contents dried out, possibly indicating enhanced fluid absorption. The effects could be attributed to amitraiz absorption rather than to one of its known metabolites and was not shown by other formamidines (Roberts and Seawright, 1983).

Bute (Phenylbutazone) and Banamine (Flunixin meglumine) both belong to class of drugs known as NSAID. Less commonly used equine drugs in this class are firocoxib (Equioxx), ketoprofen, carprofen, naroprofen and many others. Long term and high dosage use of NSAID may cause stomach and intestinal side effects including gastric and colonic ulcers which results impaction. Importantly, NSAID have the ability to mask a problem making it look less severe than it really is and give false hope and delayed treatment (Frank, 2012).

4. TYPES OF IMPACTION

There are different types of impaction in horses and these include the following:

4.1 Gastric Impaction

Gastric impaction is rare in the horse. It can occur spontaneously as a primary condition but is often secondary to other disturbance in intestinal tract of stomach such as ulceration or fibrosis at the pylorus. The condition typically causes mild to moderate colic that does not resolve with routine medical treatment. The specific cause of the impaction is not always apparent but the obstruction typically consists of excessive dry, coarse ingesta such as straw bedding or poor quality forage. It may be also compressed of foreign bodies and feeds that tend to swell after ingestion. Gastric impaction may be the result of gastric atony or defective secretion (Edward, 2003).
Clinical signs include prolonged recumbency, anorexia, lethargy, dysphagia, dropping of feed, grinding of teeth and mild to severe onset of colic (Blikslager, 2010).

Figure 1: Prolonged recumbency of the horse (Source: Vetnet, 2015a).

Diagnosis can be made when endoscopic examination or laparotomy reveals a large volume of desiccated ingesta in the stomach. Mild case responds to therapy without definitive diagnosis (Higgins and Snyder, 2006).

Figure 2: Gross view of gastric impaction (Source: Ocw.tufts, 2015).

Treatment with an oral administration of normal saline or mineral oil is commonly applied but is not usually satisfactory because the oil does not moisten the impacted mass and is likely to bypass it. The patient may require explatory lapraotomy because of the absence of satisfactory diagnosis tests .Rupture of the stomach is a potential sequel (Radostits, 2006).

4.2 Ileal Impaction

Ileal impaction is a frequent cause of moderate or severe colic. Gross distension of the proximal small intestine and ultimately, the stomach, with gas or fluid is usually encountered (Knottenbelt and Pascoe 2013).

Many cases have no apparent etiology but ileal hypertrophy or inflammatory swelling of the ileo-

cecal opening is predisposing causes. Affected horses frequently had a change diet in the immediate past. The ingestion of poor quality forage or inadequate mastication of coarse fibrous foods, or water deprivation may be important factors in the disorder. Large accumulations of tape worms *(Anoplocephala spp),* at or near the ileo-cecal opening may cause sufficient inflammation resulting the narrowing of the ileum and may be partially responsible for some cases of ileal impactions. Recent antihelminthic treatment in young horses carrying heavy burdens of ascarids *(paraascaris equorum)* may result in knots of dead worms obstructing the ileum (Knottenbelt and Pascoe, 2013).

Clinical sign include evidence of mild abdominal pain, reduced or absent intestinal sound, rectally palpable distended small intestine, gastric reflux and dehydration (Radostits, 2006).

One usually makes the diagnosis at surgery, rectal examination may also identify a solid distended ileum with proximal gas distension of jejunum but more often there is little palpable evidence of the condition. The cecum and large colon are usually empty and few feces are passed (Knottenbelt and Pascoe, 2013).

Figure 3: Intraoperative view of ileal impaction. The distended appearance of the ileum as it courses toward the cecal base is notable (Source: Reed *et al.,* 2004).

Initial therapy of horses with ileal impaction is supportive and should include gastric decompression, balanced polyconic IV fluids (e.g. acetated ringer's 50-100ml/kg/day), analgesic (e.g. fiunixin meglumine) and intensive monitoring. Occasionally, the impaction may resolve with medical therapy, however surgical therapy usually is necessary if colic signs persist; ventral mid line explatory celiotomy with reduction of the obstruction by manual extra luminal massage provides the best prognosis for complete recovery (Higgins and Snyder, 2006).\

4.3 Cecal Impaction

Cecal impaction occurs with increased frequency in older horses. Possible factors predisposing older horses to impaction of the cecum include, alone or in combination, poor dentition or dental disease leading to insufficient chewing of roughage, general debilitation, intestinal motility disorders, intestinal parasite infestation, concurrent disease, and NSAID use (Bertone, 2006).

