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A Review of Syphilis of the Stomach.

INTRODUCTION.

ONE of the least studied chapters of Syphilis is that dealing with syphilitic lesions of the stomach. Very few authentic cases have been recorded in British medical literature. Whether this is due to the rarity of this condition or to omission on the part of the British observer, it is difficult to state.

Judging from the reports of all the large pathological laboratories in this country, however, it would seem that gastric syphilis is extremely rare. This was pointed out by Turner¹ in discussing a lecture by Monod in 1921. He stated that in a personal experience of nearly 13,000 autopsies at the London hospital since 1907, he had met with only one case which might probably be regarded as syphilis of the stomach, although even in this case the proof was not completely established.

Even Jonathan Hutchinson,² with his enormous experience, seems to have met with gastric syphilis on one occasion only, and refers to this in his text-book on syphilis, published in 1887. He states "I do not know of any museum specimens nor of any published observations of syphilis of the stomach, but I have witnessed in a single case most distressing stomach pains after food, in association with extensive induration of the tongue."

A search through foreign medical literature, however, indicates that an ever-increasing number of cases of gastric syphilis are being reported by contemporary writers, thus showing that this condition is not so rare as British medical literature would have us believe. In America the routine practice in many of the hospitals of carrying out a Wassermann test on all entering patients has revealed a surprisingly large number of cases of gastric syphilis, which otherwise would have escaped a correct diagnosis. Thus the supposed rarity of this condition is without doubt accounted for, not only by faulty observation, but also by the close similarity between the symptoms of gastric syphilis and other forms of gastric disease.

The great advance of the last two decades, dependent on biological, experimental and therapeutic studies in syphilis, has led to an enormous increase in the number of cases of visceral syphilis recorded, so that to-day we look upon gastric syphilis as one of the not infrequent complications of that disease. In fact, contemporary literature on this subject is now very extensive.

In Germany, numerous clinical and pathological reports have been collected by Hausmann,³ Fraenkel,⁴ Neugebauer⁵ and others. In France the subject has been thoroughly reviewed by Leven and Barret,⁶ Mathieu,⁷ Pater⁸, Monod and Hayem,⁹ while in America Wile,¹⁰ Hemmeter, Stokes,¹¹ Einhorn,¹² Smithies¹³ and others have all contributed interesting articles on the subject. In Britain, M'Nee,¹⁴ M'Donagh,¹⁵ and Fenwick¹⁶ have described cases of gastric syphilis.

In my own experience as a general practitioner in the treatment of forty-two cases of syphilis during the last seven years, I have met with what I consider to be gastric syphilis in five cases. The interest in these cases lies in the fact that they were all suffering from chronic gastric disease and showed no evidence, at least clinically, that they were suffering from syphilitic infection. Four of these cases were at first diagnosed as chronic gastritis, while the fifth was suffering from a tumour of the pylorus of many years' standing supposed to be malignant. A diagnosis of gastric syphilis was made only after careful investigation, and the therapeutic results obtained in all the five cases justifies the diagnosis of syphilis of the stomach.

The importance, therefore, of this question of gastric syphilis is undeniable. If syphilis of the stomach is to be formally recognised, then a correct diagnosis may save a patient's life and there can be no greater satisfaction than to see a rational and methodical plan of treatment effect, as a result of a correct diagnosis, a complete cure in a patient suffering from a grave and chronic disorder of the digestive system. In fact, once a correct diagnosis of gastric syphilis is made, it is questionable if a more brilliant therapeutic result can ever be obtained in medicine than that which is obtained in the treatment of gastric syphilis by the proper means.

HISTORICAL.

The history of gastric syphilis falls into two great periods: (a) that from 1741-1907—from Morgagni to Pater—when clinical, pathological and therapeutic facts were marshalled; and (b) that since 1907 to the present day, during which time modern methods of research have thrown a flood of light upon the subject.

The first observation on syphilis of the stomach that I find in medical literature was that by Morgagni¹⁷ in 1741, when he describes a tubercle (gumma) in the stomach of a man who died following an attack of epilepsy and presenting manifestations of syphilis.

In 1834, Andral¹⁸ describes a case of chronic syphilitic catarrh of the stomach which is probably the first authentic case of this condition recorded. It was the case of a young woman, aged 27 years, not evidently syphilitic, who had been suffering for a period of two years from vomiting, epigastric pain, loss of appetite and wasting. The stools were normal and the diagnosis of chronic gastritis was made. In spite of treatment the patient became gradually worse and the vomiting was almost incessant. Sore throat developing, however, ulceration of the fauces of a certain character was observed by Andral, who being suspicious of syphilitic infection, instituted treatment by mercurial pills. At the end of a fortnight there was some improvement; at the end of a month vomiting had ceased. Mercurial inunctions were then ordered and after twelve "treatments" the patient's condition completely changed. The pain as well as the vomiting ceased and a perfect cure was established.

Chiari¹⁹ in 1891 performed 243 autopsies on known cases of syphilis and found stomach lesions in two cases only. In one case the disease was inherited, in the other acquired.

In 1899 Fraenkel⁴ describes a remarkable case seen in 1895. A man, aged 47 years, was admitted to hospital suffering from diarrhoea and pain in the abdomen and died from peritonitis following acute perforation of the stomach. In the stomach thirteen ulcers were present, along with thirty-one scattered along the small intestine. A diagnosis of enteric fever and tuberculosis of the gastro-intestinal tract were fully considered, but after a very careful histological examination had been made the diagnosis of syphilis was established.

