

the ring, but I do not believe that the fascia is sufficiently strong to withstand the pressure from within without aid from the muscle. This is further brought out by the fact that the ring is readily enlarged in cases of hernia, when a deficiency in the internal oblique is found; a lack of protection from a deficient muscle allows the gut to force its way through the fascia; on the other hand, it is not likely that a hernia emerging through a deficient ring would cause a very marked deficiency in the muscle origin.

As to the gap between the lower border of the internal oblique and Poupart's ligament, I have offered the suggestion that is normally filled by the cremaster, the latter muscle serving to bend down the otherwise practically free border of the internal oblique.

Dr. Halstead mentions deficiency in the transversalis in its relation to hernia. The transversalis has, I think, no influence in regard to protection from oblique inguinal hernia—the muscle arches above the internal ring—does not cover it at all. It is important, however, with regard to direct inguinal hernia in its relation to the relative strength or weakness of the conjoined tendon.

As to the disposal of the cord in an operation for hernia, bringing the cord out through the muscle by suturing a part of the internal oblique beneath it I do not believe to be a justifiable procedure. It is not altogether the obliquity of the inguinal canal, nor the size of the internal ring, or its position, or the strength of the fascia which forms it, which protects from hernia, but rather the strength of the muscular valve which covers the ring. If that is so, when a divergence in the muscle fibers is created, immediately over the ring, the muscle is weakened where it should be strongest.

## LEAD ILEUS MISTAKEN FOR APPENDICITIS.

BY JOHN PRENTISS LORD, M.D.

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At about 11 P. M., Nov. 25, 1898, I was called to St. Joseph's Hospital to see a case of appendicitis. The physician in attendance said that the patient had been delirious most of the day, was vomiting continuously, and the bowels had been constipated during his present illness of five days duration. There was marked pain and tenderness over the right lower quadrant of the abdomen, his temperature being 101.5 and his pulse from 130 to 140. He had had a previous attack last June. The man was now becoming progressively weaker, and the doctor thought he should be operated on that night, if at all.

Both the patient and myself arrived at the hospital about midnight, and I found him to be a man 28 years of age, quite a corpulent subject, with a very prominent fat abdomen, he being a bartender by occupation. The man was very pale and weak, wore a pinched expression, pulse 140, and complained chiefly of tenderness somewhat internal to McBurney's point. The patient being quite somnolent and delirious, his statements were not considered reliable. There was tenderness and rigidity over the whole abdomen, and the muscles had a board-like quality, which would have been right-sided in appendicitis, unless diffused by general peritonitis. There was general tympanites except over an area about the size of the palm, just over and internal to the normal location of the appendix, where there was an indistinct doughy mass, suggestive of a ruptured abscess. This tumor (?) was more distinctly outlined by percussion, which elicited a flat note over the area described. The case did not seem to me typical of appendicitis, but the recognition of a serious obstructive factor caused me to recommend immediate operative intervention. This was expected, and readily consented to by the patient's relatives.

Under an anesthetic the rigidity of the muscles was little changed because of a great tolerance for chloroform, enough of which could not safely be given to relax the abdominal muscles. The tumor (?), however, and the area of flatness had changed perceptibly, and occupied a median position below the umbilicus. This was commented upon, and the knife was drawn to make a median incision, because an operation for obstruction was the prevailing thought, when, recalling the history of a previous alleged attack, I resolved upon the McBurney incision as the most likely to uncover the primary cause of the mischief. A long appendix, free from adhesions, was, with some difficulty, lifted from its postcecal position, its short mesentery ligated, and cut step by step, to allow the appendix to be extracted from its deep location. The stump and cuff were secured by the Barker method, to economize time. The organ was disgustingly healthy, in view of expectations, though it was thickened and contained two small hard concretions of fecal matter, which were about the size of small grains of wheat. These, together with a lumen almost obliterated, and walls thickened and hardened, were evidence sufficient to show that there had been inflammation from which resolution had not wholly taken place; therefore, the attack in June was probably appendicitis. But what had caused the present obstruction and illness?

