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The occurrence in the writer's experience of a case of the character indicated in the title induced him to examine the recorded knowledge of this affection. Appended to this article is found a bibliography which includes most of the articles that have been written on tubercular ulceration of the stomach. All of the articles referred to were carefully examined and the recorded cases abstracted and tabulated. After this preparation, the writer unfortunately lost the manuscript of the work in question from his carriage, save a few cases in abstract and some data; the bibliography alone was saved. The subsequent notes, therefore, are based on a recollection of the facts which the writer secured. They are correct in general, though lacking in precise details; possibly the reader will gain by this loss, because the impressions, which include the conclusions that had been arrived at, will be more briefly presented than in the elaborate and, perhaps, labored article which the writer had in contemplation. It is believed all the practical portion of the subject is well illustrated in the paper.

The patient in whom this rare condition existed was admitted to the wards of the Philadelphia Hospital in the last stages of pulmonary phthisis, with associate tubercular disease of the intestinal tract. He was a colored man, and 44 years of age; there was nothing peculiar about the origin and course of the disease. It was remarked, at the time of his illness, that he was rather filthy in his personal habits, apathetic and careless about his appearance. He did not expectorate much, while it was

noticeable that the pulmonary discharges were swallowed. Apart from the pulmonary and intestinal symptoms, there was no evidence of local tuberculosis of other organs. The patient took food well and without discomfort.

Abstract of Autopsy.—Mesentery toward pylorus and peritoneum about bile-ducts studded with tubercle. Mustard-seed tubercle of peritoneum in lesser curvature, extending from 1½ inches from pylorus to three inches beyond. This corresponded to an area of thickening of the gastric walls, which, on section, were found to be opposite to a transverse ulcer in the lesser curvature, 3 inches in transverse length and 1½ inches wide, floor of which was cribriform. Directly in line of lesser curvature the submucous coat was much thickened, as well as parietal peritoneal wall, about ½ inch thick. The posterior end of ulceration extends to peritoneum. In the floor can be seen small tubercles. At the anterior end of ulceration is a small, firm, yellowish tubercle, which, on section, was found to contain cheesy matter; and, undoubtedly, the extensive ulceration was due to the breaking down of similar cheesy nodules. Adjacent to this cheesy nodule a few firm submucous mustard-seed tubercles are seen. The cribriform state, not unlike that seen in the bladder, is evidently composed of muscular structure; mucous membrane around ulcer not thickened. The deep portion of this ulcer at posterior extremity, the size of a nickel, is apparently due to breaking in of a large submucous cheesy mass.

Bronchial glands at root of lung enlarged, particularly on right side, but not involved as generally in the tubercular process as the solitary glands of intestine. Only a few anterior mediastinal glands enlarged. Mesenteric and retroperitoneal glands enlarged, and some caseous. Lungs and other organs of the usual appearance in tuberculosis. The usual histological appearance of the milary tubercle and this cheesy mass were found on microscopical examination, and with proper staining the tubercle bacillus was found in its usual relations.

Simple round ulcer of the stomach frequently occurs with tuberculosis. Welch remarks that, as tuberculosis claims such a large proportion of victims at the age when simple round ulcer is likely to develop, the occasional coincidence should be expected. It has been thought, however, to be a marked predisposing cause of tuberculosis. There is no doubt that the occurrence of this lesion in the stomach may cause such a degree of anæmia and such a debilitated state of the system as would favor infection by the bacillus. It has not, however, been the experience, at least the recorded experience, of any one to find simple ulcer of the stomach arise in the course of phthisis. The occurrence of gastric ulceration subsequent to tuberculosis of other organs is due to tubercular infection of the stomach. While, therefore, we may see simple round ulcer of the stomach frequently occur as a lesion antecedent to tuberculosis of other organs, ulceration subsequent to the tubercular process is of bacillary origin.

As may be inferred from the above, tubercular ulcer of the stomach is never primary. It occurs subsequent to tubercular disease of other organs, and usually ensues when there is general infection. It is more likely to occur in the acute forms of the disease than in the more chronic. As it is of secondary origin, none of the predisposing causes of tuberculosis are operative in making gastric infection more probable. It is within the province of a discussion of this subject to inquire why secondary infection of the stomach takes place, and not to discuss the cause of tuberculosis. From its infrequency it is more natural, indeed, to inquire into the cause of its rarity than the reason for its presence. The above assertions are anticipating some facts now to be stated.

