The Iraqi J. Vet Med., 11 (1987)

IDENTIFICATION AND PATHOLOGY OF *STRONGYLUS* SPECIES IN NATURALLY INFECTED MULES.

I.M.Al-Saqur, W.H.Khamas, S.N.Al-Taee and M. Al-Grabawi. College of Veterinary Medicine, University of Baghdad, Al-Ameria.

SUMMARY

Naturally infected large intestine of 16 mules were collected during one year period. All three species of *Strongylus* were identified: *S.vulgaris, S.equinus* and *S.edentatus*. Specimens were processed for standard histological examination. The effect of the parasite on the wall of the intestine included the surface epithelium, glandular tissue, muscularis mucosa and part of the submucosa. Changes on the intestinal wall were observed at the site of the parasitic attachement, which included oedema, cellular infilteration with congestion and haemorrhages.

INTRODUCTION

Strongylosis of equine is caused by mixed infection of several strongyle species in the large intestine. It is a big problem because of its effect on the general health and performance of animals. *S.vulgaris* prevalence and abundance were studied by several investigators in different counteries (Foster, 1937; Slocombe and McGraw, 1973; Ogburne, 1976; Reinemeyer *et al.*, 1984). Greatorex (1975) described the pathological changes in horses with *Strongylus vulgaris* larval

migration, while Duncan (1974) stated that effect of the adult *S.vulgaris* in the lumen of the intestine is not fully described.

Pathogenicity of *Strongylus* species and the lesions they produce on the wall of the large inteatine were not studied extensively. The only available report on parasitic infection in Iraq was by Leiper (1957) who detected two species of helminths (*Trichonema* spp.) and (*Setaria equine*). No further information is available in the literature with regard to seasonal distribution or pathological lesions caused by equine large red worm in Iraq. Therefore, it was felt desirable to study the strongylus *spp.* prevalence and their pathological lesions.

MATERIALS AND METHODS

Infected regions of large intestine of 16 mules, (4-5) years old, were collected immediatly after sacrifying the animals. Specimens were collected during one year period extending from March, 1985 to February, 1986. Helminths were collected, studied and diagnosed using the criteria of Skerman and Hillard (1966) and Georgi (1974). Tissue specimens were placed in 10% formaline solution or 70% alcohol for fixation for 48 hours or more and processed for routine histopathological examination. Tissue specimens were sectioned and stained with Harris hematoxylin and eosin stain. Further, few sections were stained with periodic Acid Schiff (PAS) reagents (Luna, 1968).

RESULTS

Parasitology: Three species of *Strongylus* were identified from the mucosa of the large intestine. Table (1) shows that *S.vulgaris* and *S.edentatus* were the most

Table 1: Helminthe's detected in the large intestine of naturally infected mules in Iraq.

Sample number	Date of sacrifice	*S.vulgaris*		*S.equinus*		*S.edentatus*	
101	3/1985	191	88	2	3	216	97
105	4/1985	295	187	5	44	79	94
114	5/1985	111	124	-	-	400	272
116	6/1985	56	23	-	-	41	19
128	6/1985	66	54	9	11	49	67
135	7/1985	-	-	8	4	33	19
146	8/1985	42	59	3	1	63	52
213	8/1985	109	99	-	-	138	153
325	9/1985	-	-	-	-	-	-
1025	9/1985	97	56	-	-	139	161
1030	10/1985	54	30	-	2	37	-
1032	11/1985	225	118	-	-	24	31
1033	12/1985	84	53	3	-	63	57
1035	1/1986	-	-	-	-	-	-
1043	2/1986	16	25	6	5	39	46

predominant species recovered followed by *S.equinus* which was detected in small number (Fig. 1).

Histopathology: In most cases the bite of the parasite was big. It included the epithelium, glandular tissue, muscularis mucosa and part of submucosal layer (Fig. 2). Surface epithelium and superficial layer of the glands were completely digested, while the rest of the glandular tissue in the region of the bite was masked by debris of the cells and blood. The area of the bite was

