

Of the patients treated by successful operation, 69.6 per cent., after periods up to eighteen years, are capable of earning their living; 33.6 per cent. are completely cured; 36 per cent. are much improved; 16.6 per cent. are improved; 13.8 per cent., including two insufficient operations, are not cured.

Garré<sup>2</sup> has been able to trace most of the patients on whom he operated. In 20 per cent. the exophthalmos had not disappeared. In 10 per cent. the tachycardia persists. The rest have been completely cured.

Berry,<sup>3</sup> in reporting on 346 cases of various forms of goiter says, "The vast majority of the patients made excellent and rapid recoveries and were completely freed from their symptoms."

Mayo,<sup>4</sup> in reporting on the results of operations in over 1,100 cases of hyperthyroidism, says, "About 70 per cent. of the patients consider themselves cured and apparently they are well." The others are improved but not well.

Rogers,<sup>5</sup> speaking of exophthalmic goiter, says that 40 per cent. are cured by ligation of three arteries, 60 per cent. by hemithyroidectomy, and 75 per cent. by ligation of four arteries.

#### GOITERS WHICH SHOWED EVIDENCE OF MALIGNANT DISEASE

There were six patients in this group, four with carcinoma, one with papillary cyst adenoma and marked induration of the surrounding tissues, and one with endothelioma. Three of the carcinoma patients died after various periods, and the postoperative history of the fourth could not be obtained. The patient with papillary cyst adenoma made a slow recovery from an incomplete operation, but was well two years later. The patient with endothelioma seemed well four years after operation.

#### CONCLUSIONS

This study has been carried on in a search for the best method of dealing with goiters. The following deductions seem to be fair:

1. For nontoxic patients who suffer from pressure symptoms or from neck deformity, cyst enucleation or partial thyroidectomy are extremely satisfactory procedures. The symptoms are relieved, and the likelihood of later toxicity is almost abolished.

2. For mildly toxic patients, operation is also very satisfactory. When the toxic symptoms develop in connection with preexisting goiter, cure is almost certain. When they develop in the early stages of thyroid hyperplasia cure is usually obtained, but cannot be expected with the same confidence. The operation may be by partial thyroidectomy, cyst enucleation, artery ligation or boiling water injection, according to the peculiarities of the case.

3. The patients with advanced exophthalmic goiter present the most difficult problems. For their successful treatment many elements must be considered, including the complex nature of the ductless glands, their interdependence on each other and on nervous and chemical influences from other parts of the body, and the various therapeutic measures which interrupt this vicious chain of disturbance.

The hyperplastic thyroid gland seems to be the cause of many of the symptoms, and it is the organ most

easily attacked in our effort to control these symptoms. The treatment consists largely in endeavor to control its overactivity.

Rest is an important element in this treatment.

The injection of boiling water (Porter) has an undoubted influence, and can be used for patients too ill for more radical measures.

The ligation of the thyroid arteries is often very beneficial, and can be used in preparing patients for hemithyroidectomy or as a substitute for that procedure.

The excision of a part of the thyroid gland has been followed by so many satisfactory results that it must be considered our most reliable therapeutic measure.

The administration of drugs and animal extracts, and the use of the Roentgen ray may be beneficial.

The choice of these procedures should depend on the condition of the patient. If that choice is judicious, nearly all of these patients can be brought to a condition of marked improvement.

#### NEEDLESS SURGICAL OPERATIONS FROM FAILURE TO RECOGNIZE TABES DORSALIS

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Within the past few years several writers, among them Cabot,<sup>1</sup> Hall<sup>2</sup> and Cheney<sup>3</sup> in this country, and König,<sup>4</sup> Lomnitz<sup>5</sup> and others in Europe, have directed attention to operations for supposedly local disease of the abdomen in patients with tabes in whom no disease was found at the laparotomy. Careful search through the literature fails to reveal more than casual reference to the frequency of such blunders. Surgeons performing laparotomies frequently are fully acquainted with this danger, but it is believed that the following study may stimulate still greater caution.

