

constitute the safest means of obviating the subsequent development of what may prove to be an irremediable condition. Active and passive motion, massage, and electricity, with permanent removal of the splint, should be advised if deemed necessary.

5. Operative treatment depends upon the individual case. No specific procedure can be suggested, but tendoplasty and resection of both bones of the forearm are the two methods of operative treatment offering the best chance of recovery of use of the hand. The nerves should always be examined to determine the extent of involvement, and should be freed if necessary.

6. The prognosis is unfavorable depending upon the duration of the case and degree of involvement of the damaged structures. Partial recovery is not unusual in cases seemingly hopeless in the beginning.

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### A CASE OF APPENDICITIS IN WHICH OXYURIS VERMICULARIS WAS FOUND IN THE APPENDIX.<sup>1</sup>

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LAURA P., a Polish girl, aged fourteen years, was admitted on March 14, 1909, to the Episcopal Hospital, in the service of Dr. G. G. Davis, to whom I am indebted for the privilege of operating and of recording the case. Owing to the patient's ignorance of the English language, it was difficult to obtain an accurate history, but it was learned that she had been ailing for a week or ten days, and that twenty-four hours before admission she had been taken with severe abdominal pain, followed shortly by vomiting. The pain was at first general, but later settled to the region of the appendix. Examination at 9.30 P.M., soon after admission, showed great tenderness with some rigidity over the right iliac region. No mass was present. The temperature was 100.6° F., the pulse 88, and the respirations 34 per minute. The white blood cells numbered 25,000 per c.mm. The diagnosis was acute appendicitis.

*Operation at 10 p.m.* Through the transverse incision of G. G. Davis,<sup>2</sup> an appendix was removed which was congested at the tip, but presented no other gross evidences of disease. The abdominal wound was closed without drainage. When the appendix was slit open at its tip, the lumen of the organ was found to contain a number of minute worms, resembling "seat worms." Subsequent examination under the microscope by Dr. C. Y. White, director of

<sup>1</sup> Read at a meeting of the College of Physicians of Philadelphia, April 7, 1909.

<sup>2</sup> *Annals of Surgery*, 1906, xliii, 106.

the laboratories of the hospital, confirmed the diagnosis of *Oxyuris vermicularis*. When warmed up, the worms squirmed around actively. Under the microscope the appendix presented the ordinary picture of acute suppurative appendicitis in the early stage, its walls being studded with miliary abscesses. The patient's convalescence was uneventful, and examination of her feces revealed the presence of many more similar parasites.

My object in reporting this case is to call attention to the fact that the presence of intestinal parasites in the appendix is by no means rare, but that they are seldom, if ever, the direct cause of appendicitis. As I have pointed out in the chapter on the History of Appendicitis, prepared for the third edition (1905) of Dr. John B. Deaver's monograph, *Fabricius ab Aquapendente*, even as early



Vermiform appendix containing *Oxyuris vermicularis*. (Natural size.)

as 1634, mentions having found at times a worm in the appendix at autopsy; Santorini (1724) made the same observation, and thought that the chief function of the appendix was to serve as a nest for round worms, where they might be cherished and be prevented from escaping into the general intestinal tract.

Many varieties of parasites have been found in the appendix, especially *Ascaris lumbricoides* and *Oxyuris vermicularis*. F. D. Patterson<sup>3</sup> has collected ten cases in which lumbricoid worms and eight in which oxyurides were found in connection with diseased appendices. Tapeworm, trichocephalus, echinococcus, and bilharzia disease were also noted, in one instance each. To his list of oxyuris should be added two cases, reported by Beyea<sup>4</sup> and by Rammstadt.<sup>5</sup>

Still,<sup>6</sup> in 200 consecutive autopsies on children less than twelve years of age, found oxyurides in the intestinal tract in thirty-eight cases (19 per cent.), and of these cases no less than twenty-five, or two-thirds, had the parasites inside the appendix. Oppe, according to Sprengel<sup>7</sup>, found oxyurides six times among sixty appendices removed at operation. Erdman<sup>8</sup> found, among 29 operations for

<sup>3</sup> AMER. JOUR. MED. SCI., 1906, cxxx, 859.

<sup>4</sup> Univ. Med. Mag., 1900, xiii, 67.

<sup>5</sup> Deut. med. Woch., 1902, xxviii, 919.

<sup>6</sup> Brit. Med. Jour., 1899, i, 898.

<sup>7</sup> Appendicitis, Deutsche Chir., Stuttgart, 1906, S. 182.

<sup>8</sup> New York Med. Jour., 1904, i, 537.

appendicitis in children under ten years of age, 4 cases with oxyurides in the appendix. Rostewsew, cited by Sprengel, found parasites three times in the appendix among 278 autopsies on persons who had not died of appendicitis; and also found them present the same number of times among 163 cases of appendicitis: from which he concluded that their influence in causing appendicitis was trifling.

It is well known that L. Metchnikoff holds parasites responsible for the majority of attacks of appendicitis; and he insists that in every case, before operation is undertaken, a microscopic examination of the feces should be made, and that in cases in which it is possible the effect of vermifuge remedies should be tried, even if this examination is negative. In 1901,<sup>9</sup> when he appears first to have called attention to this matter, he referred to four cases in which recurrent attacks of appendicitis ceased after lumbricoid worms had been expelled by the action of vermifuges. He acknowledges that it is not at all probable that the lumbricoids could perforate the appendix or other portion of the intestinal canal, but explains their action on the theory that they first produce erosions of the mucosa, and then deposit in these erosions the microorganisms with which their bodies are covered. In this way, Metchnikoff contends, parasites can be the primary cause of ulceration and perforation of the intestinal wall.

Yet I think the case reported herewith goes to show that even if the worms can be held accountable for the origin of the disease (which is a mere assumption), the lesions in the appendix, even at an early stage, are such as to make prompt operation the safest form of treatment. In this case the walls of the appendix were found on microscopic examination to be studded with miliary abscesses, and it was the opinion of the pathologist that the presence of the worms was a mere coincidence; delay in operation in this, as in most other cases, would have resulted in a localized peritonitis within a comparatively short space of time. From the fact that intestinal parasites are found within the appendix in 12.5 per cent. of children under twelve years of age (Still), it is not logical to conclude that they are on that account frequent causes of appendicitis. It is interesting to note their frequency, and it is important to take measures for their extermination; but the surgeon should not waste valuable time in attempting to cure symptoms of appendicitis by vermifuges, when it is not proved that the worms, even if present, are responsible for the symptoms of disease.

<sup>9</sup> Journal des Praticiens, 1901, xv, 185.