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Colic in Equine: A Review Article

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Abstract

Equines are monogastric animals which have their own distinct behavior. Colic is defined as a complex symptom exhibited by the animal when there is any abdominal organ pain and it is the major cause of morbidity and mortality, premature deaths, and is the number one health concern in equine. Its results due to accumulation gas, intestinal displacement, impacted food mass, parasites and also some risk factors (breed, age, management factors) that increase the occurrence of colic. There are many typical signs of colic in equine like, rolling, flank watching, pawing, sweating, elevated body temperature, frequent rising and lying down, elevated heart rate and respiratory rate. Many possible diagnostic methods used to examine colic in equines such as history, rectal palpation, physical examination, ultrasonography and abdominal auscultation. Treatment equine colic can be achieved with decompression of stomach and large intestine, analgesics, rehydration, impaction colic treatment, fluids support and surgery. Some of the preventive methods of equine colic include preventing the ingestion of dirt or sand, regular feeding schedule, regular deworming, regular dental care, regular diet that does not change substantially in content or proportion. Hence, colic is the most common symptomatic illness in equines which leads to middle to sever abdominal pain with high morbidity and mortality rate and also equines are more susceptible for colic than other species. As a result, to increase the quality of life for equine, it is vital to understand the causes, signs, diagnostics, treatment, and prevention of colic. Therefore, regular deworming, should be practiced for effective parasite control. Avoid all causes and predisposing factors that contribute for the occurrence of equine colic.

Keywords: Colic, Equine, Impacted Food Mass, Intestinal Displacement, Parasite

1. Introduction

Equines are monogastric animals which have their own distinct behavior. Horses, donkeys and mules belong to the equine group. They are found mainly in temperate, semi-arid or highland areas. The Ethiopian domestic donkey is indigenous to Africa. Ethiopia has large horse and donkey resources approximately 6.21milliondonkeys, which is 32% of Africa's and 10% of the world's donkey population and 2 million horses which is 33.5%of Africa population. Donkeys are the cheapest option for the Ethiopian family. They are relatively inexpensive to buy in comparison to horses (Kidanemariam, 2000).

Colic is defined as any gastrointestinal pain which is considered as the major disease state in horses and donkeys causing severe abdominal pain. Colic is a frequent and important cause of death to these species of animals. The etiological agents to this clinical syndrome are several including disease base on system that classifying the cause of colic as obstructive, displacement, gas, parasite, and enteritis (Radostits *et al.*, 2007).And also some risk factors (breed, age, managmental factors) that increase the prevalence of colic in equines (Edward and White, 1999).

The clinical sign syndrome as spasm of digestive system and the major sign is the pain which manifested by pawing, stamping, kicking or rolling (Radostits *et al.,* 2007)The incidence of colic is relevant to assessing the rate of colic on farms or stable. Equines are more susceptible to colic than other species due to their unique anatomy of digestive system. Out of 100 horses in the general population 4-10 cases of colic is expected in one year (Hillyer *et al*.,2001;Traub *et al*.,2001). About 10-15% of the colic cases are repeat cases with some horses having 2-4 colic episodes in a year (Traub *et al*.,2001).

Losses caused by equine colic are due to almost entirely to death of these animals. Colic mortality has decreased since the 1998 NAHMS study when it was second only to old age as cause of death in horses. In the 2005 NAHMS old age was still the most common cause of death while colic was third almost equal to injuries, which was second. In the normal farm population, horse mortality from all types of colic was 0.7 deaths per 100 horse-years with a coliccase fatality rate of 6.7% (Tinker *et al.*,1997). The predominant reasons for death were stomach rupture, strangulating lesions or enteritis.)However, the cost of treatment and the emotional trauma to the owners of their animals being afflicted with potentially fatal disease are important consideration for favorable prognosis, and decrease of fatality rate, an early diagnosis of colic is important (Dukti and White; 2009) carried out on the basis of case history, clinical sign and parameter, rectal palpation, ultrasonography (Ferraro, 2008).