The interest attaching to tuberculous ulcer of the stomach arises largely from its rarity. Some forty cases only are detailed. Cruveilhier, Rokitansky, Klebs and other eminent pathologists of large experience speak of its great rarity. Indeed, it appears to have been the opportunity of individual pathologists to have seen but one or two of these cases. Steiner and Neureuter record four cases in 302 autopsies on cases of tuberculosis in children; Widerhofer two cases in 418 autopsies; and Rilliet and Barthez the unusual number of twenty-one in 141 autopsies. All authorities agree that the last mentioned authors were mistaken as to the nature of the ulcers. In the writer's experience, it has occurred but once in a series of one hundred autopsies on cases of tuberculosis in adults. On the other hand, Lebert thinks it is not so rare in children; and it is quite remarkable to note that of the recorded cases a very large proportion occurred in children; at least ten or twelve are thus recorded. Fernet says it is more frequent in children than in adults. Subsequent to childhood its occurence takes place at different ages, the oldest recorded case being in a person past seventy.

The infrequency of ulceration of the stomach of tubercular origin has been explained in two ways. Pathologists differ about equally in their opinion as to the cause of the freedom of this organ from infection. On the one hand, it is believed that the secretions of the stomach are antagonistic to and virtually destroy the tubercle bacillus; and on the other, a large number, on most excellent ground, believe that the absence of the lymphatic structure in the submucous coat, which forms a lodgment for the

bacillus, is the cause of the absence of the disease. For the first theory, experiments are quoted to substantiate it. It has been found over and over again that acids, and particularly the acid secretions of the stomach, do destroy or prevent the growth of the tubercle bacillus. The anatomical reason, however, has much to support it. It is almost impossible, therefore, to decide which is the proper view. The frequent occurrence of the infection in children may be because of the more frequent disorder of the secretions in childhood, coupled with the fact that the sputum is almost always swallowed at this period and therefore more likely to infect the mucous membrane which it bathes. It is quite certain, too, from the case which the writer observed and from the memoranda of other cases, that the subjects of this disease had been careless and did not expectorate as they should or, as in children, had not the strength or the understanding to do so.

Morbid Anatomy.—Tuberculous ulcer in the stomach should not be considered such without the positive presence of the bacillus in the lesion, together with the histological appearances common to tuberculosis; indeed, it may be doubted that one could pronounce an ulcer tuberculous unless the bacillus were demonstrated. The cases which the writer has analyzed and which were recorded since Koch's discovery, were examined for the bacillus and its presence determined. Notwithstanding this criterion, which has been set up by many pathologists for tubercular ulcer, the appearance and association seem to warrant one recognizing this form of ulcer without difficulty. The ulcer or ulcers, for there are more than one usually, are very large. They have been found most frequently in the lesser curvature, in the direction of which their greatest length is seen.

Lebert, quoted by Spillman, reports a certain number of observations in which the ulcers were at the cardia, at the pylorus and at the greater curvature. While the greater number are found in the lesser curvature, their seat is quite variable. Many, indeed, were seen in the anterior wall. The case reported by Litten was a single ulcer in this position.

The mucous coat is entirely destroyed and the ulceration extends to the submucous or muscular coat; the floor of the ulcer is uneven, sometimes clean, sometimes bathed with cheesy and mucous material. Little masses of tubercle are readily seen by the naked eye. Sometimes the floor appears striated or ribbed,

not unlike the appearance of the bladder as seen in old people. The edges vary in thickness; in one portion they may be considerably indurated, in another scarcely at all. Often the edges are undermined and overhanging. Usually there is a great deal of submucous infiltration extending from one side of the ulcer as much as an inch or an inch and a half in distance. This on section is found to be caseating and indicates the direction in which the ulcer is extending. The submucous coat is the seat of little islands of infiltration scattered about the ulcer, and smaller ulcers frequently are seen in the vicinity. Indeed, it is usually the rule to find two or more ulcers rather than a single one. The vascularity of the ulcers differs; some are anæmic in appearance, others are situated over vessels or have penetrated the vessel. When death has occurred from this cause the clot and other appearances of the hemorrhage are seen. In one of Hebb's cases the thickened extremity of an artery occluded by a recent clot, projected about one-eighth of an inch above the level of the floor of the ulcer.