In 1901, Fenwick¹⁶ claimed that 5 per cent. of chronic gastric ulcers were syphilitic in origin.

Fournier²⁰ records a case in 1903 in which a pyloric tumour rapidly disappeared under specific medication as soon as it was remembered that the patient had had syphilis twenty years before.

In 1905, Hayem⁹ narrated a case of a man who was operated on for carcinoma of the pylorus causing stenosis. This, however, turned out to be a case of diffuse syphilitic infiltration of that organ. Anti-syphilitic treatment completely cured the case.

Pater⁸ in 1907, in his well-known thesis on gastric syphilis, discusses a record of one hundred and twenty-two cases and in this thesis, syphilis of the stomach was definitely established as a real pathological entity.

In the older literature the pathological diagnosis of one variety of gastric syphilis is fairly certain, from the definite characters of the lesion, both macroscopically and histologically. This is the submucous gumma frequently breaking down and causing ulceration. No mention of syphilitic catarrh is made by the older writers except by Andral¹⁸. This is not at all surprising when we consider that the means at their disposal for the diagnosis of this condition were limited. To-day, however, with the discovery of the casual agent—the *Tryponema pallidum*—by Schaudinn and Hoffmann in 1905, the advent of the Wassermann reaction in 1907 and the introduction of salvarsan in the treatment of syphilis by Ehrlich in 1909, the armamentarium at our disposal for the diagnosis and treatment of syphilis of the stomach, whether gummatous or catarrhal in nature, has been greatly augmented and consequently the records of gastric syphilis established on a more definite and scientific basis.

Turning now to the more recent publications on gastric syphilis, we find that although the gummatous lesions of the stomach, with or without ulceration, are by far the most numerous syphilitic gastric lesions recorded, a number of cases of syphilitic catarrh of the stomach are reported.

Smithies¹³ in 1915 gives an analysis of 7545 patients suffering from all types of dyspepsia, among whom twenty-six gave a positive Wassermann reaction in the blood. Of the patients (1063 in number) who showed definite organic disease of the stomach, 1.6 per cent. gave a positive Wassermann reaction. Although Smithies considered that these latter cases were suffering from gastric syphilis on account of a positive Wassermann reaction in the blood, I don't think his proof is conclusive, as it is possible to have a non-specific gastric disorder in a patient suffering from syphilis. In fact, this was pointed out by Fowler²¹ in 1921, in a case of a woman with a gastric ulcer of long standing and who at the same time was suffering from secondary syphilis. Antisyphilitic treatment did not lead to improvement, while gastro-enterostomy afforded short relief. Finally the pyloric half of the stomach was resected and a large callous ulcer adherent to the pancreas was found. This ulcer was proven to have no relation whatever to her syphilitic infection.

M'Neil²² in 1917 reported a very interesting case of gumma of the stomach, in which the symptomatology suggested the diagnosis of malignant disease of the stomach. A fistulous opening between the stomach and small intestine occurred. The stools were tarry in colour and the extreme emaciation made the diagnosis of malignancy highly probable.

M'Donagh¹⁵ in 1920 mentions four cases of gumma of the stomach which cleared up completely with salvarsan medication. One of his cases is of special interest, as it was a case of

a medical man who had consulted a surgical specialist concerning a tumour of his stomach. Gastro-juenostomy was advised, as the condition was diagnosed as a malignant tumour. The patient, knowing he had had syphilis, consulted M'Donagh who, as a preliminary, tried salvarsan intravenously. After a few injections the swelling completely disappeared and the symptoms cleared up.

Florand and Girault²³ in 1921 describes a case of "adenoma" of the left lobe of the liver, involving the pylorus treated surgically by gastro-enterostomy and medically for syphilis, and as a result of this combined treatment there was complete recovery.

Four cases of diffuse gummatous infiltration of the entire stomach wall is described by Galloway²⁴ in 1922. They all exhibited the symptoms of chronic gastritis where ordinary remedies failed to give relief. Malignant disease of the stomach was suspected. Salvarsan intravenously as an experiment was administered and a complete cure resulted.

In 1922, M'Nee¹⁴ was able to demonstrate the *Trypanema pallidum* in a gumma of the stomach which had perforated that organ and caused death from peritonitis and haemorrhage. This case was diagnosed inoperable malignant disease of the stomach, but proved to be an ulcerating gumma of the stomach.

Brams and Meyer²⁵ in 1923 reported two cases of gumma of the stomach, proven serologically, pathologically and microscopically to be gastric syphilis.