Treatment of equine colic is an art and science in the same time (Sanchez and Robertson, 2014) colic can be treated medically, surgically, or by both medical and surgical treatment according to the case, Medically, tympanic, spasmodic, displacement colic is relieved by surgically (Hillyer *et al.,* 2008). The incidence of colic can be reduced by restricted access to simple carbohydrates including sugars from feeds with excessive molasses, providing clean feed and drinking water, preventing the ingestion of dirt or sand by using an elevated feeding surface, a regular feeding schedule, regular deworming, regular dental care, a regular diet that does not change substantially in content or proportion and provide adequate exercises are the most relevant means of preventive and control measures for equine colic(White, 2014).Among health problems of equine, colic is the major health problem. As a result, knowing and understanding the causes and associated risk factors of colic can contribute for better diagnosis, treatment and prevention of equine colic.

Therefore, the objective of this review paper is:

> To insight about equine colic and its causes, risk factors, diagnostic methods, treatment and prevention.

2. Colic IN Equine

2.1.Causes of equine colic

Gastrointestinal tract is most important source of colic (Robertson and Sanchez, 2010). Causes of colic can be put into four groups: distension, simple obstruction, complete obstruction, and enteritis (Ferraro, 2008).

2.1.1. Distension

Distension can happen either because of physical obstruction due to accumulation of ingesta, or fluids in gastro intestinal tract, causing physical colic or without physical obstruction (Ferraro, 2008) known by ileus that characterized by moderate to severe continuous signs of colic, inmares ileus happens after delivery mostly with unknown causes (Hillyer *et al.*,2008) but the ileus happens due to disturbance of serum quantity of calcium and potassium (Edward and White, 1999).

2.1.2. Simple obstruction

Simple obstruction is partial blockage of ingesta pathway indigestive system, by food, enteroliths, parasites, foreign body(Ferraro, 2008), or sand (Hart *et al.,* 2012) resulting in disruption of food movement downwards, this obstruction makes the horseshows clinical signs of colic ranging from mild to moderate(Ferraro, 2008). The most common site of impaction is the large colon, either in horses (Mezerova *et al.,* 2001) or in donkeys (Cox *et al.,* 2007) but when small intestinal impaction happens in donkeys it always very fatal(fatality rate reaches100%).Enter olith is a mineral stone, composed especially of magnesium and ammonium phosphate. These minerals accumulate round a nidus (metal, plastic, or gravel which makes tone inside the bowl), it is usually formed in large colon, then it passes out with faeces, or retain causing obstruction according to its size, colic because of this retained stone is usually chronic intermittent. There are specific diets predispose the horse to enter olith formation when eaten in large amounts for long time,such as alfalfa. Genetically

Arab breed and Arabian-cross horses are more susceptible to enterolith formation than other breeds(Ferraro, 2008).

2.1.3. Complete obstruction

Complete obstruction, happen because of intestinal accidents such as torsion and intussception, causing severe in tolerable pain, and shock due to intestinal infarction and bacterial toxins that pass into the blood stream (Ferraro, 2008).

2.1.4. Enteritis

Enteritis is inflammation of intestinal mucosa, because of microbial infection such as Salmonella, Clostridia and(Ferraro, 2008), Rickettsia, and equine viral arthritis, or chemical poisons, enteritis causes colic of short-lived which is characterized by fever, depression, and diarrhea(Edward and White, 1999).

2.1.5. Parasite

Ascarid(round worms): Occasionally there can be an obstruction by large numbers of roundworms. This is most commonly seen in young horses as a result of a very heavy infestation of *Parascaris equorum* that can subsequently cause a blockage and rupture of the small intestine. Rarely, dead worms will be seen in reflux (Reed and Sellon, 2010).Deworming heavily infected horses may cause a severe immune reaction to the dead worms, which can damage the intestinal wall and cause a peritonitis (Reed and Sellon,2010).

