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SURGICAL ASPECTS OF ROUNDWORM DISEASE

BY

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During my last two years as surgeon to the native population of Cyrenaica I repeatedly came across roundworm infestation either simulating surgical conditions or indicating, and in my opinion justifying, surgical intervention. The following three case reports illustrate these points.

Case 1

A boy aged 13 was seized by spastic abdominal pains and violent vomiting while at school on Dec. 12, 1945. He was brought to hospital about an hour after the onset of symptoms. Inquiry revealed that he had been suffering from similar attacks of less intensity for the last ten months. They used to come on about twice weekly at odd times, his pain apparently being localized in the epigastric region. For the same period he had shown no appetite and had been constipated.

Examination showed a thin, very pale boy. The temperature was normal, pulse 100, weak. The tongue was coated and moist. Chest, N.A.D. The abdomen was not distended, its excursions on respiration were noticeably restricted, and it was very tender, with rigidity especially in the right iliac fossa. Per rectum the pouch of Douglas was slightly tender, but no effusion was palpable. An acute appendicular attack with peritoneal irritation was assumed. Following resuscitation, the patient's general condition improved, and operation, under open-ether anaesthesia, was performed about four hours after admission.

A right pararectal incision was made. The abdominal cavity contained much turbid fluid, but no pus. Coils of small intestine presented, thronged with roundworms. The caecum was found above the level of the umbilicus. The appendix was in the retro-caecal position, and not adherent. Its tip was swollen and covered with a pink serosa. After appendicectomy the presenting loop of ileum, which was crammed with worms, was opened, and the worms (*Ascaris lumbricoides*) were removed. Masses of worms contained in other parts of the small gut were "milked" towards the opening and taken out. The longitudinal opening of the bowel-wall was closed transversely, a rubber drain was inserted into the pouch of Douglas, and the abdominal wound was sutured. Altogether 91 worms were removed. The appendix contained a faecolith the size of a cherry stone. The mucous membrane underneath was blackened with ulceration, which, however, macroscopically did not involve the deeper coatings. The post-operative course was uneventful, but the patient now and again complained of abdominal spasms. Following a course of anthelmintic treatment two weeks after operation several more worms were passed. There has been no abdominal discomfort since, and he was discharged cured.

Case 2

A little girl aged 5 was admitted to hospital on May 2, 1946, having been sent by her physician, who diagnosed appendicitis. She had had abdominal pains and retching for the preceding two days. The bowels were normal. The mother stated that she had never noticed worms in the child's stools. The temperature was 99.5° F. (37.5° C.), pulse 90. The general condition was fair. Chest, N.A.D. The abdomen was moderately distended, with tenderness and slight rigidity in the right iliac fossa. On deeper palpation intestinal coils containing longitudinal masses, like bundles of pencils, and very suggestive of roundworms, could be felt through the thin abdominal wall. Santonin and castor oil were given on three subsequent days. Masses of ascarides were passed in several motions. Immediately after treatment the abdominal pains disappeared and the temperature fell to normal. The patient was discharged cured on May 10.

Case 3

A male child aged 3 was admitted to hospital on May 27, 1946. Two days before admission he had had abdominal pains and vomiting, and his last bowel motions occurred three days previously. The temperature was 101° F. (38.3° C.), pulse 100, regular. The general condition was fair. He had abdominal facies, the tongue was coated, and respirations were of the thoracic type. The abdomen was distended, diffusely very tender, with rigidity especially in the right iliac fossa. There was free fluid on percussion. Per rectum there was no appreciable disease. On the assumption of an inflammatory intestinal condition involving the peritoneum, possibly of appendicular origin, laparotomy was performed under general open-ether anaesthesia.

A right pararectal incision was made, and a fair amount of heavily blood-stained turbid fluid of slightly faeculent odour was found on opening the abdominal cavity. The caecum and appendix did not show any abnormality. A loop of ileum belonging to the middle portion of that gut was found to be distended and intensely red; its wall was thickened with inflammatory infiltration, and on the serous surface a thread-like whitish network of swollen lymph vessels was visible. The loop involved measured about 18 in. (45 cm.), a kink forming a double-barrel-shaped incomplete intestinal obstruction about 1/2 in. (1.25 cm.) long. The wedge of mesentery belonging to it was grossly thickened to approximately 1/3 in. (0.8 cm.) in diameter, and appeared white with fibrinous-purulent infiltration. The mesenteric glands were swollen to the size of a cherry or walnut. A mass of partly curled-up worms was palpable in the diseased gut, and there was worm infestation of less intensity in other sectors of the small intestine, which, however, did not look inflamed. The coil of worms was removed through a small incision; it contained about 30 ascarides of various sizes. The near-by loops were emptied by "milking" the worms in them towards the original incision; the latter was then closed. A rubber drain was inserted, and the wound closed around it. After the operation a course of 500,000 units of penicillin was given. On May 31 the drain was shortened, only sero-sanguinolent discharge being seen. There was one normal motion. The drain was removed on June 2, and next day the general condition was satisfactory. The abdomen was soft and not distended. The patient took and retained his food, and the bowel action was satisfactory. On the 5th he vomited five small ascarides. Two days later his general condition deteriorated and he vomited worms on several occasions. Next day there was further deterioration and he vomited twelve worms during the night. On June 9 the patient died, extremely cachectic, choked with ascarides creeping in masses out of his nose and mouth.