Guyot and Chavannaz²⁶ in 1924 describe in great detail a case of chronic syphilitic catarrh of the stomach and as this is one of the most recent examples of this condition recorded, a full description of it will be given. The patient was a woman aged 40 years who had suffered from abdominal pains of so severe a nature that her medical attendant gave her morphia hypodermically, thinking she was suffering from gall-stone colic. No vomiting nor fever was present, but there was emaciation and slight jaundice. At 22 years of age she had had a healthy child and later two miscarriages, the latter of which occurred in 1919. She was then confined to bed for 2½ months and had since suffered from abdominal pains. A very tender spot was felt over the head of the pancreas and the stomach was obviously dilated. No history of melaena or haematemesis was obtained and the gastric contents contained no free hydrochloric acid. A skiagram showed a dilated stomach with a central constriction corresponding to the painful spot. No evidence was obtained of diverticulum, pyloric stenosis, tabes dorsalis or syphilis. A median supra-umbilical laparotomy was performed, the stomach was found to be much dilated and a narrow band across its anterior surface was excised. No other gastric lesion was found, nor any scarring, but there were numerous enlarged lymphatic nodes on both curvatures. The gall-bladder and ducts were healthy. Two of the enlarged nodes were excised but showed no evidence of tuberculosis or of cancer. As the pain still persisted, the Borde-Wassermann reaction test was performed and a positive result obtained. The patient was given a course of novarsenobenzol in novocaine solution intramuscularly, because the veins were so small that the intravenous route was impossible. She was discharged in three weeks' time from the commencement of the treatment in good health and two months later her sister reported that she had resumed her normal work and could eat any kind of food without pain.

In this short historical review of gastric syphilis, I think one thing stands out prominently, and that is that, although the post-mortem findings of gastric syphilis have been very rarely reported in this country, there is sufficient evidence from other countries to put the existence of gastric syphilis beyond the possibility of doubt.

VARIETIES OF GASTRIC SYPHILIS.

Wile¹⁰ considers the varieties of gastric syphilis under two main heads, according to early or late involvement of the stomach in syphilitic infection. Thus he states that the stomach may show definite organic changes as early as the first few weeks after infection and that the symptoms referable to these changes are those of gastric catarrh, namely epigastric pain, vomiting, loss of appetite, foul breath, and dyspepsia.

Lancereaux²⁷ and Gougot²⁸ have also observed occasional disturbances of digestion and symptoms referable to gastro-intestinal disturbances during the stage of actively acquired syphilis, and their observations have led them to believe that such disturbances were due to syphilis, rather than coincident with it. Neugebauer⁶ considers that the stomach is frequently involved in early syphilitic infection, and forms this opinion only after a careful chemical analysis of the stomach contents in a large number of soldiers suffering from early syphilis. He found that nearly two-thirds of these cases showed a decrease in the hydrochloric acid of the stomach contents. In my own experience, I have observed two cases of acute gastric catarrh in patients with the florid skin eruptions of secondary syphilis, the gastric symptoms clearing up immediately on the administration of novarsenobillon intravenously.

The above evidence certainly points to a definite stomach involvement in many cases of early syphilis.

Wile,¹⁰ in perhaps the most recent review of the late manifestations of gastric syphilis, adopts a very wide classification of the variety of lesions found. His classification is as follows :

I. GASTRIC SYPHILIS.

- (a) Syphilitic Catarrh.
- (b) Syphilitic Round Ulcer.
- (c) Submucous Gumma (ulcerative or non-ulcerative).
- (d) Diffuse syphilitic infiltration of the gastric mucosa, giving rise to distortion.
- (e) Pyloric Syphilis, including ulcer and cicatrix, gumma and diffuse syphilis.

II. PERIGASTRIC SYPHILIS (with secondary involvement of the stomach).

While there is abundant evidence in literature to justify Wile's broad classification, I have so far met with only two of the above types of gastric syphilis, namely syphilitic catarrh and pyloric gumma. These will, therefore, be the only types of gastric syphilis recorded and discussed by me in this thesis.

In considering the above historical review, it appears that gumma of the stomach, with or without ulceration, is the most frequently recorded syphilitic lesion of the stomach. In my experience, nevertheless, in the treatment of forty-two cases of syphilis, I have met syphilitic catarrh four times and gumma only once, and the following is a record of these cases :—

CASE I.

Mr. B., age 32 years, consulted me in July, 1924, complaining of epigastric pain, nausea and vomiting after food of two years' duration. He stated that he had lost two stones in weight. Examination showed a poorly-nourished body, much emaciated and he was very ill. His colour was of a pale lemon tint, very suggestive of pernicious anaemia. The blood was examined to ascertain if he were suffering from pernicious anaemia or any of the forms of white cellular diseases of the blood, such as myelogenous or lymphatic leukaemia. There was no evidence of any of these conditions being present. Over the epigastric region there was diffuse tenderness on deep pressure, but no signs of tumour formation. A diagnosis of chronic gastric catarrh was made and treatment for this condition instituted. A rigid diet was given, along with an alkaline mixture. The bowels were thoroughly regulated by Parke Davis' cascara evacuant. No relief was experienced from this treatment, so an acid stomach mixture was tried, half an hour after food, without the slightest relief of the gastric symptoms. Radiographic examination of the stomach and gastro-intestinal tract was made, and showed a slightly dilated and atonic stomach, a small residue of barium remaining at six hours. Chemical examination of the stomach contents after an Ewald's meal showed hypochlorhydria, with abundant mucus. There was no evidence of occult blood. The diagnosis of chronic gastric catarrh was still maintained. While these investigations were being conducted, an interesting incident occurred, which helped to throw some light on this case. His wife had an abortion at the fifth month and stated that this was the third abortion in a period of five years. She also stated that she had one child, a female, alive and healthy, aged twelve years. His blood was then examined and a positive Wassermann reaction obtained on the 30th of September, 1924. His wife's blood also was positive to the Wassermann test on the 24th of October, 1924. Treatment was then given for his syphilitic infection, in the form of mercury and potassium iodide. The following mixture was given :—

R	Liq. Hydrarg. perchlorids	3i.
	Potassium Iodidi,	gr. v.
	Ammon. Carb,	gr. iii.
	Ag. Chlorofomi,	ad. 3i
	Sig. T. I. D. p.c. ex aq.	

