

REPORT OF TWO CASES OF TYPHOID FEVER, WITH PERFORATION AND OPERATION.*

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BENGUET, P. I.

A mild epidemic of typhoid fever occurred in this mountain settlement during the dry season just passed. There were seven cases in all, five of the patients being members of a gang of Japanese carpenters who lived on the lower floor of the servants' barracks of the Civil Government Sanitarium. The upper floor was occupied by Chinese and by native Filipino servants, but no case of typhoid occurred in the building, besides the five Japanese. The origin of the infection of the carpenters is uncertain, but it is probable that the first patient contracted the disease in one of the neighboring road-camps and that the flies, of which there was a plague during the dry months, carried the infection from his dejecta to the food of his companions. A general infection of the water or food supply of the neighborhood doubtless would have affected a larger proportion of the forty or fifty carpenters messing together, and many Filipinos would have been exposed.

One of the two patients concerned in this report was a Japanese carpenter; the other was a native Igorrote, a private in the local detachment of constabulary. The latter lived and messed in the constabulary quarters about one-quarter of a mile from the Japanese barracks, together with about thirty Igorrote and Ilocano comrades, and, as no other case developed there, it is fair to assume that he was infected at some other place, probably in the lowland road camps which he visited on duty from ten to fifteen days before he was admitted to the sanitarium.

Of the seven cases of typhoid fever, four were uncomplicated and rather mild in character; one was complicated by long-continued hyperpyrexia and parotitis; two were complicated by intestinal perforation and peritonitis, and the following is a brief résumé of their history:

CASE 1.—Typhoid fever; perforation about fifteenth day of disease; operation; death.

Patient.—Guteng, Igorrote constabulary soldier, about 25 years old, was admitted to Civil Sanitarium, Baguio, Feb. 24, 1905.

History.—History of illness previous to date of admission unknown, except that he had been indisposed for several days, but had persisted in doing duty about the quarters. He had visited laborers' camps in the lowlands ten or twelve days before admission to the sanitarium.

Course of the Disease.—February 24, his temperature reached 105, pulse 104, and he had roseola on the back. The spleen was somewhat enlarged.

February 27, there was mild delirium during the day, and at night the patient left his bed and attempted to leave the ward. There was moderate diarrhea.

March 3, the case proceeded uneventfully, with tendency to delirium, until early this morning, when the patient gave evidence of severe pain in the bladder and penis immediately after passing urine. At 8 a. m., when I examined him, he was suffering from shock, pulse thin and 120 and face pinched. The abdominal recti were very rigid. The abdomen was tender, but not markedly so.

The patient was stimulated with strychnin and brandy hypodermically, heat locally, enemata of hot water and brandy and warm saline transfusions. There was no improvement or prospect of reaction by 4 p. m.

• *Operation.*—At 4:30 p. m., ten and a half hours after the first symptoms, laparotomy was performed. Ether was the

anesthetic used. An incision was made in the median line, one and a half inches long. Several ounces of flocculent serum escaped. There was no fecal odor. There was intense hemorrhagic peritonitis, the intestines having a mahogany red color. I examined about three feet of the ileum without finding the perforation. The pulse was too rapid and feeble to count, and death on the operating table seemed imminent. In view of the desperate condition of the patient, the character of the peritonitis and the possibility of the peritonitis being non-perforative, I decided to desist from the search for a perforation. I irrigated the peritoneum with hot saline solution and left the abdominal cavity full of it, and closed the abdominal wound with sutures, including all tissues. The pulse and general condition were better for half an hour after operation than all day, but soon declined again. The patient was left on the table and given high enemata of hot water and brandy. There was no reaction to hypodermics of adrenalin chlorid, one to twenty-five thousand, 30 minims and later 60 minims every fifteen minutes. The patient died at 9 p. m., about four hours after the operation.

Autopsy.—A partial autopsy was performed at 10 p. m. A perforation of the ileum was found in a coil of the intestine just above the bladder. The ulcer of the mucous membrane was about one-half inch in diameter, but the opening in the visceral peritoneum was small and apparently plugged with exudate. Several punched-out ulcers of the ileum were found reaching to the muscular coat. There was intense general hemorrhagic peritonitis, with large patches of plastic exudate.

CASE 2.—Typhoid fever; apyrexia; relapse; perforation on thirty-fifth day of disease; operation; recovery.

Patient.—Musiaka, a Japanese carpenter, about 25 years old, was admitted to Civil Sanitarium, Feb. 8, 1905, with a history of having been ill in the Japanese quarters with chills and fever for four days. There was no diarrhea.

Course of the Disease.—February 8, temperature 101.4, pulse 82, otherwise negative.