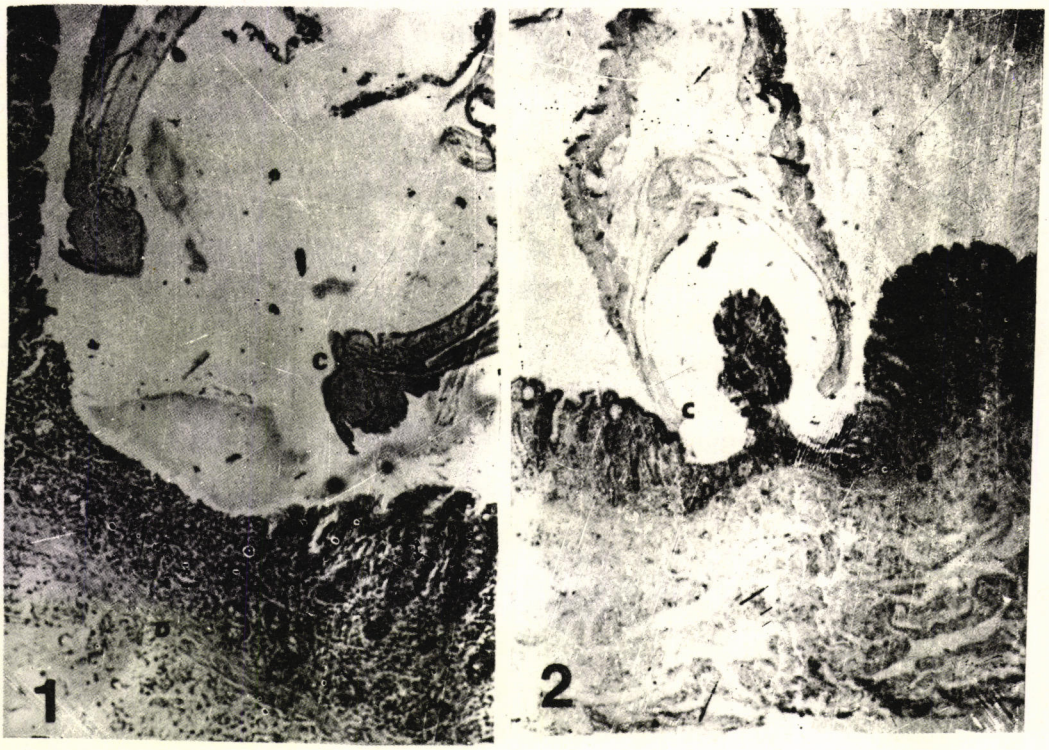

Fig.1.

Microphotograph showing the parasite (*S.edentatus*) close to the site of attachment in the intestine of mule. Notice the erosion of the surface epithelium. H & E Stain. 75 X.

Fig.2. *S.edentatus* at the site of attachment. H & E Stain. 35 X

severely congested and in some places small haemorrhage were obvious (Fig. 3).

Adjacent areas were oedematus and infilterated by eosinophils. Further, mononuclear infilteration especialy lymphocytes, plasma cells as well as macrophages were abundant. These cells tend to increase in number toward the deep layer of lamina propria and submucosa close to the site of attachment of the parasite. Hemosiderin laden macrophages were abundant because of hemolysis of red

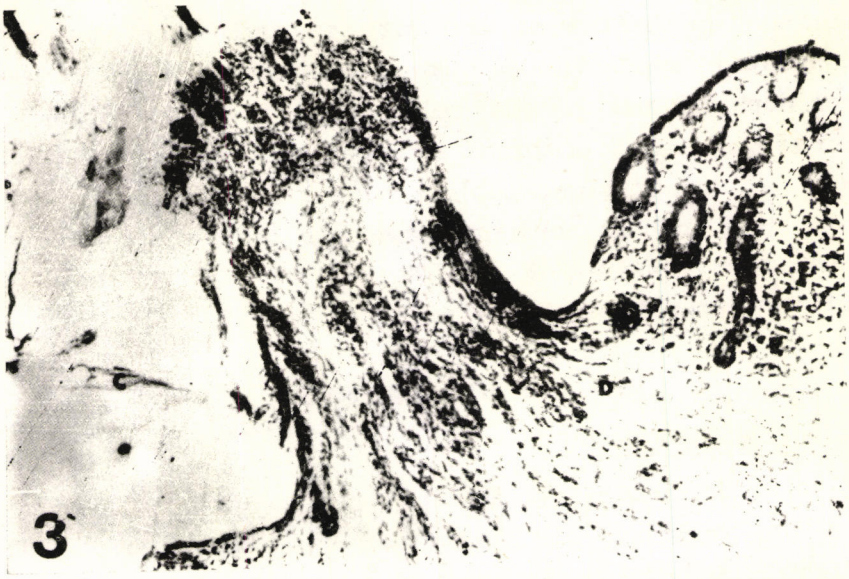

Fig.3.

The exact site of attachment of the parasite (*S.vulgaris*) in the wall of the large intestine. Notice the bite included the lamina propria with muscularis mucosa. H & E Stain. 70 X.

C- Buccal Mucosa
D- Lamina muscularis mucosa
E- Cellular infilteration

blood cells. Eosinophils decreased in number as the bite was approached so that no eosinophils were present inside the bite itself.

In some specimens, the muscularis mucosae were thickened and buldge inside the bite, while in other specimens, the muscularis mucosae were broken and did not buldge into the bite. Other region of attachment showed less changes and the parasitic bite included the surface epithelium and few layers of glandular tissue, whereas muscularis mucosa was intact and not included. The surface epithelium of the bite in this case was highly congested with blood. In such area of attachment, eosinophils and plasma cells were present but not in large numbers as compared to other sections.