As this mixture aggravated the stomach symptoms, it was discontinued and mercury alone given, in the form of hydrarg e creta gr. i. T.I.D. This also had to be stopped on account of gastric irritation it produced. Potassium iodide gr. v. T.I.D. was tried and had to be stopped for the same reasons. A course of salvarsan intravenously was given in the form of novarsenobillon, commencing with 45 gm. dissolved in 10 cc of distilled water and increased to 6 gm. weekly. The results of this treatment on the gastric symptoms were immediate. After the first intravenous injection, the epigastric pain, nausea and vomiting improved, and after the second injection disappeared entirely, and by the end of six weeks he was able to eat any kind of food without discomfort. He rapidly put on weight and returned to his work in good health. After the first intravenous injection of novarsenobillon, I again put him on mercurial and iodide treatment, which he tolerated well and which he still continues to take periodically. After two years since the intravenous injections his stomach still keeps well. There was no clinical evidence of cerebro-spinal syphilis present. Had the gastric symptoms been due to nervous involvement, the response to treatment would not have been so instant and complete.

CASE II.

J. F., a male, age 27 years, consulted me in August, 1924, complaining of epigastric pain, nausea and vomiting after food of three weeks' duration. Examination showed him to be well nourished and in good physical condition. There was tenderness on pressure amounting to pain over the whole epigastric region. The tongue was thickly furred and the breath foul. A diagnosis of gastric catarrh was made and the usual remedies directed to diet and medicine given. Fourteen days of this treatment failed to relieve his symptoms. I then put him on an acid mixture half-an-hour after meals, thinking he was suffering from a achlorhydria dyspepsia. This also failed to relieve the gastric symptoms. A blood examination was then made and a strong positive Wassermann reaction obtained on 1st Nov., 1924. He strongly denied ever having syphilis. Mercury was then given in the form of Hutchinson's Pills T.I.D. This treatment, as in Case I., had to be discontinued owing to the aggravation of the gastric symptoms. Potassium iodide gr. v. T.I.D. was tried with similar results, and had to be stopped. Intravenous injections of novarsenobillon were then given and immediate relief of the stomach symptoms resulted, the pain, nausea and vomiting completely disappearing after the second weekly injection. His appetite returned and a complete cure resulted. He, as in Case I., was given a mixture of potassium iodide and mercury after the second injection of novarsenobillon and tolerated it well and continues to take this mixture periodically.

CASE III.

Mrs. G., age 42 years, married, sought medical advice about her stomach trouble in August, 1921. She then complained of loss of appetite, bad taste in the mouth, epigastric pains with occasional vomiting after food of many years' duration. Examination showed a well-nourished and healthy body. Tenderness was elicited over the whole epigastric region on deep pressure. The general physical examination proved negative and a diagnosis of chronic gastric catarrh of the stomach was made. The bowels were thoroughly regulated by Nujol three times daily, a restricted diet was advised and both alkaline and acid stomach medication were given as in Case I. and II. No improvement resulted from this treatment.

She then gave a history of a miscarriage—the only child of the marriage—fourteen years ago. She had then undergone an operation for retroflexion of the uterus in a London hospital. Both she and her husband denied ever having syphilis. A blood test of both was performed on the 16th of March, 1926, and a strong Wassermann reaction was found in both. I again tried oral administration of mercury and Potassium iodide, at first combined in a mixture and then separately. This treatment did not improve her gastric symptoms, but as in my other cases aggravated them. I then gave her a course of intravenous injections of novarsenobillon, commencing with .3 gm. and increasing the weekly dose until .6 gm. were being given. This treatment promptly relieved her stomach symptoms. After a course of nine weekly injections, her stomach trouble had completely gone and she was able to eat ordinary food without the least discomfort. After the second injection of novarsenobillon, I put her on potassium iodide and mercury, which she tolerated without gastric discomfort. Since her treatment she and her husband have gone to America and she writes telling me that her stomach is keeping well, and that she is able to eat any kind of food without discomfort.

CASE. IV.

J. G., age 48 years, married, was seen by me in May, 1926. He complained of severe abdominal pain, diarrhoea, sickness and vomiting after food of four years' duration. He had lost two stones in weight during that period. He was the father of four children, three of whom were alive and healthy, the third child having died one hour and a half after birth. Examination showed him emaciated and in a poor state of health. The stomach was tender to pressure, but there was no evidence of tumour formation or ulcer. The usual remedies directed to diet and medicine having completely failed to give him relief, he was admitted to the Perth City and County Royal Infirmary, in which he was under my observation. For fourteen days after admission, he vomited everything that was given to him, both food and medicine, and the diarrhoea still continued. Radiographic examination of the gastro-intestinal tract showed nothing pathological. On my suggestion, the house-physician had his blood test done on 3rd of June, 1926, and this was strongly positive to the Wassermann reaction. Mercury and potassium iodide were tried, both as a mixture and then separately, but only aggravated the gastric symptoms. Novarsenobillon intravenously was then given and prompt relief of the gastric symptoms obtained after the first injection. After the second injection he so completely recovered from all his gastric symptoms as to be able to eat the food of the ward without the slightest discomfort. He was discharged from the Infirmary in good health, with his stomach symptoms and diarrhoea completely cured and now takes mercury and potassium iodide regularly and tolerates them well.