Cyathostomes: Acute diarrhea can be caused by *cyathostomes* or "small *Strongylus* type" worms that are encysted as larvae in the bowel wall, particularly if large numbers emerge simultaneously. The disease most frequently occurs in winter time. Pathological changes of the bowel reveal a typical "pepper and salt" color of the large intestines. Animals suffering from cyathostominosis usually have a poor deworming history. There is now a lot of resistance to fenbendazolein theUnited Kingdom(Chandler and Love, 2000).

Large strongylus: Large strongyle worms, most commonly *Strongylus vulgaris*, are implicated in colic secondary to non-strangulating infarction of the cranial mesenteric artery supplying the intestines, most likely due to vasospasm(Reed and Sellon, 2010;White,2014). Usually the distal small intestine and the large colon are affected, but any segment supplied by this artery can be compromise (Reed and Sellon, 2010). This type of colic has become relatively rare with the advent of modern anthelminthics (White, 2014).Clinical signs vary based on the degree of vascular compromise and the length of intestine that is affected, and include acute and severe colic seen with other forms of strangulation strangulating obstruction, so diagnosis is usually made based on anthelminthic administration history although may be definitively diagnosed during surgical exploratoration (Reed and Sellon, 2010).

2.2. Risk factors associated with equine colic

A risk factor is not important to be the causative agent of equine colic, but it means that horse will be more susceptible to the colic when it exposes to this factor (Edward and White,1999).

2.2.1. Species

Comparing to ruminants equines are more susceptible to colic, because of both physiological and anatomical properties of their digestive system. In ruminants the fermentation compartment (rumen) is in beginning of the digestive system, butin equines partially digested food has to be pushed from stomach to large intestine through relatively narrow hyperactive small intestine to be fermented there, also junction between the distal oesophagus and cardia works as a valve, allowing the food to be moved from the stomach to the intestineonly, but not back, so any disturbance of this normal movement results in colic, or even death which may due to gastric rupture(Dana *et al.*,2005).

2.2.2. Breedand age

They are valuable colic risk factors (Concalves *et al.*,2002).Arabian breed (Holdstock and Proudman, 2000) crossbred horses (Mehdi and Mohammad, 2006) and older horses are more susceptible to the colic (Rabuffo *et al.*,2009) and its fatal outcome (Kaneene *et al*., 1997). Geriatric horses were found more susceptible to death due to colic unless there is surgical intervention(Southwood *et al*., 2010), aged horses have more opportunity to be subjected to the colic causative agents and its risk factors comparing to younger ones. As in horses old donkeys are more susceptible to colic development (Toit *et al*., 2008and Toit *et al.*,2009) because, dental problems and muscular weakness, which are considered the most important risk factors for colic in donkeys, are more common among old members of this species(Cox *et al.*,2007).

2.2.3.Managemental factors

Food and water: Equine nutrition has important role in their health, although veterinarians are considered the basic sources of nutrition aladvices for the equine owners, unfortunately many of them were found do not counseling their clients (Murry and Robert, 2013*)*.Type of food (Concalves *et al*., 2002), sudden change of food(Archer and Proudman, 2006) and way of feeding are important risk factors for colic. When a horse is fed on the ground, or when it is being at a pasture with no grasses, or with short grasses, it will be more susceptible to sand colic (Husted *et al*., 2005), hay ofpoor quality is relatively indigestible. Decrease in water intake is considered a risk factor for equine colic (Scantlebury *et al*.,2011; Archer andProudman,2006), in addition to over drinking of water especially after heavy work (Hillyer *et al*.,2002).

Control of internal parasite: Equine colic risk factors, due to internal parasite control programme include history of this programme (Concalves *et al* .,2002) treatment of worms within seven days preceding colic(Cohen *et al*.,1999) and extensive usage of ivermectin, frequent usage of ivermectin increase the risk of colic due to tapeworm infection, but fortunately this problem can be overcome by administration of anticestodes (Holdstock and Proudman, 2000).In addition to that, history previous episodes of colic (Cox *et al*.,2007) of and abdominal surgery are also important equine colic riskfactors (French *et al*.,2002).

