Pathogensis & Stages of Life Cycles of Strongylosis

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Abstract: Equine has an important role all over the world of veterinary sciences as well as civilians interesting, but internal parasites affect equine reduce their physical powers and beautiful appearance which is important for racing and showing. We focus in our review on epidemiology diagnosis and treatment of strongylosis as an important parasitic disease in equine. There are two strongyle families; firstly, is the large strongyle which caused by stronglus vulgaris which is the most pathogenic and wide spread species in equine that may cause severe internal organs damage. Verminous Arthritis Embolism may cause death due to migration larvae. The second member is the Small strongyle which causes mild symptoms of diarrhea and weight loss. However recent method of diagnosis is the real-time PCR, with advanced molecular biology techniques usage like Cyathastomine Gut Larva Antigen (Cy-GALA-1) for molecular antigen detection that help in early diagnosis which consider one of the best methods of strongylosis eradication and treatment. Current use of Anthelmintic cause wide spread of parasitic diseases with common antigen resistance, so all new goals are set for developing a vaccine that is able to control and eradicate in the safest way possible.

Keywords: equine, internal parasite, fecal exam, migrating larva, anthelmintics.

1. INTRODUCTION

Obviously, knowingly that Strongylosis is the most common internal parasitic disease that affects more than 80% of equine (Neils et al., 2011). Cyathostomine obviously is one of the smallest strongyle obviously important internal population all over the world parasites (Peter and Waller., 1997) 90% of horses infested with more common parasites (Owend and Slocombe., 1985)). Large strongyle infections obviously causing 59% infection rate (Kuzmina et al., 2012). Highly important internal and pathogenic effects in equine caused by small strongyles diagnosed with an been obviously considered as S. vulgaris (Patton and Drudge, 1977; Eysker 1986). Most studies obviously, S. vulgaris infection obviously in horses 55–90% of horse’s harbor (Meads, 1969, McCraw and Slocombe 1974.).

Clinical symptoms nematodes clear signs sluggish intestinal motility emication, eating disorder, abnormal hair growth, weakness, alter animal condition, and bowel movement problems intermittent diarrhea (McCraw and Slocombe, 1976; Krecek et al., 1987; Mathew and morris, 1995). Once animal eats and peripheral edema digests contaminated food, then larvae transported through the esophagus obviously to cecum and colon. S. vulgaris effectively traveling to liver and anterior mesenteric artery, S. endentatus travel to viscera (Ogbourne and Duncan, 1999). All stage of adult worm are now live in the large intestine and especially to the flank area large intestines. Different stages of larvae causing joint inflammation, tissue damage, and emboli blood vessels (Proctor, 1966; Krecek et al., 1987; Pilo et al 2012). Old studies stated that larvae migrate to blood vessels (Ottaway and Bingham, 1945).

The highly spread of infection in most equine e.g., donkeys and horses, likely to be clever obviously of the infection at the end of their established that life (Reinemeyer et al., 1984). Large number of strongyles infections obviously cause mild disease inflammatory enteropathy, reduce, and colic (Nielsen 2006; Bechera 2010).
Slocombe, 1976; Duncan and Pirie, 1985). Infarction resulting with signs of severe colic cause death of horses (Marinkovic et al., 2009). One of the reasons obviously from thrombosis and embolism we cannot treat that infection is hard to stop the larval traveling, and are only that early enough seen by fecal culture techniques indicating the adults (Morgan et al., 1994).

Using direct fecal examination for detection number of eggs has been first and the most common method sever infestation obviously widely used method nematodes (Osterman, 2005; Kuzmina, 2006). A helpful Molecular way has been obviously used to identify strongyle before getting to adult shape (Gasser et al., 2004; Mahmood and Ashraf, 2010). Regular nematodes species eradication for killing of large strongylus is essential to remove contamination of surrounding area very quick. Thiabendazole as common anthelmintic in adult horses, and updated method indicated and used in strongyles contamination of addition to benzimidazole compounds (Drudge et al., 1975). If a lower dose was given, it would be for anthelmintic resistance (Toscan et al., 2012). Routine usually the reason removal of Pasture is important huge anthelmintic control measure. Studies must consider the resistance.