February 12, there was a diffuse rash on body, probably due to quinin; no splenic enlargement. Blood was sent to Manila for Widal test. Temperature gradually rose in afternoon to 103.2.

February 13, diazo reaction positive. Two roseolar macules were found on back.

February 14, several roseolar macules appeared on back and chest.

February 16, diazo test again positive; spleen normal.

February 19, Widal test of February 12 reported negative.

February 26, no fever for eight days. Patient sat up in chair for a short time. Evening temperature was 101.8.

March 10, temperature increasing daily, reaching from 104 to 104.5 in evening. The nervous system of the patient was much affected.

March 17, patient was groaning with pain about 4 a. m., when the nurse called me. The pain was referred to the region of the bladder, where patient kept his hand pressed. There was tenderness over the entire abdomen, but not marked. There was also board-like rigidity of the recti. Pulse was dicrotic. After consulting with Dr. Snyder, U. S. N., and Dr. Tormey, of Manila, who were guests at the sanitarium, immediate operation was decided on.

Operation.—March 11, 8:40 a. m., four hours and forty minutes after first symptoms manifested, Dr. Tormey gave ether. A median incision, one and a half inches in length, was made. A small amount of turbid fluid escaped; there was no fecal odor; there was a beginning peritonitis, and small areas ($\frac{1}{2}$ inch in diameter) of exudate on the ileum at regular intervals where the coils were in contact with the perforation. Over the bladder was found a perforation of the ileum; the opening into the peritoneal coat of intestine was one-quarter inch in diameter; the gut was red and much indurated for about one inch of its length, and the peritoneal coat was friable. I closed the perforation with interrupted silk sutures (Lembert), irrigated the intestine before returning it to the abdominal cavity, and then flushed the abdominal cavity. I left a small gauze drain reaching to vesicorectal fold, and closed the abdominal wound with silkworm gut, including all layers of tissue, and leaving lower angle of wound open for drainage.

Result.—March 12, the temperature dropped to 99.4 in fif-

* Read before the Manila Medical Society, 1905.

teen hours. General condition was improved. I removed gauze drain at 9:30 a. m. and inserted a fresh one.

March 13, patient was semicomatose, with fluttering of lids and contraction of flexors of hands and fingers. There was no tympanitis nor tenderness over the abdomen. There was no nausea. He began to take nourishment, clear chicken broth. The nervous condition improved during the afternoon.

March 14, patient passed a good night. He had some stupor and nervous symptoms in the morning, but they were less marked. A fresh crop of large roseolar macules, one-quarter inch in diameter, appeared on face, body and legs.

March 15, there was slight tympanitis and a discharge of serous fluid from wound.

March 20, patient improving rapidly; small stitch abscess.

March 27, no fever since March 21; wound healed perfectly.

April 11, no fever for twenty days, but very constipated; patient began to sit up; no abdominal discomfort.

May 2, patient was discharged, cured, and was advised to wear a flannel binder, as a support, for several months.

The observation and treatment of these two cases, with but little aid from the few text-books at hand, have led me to the following opinions concerning the technic and the relative time of the operation for perforation; also concerning the pathology of perforation and the symptomatology of perforation proper in relation to that of the resulting peritonitis.

Since my first notes on the operations I have read two excellent reports on similar cases, one a report of 19 cases by Dr. Morris Manges,¹ and the other a report of 12 cases by Dr. George L. Hays.²

The conclusions of these authors confirm some of my half-formed conclusions and shed light on some of the obscure features of this most interesting and desperate complication of typhoid.

If these reports had reached me two months earlier than they did, I should have proceeded with the treatment of my two cases with much clearer ideas of both the pathology and surgery of the condition and with proportionately greater peace of mind. The general text-book, surgical or medical, is inadequate and unsatisfactory and, as Dr. Manges aptly remarks, "the lore which lies buried in society reports, hospital bulletins and medical journals is not the working stuff which reaches the general practitioner and guides him in the darkness and despair which envelope these gloomy hours" (of recognizing and treating perforation). How shall we determine the degree of shock that would make it advisable to postpone operative interference in these cases?

The "American Text-book of Surgery" advises as follows:

"He (the surgeon) should operate as quickly as possible, but not during marked shock if it is present. In this case he must wait, but only a reasonable time, for the rally, hurrying the reaction, etc."

In Case 1, while waiting for the patient to rally, I delayed longer than I should in the future. The patient never, in fact, rallied from the shock, but after the operation was finally performed his condition improved slightly for about an hour. In future, I should operate as soon as possible after establishing a diagnosis, except in case of extremest shock or of imminent death.