Teeth problems: Teeth problems are risk factor for colic in donkeys (Toit *et al*., 2008)and in their counterparts horses (Scantlebury *et al*.,2011)especially recurrent type (Hillyer *et al*.,2002 ;Scantlebury *et al*; 2011) and simple colonic obstruction because these problems do not make horses(Hillyer *et al*.,2002) and donkeys (Toit *et al*., 2008) masticate well, allowing long undigested fibers passing down causing colic(Toit *et al*.,2009).

Exercise: Colic risk factors due to exercise include, recent change of stabling (Hillyer *et al*., 2002) and of exercise schedule, which reduce large intestine peristalsis, resulting in simple obstruction and distension of colon. Exposure to cold (Mott *et al*.,2004,Scantlebury *et al*., 2011) fatigue, exhaustion, wet stormy weather, and overwork, paralyze the digestive system, making equine more susceptible to *colic* (Mott *et al*., 2004).

2.3. Types of colic

2.3.1. Tympanic (flatulent) colic

Gas colic, also known as tympanic colic, is the result of gas buildup within the horse's digestive tract due to excessive fermentation within the intestines or a decreased ability to move gas through it (Jame and Moore,2014). It is usually the result of a change in diet, but can also occur due to low dietary roughage levels, parasites and anthelminthic administration over distention of viscera stimulate pain and pressure receptor caused mild to severe colic(Briggs and Karen,2014; James and Moore,2014).

2.3.2.Impaction (obstructive) colic

This is caused by an impaction of food material (water, grass, hay, grain sand and stone) . The most common cause is when the horse is on box rest and/or consumes large volumes of concentrated feed, or the horse has dental disease and is unable to masticate properly Impaction generally responds well to medical treatment, usually requiring a few days of fluids and laxatives such as mineral oil(Carey and Lyons, 2014) but more severe cases may not recover without surgery. If left untreated, severe impaction colic can be fatal. Impactions are often associated with the winter months because horses do not drink as much water and eat drier material (hay instead of grass), producing drier intestinal contents that are more likely to get stuck (Briggs and Karen, 2014).

2.3.3. Displacement (Extra-Luminal) colic

It occurs due to mechanical distortion or obstruction of intestine with consequence of interfere with blood supply. A volvulus is a twist along the axis of the mesentery, a torsion is a twist along the longitudinal axis of the intestine (Smith *et al*., 2002). Various parts of the horse's gastrointestinal tract may twist upon themselves. It is most likely to be either small intestine or part of the colon. Occlusion of the blood supply means that it is a painful condition causing rapid deterioration and requiring emergency surgery (Reed *et al*.,2010).

Intussusceptions is a form of colic in which a piece of intestine "telescopes" within a portion of itself because a section is paralyzed, so the motile section pushes itself into the non-motile section (Briggs and Karen,2014). It most commonly occurs at the ileocecal junction and requires urgent surgery. It is almost

always associated with parasites infection, usually tapeworms (Smith *et al*., 2012;Briggs and Karen, 2014).

2.3.4. Spasmodic (Spastic) colic

It is characterized by periodic spastic contraction of the intestinal muscle or visceral pain. it is the most common type of colic which occur due to irritation of Gastrointestinal mucosa by unsuitable foodstuff, excitement and drinking of cold water after work (James and Moore, 2014).The clinical signs of these forms of colic are generally mild, transient(22% of spasmodic colic are associated with tapeworms (Briggs and Karen,2014).

2.4. Clinical signs

Elevated body temperature: most commonly associated with medically managed colic such as enteritis, colitis, peritonitis, and intestinal rupture, elevated heart rate, elevated respiratory rate, *i*ncreased capillary refill time, change in mucous membrane (gum) color, physical examination (Erica and Larson, 2014, change in the degree of gut sounds auscultation, pawing. Increased attention toward the abdomen, including flank watching (turning of the head to look at the abdomen and/or hind quarters), nipping, biting, or kicking (Bentz and Bradford, 2014).