Discussion

Diseases due to roundworms play a considerable part among the abdominal troubles of the native population in the Middle East. The clinical picture they produce may mislead the observer, unless he bears in mind their relative frequency in this part of the world as compared with Europe, and the possible variety of accompanying symptoms.

In Case 1 it did not occur to us that roundworms might be the cause of the frequent abdominal spasms. The boy's mother made no mention of their presence in the faeces, and examination led us only to the conclusion that operation was indicated because of clear signs of appendicitis with peritoneal involvement. From previous experience we concluded that the masses palpable through the thin abdominal walls in Case 2 consisted of conglomerates of roundworms; the only disquieting sign was the raised temperature, which we had not found before in roundworm disease. The success of the anthelmintic treatment confirmed our assumption, and suggested that roundworms may cause inflammatory intra-abdominal changes; and the tenderness on palpation may be significant in that connexion. The intense inflammatory changes in Case 3 reminded me of Crohn's disease. However, the presence of a big mass of roundworms in the diseased intestinal loop led me to believe that they were the aetiological agent, not only grossly damaging the bowel wall but also causing the most severe inflammatory infiltration of the related mesentery. Through an unfortunate accident we lost a swollen mesenteric gland which had been removed for histological examination during the operation. Therefore, and because the relatives refused permission to perform a post-mortem examination, no histological details are available.

Summary

Roundworm infestation may become of surgical importance not only by causing mechanical obstruction of the small gut but by producing inflammatory changes varying in degree from trivial (Case 2) to the most serious conditions (Case 3). It is usually

difficult to distinguish this variety of inflammation from that of other origin. Correct diagnosis will be facilitated if in regions with prevalent roundworm infestation one will bear that possibility in mind, and go into the history of the case accordingly, using also the laboratory methods for investigation.

Surgical treatment will have to consider removal of as many worms as possible from the bowel, by "milking" them from adjoining loops towards an incision made over their biggest accumulation.

I would not hesitate even to make more incisions in cases where very extensive infestation renders removal through one opening impracticable.

At times the prognosis seems to depend to a considerable extent on the thoroughness with which the worms were removed during the operation. As medical anthelmintic measures are not advisable for at least two weeks after incision and suture of the gut, the remaining worms have ample time to grow and flood the organism. They may decide the fatal issue in cachectic individuals whose resistance through chronic roundworm infestation has already been lowered a long time before sudden developments compel them to seek medical advice.

MESENTERIC VASCULAR OCCLUSION

BY

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Mesenteric vascular occlusion is one of the less common abdominal emergencies. It is extremely difficult to diagnose and the mortality rate is high; consequently scant attention has been paid to it in most surgical works. In the past five years I have had two cases which recovered, and I feel that wider recognition and earlier treatment would do much to improve the gloomy prognosis.

The first case was recorded by Tiedmann in 1843, but it was not until fifty years later that the first resection was performed (Elliot, 1895). In 1913 Trotter presented 359 cases collected from the literature, with seven personal cases. Cokkinis (1926) published a monograph embodying an exhaustive description of mesenteric vascular occlusion and the mesenteric circulation. A series of cases was reported by MacLeod (1937) and by Atkins (1937), a case complicating labour was described by Grey Turner (1937), and two cases were recorded by Fallis (1940). A review of the literature was given by Brown (1940), and Moore (1941) followed with another, supported by eight cases. In 1943 Luke described a case treated with heparin.

Anatomy

For a proper appreciation of the possible consequences of mesenteric vascular occlusion an understanding of the anatomical arrangement of the blood supply of the intestine is necessary. The whole of the small intestine and the large intestine as far as the middle of the transverse colon are supplied by the superior mesenteric artery. This artery rises at an acute angle from the abdominal aorta behind the pancreas, crosses the third part of the duodenum, and passes forward into the root of the mesentery. It gives off ten to fifteen intestinal branches, and ends near the caecum by anastomosing with one of its own branches—the descending branch of the ileocolic artery. One of its early branches—the inferior pancreaticoduodenal artery—anastomoses with the superior pancreaticoduodenal artery, which has its origin in the gastro-duodenal branch of the coeliac axis, and this forms a collateral channel if the superior mesenteric artery is occluded. The branches of the superior mesenteric artery form numerous arterial arcades in the mesentery by anastomosing with each other. These are more numerous in the lower ileac than in the upper jejunal region. From the arcades the vasa recta, which are true end-arteries with no anastomoses, run to supply the gut-wall. The large bowel as far as the middle of the transverse colon is supplied by the ileocolic, right colic, and middle colic branches of the superior mesenteric artery, the last-mentioned of which anastomoses with the left colic branch of the inferior mesenteric artery, which is a separate branch of the abdominal aorta. This is therefore another important anastomosis should the superior mesenteric circulation be interfered with. Other anastomoses occur with the lumbar arteries in the retro-