Rapid cleansing of the peritoneal cavity and the absorption of warm salt solution left in the abdomen should aid in relieving the shock. Rapid closure of the perforation, using local anesthesia or ether as a general anesthetic, should not add so much to the existing shock as would the unrelieved and progressive peritonitis and septic intoxication.

Case 1 emphasizes the difficulties offered by such complications as delirium, stupor or obtunded sensibility due to any cause, for such conditions may veil the symptoms of perforation and peritonitis until they have progressed too far to be susceptible of relief.

It will be noted that in Case 2 the operation was begun about five hours after the first symptoms of perforation were manifested. In both cases, about an inch of the intestine adjoining the large perforating ulcer was greatly inflamed and indurated and all the intestinal tissue was friable. Owing to the danger of the sutures cutting through and of the development of other perforations in the same area, I was impressed with the possible advisability of performing enterectomy under such conditions.

I am still inclined to believe that such an operation performed by a rapid and skillful operator would give the patient the best chance of recovery in a condition like that in Case 2, in which shock was moderate and the peritonitis incipient, by preventing the possibility of a secondary perforation from that area at least and perhaps diminishing typhoid intoxication by the removal of a large ulcerating nidus of the disease.

I note that Dr. Hays meets the danger of the rupture of sutures closing the perforation by anchoring that portion of the intestine to the upper angle of the abdominal wound.

Concerning the symptomatology, both cases presented typical and convincing symptoms of peritonitis from the first moment when complaint of pain gained the attention of the attendants.

The first patient was delirious and the time of the beginning of his pain was uncertain, but early in the morning of the day of operation he cried out frequently during efforts to urinate, and examination revealed undoubted signs of peritonitis. In both cases, the pain was referred to the region of the bladder, and to the penis in one case; there was marked rigidity of both abdominal recti muscles in both cases; there was tenderness over the entire abdomen, but especially the hypogastric region; in Case 1 the patient suffered from great shock, sweating and chill, with rapid intermittent pulse, pinched face, pallor; in Case 2 the patient had moderate shock; poisoning of the nerve centers in his case being usually evidenced by twitching of the muscles of arms and face and by a rapid fluttering of the eyelids, much like that observed in certain cases of hysteria.

I was impressed by the fact that there must have been an interval of many hours between actual perforation and the acute symptoms of peritonitis in Case 1 and a considerable interval in Case 2. In the latter case, there was a large opening into the intestine, giving evidence of a necrotic process of several hours' duration. In the former case, there was an advanced general peritonitis, and even in Case 2 there was a well-marked local peritonitis, with patches of exudate on the coils of the intestine in contact with the perforated ulcer.

It may be stated, therefore, that in both cases the symptoms calling attention to the perforation were due to secondary peritonitis and not to the actual rupture of the intestine.

In this connection, the following statement made by the "American Text-book of Surgery" appears to me to be misleading, namely: "When perforation occurs, the individual passes into a state of profound shock." This is true in a sense, but the passage into the state of shock is slow and proceeds *pari passu* with the septic peritonitis.

Dr. Morris Manges, in his report, makes the following

1. The Journal A. M. A., April 1, 1905, p. 1016.

2. The Journal A. M. A., April 22, 1905, p. 1265.

pertinent statement: "It also becomes easy of comprehension that most physicians expect too many and too pronounced symptoms for an early diagnosis of perforation, for the appearance of which they often sacrifice the golden time for successful operative interference, since the fact is so often overlooked and so seldom understood that the perforation itself causes little shock and may even afford temporary relief."

Shattuck, Warren and Cobb³ state that "early warning pains, earlier by a definite number of hours than the severe symptoms, occurred in 14 out of 21 cases of perforation reported by them."

All these facts emphasize the necessity of frequent careful palpation of the abdomen by the physician to determine at the earliest possible moment the occurrence of perforation before the resultant infection, peritonitis and shock have had a chance to proceed far in their development. Equally important is an alert and intelligent nurse, instructed to be on the lookout for the earliest symptoms of the complication.

Special Article

IMMUNITY.

CHAPTER XXXI.

ACTINOMYCOSIS.

Actinomycosis is a chronic infectious disease of man and animals, the lesions of which present, characteristically, a central mass of purulent and necrotic material containing colonies of "ray fungi," about or through which is disposed an abundant growth of granulation or fibrous tissue. In young or rapidly progressing lesions the amount of purulent material is large, while in older lesions well formed connective tissue is more conspicuous. The disease prevails especially among cattle, although it is met occasionally in the horse, hog, sheep, dog, cat and other animals; man is infected not infrequently.

Although the threads of fungi had been found in diseases resembling actinomycosis in 1845 and later, Bollinger, in 1877, gave the first accurate description of the disease in cattle, and in 1878 J. Israel described it as a new disease in man. A short time later Ponfick demonstrated the identity of bovine and human actinomycosis.