Repeatedly lying down and rising, which may become violent when the colic is severe, rolling, especially when not followed by shaking after standing, and which may become violent when the colic is severe (thrashing), sweating , change in activity level: lethargy, pacing, or a constant shifting of weight when standing, change in feces: decreased fecal output or a change in consistency, groaning, excess salivation (Ptyalism), loss of appetite, poor coat or weight loss(chronic colic) (Carey and Lyons, 2014).

2.5. Diagnosis of equine colic

For favorable prognosis, and decrease of fatality rate, anearly diagnosis of colic is important (Dukti and White, 2009).

2.5.1. Case history

The most important element in the case history of colicky horse, is the time when the horse shows signs of colic, which canbe estimated from the owner, by asking him, what is the first time he noticed that his horse was attacked by the colic, and the last time he saw his horse well, then he/she should be asked about the factors that preceded colic, especially that considered as risk factors for colic, such as stabling, food, usage of anthelmintics for treatment and prevention of internal parasites, treatment with drugs that known as causes of colic, such as prolonged usage of non-steroidal anti-inflammatory agents (Edward and White,2001).

2.5.2. Clinical signs and parameters

Evaluation of pained animals depends on the observable clinical signs and their interpretation, so identification of the animal, source of the pain and its duration are important data(Robertson and Sanchez, 2010). Clinical signs are also important for identification and differentiation of medical treatable colic cases than surgical needed others (Ihler *et al.*, 2004;Sutton *et al*., 2009).

Clinical parameters which include evaluation of the cardiovascular system, such as heart rate, mucous membrane color (Ihler *et al*., 2004;Sutton *et al*.,2009) capillary refilltime (Thoefner *et al*., 2001;Sutton *et al*., 2009) are negatively affect by fatal endotoxaemia (Furr,2005; Skyes *et al*.,2005) so they play an important role in evaluation the outcome of the case. In addition to that degree of pain anddeviation of temperature from 38^{o}C are also important factors for prognosis of colicky cases (Thoefner *et al*.,2001). It was noticed that, in old horses after exercise their temperature can reach40^{o}C faster with increasing heart rate and more sweat loss than young horses (Mckeever *et al*., 2010).

Distension of abdomen is rarely noticed in colicky horses, but symmetrical distension of abdomen refers to accumulation of gasin small colon, and distension of the right flank is indicator of gas accumulation in the caecum Colic increases capillary refill time and pulse rate (Hillyer *et al*.,2008; Sutton *et al*., 2009 ; Alsaad and Nori, 2010) and they are of great value in assessment of prognosis of colicky horse (Southwood *et al*.,2010)as the most the case gets worse the most they increase(Sutton *et al*., 2009;Southwood *et al*.,2010) for favorable prognosis pulse rate should be less than80/minute, but when it reaches 100pulse/minute this is considered bad prognosis indicator(Bryan *et al*., 2009).

Examination of mucous membranes is important for assessment of hydration, cardiovascular status, degree of shock and endotoxaemia. Pale dry clammy

mucosais indicator of coma that; congested dark red to purple colour with long capillary refill time are indicators of severe dehydration and shock. Respiratory rate is of less importance in estimating the prognosis of colicky horse, but it is said to be increased in colicky horses(Ferraro,2008*;*Sutton *et al.*, 2009;Scantebury *et al.*,2011) due to either pain, or acidosis(Bryan *et al*.,2009).Although body temperature is usually in the normal range in colicky horses, sometimes it decreases as in shocked cases(Hillyer *et al*.,2008), or increase (Alsaad and Nori, 2010; Hart *et al*., 2012)as in acute(Alsaad and Nori, 2010) and sand colic(Hart *et al.*,2012).

2.5.3. Nasogastric intubation

Nasogastric intubation is important for diagnosis of colic, and relief of gastric distension, which will rupture the stomach, if not treated, because of inability of equines to vomit (Ferraro, 2008).Normal stomach contents are thick, mucoid, acidic and of large quantities of fetid gas and fluids(Hillyer *et al*.,2008). But they become watery, bile stained and alkaline as duodenum contents get into the stomach (Ferraro,2008).