In the past five years (1910-1915) over 1,000 cases of tabes dorsalis have been carefully studied in the Cook County Hospital on the neurologic services of Drs. Hall, Grinker, Hassin, Hamill and Kuh. These records have been examined to determine the relative frequency of the cardinal symptoms, the number of patients operated on, the frequency of gastric crises, etc. In estimating the number of operations, only those have been included in which the patient was told by the surgeon that nothing wrong was found, and in which the old symptoms returned following the operation. Cases have been excluded when scars of previous operations were found in the epigastrium, kidney or appendix regions with no record of what was found or done at the operation recorded on the history sheets, or when this could not be learned from the surgeon. Obviously some of the latter deserve recognition, as all these patients at the time of admission to the hospital exhibited several or many of the important symptoms of tabes. It is believed, however, that this error is not a great one.

1. Cabot, R. C.: *Differential Diagnosis*, Philadelphia, 1914, ii, 229, 230.
2. Hall, G. W.: *Tabes and the Surgeon*, Ill. Med. Jour., 1910, xviii, 527.
3. Cheney, W. F.: *Gastric Disturbances in Tabes Dorsalis*, Am. Jour. Med. Sc., 1913, cxlv, 328.
4. König: *Tabische Krisen*, Deutsch. med. Wchnschr., 1911, xxxvii, 2357.
5. Lomnitz, quoted by K. Singer: *Die Krisen der Tabiker*, Berl. klin. Wchnschr., 1911, xlviii, 2168.

2. Garré: *Verhandl. d. deutsch. Gesellsch. f. Chir.*, 1911; *Murphy's Year Book*, 1912.

3. Berry, J. H.: *Lancet*, London, March 15, 1913.

4. Mayo, C. H.: *Med. Rec.*, New York, Dec. 31, 1910.

5. Rogers, John: Paper read before New York Surg. Soc., Jan. 15, 1915, and personal communication to the author.

Of 1,000 patients with tabes, only five had operations in the Cook County Hospital during the past five years (1910-1915). About 200 tabetics are admitted to this institution annually, and there are approximately 2,400 major surgical operations performed here each year. Regarding the remainder of those operated on, it was learned that in ten different hospitals, widely separated from each other and naturally with great variations in size and experience of the surgeons, there were twenty operations on tabetics under mistaken diagnoses in approximately the past four years.

It is clear that the mistake is not confined to any special locality. Furthermore, it was learned that such operations are fewer in the larger hospitals, such as the Cook County Hospital, than in the smaller hospitals throughout the United States.

The following are what have been apparently surgical errors: Ninety-seven operations have been performed on 87 patients. Of the total number, there were 19 operations on 18 patients for gastric ulcer; 19 operations on 16 patients for gallstones or cholecystitis; 18 operations on 17 patients for appendicitis; 11 patients were operated on 13 times for salpingitis; on 9 patients an exploratory laparotomy was made; 7 operations were performed on 6 patients for renal calculi; 7 operations on 5 patients for postoperative adhesions, and 1 operation for each of the following: tumor of the cauda equina, sciatica (nerve stretching), meningocele, ectopic gestation and peritonitis. (See the accompanying tabulation.)

Of 1,000 tabetics, 8.7 per cent. have been subjected to laparotomy under mistaken diagnoses one or more times. Furthermore, gastric ulcer was the diagnosis most frequently made, and next gallbladder disease, with appendicitis a close third. As regards operations for postoperative adhesions, there were seven on five patients. One patient had five laparotomies, the last three for postoperative adhesions, and following each operation the old symptoms of epigastric pain with severe vomiting returned, that is, the gastric crises of tabes.

USELESS SURGICAL OPERATIONS IN ONE THOUSAND CASES OF TABES DORSALIS

Surgeon's Diagnosis	No. of Operations
Gastric ulcer	19
Gallstones or cholecystitis	19
Appendicitis	18
Salpingitis	13
Exploratory laparotomy	9
Renal calculi	7
Postoperative adhesions	7
Tumor of cauda equina	1
Sciatica (nerve stretching)	1
Meningocele	1
Ectopic gestation	1
Peritonitis	1

Total number of operations..... 97 (9.7%)

In Chart 1 is shown the relative frequency of the important symptoms; altered pupillary reactions in 800 patients; lancinating pains, usually early in the disease, in 740; loss of the patellar reflexes or of the Achilles jerks or both in 700, etc. It is of interest that

visceral crises were observed in 22 per cent. of all the patients, that is, 19 per cent. of the gastric type, 2 renal, and 1 per cent. intestinal crises.