The intestines were entirely free from adhesions. The cecum and ileum presenting were congested and so distended as to interfere with manipulations. Exploration toward the median line quickly revealed a mass of ileum and jejunum markedly contracted, their approximate size having been about that of the little finger; indeed, they were mere tape-like cords. A large proportion of the small intestines were brought outside the abdomen and were meanwhile protected by hot towels. Concluding that there was no advantage, and possibly considerable disadvantage, in this examination, the process of evisceration was discontinued, and bowels were returned. To facilitate the closure of the wound, the cecum was punctured by a trocar and the gas allowed to escape through the canula, through which eight ounces of saturated solution of Rochelle salts were injected to insure early bowel movements. The abdominal wound was closed by layer catgut and retention worm-gut sutures, with perfect results.

The operation was well borne, considering the precarious condition, and it was necessary to sustain the patient by hypodermics of strychnia, nitroglycerin and whisky. There was stupor and delirium until the bowels began moving at 10 A. M. of the same day, when he was much improved in all respects, though the convalescence was slow, and at times interrupted by a return of the somnolence and delirium. This was always improved by salines and stimulants. There was some fever during his entire stay of less than four weeks in the hospital. He has since been doing well.

When the operation was over I remarked that the only similar case which I had ever seen was in a man in whom lead poisoning had been discovered subsequent to operation, when I was told by one of my assistants that the man was a plumber, which fact had not been elicited by me. Further inquiry revealed that this was true, but that he had not worked at this trade for four years, though examination revealed well-marked evidence of plumbism in

his gums, so that there was no doubt in my mind as to the character of his ailment.

When our patient was sufficiently recovered, he was asked about the amount of lead pipe used in drawing the beer, whereupon he answered: ten or twelve feet, that the ice-box was in the basement, and the beer was drawn through the pipe to the floor above; and the circumstance that he slept in the saloon and took beer early and warm, English style, left nothing to be desired as regards causation.

The other case of lead ileus above referred to, and reported because of its manifest interest in this connection, was in an engineer and janitor, who had suffered for a number of weeks with pain in the left hypochondriac region, constipation, loss of appetite, general debility, etc. The pain was at times so severe that it required repeated hypodermics of half a grain or more of morphia, which often failed to relieve. In fact medication brought so little relief that the man begged for relief by operation, he insisting that the contents of his bowels were arrested at the painful point, i. e., at the splenic flexure of the colon. Repeated examinations were negative, though it was thought that there was something there, but it could not be defined. There was difficulty in moving the bowels, but they could be moved. The case was obscure and the patient, tiring of failure to secure relief, insisted on an exploratory operation, which was done by my associate, Dr. Galbraith, May 19, 1898. The only abnormality found was a constriction of the colon, for about ten inches, at the splenic flexure; the gut at this portion having been reduced in circumference to that of an average-sized finger, the contraction of the circular muscles so condensing and thickening the walls as to render the intestine of a firm, solid consistency; the lumen must have been nearly obliterated. The cause of this condition was not understood at the time, and nothing was done, though in the after-treatment vigilance was maintained to keep the bowels moving, and a good recovery followed. The true character of the trouble was discovered in the second week after the operation, the blue line, together with the history, establishing the diagnosis without peradventure.

Literature is for the most part mute upon this part of the pathology, and the only references to this condition which I find in the text-books are the following: The "Reference Handbook of Medical Sciences" states that there is a spasmodic contraction of the intestine, producing constipation in man and diarrhea in animals. Tyson's "Practice of Medicine" (1896 edition) says: It (the colic) is probably due to powerful contractions of the muscular walls of the intestine. Unlike flatulent colic, the abdomen is not distended but flat, and may even be contracted, sometimes so much so that it is said that the vertebrae may be discerned through the abdominal walls. Still, distension of the abdomen is occasionally present. Eulenberg's "Realencyclopädie der Gesamte Medicine," Dritte Auflage, Band ii, contributes definite and valuable information on the subject. Dr. Thomas Oliver, F.R.C.P., in an exhaustive article upon lead in a "System of Medicine," edited by Allbutt, recently published in London, states that "in animals that have died from plumbism he has found the small intestine irregularly contracted; at places so extreme was the spasm that the intestine felt like a piece of cord, its caliber being obliterated. Was the contraction of the intestine in these cases due to the direct action of lead

upon the muscular fiber, or had the arteries become primarily contracted, and thus, by shutting off the blood-supply, caused nervous excitation and muscular contraction? Clearly the pain is due to extreme spasm of a portion of the intestine and pressure upon sensitive nerves, and the recurrent pain would be explained by the effort of the dilated segments of the intestine to pass their contents on into the constricted portions below. Spasm and arterial ischemia, by cutting off the supply of liquid, would aggravate constipation. It is probable that the nerve ganglia are first affected."