2.5.4. Rectal Examination

Rectal examination is important step in diagnosis of colic, through it clinician can examine reachable organs(Ferraro, 2008;Hillyer *et al*., 2008), some cases such as impaction of pelvic flexure accurately diagnosable by rectal palpation. Intestinal ileusis characterized by palpable loops of distended small intestine with normal wall thickness (Hillyer *et al*., 2008)*;* distended small intestine appears in accordion–like shape which can be located vertically or horizontally(Edward and White, 2001). Impaction of faeces in the large intestine gives palpable long column like-shape, which indicates impaction colic (Bryan *et al*., 2009).

Stretching of mesentery is detected when there are heavy contents in the intestine pulling it down, or when small intestine is twisted ortelescoped into itself. If the rectum is empty from faeces, this refer to either partial or complete obstruction, they are distinguishable by administration of oil, in partial obstruction drenched oil will pass out through rectum, but not in complete obstruction (Bryan *et al*., 2009).

Despite the importance of rectalpalpation, it is difficult to be carried out in small sized horses andin horse with severe abdominal pain (Mezerova *et al*., 2001).Anyhow rectal palpation findings are not dependable alone in final decision making, they should be interpreted with the results of other steps of examination (Bryan *et al*., 2009).

2.5.5. Ultrasonography

Ultrasonograhpy is used for examination of unreachable organs by rectal examination (Ferraro, 2008*).* Percutaneous ultrasoungraphy is used in confirming of gastric rupture diagnosis which is characterized by increased volume of peritoneal fluids(Hillyer *et al.*,2008). Abdominal ultrsonograhpy also can be used for definitive diagnosis of small and large intestine disease such as obstruction and strangulation (Beccanti*et al*., 2011).

2.5.6. Abdominal auscultation

Auscultation to the abdomen by stethoscope is carried outparallel to the edge of the last rib on both sides(Edward andWhite,2001)but one should pay attention so as not to confuse gas sound which is produced by microbes, with sounds of intestinal movement. There are two sounds can be heard in normal equine, short mixing sounds 2-4times/minute, and long propulsive sound which can be heard one/2-4minute. The last one increase directly after eating*)*,in colic cases this sound would decrease, or even absent if the case was severe (Hart *et al.*,2012; Hillyer *et al.*, 2008;Scantlebury *et al*., 2011)or may not be affected during colic period (Hart *et al*.,2012;Scantlebury *etal*.,2011).

2.5.7.Fecal examination

The amount of feces produced, and its character can be helpful, although as changes often occur relatively distant to the anus, changes may not be seen for some time. In areas where sand colic is known to be common, or if the history suggests it may be a possibility, faeces can be examined for the presence of sand, often by mixing it in water and allowing the sand to settle out over 20 minutes (King and Marcia, 2014). However, sand is sometimes present in a normal horse's feces, so the quantity of sand present must be assessed. Testing the feces for parasite load may also help diagnose colic secondary to parasitic infection. (Erica and Larson, 2014).

2.6.Treatment of equine colic

Treatment of equine colic is an art and science in the sametime (Sanchez and Robertson, 2014) colic can be treated medically, surgically, or by both medical and surgical treatment According to the case (Hillyer *et al.*, 2008). Mild colic can relieve even without or with minimal medical care (Bryan *et al.*,2009)medical treatable cases are more favorable in prognosis than surgical ones (Reeves *et al.*,1989 and Sutton *et al.*,2009) so it is important to differentiate between them, because delay in identification of complicated cases increase the probability of death (Bryan *et al.*,2009)Measurement of abdominal fluid protein concentration and evaluation of this fluid color are helpful in differentiation between medical and surgical treatable cases(Hillyer*et al.*,2008).