In the report by Schaffer<sup>6</sup> regarding the symptoms in tabetics, the following are given in order of frequency: pupillary symptoms; lancinating pains; Westphal's sign (loss of patellar reflexes); Romberg's symptom, and urinary disturbances.

In Chart 2 the relative frequency of the symptoms included in the previous chart are contrasted with those in the eighty-seven patients operated on, the light line representing the eighty-seven patients operated on, the dark line the incidence indicated in Chart 2, here reduced to a curve.

From consideration of this chart it is evident that in 65 per cent. of the 87 patients operated on, the "crises" must have largely influenced the decision to operate, for in the entire series, visceral crises were observed only in 220 patients, or 22 per cent. This supposition is also supported by statements that the initial symptoms leading to the ninety-seven operations were gastric crises in 17 per cent. Friedenwald<sup>7</sup> found the gastric crises occurring as the initial symptom of tabes but five times in forty-two cases, and, according to this writer, Erb found them ten times in 400 cases, and Fournier fifteen times in 211 cases.

The following brief summaries of case histories are introduced to illustrate how the data used in the charts have been arrived at and also how great the importance attached to early symptoms of "crises" has been in determining operation.

CASE 1.—L. K., woman, aged 46, housewife, when admitted complained of paroxysmal attacks of intense abdominal pain, vomiting and diarrhea for twenty years.

Twenty years ago she had a right cystic ovary removed. No relief followed the operation. One year later her appendix was taken out. Following this all of her former symptoms returned. During the next ten years she had three operations for postoperative adhesions. She entered the hospital with her original complaint.

Physical examination revealed a poorly nourished individual who appeared acutely ill, sclerae icteric, lips cyanotic, bilateral ptosis, both pupils slightly irregular and not reacting to light. There was a generalized abdominal tenderness but no definite rigidity. There were multiple abdominal scars of previous laparotomies. All the normal reflexes were active and readily elicited, except the Achilles jerks, which were sluggish. There was a transverse band hypalgesia about the chest. No Romberg's symptom and no ataxia were present. Lumbar puncture revealed a clear fluid under normal pressure. Nonne negative. Cell count showed 15 small mononuclear lymphocytes per cubic millimeter.

Here the initial symptoms were a combination of gastric and intestinal crises. The first operation, said to have been for a cystic ovary, may possibly have revealed gonorrhoeal salpingitis, and has not been enumerated in the charts or other statistics. That the

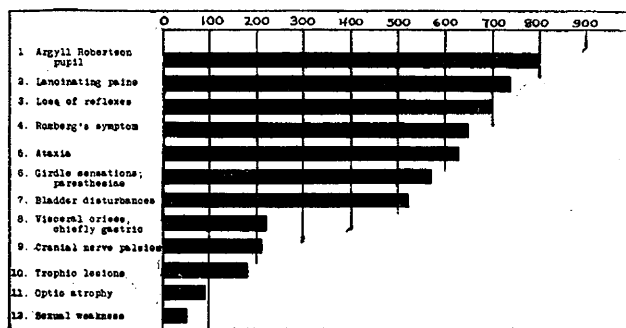


Chart 1.—Relative frequency of the cardinal symptoms in 1,000 cases of tabes dorsalis; thus, 800 patients presented Argyll Robertson pupils, 740 lancinating pains, etc. Note that the visceral crises were present in 22 per cent.

6. Schaffer, Karl: Tabes Dorsalis, Handbuch der Neurologie von Lewandowsky, Berlin, 1911, ii, 1037-1038.  
7. Friedenwald, J., and Leitz: The Gastric Crises of Tabes, New York Med. Jour., 1912, xcvi, 13.

appendectomy was truly indicated cannot be determined. Whether the three successive laparotomies were made for troubles which the surgeon, previous to operation, believed due to postoperative adhesions, or whether the conclusions were arrived at subsequent to the operations cannot be determined from the records.