In response to a letter of inquiry, Dr. J. B. Murphy kindly sent me a reprint from an article of his on "Ileus" (vide JOURNAL, Jan. 4 and 11, 1896), and, because of its great interest and importance, I reproduce the report of a case of lead ileus detailed by this distinguished surgeon.

Male, aged 40 years; admitted to the Alexian Brothers' Hospital June 10, 1894, and referred to me by the attending physician for operation. The patient gave the following history: Five days previous was attacked with pain of a spasmodic character in the abdomen, followed by vomiting and inability to move the bowels. The abdomen became greatly distended and the symptoms continued up to the time of admission. All efforts to move the bowels by cathartics, stomach and intestinal irrigation were futile. The physician in charge, who had before treated him through a number of attacks of lead colic, believed this attack differed materially from the others, particularly in its duration, which was five days, and the degree of depression. The physical signs showed the abdomen decidedly tympanitic, and an enlarged coil of intestine could be recognized leading up to the right hypochondriac region, where it suddenly terminated. The patient located the pain at this point. It was decided that a laparotomy would be less dangerous than to allow the patient to remain longer with a possible mechanic obstruction. Median incision was made, the omentum withdrawn, and the hand passed up to the right hypochondriac region; the enlarged coil of the intestine was grasped and drawn into the wound; with it came eight inches of a contracted portion, which resembled a solid cord three-eighths of an inch in diameter and was as stiff as a rope of that size.

At first I believed it to be an organic stricture. The intestine above it measured over two and one half inches in diameter, and was distended with gas and fluid feces. Below, the intestine was empty, soft and pliable. After ten minutes' exposure to the air the spasm at the proximal end began to subside and dilatation gradually advanced to the distal. After twenty minutes the intestine had expanded to about one inch in diameter, was returned and the abdomen closed. The bowels moved within three hours. The patient did not have an unpleasant symptom and left the hospital in ten days. The theory of lead colic advanced has been that it was due to a tonic contraction of the muscle of the bowel; but from superficial review of the literature on the subject, I can not find a case recorded where this theory was verified by observation and examination of the contracted portion, as I have noted in this case. Dr. Murphy also states that this contraction is also produced by tyrotoxin, etc.

Dr. J. S. Foote, pathologist to the Creighton Medical College, thus explains the effects of lead in producing these phenomena: "The presence of lead in the tissues of the body seems to declare itself either by a resulting paralysis or in varying degrees of smooth muscle contraction. Its method of operation is one of arrest or modification of cell oxidation. We know that an oxygen income and a CO<sub>2</sub> outgo are necessary conditions of cell metabolism, and whenever these are upset, metabolic failure or excess is the result. If the former, paralysis would follow, if the latter, irritation, with the former "drop wrist" or extensor paralysis, with the latter an irritation equivalent to inflammation. This occurs as a peripheral neuritis with the sympathetic ganglia involved in the gastro-enteric region and a tonic contraction of the smooth part of the small intestine and upper colon. The impulse which travels down the efferent nerves

to the muscle of the intestinal wall meets with an unusual resistance at or near the final distribution of the nerves to the muscle, on account of the modified cell metabolism, and the result is a gathering intensity of nervous energy at its natural point of escape, and an excessive irritation of both nerves and muscle. Muscle only knows how to contract and relax. If the irritation is continued for a long time, some degeneration may follow, with relaxation or paralysis."

It will be observed that none of these cases reported was typic of lead colic, the pain in each having been more localized than in the typic cases, and the retraction usually seen was absent.

It is probable in Case 1 that there was also a contracted segment low in the colon, which would account for the extreme distension of the lower ileum and colon, producing the tympanites. The larger mass of contracted small intestine simulated an inflammatory tumor, until its changed location admitted doubt. The running pulse, with absence of dicrotism, so characteristic of advanced general peritoneal infection was closely simulated. All things considered, the writer feels that his error was only that of fallible man; but is now confident that he will not be again led into the same error after this experience, which having now become yours may help to create greater precision in diagnosis and be of value. It is probable that in cases with tympanitis there are one or more localized constrictions in the bowel, most probably the colon. The more universal understanding by the profession of the pathology of lead ileus, may improve its treatment. The experience of Murphy in getting relaxation of the intestinal spasm by exposure to air, and the injection into the intestine of a solution of salts, as practiced by me, securing prompt bowel movements, suggests possibilities for relief by celiotomy in cases apparently hopeless under the usual methods of medical treatment.