There are two types of cecal impaction. A primary impaction is when the bowel becomes full of ingesta and is very firm upon palpation. This type of impaction has gradual onset usually over several days and the horse will have a significant decrease in fecal

output and exhibit mild but progressive sign of discomfort (Blikslager, 2010).

A secondary cecal impaction is when the bowel becomes distended with fluid ingesta .This may be more appropriately called cecal dysfunction resulting from abnormal motility. The reason for impaired motility is unclear but may be related to postoperative pain or associated with NSAID (Blikslager, 2010).

Clinical signs include decreased fecal passage and mild to severe abdominal pain. Heart rate varies with the degree of pain. Mucus membranes are usually pink but may be tacky due to dehydration. PCV, plasma, protein, and creatinine may be elevated due to dehydration (Higgins and Snyder, 2006).

Diagnosis of cecal impaction relies on history, physical examination including clinicopathologic analysis, rectal examination, and response to therapy. Rectal examination is helpful in diagnosing cases of cecal impaction, although typical findings of an extended ventral band and firm ingesta within the organ may not be present in all cases. Cecal impaction due to disruption of normal motility and/or outflow is described as presenting a large, ingesta-filled cecum of fluid consistency upon rectal palpation (Bertone, 2006).

Figure 4: View of cecal impaction during surgery (Source**:** Vetnet**,** 2015b).

Options for medical therapy include over hydration with oral and/or intravenous fluids; intragastric administration of fecal softeners and laxatives such as mineral oil, magnesium sulfate, and docusate sodium; and pain control. Feed should be withheld initially but it may be advisable to offer small amounts of easily digestible feeds such as grass or pellets once improvement is noted and passage of feces has resumed. In horses that are repeatedly given laxatives and fecal softeners, diarrhea may develop, and feeding of small amounts may help to maintain normal intestinal flora (Bertone, 2006).

The prognosis is guarded for surgical treatment of all cecal impactions because of the potential for the cecum to rupture during prolonged medical treatment or during surgical manipulation, the possibility of abdominal contamination during surgery, and the extensive surgical procedures required. In a recent report, seven of nine horses for which cecal impaction was treated by typhlotomy and ileocolostomy or jejunocolostomy lived long term. However, a separate report indicated that all horses with cecal impaction following another disease process had cecal rupture without any signs of impending rupture (Reed *et al*., 2004).

4.4 Large Colon Impaction

The cause of most impaction of the large colon is unknown. Known or speculated causes include poor dentition, poor feeding, horses not feed in preparation for surgery or racing, and then given unrestricted access to feed or allowed to eat bedding materials, high fibers diets and administration of NSAIDS which alter colonic motility (Radostits, 2006).

Clinical signs of large colon include, there is often slight depression and anorexia. There are no abnormalities of temperature, pulse, and respiration but there is evidence of periodic visceral pain when the horse stretches and looks at its flank. There is decreased fecal output and feces are small, firm, and covered with mucus (Ogilvie, 1998).

Figure 5: View of the horse looking the flank (Source: Westvets, 2015).

Diagnosis is generally achieved by rectal examination and detection of a variably compressible mass within the ascending colon, frequently the pelvic flexure, and colonic gas distention. Gastric reflux in the absence of small intestinal distention may be caused by pressure on the stomach exerted by the distended colon as well as generalized intestinal stasis (Bertone, 2006).

Figure 6: View large colon impaction, the thickness of the colon is notable (Source: Pinterest, 2015).

The treatment includes administration of analgesics (e.g., flunixin meglumine at 0.5 to 1.1 mg/kg intravenously every 8 to 12 hours; butorphanol at 0.04 to 0.1 mg/kg intramuscularly every 4 to 6 hours; or xylazine at 0.3 to 0.5 mg/kg intravenously as needed) controls intermittent abdominal pain. Administration of oral laxatives such as mineral oil (2 to 4 L by nasogastric tube every 12 to 24 hours) and the anionic surfactant dioctyl sodium sulfosuccinate (6 to 12 g/500 kg diluted in 2 to 4 L of water by nasogastric tube every 12 to 24 hours) are used commonly to soften the impaction. Saline cathartics such as magnesium sulfate (0.1 mg/kg in 2 to 4 L by nasogastric tube) also may be useful. One should not permit access to feed. For impactions that persist, one should institute aggressive oral and intravenous fluid therapy (2 to 4 times the maintenance fluid requirement). If the impaction remains unresolved horses becomes uncontrollably painful, or extensive gas distention of the colon occurs, surgery is indicated. In addition, one can monitor abdominal fluid serially to determine the onset of intestinal compromise. At surgery, one evacuates the contents of the colon via a pelvic flexure enterotomy (Reed *et al.,* 2004).