CASE 2.—M. C., aged 49, married, a traveling man, entered the Cook County Hospital, May 8, 1915, complaining of paroxysmal attacks of nausea and vomiting, epigastric pain and weakness. The vomiting bore no relation to food taking, and often appeared suddenly in the middle of the night. Attacks lasted from two to three days, and disappeared suddenly. In 1908 the patient was operated on for gastric ulcer, but nothing abnormal was found. In 1912 he was operated on for gallbladder trouble, and a cholecystotomy was done. This gave him no relief, and with the return of his old symptoms the patient submitted to a second operation on his stomach for postoperative adhesions. He has since developed a postoperative hernia the size of a hen's egg at the site of the last operative scar. He is now a morphin habitué.

Physical examination revealed ptosis of the right upper eyelid. The right eyebrow arched upward more than the left. The wrinkles on the right side of the forehead were deeper than on the left, that is, there was compensatory overaction of the right occipitofrontalis muscle. The pupils were oval, irregular in outline, and unequal in size. Reaction was very sluggish to light. There was marked ulnar analgesia. Hyperalgesia was present over the thighs anteriorly. There was a slight degree of ataxia. Romberg's symptom was suggestive. There was paroxysmal incontinence of urine. The plantar, Achilles, triceps and other reflexes were all readily elicited. The patient left the hospital before an analysis of the spinal fluid could be made.

This also serves to illustrate the onset of tabes with typical gastric crises. After fifteen years of the disease, the plantar and Achilles reflexes are still active.

CASE 3.—J. H., man, aged 50, druggist, entered the hospital complaining of pain in the left leg present for the past fifteen years. Beginning in the left hip, these pains radiated down the leg into the foot, and at times were constant, severe and sharp. There was impaired sensation over the outer surface of the left lower extremity. The patient stated that one year before he lost the sensations of pain and touch in this limb; he could stick needles into the leg without feeling it. He has been taking morphin sulphate, 1 grain per dose, to relieve these pains.

Physical examination revealed an emaciated, elderly man of medium stature. The pupils reacted to light and accommodation. The heart, abdomen and genitalia were negative. There was a trophic ulcer present at the base of the left great toe. The patellar and Achilles reflexes were absent. Pain sensation was greatly diminished over the lower left leg laterally. No pain was elicited on pressure over the sciatic nerve.

The patient was transferred from the neurologic service with the diagnosis of tumor of the cauda equina, for surgical

treatment. The operation as recorded on the history sheet follows:

"Longitudinal incision over spinous processes in lumbar region, down to vertebrae.

"*Pathology.*—Chronic pachymeningitis, with areas of hemorrhagic character, and adhesions between cord and meninges posteriorly. Cord has dark spotted appearance, like old hemorrhages.

"*Technic.*—Opening and closing spinal canal by laminectomy. Opening dura and closure with catgut. Clearing adhesions with probe."

During the operation the condition was recognized as tabes. Death occurred three weeks later. No postmortem examination was made.

Over forty-seven years have passed since Charcot<sup>8</sup> described the gastric crises in tabes. His work forms the basis of all our knowledge regarding them, and relatively little additional information concerning them has been learned; his account is worthy of repetition:

But of all the visceral symptoms which may display themselves from the period of lightning pains, one which is at once the most remarkable and the least known, if I mistake

not, is that which I have proposed to designate by the name of gastric crises. . . . Very often, their real signification remaining misunderstood, they are the occasion of grave errors of diagnosis.

But it is time to tell you in what these gastric crises consist. Suddenly and generally at a period when a paroxysm of shooting pains has seized upon the extremities, the patient complains of pains which, starting from the groins, seem to ascend both sides of the abdomen and to fix themselves in the epigastric region. At the same time they complain of pains situated between the shoulders which radiate around the base of the trunk in a lightning-like manner. Then the pulsation of the heart commonly becomes violent and precipitated. . . . Frequency of the pulse without fever is in truth a very common incident. . . .

Almost incessant and extremely distressing vomiting is often associated with gastric crises. Food is first ejected and then a mucous colorless liquid sometimes mixed with bile or tinged with blood. An intense feeling of sickness and vertigo are superadded to the vomiting and cardiac pains. . . . Many a time I have seen this symptom diverting the attention of the physician and causing him to misapprehend the real nature of the disorder. I also have several times fallen into the snare in other days.