A very interesting point in these four cases is that there was no history or knowledge of syphilitic infection and consequently no treatment for this condition had ever been given.

From these cases which I have recorded above the following conclusions are justified, in the light of the serological test and therapeutic results obtained.

- (1) That syphilitic catarrh of the stomach is a real and frequent pathological entity.
- (2) That syphilitic catarrh of the stomach does not differ in its symptomatology from catarrh of the stomach from other causes.
- (3) That the Wassermann test and response to anti-syphilitic remedies are the only means at our disposal in differentiating between syphilitic catarrh of the stomach and gastric catarrh from other causes.
- (4) That the response of syphilitic catarrh of the stomach to the salvarsan remedies, particularly novarsenobillon, is immediate in relieving the symptoms, whereas all the ordinary remedies directed to dietary and medicines fail to give relief.
- (5) That mercury and the iodides, administered orally in the initial stages of treatment in syphilitic catarrh of the stomach, only aggravate the gastric symptoms, but are well tolerated after an initial course of novarsenobillon intravenously.
- (6) That if a routine serological examination was made in every patient suffering from chronic gastric disorder and the results of antisyphilitic treatment observed where the Wassermann test was positive, the recorded cases of syphilitic catarrh of the stomach would be on the increase.
- (7) That gastric syphilis is more frequently met with in untreated cases of syphilitic infection than in treated cases.

The fifth case about to be recorded belongs to a category different from the above, in so far as a definite pyloric tumour was palpable. It presented the symptomatology and signs of a malignant growth, which turned out to be a gumma.

CASE V.

Mrs. F., age 60 years, married, with four of a family, came under my care in September, 1919, complaining of a dull aching pain in the epigastric and right hypochondriac regions, radiating through to the right shoulder. These gastric symptoms had lasted 27 years. The pain was increased after food and considerably relieved on vomiting. Examination showed a very emaciated body and the colour of the skin was like that found in pernicious anaemia. The abdominal wall was so thin that a large smooth oval-shaped tumour, the size of a hen's egg, was easily palpable over the pylorus. It was not painful to pressure. A large pulsating aneurism could also be felt above and to the left of the umbilicus, and a painful spot could be elicited over the spine at this level. There was no history of haematemesis or melaena, and although the skin was of a pale lemon colour, no definite jaundice was ever observed.

Radiographic examination revealed a dilated stomach and pyloric stenosis, with a barium residue after six hours. Chemical analysis of the stomach contents after a Ewald's test meal showed complete absence of free hydrochloric acid and total acidity 35. There was abundant sour smelling mucus, but no blood present. The diagnosis of malignant disease of the pylorus was made and treatment by diet, gastric sedatives and stomach lavage instituted with but slight relief of the gastric symptoms. A gummatous lesion was not suspected, until one day, while I was visiting her, her son, age 30 years, appeared. He displayed in their entirety the classical signs of congenital syphilis. The saddle-shaped nose, marked condylomatous scarring radiating from the angles of the mouth, old interstitial keratitis, causing defective vision, hoarseness of the voice, deafness and defective mentality. The patient then admitted having syphilis thirty-one years ago, for which she received mercurial pills. This revelation, together with the chronicity of her stomach trouble made me suspect gumma of the stomach, and I immediately put her on a mixture containing mercury and potassium iodide. The improvement under this treatment was very slow and indefinite, so I instituted weekly intravenous injection of novarsenobillon, commencing with .3 gm. increasing to .45 gm. and then to .6 gms. From the commencement of this treatment the stomach symptoms began to improve, and after six weeks from the commencement of the treatment, the pain, nausea and vomiting had entirely disappeared and she stated she could eat any kind of food without discomfort. She takes periodic courses of mercury and iodide, which she tolerates well. She has put on 1½ stones in weight and now enjoys better health than she has for 27 years. The gummatous thickening has greatly decreased in size, although there is still a little thickening left. I think the reason for the gummatous tumour not completely resolving is that during these many years the gummatous lesion has undergone dense fibrous change and that this fibrous tissue has not been acted upon by the anti-syphilitic treatment, even by prolonged courses of the iodides.

The following conclusions in this case are warranted :—

- (1) That this was a case of pyloric gumma, originating from syphilitic infection thirty-one years ago.
- (2) That pyloric gumma closely resembles carcinoma of that organ in its symptomatology, and that in both cases complete absence of free hydrochloric acid may be found in the stomach contents.

- (3) That a search into the past history and also the family history in cases of gastric tumours may give the clue to the correct diagnosis.
- (4) That no case of gastric tumour should be subjected to operation until syphilis has been eliminated, and if found to be present should be thoroughly treated by novarsenobillon before operative interference.
- (5) That the results of intravenous injections of novarsenobillon in pyloric gumma, even of long standing, are excellent in removing the gastric symptoms and diminishing the size of the gumma.

GASTRIC ANALYSIS IN SYPHILIS OF THE STOMACH.