4.5 Small Colon Impaction

The small colon is another site of feed or foreign body impaction. Horses with small colon impaction may have fever, low white blood cell count, and other clinical signs suggestive of endotoxemia. Salmonellosis has been associated with small colon impactions (Frazer, 2015).

Clinical signs are abdominal discomfort and straining to defecate. Bilateral abdominal distension and nasogastric reflux develops as complete obstruction leads distension of the proximal large colon with gas and ingesta. Decreased fluid intake leads to dehydration (Higgins and Snyder, 2006).

Diagnosis can be based on rectal palpation of a firm mass in the ventral portion of the abdomen. However, often the impaction cannot be palpated and presumptive diagnosis is made based on clinical signs (Frazer, 2015).

Figure 7: View of small colon impaction (Source: Roseoftexas, 2015).

Treatment includes analgesics, correction of fluid electrolyte and acid base abnormalities and administration of fecal softeners. Treatment to hasten softening and passage of the impaction include over hydration, administration of sodium or magnesium sulfate and a lubricant such as mineral oil, and occasionally administration of an enema to the standing horse. overhydration should be achieved by either IV or oral administration of polyonic fluid at 3-5 maintenance(10ml/kg/h). Administration of enemas to standing horses is controversial and should be done with care so as not to rupture to small colon. Trocarization of the large colon or cecum may be necessary in horses with severe abdominal distension (Radostits, 2006).

4.6 Pelvic Flexure Impaction

It is a common cause of persistent, mild or moderate colic. Occasional cases may be more severely affected, particularly where there is gaseous distension of the colon and cecum proximal to the obstruction. The disorder sometimes follows ingestion of coarse, indigestible foods, poor mastication or reduce water intake, but some cases apparently occur without any obvious etiological factor (Knottenbelt and Pascoe, 2013).

The level of pain displayed by a horse with a pelvic flexure impaction varies with the severity of the impaction and the horse's individual pain tolerance. Some horses may exhibit only mild signs such as lethargy, while other horses may roll, kick at their abdomen, and have an elevated heart rate. Although manure production is typically decreased from normal, horses may still pass small amounts of manure with a pelvic flexure impaction. The diagnosis is based on rectal palpation by the veterinarian of a firm mass in the left side of the abdomen (Frazer, 2015).