The specific organism, *Actinomyces bovis et hominis*, on culture media consists of a mass of delicate threads which exhibit

The Fungus. "true branching" and which, to a certain extent, segment to form "spores." The radially arranged groups of cells which occur as macroscopic granules in the pus of the actinomycotic abscesses, and which gave to the organism the name of the "ray fungus," are essentially a manifestation of parasitic existence; they are not formed in cultures. Each granule represents a colony of organisms the members of which possess club-shaped extremities, and in the center of the mass and extending from it are many of the delicate threads found in cultures of the organism. It grows on various culture media, often as a mold, and stains by Gram's method.

The actinomyces is an organism of considerable resistance. Cultures remain alive for one year or more when in a dried condition and the spores in one instance germinated after having been preserved for six

Resistance. years. A temperature of 80 C. for fifteen minutes kills the spores (Bérard and Nicolas). When suspended in bouillon spores are killed in fifteen hours by direct sunlight, but when thoroughly dried, approximately ten days' exposure produced no injury.

Attempts to place the actinomyces in a botanic system have resulted in many differences of opinion. By some investigators they are considered as an independent family midway between the hyphomycetes and the schizomycetes (bacteria), others place them under the hyphomycetes in the group of the strep-

tothrix, while still others consider them as pleomorphic bacteria placing them in the group cladothrix. Petruschky recognizes actinomyces, streptothrix, cladothrix and leptothrix as genera in the family trichomyces, the latter belonging to the order hyphomycetes. Biological variations which have been encountered have led to the recognition of several species of actinomyces, among which are a number of non-pathogenic forms. Wright limits the term actinomyces to those strains which produce colonies of club-shaped organisms in animal tissues.

Many attempts have been made to transmit actinomycosis to animals by inoculating them with the diseased tissues of animals and man, and with pure cultures obtained from these tissues. Although a number of experimenters have reported positive results, by far the greatest number of the attempts have been fruitless. Probably Wright has been more successful than others in producing actinomycotic lesions in rabbits and guinea-pigs by the inoculation of pure cultures. Colonies of club-shaped organisms developed with considerable uniformity. In many instances the infection remains localized, not causing the progressive and destructive changes which actinomycosis produces when it occurs naturally.

The organism has been found on grains, straws and other kinds of feed, and such bodies are commonly discovered in the initial lesion of the disease. Usually in cattle, and frequently in man, infection is accomplished by their implantation in the soft parts of the mouth (gums, tongue), or in carious teeth. Transmission of the disease to

man by eating the meat of actinomycotic cattle has not been noted. In man the disease is primary in internal organs (lungs, intestines, liver, brain, etc.) in a large percentage of the cases, whereas "lumpy jaw" is rare. The disease extends locally by the gradual involvement of adjacent tissues, which in time become occupied by sinuses, abscesses and masses of connective tissue. Numerous "spores" and bacillus-like cells, having their source in the fungous threads, abound in the vicinity of a colony. The occurrence of such forms in leucocytes and other large mononuclear cells has led some to the view that the micro-organisms may be carried to neighboring tissues or to distant parts as cell inclusions. In cattle the disease usually is more chronic than in man, more fibrous tissue is formed and metastases in internal organs are less frequent. In man the lesions are more purulent in character, large abscesses sometimes form as in the liver, and metastases in visceral organs are more common. Cases of general actinomycosis are occasionally met with in both cattle and man.

Little can be said in the way of prophylaxis against actinomycosis. Knowing the part that infected grains, straws, etc., play in instituting infection, the practice of biting or chewing grains or of using straws as toothpicks, evidently is one which affords opportunity for infection. The presence of carious teeth has often been suggested as a predisposing condition for infection.

Practically nothing is known concerning the degree to which susceptibility to actinomycosis prevails, and the question of immunity to the disease remains unexplored.

Immunity and Susceptibility. The inability to reproduce the infection in animals at will renders impossible the systematic study of these questions. The presence of large numbers of polymorphonuclear leucocytes in the vicinity of the organisms suggests, but does not prove, that they may have some influence in combating the infection. Surely the abundant mass of connective tissue which develops about the abscesses and sinuses aids in confining the process to a definite region.

That the iodid of potassium has a curative influence on some cases of actinomycosis seems to have been well demonstrated. The principles by which it produces its effects are unknown.

MADURA FOOT.

Mycetoma, or Madura foot, resembles actinomycosis in the formation of abscesses, sinuses and granulation tissue, but it shows a peculiar predilection for the foot, which probably is

3. Report of Dr. Manges.