A number of writers have adopted the classification of the gastric crises attributed to Fournier. He divided them into the following types:

1. The *grand crise gastrique*, in which there is extreme epigastric pain, retching and vomiting, followed often by general prostration. This is the most common form.

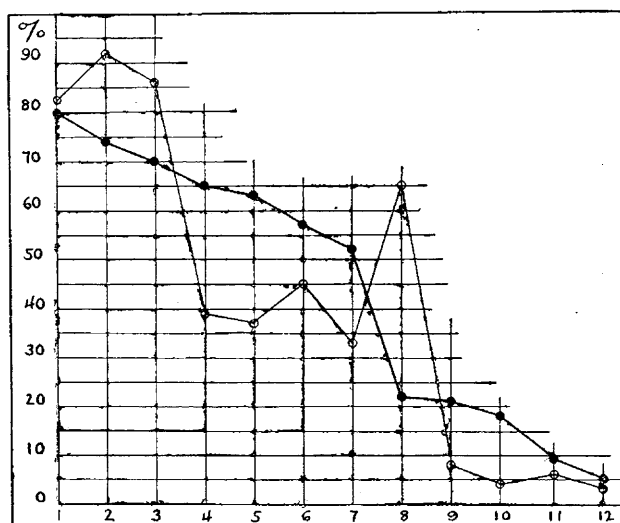


Chart 2.—Frequency of cardinal symptoms; the ordinates represent the cardinal symptoms in the following order: 1, Argyll Robertson pupil; 2, lightning pains; 3, loss of reflexes; 4, Romberg's symptom; 5, ataxia; 6, paresthesia; 7, bladder disturbances; 8, visceral crises; 9, cranial nerve palsies, diplopia, strabismus, etc.; 10, trophic lesions; 11, optic atrophy, and 12, sexual weakness. The light line represents the eighty-seven tabetics operated on, the heavy dark line the incidence indicated in Chart 1, but here reduced to a curve. Note that the crises (Ordinate 8) were present in 65 per cent. of the patients operated on as contrasted with but 22 per cent. in the series of 1,000 cases.

8. Charcot: Lectures on Diseases of the Nervous System, New Sydenham Soc. Pub., 1881, xc, 29.

2. Crises with vomiting alone.
3. Crises with pain alone.
4. Crises in which there may be only loss of the appetite.

That they may and do occur as the initial symptoms of tabes must be remembered. Their average duration varies from one to three days; they may drag on for several weeks with the ultimate exhaustion of the patient. The sudden onset and abrupt termination is quite typical of them. During the intervals between the attacks, the stomach functions in a normal way. During the attacks the pulse rate is accelerated (from 90 to 100) while the temperature usually remains normal.

Stomach analysis of the vomitus and of the gastric secretions during the crises fails to reveal anything characteristic. Bile-stained mucus with hyperacidity, hypacidity, and even achylia have been found.

The blood pressure is raised during the crises. Thus Barker<sup>9</sup> reports a blood pressure ranging between 180 and 220 mm. Hg during a seven-day attack. He noted that with the fall of the blood pressure to normal, the attack promptly subsided. Accordingly nitrite medication as well as epinephrin chlorid during the crises gives relief.

From a study of the information presented in these charts, it is apparent that the mistaken diagnoses and resulting operations were chiefly in two main groups of patients.

1. Tabetics in whom the initial symptoms were the visceral crises and less frequently those with renal or intestinal crises.

2. Tabetics in the class designated by Erb as "tabes incompleta" or "formes frustes" by the French. These patients presented fewer of the characteristic symptoms of tabes, and the mistakes leading to operations are less surprising.

From studying these records it has seemed that the mistakes made have been not so much the result of clinical ignorance as of superficial examination and the failure to consider tabes: furthermore, there would seem to be little excuse for such failures when patients present themselves for examination with a history of pain in the stomach, vomiting, rheumatism, paresthesias, arthropathies, bladder disturbances, or fractures without physical violence.

In studying these records the possibility of bona fide abdominal disease developing in tabetics has been constantly in mind. An example of this follows:

CASE 4.—J. G., man, aged 53 (?), a laborer, was admitted to the hospital complaining of general weakness, failing vision, anorexia and ataxia.