## TREATMENT OF SUDDEN SEVERE POSTPARTUM HEMORRHAGE.\*

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Entirely appropriate to the hemorrhage that sometimes occurs after labor is the popular term "flooding." Such furious bleeding as may occur after a labor it is the lot of the general surgeon but very rarely to meet. Postpartum hemorrhage is the obstetric emergency, for here more depends on quick perception, rapid judgment and swift action than in any other condition incident to pregnancy. Even placenta previa and eclampsia, the other two furies of obstetric practice, do not demand such preparedness for complications as does postpartum hemorrhage. Reference is had only to those rare cases where during or after the placental stage, blood gushes from the genitals in a manner which is appalling and places in a few moments the life of the woman in acute jeopardy.

Some authors say that these cases are preventable, that they are due to improper care of the third stage, that a man who has many cases of postpartum hemorrhage has himself to blame (Spiegelberg), but they all recommend drastic measures for stopping hemor-

rhage and speak with a positiveness that comes only from experience.<sup>1</sup> Michaelis<sup>2</sup> reports a case where, after each of three labors, blood "rushed out like from a barrel with the bottom knocked out," and in the next two labors he removed the placenta at once. It is said that in Prussia a woman dies of postpartum hemorrhage every day,<sup>3</sup> and fatal cases that have occurred in skillful hands are well known. No doubt a large number of cases of bleeding in the third stage can be prevented by proper attention and conduct throughout labor, and there is no doubt that a woman ought almost never to die under such circumstances, but sometimes pathologic conditions exist that defeat every effort of the physician, and the woman bleeds to death under his hands, than which no catastrophe is more terrible.

Investigation of the causes of these hemorrhages bears directly on the physiology of the third stage, the study of the natural mechanism of hemostasis after the birth of the child.

The vessels of the placental sites are simply spaces between the muscular lamellæ, lined with a layer of endothelium, the vessels leading to and from these sinuses quickly losing their coats. Toward the end of pregnancy, according to Leopold, some of these vessels become thrombosed. Immediately after the birth of the child, sometimes even as the child is leaving the uterus, the placenta becomes wholly or partly detached, the sinuses passing from the uterine wall through the serotine decidua to the intervillous spaces of the placenta are cut squarely off, and may be seen on the placenta as open vessels, and felt on the placental site, being filled with clotted blood. Hemorrhage occurs from these sinuses, more or less with every labor, but nature has a very efficient and instantaneous method of controlling it. As the uterus contracts down on its lessened contents, the muscular lamellæ and bundles become superimposed on each other, they are felt together, the various layers slide in many directions on each other, also obliquely from without inward so that the wall thickens. The blood-spaces lying between these shifting layers are compressed, bent and twisted, and mechanically occluded as if ligatured. Some of them are surrounded by circles of muscle, so that the term "living ligatures" is quite apt. The efficiency of this mechanism of hemostasis depends on the vigor of the contraction of the uterine muscle and on the amount of its retraction or muscle elasticity.

Another factor in securing hemostasis is the thrombosis in the vessels themselves. Nature provides for hemorrhage during labor by increasing the total amount of the blood and augmenting its clotting power. This factor is of secondary importance and is relied on by the accoucheur only when absolutely necessary. In the study of the causes of hemorrhage, postpartum, failure of one or other function will be noted, to which must be added another cause, accidental, i. e., lacerations.

Failure or insufficient clotting of the blood can not give rise to the hemorrhages under consideration. Cases of persistent oozing of blood during which the patient's life slowly drains away may be due to this. Hemophila rarely causes death in women, or the class would soon be extinct, as the tendency is transmitted through the female. The writer believes that syphilis

<sup>1</sup> Dohrn: Die Behandlung des Nachgeburtszeitraumes, Jena, 1898.

<sup>2</sup> Michaelis: Neue Zeitschrift für Geburtskunde, Band iv.

<sup>3</sup> Siepen: Deutsche Med. Woch., 1893, No. 21.

\* Read before the Chicago Medical Society, March 22, 1899.