**Stages of Life Cycle:** Strongyles life cycle in usually known to be direct life cycle in considering species (Ogbourne, 1975, Bucknell et al., 1995, Edward, 2000 Kuzmina et al., 2012).

Number of eggs ranging from 40-110 in female uteri equine species (Reinemeyer, 2009). Strongyle adult females laid their eggs that pass-through feces to external environment to get better temperature helping it to hatch to become the first level larva (L1s), at 10-40 °C with enough humidity, and for eggs to hatch the minimum temperature is 7–8 °C (Bucknell et al., 1995).

In soil, eggs / pasture L1 grow to be L2 then L3. The L3 is the infective stage high temperature of summer season, then takes 10-15 days to develop and grow, then cover itself with outer under optimal protective sheath which is highly efficient to chilling and water resistant for different larva stages. Dryness of feces avoid and getting contact to L3s from leaving herbage. Any larvae grow less than 10 cm height from the move physiological factors helps 15 cm vertically, but within rains; Larva traveling from defecation to the surrounding environment surface can easily (Urquhart et al., 1996; Osterman, 2005). After L3s ingested by the host, it goes down to o the small intestine, with external sheath removed to initiate outer covering the internal the cycle. With the help of biochemicals the phase of removal of protective covering in the host gut. Large strongyles larva go out sheath through an anterior cap, in other hand, from emerges through a longitudinal slit in the their larvae of small strongyle esophagus (Pilo et al., 2012).

The removal of at 37 °C within 4 hours can be done using fluid like ingestin artificial intestinal which experimentally been approved (Kuzmina et al., 2006). Somatic migration is penetrating caecum of large strongyles larval, while Larva internal phase of small strongylies and colon glands and become capsulated without movement. (Jubb et al., 1985; Love et al., 1999).

Next molting in sub mucosa in L4 in about day 4 or 5. L4s happens gradually move against the blood flow, and then move up the of the intestine arterial system. By nine to ten daysL1 larvae go to cercal arteries and causing emboli by staying tin these large arteries, then it takes the way travelling to ventral colic arteries try crossing its twisty branches of fibrin on the inner wall in mural thrombi and by day 14 larvae may be found. By 15 days larva can reach to The ileoceco-colic and arteries.then larvae increase in size and length up to 1.8 cm long. S. vulgaris larvae stayed s un hatched until molting to the fifth stage L5, though the arterial site L4 larvae are had been removed away before the final hatching done. Different cycle of molting affected by dehydration can causing effect in separation of flow of blood larvae from arterial lesions. Serosal surface of small arteries and terminal small intestine can be invaded by preadult larvae, but unable to migrate further in arteries (Hassenin, et al 2017). pea-sized nodules formed by young one of large strongly becomes in. These nodules are formed by infested larva; migrate from nodules into the intestinal gut. S. vulgaris need further four to six weeks to be adult sexual mature. Since ingestion of L3s acidity help remove cover membrane to the produce egg in the faeces within 4–6 months (McCraw and Slocombe, 1976). There is variation of the prepatent period in the species from 5-8 months (Kuzmina et al., 2006; Edward, 2007). No infection (Andersen, 2013). Some larva traveling to internal organs and viscera. Deviant larvae-transfer, and ways of larval migration. larvae extra-alimentary penetrate, where they grow up in intestinal tract and survive as long as 2.5 years (Niels et al 2011). Now we know that.
Developmental changes and growth to different stages related to environment and host

**Pathogenesis:** When Horses infested naturally usually hold a huge load different nematodes on proportion of strongyles in the intestines (McCraw and Slocum, 1976). Study the strongylus is based on detection of experimental one certain infections (Patton and Drudge, 1977; Bueno et al., 1979; Alam et al., 1999). Destruction of internal organs by nematodes based on penetration e of small stages. Pathogenicity of nematodes occurs because it has small and feeds suction to intestinal lumen (Newton, 2002). On other hand, adult worm suckers connect to the wall of parenchyma to attach to the internal organs, Cyathostomin parasites is highly pathogenic internal parasites in equine due to traveling larvae of this parasite to blood vessels and internal organ. Causing thrombosis, infraction and deaths (Enigk 1951). Following ingestion acidity help remove outer sheath covering larvae then migrate and penetrate mucosa of gastro intestinal tract, then changed from m L3 to L4 by day 4-6 day. On the day 10 traveling toward mesenteric artery (Love and Duncan 1991).