2.6.1. Decompression of stomach and large intestine

Nasogastric intubation is applicable for decompression of stomach distended by gas or fluids, intubation should be repeated until no gastric reflux is seen (Hillyeret *al.*,2008).Caecum is the most common place for gas accumulation, for removal of this gas, caecum is punctured from outside, in the right flank Unfortunately when caecum decompression is needed, surely there is lesion need surgical interference. Generally abdominal distension has to betaken in account when assessing colicky horses (Southwood *et al.*,2010).

2.6.2.Analgesics

Analgesics make the colicky animals relax and prevent it from injuring itself (White, 2006), the most used pain killers during colic period are: non-steroidal anti-inflammatory agents(Hart*et al*., 2012;Robertson and Sanchez, 2010).

Non-steroidal anti-inflammatory agents *:*Non-steroidal anti-inflammatory agents which include flunixinmeglumine, ketoprofen, phenylbutazone (White, 2006;Robertson and Sanchez, 2010) and meloxicam (Mezerova*et al.*,2001) are the most drugs used for killing pain (Sanchez and Robertson; 2014) of either surgical or non-surgical cases (White,2006) and for manage of endotoxaemia associated with equinecolic (Blikslager and Marshall, 2011).

Non-steroidal drugs have different effects when they used as pain killers, this may be either due to their mode of action (White, 2006), or to their distribution, non-steroidal anti-inflammatory agents distribute in different levels in the different tissues, clear example is phenylbutazone which concentrate in muscles more than viscera, so it is more useful in killing somatic pain, non-steroidal anti-inflammatory agents inhibit cyclo-oxygenase 1and cyclo-oxygenase 2 in different levels also, and these enzymes are distributed in different concentrations in the different tissues (White, 2006). Ketamine and/or butorphanol are being used for controlling severe pain; drugs such as gabapentin which control neuropathic pain are used for controlling pain as that of laminitis (Sanchez and Robertson,2014**).**

Flunixinmeglumine is spasmolytic and analgesic drug(Huskamp and Scheidemann, 2000) it is the strongest available on steroidal analgesic (White, 2006 ;Robertson and Sanchez 2010) single dose of 1mg/kg of flunixinmeglumine given intravenous, intramuscular, or per os can treat many cases of colic completely (Robertson and Sanchez, 2010) Flunixinmeglumine also is characterized by relative long duration of action, (Bartom and Moore, 2003 and White, 2006) and it keeps blood flow to the obstructed and strangulated organs (White, 2006), with out interfering with healing of damaged intestinal mucosa (Morton *et al*., 2011). But the opposite was said in the small intestine, Flunixinmeglumine was found to influence recovery of small intestine mucosa injury because of ischaemia (Marshall *et al*., 2011; Blikslagre and Marshall, 2011) due to inhibition ofcyclo-oxygenase enzymes (Marshall *et al*., 2011).The disadvantages of non-steroidal anti-inflammatory agents especially phenylbutazone include, gastrointestinal ulcers and renal damage (Moore and Barto, 2003; White, 2006).

2.6.3. Rehydration

Colic cases with dehydration, almost have metabolic acidosis, so solutions contain lactic acid must be avoided so as not to deteriorate the case; fluids contain carbohydrate are Suitable for such cases (infusion of 50gram in one litter intravenously and fluids with potassium and calcium should be administered according to the laboratory investigation (Hillyer *et al*., 2008).

2.6.4. Impaction colic treatment

Impaction is treated either by laxatives or anthraquinone purgatives, efficacy of anthraquinones is variable and may cause severe diarrhea. they lubricate the intestine and prevent toxins absorption the recommended dose is5-10ml/kg, mineral oil administration is contraindicated in horseswith obstruction especially obstruction of small intestine because they worsen the already distended stomach, so they must not be given to horses with severe colic without accurate diagnosis (Whiteand Edward, 2001).