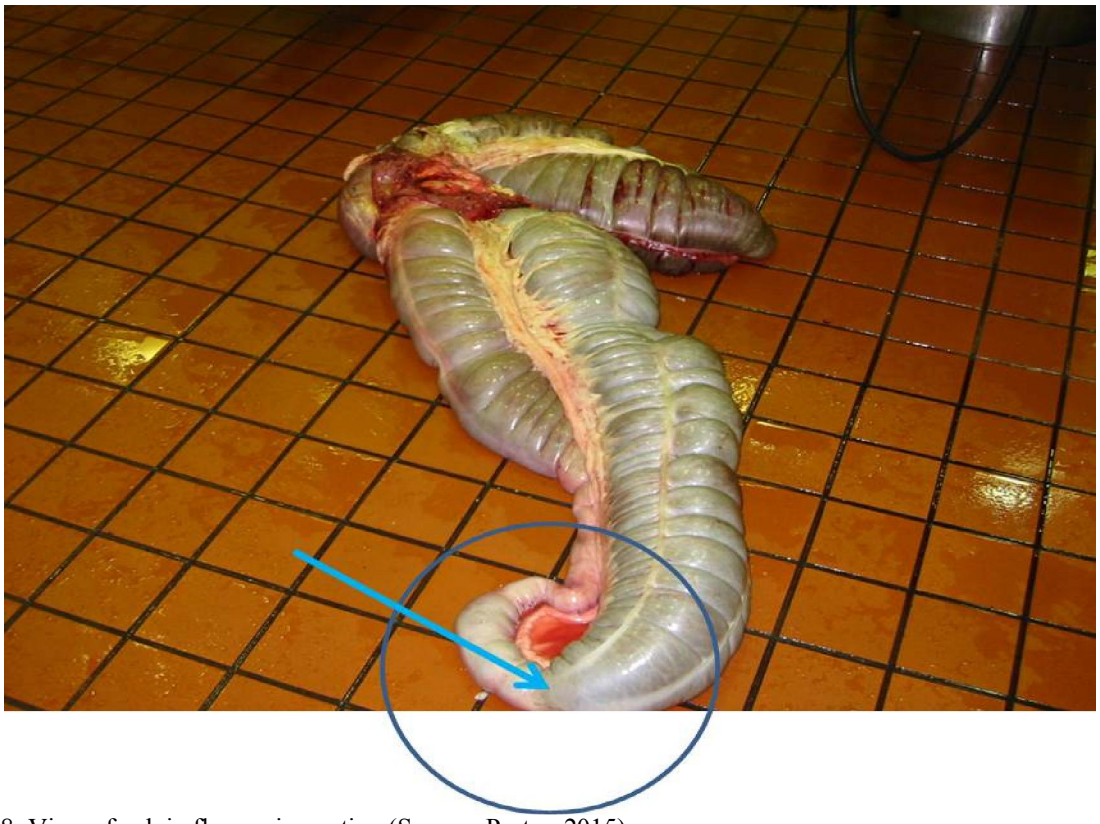

Figure 8: View of pelvic flexure impaction (Source: Porter, 2015).

Initial treatment of pelvic flexure impaction usually includes administration of water and possibly mineral oil. The veterinarian passes nasogastric tube into stomach to facilitate administration. Before administering fluid, the veterinarian checks for reflux (increased volume of fluid in the stomach) to prevent adding fluid to an already distended stomach. The goal of water and mineral oil is to increase the fluid content and soften the impacted feed material (Frazer, 2015).

Other medications sometimes given orally include DSS and magnesium salt. Both function to pull water into the GIT with the goal of hydrating and softening the mass. DSS also functions as a surfactant to increase water permeability of the impaction. However, DSS may be irritating to the walls of the GIT and has declined in use in recent years (Frazer, 2015).S

Pelvic flexure impactions that do not respond to oral fluid therapy may require IV fluid therapy. IV and oral fluid therapy can be combined to provide the best chance of hydrating and moving the impaction through the intestinal tract (Frazer, 2015).

Pelvic flexure impactions that fail to respond to medical therapy can require surgery. Reasons for taking a pelvic flexure impaction to surgery include high levels of pain in the horse and concern over additional GI lesions or failure to respond to medical therapy (Frazer, 2015).

5. PREVENTION OF IMPACTION

Impaction can be prevented by revisits to an animal attention to clinical sign are necessary to judge the response to therapy. If repeated doses of analgesics are necessary to control the pain or if the pain increased in intensity or duration, the diagnosis of primary medically responsive of impaction must be reassessed. A decision for surgery must be made early for the maximum probability of success. Owner needs to consider management changes in order to address the risk factors (Ogilvie, 1998).

Minimization of impaction depends on management factors including, ensuring adequate parasite control, feeding large quantities of forage and minimizing the amount of concentrate feed, and providing dental care (Radostits, 2006).

Older horses with missing teeth may benefit from replacing hay in their diet with a complete feed formulated for senior horses. All horses, particularly those prone to repeated impaction should have yearly examination by veterinarian to detect any health or dental issues that may contribute to colic. Also, maintain a close relationship with your veterinarian to formulate a feed and management practice to prevent impaction (Frazer, 2015).

6. CONCLUSION AND RECOMMENDATIONS

In horses, the cause of impaction is not readily known. The occurrence of impaction however, is related to dental problems and low fiber feeds. Impaction is also commonly caused by parasite infestation and lack of water consumption. Most of the time impaction is present in mature horses than young ones. Since there are different types of impaction affecting the wellbeing of the horses; each has its own effect on the animal as well as on the livelihood of the owner. Generally, impaction is the result of management problems. Therefore, so; it can be prevented by improving management and way of handling of animals.

Based on the above remarks the following recommendations are forwarded;

- Regular dental examination and corrective measures should be applied to prevent impaction in horses associated with dental problems.
- Horses should be provided with high quality roughage and ample, clean water.
- Strategic deworming should be practiced to minimize parasite burden and subsequent impaction due to parasite.
- The veterinarians need to be experienced enough to differentiate different types of impaction for proper management.
- More researches should be done on causes, diagnostic, treatment options and the effects of impaction on animals.

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