Emboli and thrombosis and by larvae migration causing severe pain and extreme signs of colic associated with no blood flow and deaths lumen of intestine (Duncan and Pirie 1975). related and ileo- in intestine techniques had been demonstrated that horses gastrointestinal disturbances and infraction (Malan et al., 1982). Characterized by Ulcers with pitted shapes caused by sever infestation with adult worms (Smith, 2010)

Hard to know the effect of species with naturally acquired mixed infections necropsy suggesting that, to the. A lot of studies noted

**Clinical Signs:** there are different ranges of clinical signs from acute to chronic, even mild up to death. Migrating larvae of large causing acute symptoms, and mostly common early month of acute infection. Extreme symptoms and death correlated with huge larvae in intestinal tract, size and age, of the animal. (Ogbourne, 1985), and AS.H.Hassenin et al 2017). Old age horses mostly have emboli without evidence of certain lesion at postmortem previous existence signs, (Love et al., 1999). Weakness, lethargy, loss of weight, paleness, emication, and anemia are frequently caused by large clinical strongyles at the the in intestines. Diarrhea is apparent clinical signs with low version in large strongyles than small strongyle infection (Owend and Slocumbe 1985). Small strongyle time of being shows clinical sign infection and subcutaneous usually of emaciation (Bueno et al., 1979). Other common clinical signs are increase nematodiases incidence of diarrhea, exaggeration body weight loss, lethargy with regular feeding, edema of the lower belly. Later stage of fatal signs with higher morbidity up to 60-70% (Gasser et al, 2004). Due to large number of capsulated larva in intestinal tracts, cyst broken emerging under skin leading to the disease called ‘sever larvae infestation or called (cyathostominosis), which is associated with symptoms of, loss of appetite, body weakness, emication and intestinal spasm. It can be causing death in cases up to 60% horse (Matthews, 1999). High temperature in nematodes caused by cellular death due to toxin causing what is called toxic edema, diarrhea materials elaborated by larvae, sharply increase of total white blood cells (WBC) counts during early stage of infection to levels of 20,000 to 25,700/mm3 steady change in early S. vulgaris infection considered the most, these numbers rise, anorexia, severe colic, and may be death (Anderson, 2002). When foals being infected naturally, rarely there were seen severe symptoms, in some cases ingestion large number of larva can be overcome by immunity (Duncan and Pirie, 1985). Symptoms of adult worm caused by strongyles not clear and need further investigation and work paper.

**Diagnosis:** History with age of anthelmintic can be evaluated with Signs and symptoms for diagnosed. showed difference between method (Osterman 2005; Skotarek et al., 2010).

Counting Egg in fecal samples are best way for correlation drug resistance effect and determining the accurate anthelmintic treatments (Urquhart et al, 1996; Nautrup et al, 2003). It is hard to differentiate strongyle eggs of different species genetically, are investment anthelmintic compounds characterization of strongyle to reach the development of L3s, which is useful to be used for faecal samples. Method common way used for fecal samples infected horses. recovery. It is hard to find strongyles larvae while animal grazing (Kania and Reinemeyer, 2006). Diagnosis of larval strongylosis can be detected by mucosal larval stages would be required. Recently molecular approaches using larval antigen-1 (CyGALA-1) gut-associated) has been identified, with antigen antibody reaction in live
animals (Anderson, 2002). Recently genetic analysis experimentally used as new method differentiate DNA sequences (Saeed & Ashraf, 2010), genetic markers recently new molecular techniques second internal species identification. Species-specific oligonucleotide. genetic variation between sequences. Hybridization assay used for IGS parasite oligoprobes depend on a PCR-ELISA test for used for differnent types of nematodes (Newton, 2008). has electrophoresis technology shown Parameters changes in serum picture of infected horses with biochemical and hematological differences. Lower level of albumin in blood called Hypoalbuminemia is a common parameter of blood biochemical in live animals, may be causing the elevation of leakage of lumen fluid. Elevation level of Golbulin noted in natural infections. (Hassenin, A.S.H et al, 2017).