2.6.5.Fluids support

Fluids are commonly given, either orally by nasogastric tube or by intravenous catheter, to restore proper hydration and electrolyte balance. In cases of strangulating obstruction or enteritis, the intestine will have decreased absorption and increased secretion of fluid into the intestinal lumen, making oral fluids ineffective and possibly dangerous if they cause gastric distention and rupture. This process of secretion into the intestinal lumen leads to dehydration, and these horse require large amounts of intravenous fluids to prevent hypotension and subsequent cardiovascular collapse. Theintravenous fluid requirement of horses with simple obstruction is dependent on the location of the obstruction. Those that are obstructed further distally, such as at the pelvic flexure, are able to absorb more oral fluid than those obstructed in the small intestine, and therefore require less intravenous fluid support(Merck, 2014).

Impactions are usually managed with fluids for 3–5 days before surgery is considered. Fluids are given based on results of the physical examination, such as mucous membrane quality, packed cell volume, and electrolyte levels. Horses in circulatory shock, such as those suffering from endotoxemia, require very high rates of intravenous fluid administration. Oral fluids via nasogastric tube are often given in the case of impactions to help lubricate the obstruction obtained(Merck, 2014).

2.7.6. Surgical treatment

Most of death due to colic happens after surgical treatment of colic (Ihler *et al*., 2004) due to post operative complications. Most cases of death are noticed during the first ten days post surgical operation (Proudman *et al*., 2002).Surgical intervention should be done only when there is accurate diagnosis of intestinal obstruction (Mezerova *et al*., 2001)and real need forit. Severe abdominal pain and the mild one because of caecal hypertrophy (Scheidemann, 2000) and which do not respond to analgesics need surgical intervention long duration of the disease, high degree of general health alteration are good indicators of need for surgical treatment especially in right dorsal colon impaction cases (Mezerova *et al*., 2001).

2.7. Prevention

The incidence of colic can be reduced by restricted access to simple carbohydrates (White, 2014)including sugars from feeds with excessive molasses, providing clean feed and drinking water, preventing the ingestion of dirt or sand by using an elevated feeding surface, a regular feeding schedule, regular deworming, regular dental care, a regular diet that does not change substantially in content or proportion and prevention of heatstroke. Horses that bolt their feed are at risk of colic, and several management techniques may be used to slow down the rate of feed consumption. Supplementing with previously mentioned form of Pysllium fiber may reduce risk of sand colic if in a high-risk area. Most supplement forms are given one week per month and available wherever equine feed is purchased (Antony and Blikslager, 2008).

Turnout is thought to reduce the likelihood of colic, although this has not been proven (Antony and Blikslager, 2008; White,2014). It is recommended that a horse receive ideally 18 hours of grazing time each day (Antony and Blikslager, 2008)as in the wild. However, many times this is difficult to manage with competition horses and those that are boarded, as well as for animals that are easy keepers with access to lush pasture and hence at risk of laminitis. Turnout on a dry lot with lower-quality fodder may have similar beneficial effects(White, 2014).

3. Conclusion and Recommendations

Colic is the most common symptomatic illness in equines which leads to middle to sever abdominal pain with high morbidity and mortality rate and also equines are more susceptible for colic than other species. Equine are hindgut fomenters and their cecal microbiome can easily be altered due to environmental and physiological changes. Distention, simple obstruction, complete obstruction, enteritis, and parasites are the major causes of equine colic. In addition to these, there are detrimental factors like

species, breed age and some management factors which can increase the risk of equine colic. Tympanic, impaction, displacement and spasmodic colic are the commonest types of equine colic. Hence, to increase the quality of life for equine, it is vital to understand the causes, signs, diagnostics, treatment, and prevention of colic.

In line with the above conclusion, the following recommendations are forwarded:

Regular deworming programme should be practiced for effective parasite control.
Avoid all causes and predisposing factors that contribute for the occurrence of equine colic.
The owners should feed the animal on a regular schedule with appropriate dry matter and concentrate ratio.
Sudden change of feed should be avoided and gradual feeding should be implemented.
Keep feed boxes and hay racks as well as the feedstuffs clean and free of mold and dust.
Check teeth frequently for dental problems that may cause chewing issues.
Keep feed off the ground to avoid sand ingestion.

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