The peritoneum over the ulcer is dull, opaque, and usually studded with minute tubercles. Indeed, sometimes the ulceration seems to have extended from without inwards. Förster reports the case of a patient in whom a tubercle of the peritoneal coat of the stomach had softened and produced perforation. Wilson Fox reports a similar case. Beneke (in Förster) writes of a case of tuberculous perforating ulcer, in which the ulceration occurred near a tuberculous lymphatic gland, with degeneration of the serosa.

The unusual occurrence of ulcerous communication between the stomach and colon was observed by Oppolzer, in 1863. He believes it to be of tuberculous origin. Hemorrhage has been referred to. Peritonitis, after perforation, as in simple round ulcer, has been observed in one instance of tuberculous ulceration of the stomach. Paulicke found perforation with fatal peritonitis to have occurred in a group of tuberculous ulcers near the pylorus, one of which had perforated.

The lymphatic glands in the lesser curvature of the stomach are enlarged and caseated. The anatomical appearances in other organs are those of tuberculosis.

Symptoms.—It is quite remarkable that in the large majority of cases the ulceration existed without any symptoms; indeed, most frequently its presence was not suspected. In the cases

which manifested gastric symptoms prior to death, they occurred but a short time before this termination. In only one of the large series of cases were the symptoms sufficiently classical to warrant the diagnosis of ulcer of the stomach a long while before death. It was a case of Gerhardt's. Pain, vomiting, and epigastric tenderness, like that of ulcer of the stomach, were present for many weeks. Apart from the combination of symptoms in this case all of the cases were without symptoms, or single gastric symptoms alone were complained of. Epigastric pain and tenderness were noted five or six times. The occurrence of sudden hemorrhage was recorded a number of times, and its occurrence was the first indication of gastric lesion. In the larger majority of the cases in childhood it was the only symptom of gastric origin, and was followed usually in a short time by death. In some of the cases the vomiting that occurred could not have been told from the vomiting of gastritis. Perforation and peritonitis occurred in one case. From a study of the cases, therefore, we are warranted in the statement that the larger portion of cases show no symptoms of the grave ulceration that is present.

Hemorrhage occurred in fully one-fourth of the cases, in a sufficient amount to cause death. It is worthy of note that the hæmatemesis is seen in children as frequently, if not more so, than in adults. Vomiting occurred in many cases, and was the only symptom of gastric disturbance, but was not significant. The same may be said regarding the pain. Of course the significance of these symptoms combined, or of one marked symptom, is much increased by the association with, or occurrence during the course of, tuberculosis. Given a case of the latter with such symptoms, tuberculous ulcer might well be suspected. The striking occurrence of gastric hemorrhage in the course of tuberculosis without previous gastric symptoms, might be considered almost always to be due to ulcer. The gastric symptoms apparently did not influence the course of the primary disease in any way, unless fatal hemorrhage or perforation arose.

Diagnosis.—Little need be said of this. As indicated above, when hemorrhage occurs in the latter stages of tuberculosis, it is probably due to an ulcer of the stomach, and when the classical symptoms of ulcer of the stomach arise during the progress of tuberculosis, they are due, in all probability, to secondary ulceration in that organ.

Conclusions:

1. Tuberculous ulceration of the stomach is rare.

2. It occurs most frequently in children.

3. It is never primary.

4. Gastric infection is probably due to the voluntary or involuntary swallowing of sputum.

5. The presence of the bacillus tuberculosis is the only positive proof of the nature of the ulceration.

6. The anatomical peculiarities of this form of ulceration include the following:

a. The seat of the ulcer is in the lesser curvature, although it may be found in any position.

b. More than one ulcer is usually seen.

c. The ulcers are large and irregular.

d. Miliary tubercles in the floor of the ulcer or in the submucous coat are seen.

e. The ulcers are near vessels and the results of vascular ulceration are found.

f. Small caseating masses are seen in the ulcer or at a portion of the periphery. Similar collections are found in the territory adjacent to the ulcer, in the submucous coat.

g. The peritoneum is studded with miliary tubercle very often.

h. Neighboring lymphatics are involved.

7. In the large majority of cases there were no symptoms during life.

8. Sudden hemorrhage is a frequent symptom and cause of death; it has been particularly noted in children.

9. Epigastric pain and vomiting may occur.

10. The presence of gastric symptoms of this kind, occurring in the course of tuberculosis, is significant of possible ulceration.

11. In view of the fact that the swallowing of sputum is possibly dangerous, expectoration should be insisted upon in adults and its method taught to children.

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