Little is known regarding the chemical analysis of the stomach contents in early syphilis, but the reports of Neugebauer⁵ and Smithies¹³ seem to indicate that the hydrochloric acid contents of the stomach are affected in early syphilitic infection. Neugebauer⁵ studied test meals in 200 cases of early syphilis in patients exhibiting florid manifestations. He found marked deviation from the normal in a large percentage of his cases. Thus a decrease in acidity was found in 62 per cent.; hyperacidity in 17 per cent. only. In association with these findings he noted loss of appetite, pain, emaciation, bad taste in the mouth and vomiting. He also found marked deviation from the normal in the hydrochloric acid contents of the stomach in many cases of early syphilis, in which there were absolutely no symptoms referable to gastric involvement.

Smithies¹³ also states in his statistical study of the effects of early syphilis on the stomach, that among twenty-six cases regarded as probably due to syphilis, on account of a positive Wassermann reaction, free hydrochloric acid was completely absent in twenty-four. One of my cases of syphilitic catarrh showed marked hypochlorhydria in the gastric contents. The evidence to hand indicates that a decrease or absence of free hydrochloric acid in the stomach is frequently met with in early syphilitic infection.

The occurrence of achlorhydria in the gummatous variety of syphilis of the stomach has been recognised by Hausmann,²⁹ Brams and Meyer,²⁵ M'Nee,¹⁴ Larimore,³⁰ and others, and a critical survey of the cases in this variety of syphilitic lesion of the stomach brings anacidity forward as a striking characteristic of fully two-thirds of the recorded cases in which gastric analysis has been made.

Hausmann²⁹ describes a case of gumma of the stomach involving both curvatures and the pyloric region, which he diagnosed clinically and treated with salvarsan. A history of syphilis was obtained and the Wassermann reaction was weakly positive. The tumour entirely disappeared in six weeks' time after treatment was commenced. Before treatment was instituted there was achlorhydria, but after two months' treatment free hydrochloric acid began to return, and a month later the chemistry of the stomach was normal. He regards anacidity as typical of stomach gumma and points to a large number of cases in which this occurred.

Guyot and Chavannaz²⁸ found complete absence of free hydrochloric acid in their case of chronic syphilitic catarrh of the stomach already described by me.

Glaser³¹ deals most fully with the question of gastric analysis in cases which have been diagnosed as gastric syphilis with more or less certainty. He collected for his paper ten cases (including one of his own), in which the results of examination are recorded. In all of these there was achlorhydria. Brams and Meyer²⁵ reported two cases of gastric syphilis, in one of which the pyloric end of the stomach was infiltrated, causing stenosis, and the other was a case of miliary gummatous lesions, with ulceration scattered over the whole gastric mucosa. Both these cases showed complete absence of free hydrochloric acid in the stomach contents.

Larimore³⁰ describes eight cases of gastric syphilis, in which the stomach analysis of six showed altered hydrochloric acid in the stomach contents. One had achlorhydria, one marked hypo-acidity, and four slight hypo-acidity. In the other two the gastric analysis is not reported.

M'Nee,¹⁴ in his case of gummatous ulceration of the stomach, found complete absence of free hydrochloric acid and the presence of lactic acid. In the case of gumma of the pylorus, which I have already described, there was complete absence of free hydrochloric acid found, and in one of my cases with the symptoms of chronic gastritis which proved to be syphilitic there was hypochlorhydria.

The statistical study of the late manifestation of gastric syphilis indicates that a definite decrease or absence of free hydrochloric acid is frequently found in the stomach contents.

PATHOLOGY OF GASTRIC SYPHILIS.

According to Lancereaux,²⁷ Gougot,²⁸ Wile,¹⁰ and Neugebauer⁵ definite organic changes may occur as early as the first few weeks after infection. Unfortunately the pathology of such cases is little understood, owing to the fact that the patients seldom succumb during this period of the disease, and post-mortem examinations of such cases are few. Wile¹⁰ states that it is highly probable that during the first few weeks or months of syphilitic infection there exists in all the mucosae a condition analogous to the roseola or to the papular eruption of the skin. As in the case of the skin, such lesions are likely to be transitory in nature and heal spontaneously.

Neugebauer's⁵ chemical report on gastric analysis in early syphilis substantiates this view. Stoeckenius,³² in 1921, has described in great detail the results of extensive histological examination of the organs from four cases of recent syphilis in young adults. In all of them the amount of granulation tissue found scattered throughout the various organs was very great, so that in three of them tuberculosis was at first suspected. Damage to the blood-vessels was also a prominent feature, and although the stomach was not dealt with apart from the intestinal tract generally, these observations do at least suggest the possibility of early syphilitic lesions of the stomach:

The pathology of the late manifestation of gastric syphilis is, however, fairly well known. These lesions are of a more serious nature and show more striking symptoms as a chief cause for complaint. Furthermore, they are not infrequently fatal, and hence their pathology is more readily available. Thus, in searching through medical literature for records of different syphilitic lesions of the stomach we find symptoms referable to chronic catarrh, ulceration, perforation, tumour, hypertrophy and atrophy.

I shall deal with the pathology of syphilitic catarrh of the stomach as far as is known, and also gumma, as these two types of lesions are the only ones I have met with.