Approaching and enchantment shown new approaches of genetics technique without specific Detect larval using of for specific criteria also been cyathostomins is still available. Verminous arteritis in need for more studies best for the diagnosis in horses. Therefore, now, Recent approaches of diagnosis using molecular biology techniques is not for fit for animal surveillance as well as lab procedures.

**Epidemiology and Prevalence:** incidence with huge number of nematodes concluding millions of strongylosis with many species (Gasser, 2008). In different animal species one of them can be infected with 11 that had been detected (Bucknell et al., 1995). Old studies indicated that equine strongyles had more than 50 species of different species There was comparison relation between prevalence of S. vulgaris and different treatment used for routine basis as control or prevention depending on fecal exam results. Infestation showed degree of efficacy of anthelmintic for strongyulus vulgaris adult and different larvae stages. Moreover, Studies suggested more observation on examination fecal samples frequently to make sure that farms free from S. vulgaris for starting new approach of research for treatment.

No estimated level for seasonal variation on larvae in fecal samples. infestation with adult worm was initiated contribute to infected occurrence is still high (Gawor, 1995).

It has been known from current studies that major necessary to in comparison efficacy of treatment all larvae stages, infected. This inform us that anthelmintic are determined. cold weather inhibiting the cure of Strogylyus infestation lower the development stages. However, further studies are needed prerequisite for better understanding epidemiology of strongyle infestation in large intestines (Hassenin, et al, 2017).

**Control and Treatment:** Anthelmintic drugs Usually used in horses for treatment and prevent contamination of pastures with eggs and Larvae. Thiabendazole drug larval bionomics approved with several other drug as tetrahydropyridines. Oxibendazole orally for two consecutive day shown great effect (Ogbourne, 1975). There were three main classes for treatment to eliminate side effect: There was variation in the efficacy of anthelmintic resistance. By 30th day post medication it was respectively 100%, 96% and 86%, respectively (Ramsey et al., 2004). One of most common recommendation significantly to prevent of enteropathy (Martin et al., 2007). Non-steroidal anti-inflammatory can be used in cases of severe the administration of agent. Meloxicam is recommended for horses. (Reinemeyer, 2009). Therefore, widespread is also required agreement that at different period Recommended and parasite control be frequently lower dose of routine anthelmintic (Nielsen, 2012). Control and Eradication de-worm of horses is unusual everywhere during infestation period increase source of contamination and spread infection. Encouraged. Increase contamination and spread infection developing many cases of infestation. Therefore, Main target for parasite control can be regulated to the climate conditions, and medical treatment is not necessary (Edward, 2007). Providing an necessary condition of humidity to prevent further stages of parasite growth is main chemo biology method of control the predacious fungi finalizing widely used in Europe. (Mahmood and Ashraf, 2010). On production for newborn horses must be checked frequently for infestation and isolation infected one to avoid pasture contamination. (Kaplan and Nielsen, 2010). Effectiveness of using herbal compounds as anthelmintics against strongylosis is in the way of more explantion and studies.

## 2. Conclusions

Our current studies compare efficacy of treatment and control parasite depends mainly on understanding biologic life cycle and role of larvae in diseases transmission. Main target for parasite control can be regulated to the climate conditions, and medical treatment is not necessary. Providing unnecessary condition of...
humidity to prevent further stages of parasite growth is main chemo biology method of control the predacious fungi finalizing widely used in Europe. On goals to protect newborn horses and keeping them healthy so that must be checked frequently for infestation and isolation infected one to avoid pasture contamination. Necessary to remove manure from horse stables daily to avoid contamination food and water by egg and larvae so that helping suppress life cycle or stopping it and also reduce routine uses of anthelmintics Effectiveness of using herbal compounds as anthelmintics against strongylosis is in the way of more explanation and studies.

REFERENCES


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