In addition, goblet cells increased in number at the site of attachment. Muscular arteries were seen sometimes, especially in the vicinity of the attachment of the parasite.

DISCUSSION

Parasitology: Little informations are avialable on the presence of *Strongylus* spp. in mules, as these animals and the donkey act as a carrier for spreading of helminths infection to horses. The parasites observed in this study are recorded for the first time in Iraq.
Histopathology: The pathogenic effect of the worm on the intestine of the animals depend on the number of the parasites and the size of the bite involved from the mucosa of the intestine. Some of the migratory genera involve the mucosa only, especially migratory larvae which most of the time leave the epithelium intact when they move to a fresh site (Dunn, 1978).

In this study, ulcerative damage and rupture of muscularis mucosae in most cases were detected. Haemorrhage at the site of attachment was observed in some specimens with the adjacent areas infilterated by large number of eosinophils. Diarrhoea might result due to slaughing of epithelium, increased number of goblet cells and increased mucine content in the intestine.

Nodules containing a single worm in yellowish purulent matter have been found in the small and large intestine even in the stomach wall (Dunn, 1978). No such nodules have been observed in the specimens examined in this investigation.

Macrophages, eosinophils and plasma cells infilteration with thickening of muscularis mucosae and thickening of the arterial wall adjacent to the infected area were observed. These findings were in agreement with earlier studies done by Greatorex (1975) and Dunn (1978) in horses.

The site occupied by some parasites in the intestine was speculative by several researchers. It could be due to physiochemical conditions in the gut lumen and feeding habits, which explains why so many species are able to coexist within the same individual host (Duncan, 1975; Crompton, 1973).

REFERENCES

Cromoton, D.W.T. (1973). The site occupied by some parasitic helminth in the alimentary tract of vertebrates. Biol. Rev. 48, 27-83.

Duncan, J.L. (1974). Field studies on the epidemiology of mixed strongyle infection in horses. Vet. Rec. 49, 337-339.

Duncan, J.L. (1975). Immunity to *Strongylus vulgaris* in the horse. Equine Vet. J. 7, 192-197.

Dunn, A.M. (1978). Veterinary Helminthology. Second edition, pp. 212-215, Willam Heinemann Medical Books Ltd, London, Great Britian.

Foster, A.O. (1937). A relationship in the equines between age of host and number of strongylid parasites. Am. J. Hygiene. 25, 66-75.

Georgi, J.R. (1974). Parasitology for Veterinarians. Second edition, pp. 225, W.B. saunders Company, philadelphia.

Greatorex, J.C. (1975). Diarrhoea in horse associated with ulceration of the colon and the caecum resulting from *Strongylus vulgaris* larval migration. vet. Rec. 97, 221-225.

Luna, L.G. (1968). Manual of Histologic staining methods of the Armed Forces Institute of Pathology. Third edition, McGraw-Hill Book Co., New York.

Leiper, J.W.G. (1957). Animal parasites and their control. Report to the Goverment of Iraq. No. 610, FAO, Rome.

Ogbourne, c.P. (1976). The prevalence, relative abundance and site distribution of nematodes of the subfamily Cyanthostominae in horses killed in Britain. J. Helminth. 50, 213-214.

Reinemeyer, C.R.; Smith, S.A.; Gabel, A.A. and Herd, R.P. (1984). The prevalence and intensity of internal parasites of horses at necropsy in the USA, Vet. Parasit. 15, 75-83.

Skerman, K.D. and Hillard, J.J. (1966). A handbook for studies of helminth parasite of ruminants FAO.

Slocombe, J.O.D. and McGraw, B.M. (1973). Gastrointestinal nematodes in horses in Ontario, Can. Vet. J. 14, 101-105.

امراضية الخمج الطبيعي بديدان من نوع Strongylus في البغال

احسان مهدي الصقر 1 ، وائل عبد الحميد 2 ، صباح ناجي الطائي 3
و مولود الغريباوي، فرع الطفيليات 1 ، فرع التشريح 2 وفرع
الصحة العامة 3 ، كلية الطب البيطري، جامعة بغداد

الخلاصة

جمعت الامعاء الغليظة لستة عشر بغلا مخمجة بصورة طبيعية خلال سنة واحدة. وتم تشخيص ثلاثة طفيليات من جنس Strongylus والموجودة في جدار الامعاء وهي S. vulgaris، S. equinus and S. edentatus. مررت العينات للفحص النسيجي المرضي باستخدام الطرق القياسية وقد وجد من الدراسة ان تأثير الطفيلي على جدار الامعاء كان كبيرا حيث شمل الظهارة السطحية والنسيج الغدي والصفيحة العضلية المخاطية وجزء من الطبقة تحت المخاطية. لوحظت تغيرات كبيرة على جدار الامعاء عند الاتصال الطفيلي اشتملت على استسقاء Oedema وارتشاح خلوي cellular infilteration مع احتقان ونزف في بعض الاحيان.