The pathology of syphilitic catarrh of the stomach is little known, as the cases reported in medical literature are cases in which the diagnosis was based on the Wassermann test and therapeutic response to anti-syphilitic medication. It is highly probable, however, that when the *Tryponema pallidum* spreads through every nook and corner of the body, that the mucous membranes of the stomach will also be invaded. Judging from what occurs in the buccal and pharyngeal mucous membranes in the generalisation stage of syphilis, the gastric mucous membranes will in all probability be congested with round cell infiltration, which, if unchecked by anti-syphilitic treatment, will ultimately lead to an increase in the inter-glandular supporting fibrous tissue. That this actually occurs has been pointed out by Stoeckenius³². M'Nee¹⁴ also points out in the pathological report of his case that the portion of the stomach not involved in the gumma showed changes of the nature of interstitial gastritis, with complete atrophy of the glandular tissue. Thus, he shows that the end results of syphilitic catarrh of the stomach, where gumma has not developed, are complete fibrosis of the mucous, submucous, and even the muscular coat of the stomach. Then the gastric analysis performed by Neugebauer⁵ and Smithies¹³ in the early secondary stages of syphilis proves beyond doubt the existence of pathological changes in the mucosae of the stomach, the symptoms of which are referable to catarrhal lesions of the stomach.

The pathology of gumma of the stomach has been worked out by Flexner,³³ M'Nee,¹⁴ Brams and Meyer,²⁵ and others.

Brams and Meyer²⁵ describe two cases both macroscopically and microscopically in great detail, and the following pathological changes were observed by them. Macroscopically the changes seen were a submucosa thickened to about eight times its normal size, in the region where the gumma had ulcerated and normal beyond this. This thickened layer was pearly grey in colour and was of rubber consistency. At no place in either of their cases did the ulcer penetrate deeper than the superficial part of the submucosa.

Microscopically, the following changes are described. Perivascular infiltration, which consisted chiefly of lymphocytes and a few plasma cells. There were many vessels involved in this manner, regardless of size, and both the veins and arteries were affected. Pan-arteritis and pan-phlebitis, with perivascular infiltration were present. The process began in the outer layers of the vessels and then attacked the media and intima. The earlier changes were a teasing apart of the elastic fibres of the adventitia with infiltration of round cells. The media was next attacked and then the intima, but this layer did not show the teasing apart of the elastic fibres to the same extent as did the adventitia. Fibrosis then occurred and the vessels became permanently changed. The lumen became narrowed and in many cases completely obliterated during the stage of infiltration and fibrosis. The miliary gumma were chiefly confined to the submucosa, but there were some present in the muscular coats as well. The gumma consisted of circumscribed collections of cells, chiefly lymphocytes, but also a few plasma cells at the periphery. Both these elements rested on a fine connective tissue framework and an occasional capillary was seen within the gumma. The whole was surrounded by a thin connective tissue capsule, but there was no marked vascular reaction in

the vicinity nor were there any large vessels nearby. This was quite distinct from the other forms of infiltration and no necrosis nor caseation was present. A few epithelioid cells were present near the periphery, and one giant cell of the Langhans type was present.

The diffuse infiltrate consisted chiefly of lymphocytes and a few plasma cells, with an occasional giant cell. A few polynuclear cells were present near the surface. The infiltrate was very extensive and was found chiefly at the base of the gummatous ulcer. There were many capillaries and a number of extensive haemorrhages, especially near the mucosa. This may have been a factor in the formation of the ulcer. Other changes were round-cell infiltration of the interstitial tissue of the mucosa, with occasional haemorrhage. The muscular layers showed evidence of fibrosis and slight round-cell infiltration, and the peritoneum was, practically speaking, normal. There was also an occasional round-cell infiltration around the nerves in the muscular coats. This may perhaps be one of the causes of the pain.

Flexner³³ also describes the pathological histology of an ulcerating gumma in a man who died from perforation of the stomach. He noted changes of two distinct types in the lesion. The earlier lesion consisted of a cellular infiltration of the submucosa, with cells of the granulation tissue type. Foci of necrosis had occasionally occurred within large collections of these cells. The second or later type of lesion was more common and was found in all parts of the ulcer, including the tissue found at its elevated borders. It consisted of dense fibrous tissue formation, containing scattered tissue cells. In this tissue also the blood vessels showed extensive damage endarteritis and endophlebitis obliterans and hyaline thrombosis with organisation being very prominent. M'Nee's¹⁴ description of the pathological histology in his case of gastric gumma is similar to that of Brams and Meyer²⁵ and Flexner's.³³

All are agreed that the gumma of the stomach arises as a submucous gumma, which tends to undergo the usual degenerative changes and finally leads to ulceration.

DIAGNOSIS OF GASTRIC SYPHILIS.

In considering the pathology and clinical features of gastric syphilis, one realises the great difficulty there is in diagnosing this condition. The symptomatology presented by it does not differ from that of other gastric diseases. Where no tumour presents itself in the stomach and where the symptoms are referable to gastric catarrh which resists all the ordinary remedies, great importance attaches to the possibility of syphilitic catarrh of the stomach being present. Then the greatest points in the differential diagnosis are the serological and the therapeutic tests (*vide* Cases I., II., III., and IV.). Syphilitic catarrh of the stomach resists all the ordinary remedies directed to dietary and medicinal measures, but rapidly responds to antisymphilitic remedies, while catarrh of the stomach from other causes is not influenced by antisymphilitic treatment, but usually responds to the ordinary medical measures directed for its relief. When the symptoms of gastric disease are associated with other overt signs of syphilis, the diagnosis of gastric syphilis is not difficult, especially if these symptoms appear in a previously healthy person simultaneously with the eruptive manifestations of this disease, and more especially if these symptoms promptly disappear with the institution of specific medication. Due consideration, however, must always be given to the fact that a patient may contract syphilis after the onset of gastric disease or that syphilis and gastric disease may be coincident in the same person, without syphilis having anything to do with the stomach disease.