Physical examination revealed a feeble old man, poorly nourished, and taking but little interest in his surroundings. The right eye was missing. The left pupil did not react to light, and only sluggishly to accommodation. There was no abdominal tenderness or rigidity. The patellar reflexes and Achilles jerks were absent. Paresthesias were present.

The patient was admitted to the neurologic service with the diagnosis of tabes. There was sudden onset of intense epigastric pain. The pulse became rapid and thready, the face cyanotic, respirations shallow and labored, temperature subnormal, and death occurred five hours after admission.

Dr. LeCount made the following anatomic diagnosis:

"Perforating peptic ulcer of the duodenum; fibrinopurulent peritonitis; edema of the mediastinal tissues and of both lungs; subcapsular petechial hemorrhages of the liver; healed encapsulated caseous tuberculosis of the left lung;

tuberculous osteomyelitis of the ribs; moderate kyphosis; moderate hyperplasia of the biliary, mesenteric and tracheo-bronchial lymphgland; adventitious fibrous adhesions between the lungs and chest wall; syphilitic nodular sclerosis of the aorta; gummatous scars in the leptomeninges; copper-colored scars over the left tibia; marked chronic diffuse nephritis—secondarily contracted kidneys; marked hypertrophy of the left ventricle of the heart; numerous absent teeth—caries; old healed scars of the left temple; infantile cecum; persistent membranous eustachian valve; postmortem digestion of the lining of the esophagus." The spinal cord was not examined.

Other patients with tabes were operated on for hernia, many were treated for fractures; some patients with tabes had gallstones removed according to the records, others stones from the kidney. None of these, as previously stated, have been included in the unnecessary operations.

Recently, we have received a very promising aid to the early diagnosis of tabes in the so-called cytodagnosis of the spinal fluid. "Marked lymphocytosis appears to occur even in the earliest stages of tabes."<sup>10</sup> A positive Wassermann reaction with the spinal fluid is of great value in doubtful cases.

As Cabot<sup>11</sup> has stated:

What we are learning in the last few years, since lumbar puncture and Wassermann reactions in the blood and spinal fluid have become matters of routine in doubtful gastric cases, is that any type of stomach trouble, acute or chronic, mild or severe, sharply painful or merely distressing, may be due to cerebrospinal syphilis. Until within the past few years, one was on the lookout, if he were conscientious, for so-called gastric crises in tabes. What we have learned lately is:

- (a) That we must suspect the possibility of tabes even when the pupils are normal, and must investigate this possibility by means of spinal puncture.

- (b) That any sort of gastric abdominal pain or distress may be due to tabes.

It is believed that with a careful examination to exclude tabes, in the future more tabetics will be spared useless surgical operations, and more acute abdominal symptoms will be proved of spinal origin.

#### CONCLUSIONS

1. Of 1,000 tabetics, 8.7 per cent. have been subjected to laparotomy under mistaken diagnosis one or more times.

2. The "crises" of tabes have largely influenced the surgeon in his decision to operate. This statement is supported by the fact that 65 per cent. of the eighty-seven patients operated on presented visceral crises. In 17 per cent of these, the "crises" were the *initial symptoms* of their disease.

3. Mistaken diagnoses and resulting operations occur chiefly through failure to examine the nervous system.

4. Gastric ulcer, gallbladder disease and appendicitis are the diagnoses most frequently made.

5. Tabetics subjected to several successive laparotomies have, as a rule, been operated on by as many different surgeons.

6. A history of paroxysmal attacks of vomiting, rheumatism, paresthesias, bladder disturbances or fractures without physical violence should excite interest to exclude tabes dorsalis.

7. The cytodagnosis of the cerebrospinal fluid, together with the Wassermann reaction with the spinal fluid, are of intestimable value in doubtful cases.

9. Barker, L. F.: Paroxysmal Arteriospasm with Hypertension in the Gastric Crises of Tabes, *Am. Jour. Med. Sc.*, 1910, cxxxix, 631.

10. Erb, Wilhelm: *Tabes Dorsalis*, Modern Clinical Medicine (Church's Translation), 1911, p. 528.

11. Cabot, R. C.: *Differential Diagnosis*, p. 256.