This was pointed out by Fowler²¹ in 1921. He emphasised this point in the case of a woman who had a non-syphilitic gastric ulcer, but was suffering from secondary syphilis.

Gumma of the stomach, with or without ulceration, forms the largest number of reported cases of gastric syphilis, and this condition is often diagnosed and treated as carcinoma, especially where ulceration with haematemesis has taken place. In both these conditions there is almost invariably the presence of a palpable tumour and a complete absence of free hydrochloric acid in the stomach contents. A rapid loss of weight is common in gumma and in carcinoma of the stomach, but the degree of anorexia is greater in carcinoma than in gumma. Carcinoma usually proves fatal within two years; gumma of the stomach may be present for many years without proving fatal, as in Case V. recorded in this thesis.

In the differential diagnosis between gumma and carcinoma of the stomach, most reliance must be placed in the Wassermann and therapeutic tests, and more especially in the therapeutic test. While the symptoms referable to gumma of the stomach will respond to specific medication, those referable to carcinoma will not be affected by this treatment.

TREATMENT OF GASTRIC SYPHILIS.

The French school support the older methods of treating gastric syphilis by mercury, and especially the iodides, as against the newer salvarsan remedies. In my experience in the

treatment of gastric syphilis, novarsenobillon intravenously has proven itself the remedy of predilection in relieving the gastric symptoms. Mercury and the iodides, at least in the initial stages of the treatment, have aggravated the stomach symptoms in syphilitic catarrh and did not improve the gastric symptoms in pyloric gumma, while their administration after a course of novarsenobillon has been well tolerated and, I believe, make the cure more permanent. Iodides are given by me over a prolonged period, because of their reputed value in removing the newly-formed tissue of the lesion. Hausmann⁸ prefers salvarsan in the treatment of gummatous lesions of the stomach, and cites a case where a very large gumma tumour of the stomach disappeared in six weeks' time under its administration. Pezoldt³⁴ also reports a case of typical ulcerating gumma of the stomach of a negro in which a complete cure followed within a few weeks after treatment with salvarsan and iodides. M'Donagh's¹⁵ four cases of gumma of the stomach were completely cured in a few weeks with intravenous injections of salvarsan. Many more examples could be cited.

In syphilitic catarrh of the stomach, in which the gastric mucosa is in a state of great irritability, I have repeatedly tried treatment by mercury and the iodides, and in every case this form of treatment had to be discontinued owing to the aggravation of the gastric symptoms caused by these drugs. Novarsenobillon intravenously has never failed to give prompt relief. Mercury and the iodides, if given after the first few injections of novarsenobillon, were well tolerated in all my cases and seem to effect a more complete cure.

GENERAL CONCLUSIONS.

From this historical review and my own recorded cases, the following conclusions seem warranted:—

- (1) That the cases of gastric syphilis recorded in foreign medical literature and collected by me, indicate that syphilis of the stomach is more common than British medical literature would have us believe.
 - (2) That while the gummatous lesions of the stomach, with or without ulceration, are the most frequently recorded cases of gastric syphilis, syphilitic catarrh of the stomach is more prevalent, occurring as it did in nearly 9 per cent. of my cases of syphilis, while gumma occurred in only 2·3 per cent.
 - (3) That if the serological and therapeutic tests for syphilis were applied in all cases of chronic stomach diseases which resisted the ordinary remedies, the number of cases of gastric syphilis recorded would be greatly increased.
 - (4) That gumma of the stomach so closely resembles carcinoma of that organ in its symptomatology and signs, that an erroneous diagnosis is likely to be made, unless all the means at our disposal for the diagnosis and treatment of syphilis are utilised. Both these conditions show—
 1. The invariable presence of a palpable tumour.
 2. The occurrence of loss of weight and cachexia.
 3. The absence of free hydrochloric acid in the stomach contents.
 4. The occurrence of haematemesis.
 - (5) Mercury and the iodides, either separately or in combination, aggravate the gastric symptoms in syphilitic catarrh of the stomach if given before an initial intravenous injection of novarsenobillon, but are well tolerated after the administration of novarsenobillon and seem to make the cure more complete.
 - (6) Novarsenobillon administered intravenously gives prompt relief of the symptoms in gastric syphilis, whether the lesion is gummatous or catarrhal in nature, and is the drug of predilection in the treatment of gastric syphilis.
 - (7) That syphilitic catarrh of the stomach presents the same symptomatology as gastric catarrh from other causes, and that the differential diagnosis between syphilitic catarrh and catarrh of the stomach from other causes is only possible when the Wassermann and therapeutic tests are applied.
 - (8) That gumma of the stomach consists essentially of the development of a granulation tissue mass, or gumma, in the submucous layer of the stomach, which often leads to destruction of the overlying mucosa and to ulceration.
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