INTERNAL FISTULAE OF THE DIGESTIVE TRACT

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It is not intended that under such a heading all sorts of fistulae of the digestive tract be treated exhaustively. My intention is to describe only those cases, which passed through the X-Ray department at St. Luke's Hospital during the last two years. These cases, although rather uncommon, have been chosen because they usually occur as a complication of common diseases of the digestive organs, while some are the result of odd abnormal findings in adjoining organs. The only exception is the case of an oesophago-tracheal fistula, which is usually due to congenital maldevelopment.

Another reason for this selection is to stress the importance of the evaluation of the signs, symptoms and the characteristics of the special investigations, which will lead one to the correct diagnosis of these cases.

1. Oesophago-tracheal fistula.

These cases are becoming more interesting lately, because of the improvement in the surgical treatment with a corresponding decrease in the operative mortality. In fact in a series of 32 primary anastomoses Swenson had only 5 postoperative deaths.

But these good results depend entirely on:

(a) Earlier diagnosis (Osler, Abbot and Williams state that with early diagnosis 80% may be saved).

(b) Improved pre-operative and post-operative care.

(c) Change in operative technique.

Diagonsis.

An early diagnosis will be made if the symptoms are looked for and well noted. They are present in the early hours of life.

(1) The commonest, and a very important one, is *excessive salivation.* This is not due to increase in actual oral secretions, but to their accumulation in the mouth on account of the oesophageal obstruction.

(2) During feeds the baby coughs, and temporary cyanosis may be noticed. These signs of respiratory distress are usually repeated every time the baby is given a feed.

Eventually unless this condition is remedied very early in life, pulmonary complications supervene and the general condition of the baby deteriorates towards a fatal ending. The factors which usually contribute to this fatal outcome are:

(a) Starvation

(b) Pulmonary complications

(c) Reflux into the lungs of gastric juice, which is highly irritant to the respiratory membranes.

An incidence of one in 2650 births has been reported by Donelly. Associated malformations should be looked for; these have been found in 80 out of Swenson's series of 113 cases.

Various forms occur of atresia with with aesophago-tracheal fistula:

(a) Fistula of trachea with proximal segment of atresic œsophagus. The distal œsophagus segment is blind.

(b) The proximal segment is blind and a fistula is present between the distal segment and the trachea, or rarely the main bronchus.

(c) Communication of both proximal and distal segments with the trachea.

(d) A rare form, the H type, is a tracheo-œsophageal fistula without atresia.

The diagnosis is usually made by paying all due care to the presenting symptoms and by passing gently a small catheter and noting whether any obstruction is met with; or in the case of a normal oesophagus, the hearing of the characteristic gurling sound as the catheter enters the stomach. The latter sign, however, does not exclude the H type.

If this is not convincing enough, confirmation is sought by X-Ray examination. First a plain film is taken to see whether gas is present in the stomach and intestines. Then a No 8 soft rubber catheter is passed through the nose. Lipiodol O.5 to 1 c.c. is injected slowly, under screen control, to spot the fistula. *Barium should not be used,* because it causes a severe reaction in the lungs. If the intestines contain gas and a blind upper pouch is found, it means that atresia is present and there is also a tracheal fistula with the lower œsophageal segment. If no gas is present in the intestines and lipiodol enters the trachea, it follows that there is a fistula of the upper segment with the trachea .

If gas is present in the intestines and lipiodol enters the trachea, a double fistula exists. When there is a fistula without atresia, lipiodol may enter the trachea, while the outline of the œsophagus is normal. In the latter case more care should be taken to establish the presence of such a state of affairs, as cases have been reported in which lipiodol failed to show the the fistula while diodrast (a nonviscous opoque medium) did. The prone position is also recommended in such cases, as the fistula usually lies on the back of the trachea and the anterior surface of the œsophagus. Cases of fistula without atresia are easily missed. Several cases have been reported to have gone on undiagnosed to adult life. One case was 58 years of age when it was diagnosed and treated.

Case I. (Fig. I)

A newly born child of healthy parents. 3rd. pregnancy. Normal delivery. Seen when 30 hours old because of presistent salivation and choking and cyanotic attacks on every attempt at feeding. The general condition of the baby was excellent, but there was a second congenital defect of a mild nature — a vaginal anus. The baby was admitted to St. Luke's hospital, where the diagnosis of œsophageal atresia with fistula was made.

X-Ray examination showed flooding of bronchial tree with lipiodol which was injected through a nasal catheter. The middle portion of the œsophagus was never traced. It was difficult to establish the true state of affairs as the baby coughed each time lipiodol was injected, and the trachea was wholly outlined with lipiodol .Therefore, since the examination could not be controlled by screening at the time, inhalation of lipiodol through the larynx could not be definitely excluded.

The baby was operated upon, and an atresia of the œsophagus was found with a blind upper end communicating with the trachea just above the carina and lower end of the œsophagus communicated with the trachea at the upper end of the main bronchus.

The baby did not seem to improve, post-operatively, despite every attention and died 14 hours later.

II. Cholecysto-duodenal fistula.

Spontaneous internal biliary fistula are rare. Several types occur; the most common is a fistula between the gall-bladder and some part of the alimentary tract. A fistula from the common bile duct to the gastro-intestinal tract is far less frequent.

Gall-stones in 90% cases are the

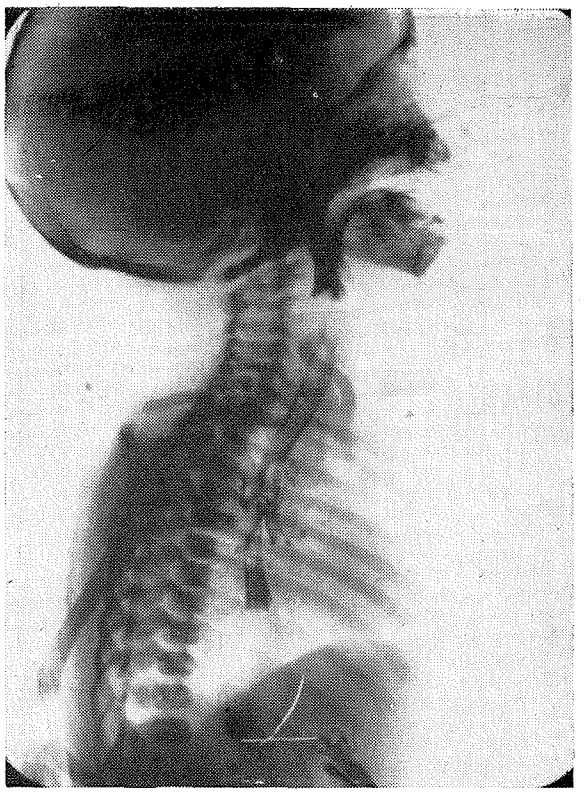

Fig. 1. OESOPHAGO - TRACHEAL FISTULA
Trachea and main bronchi well outlined with lipiodol, Upper part of oesophagus faintly seen above carina. Note gap of oesophagus at side of atresia. Lower end of sosophagus well shown in its proximal part, communicating with trachea near bifurcation.

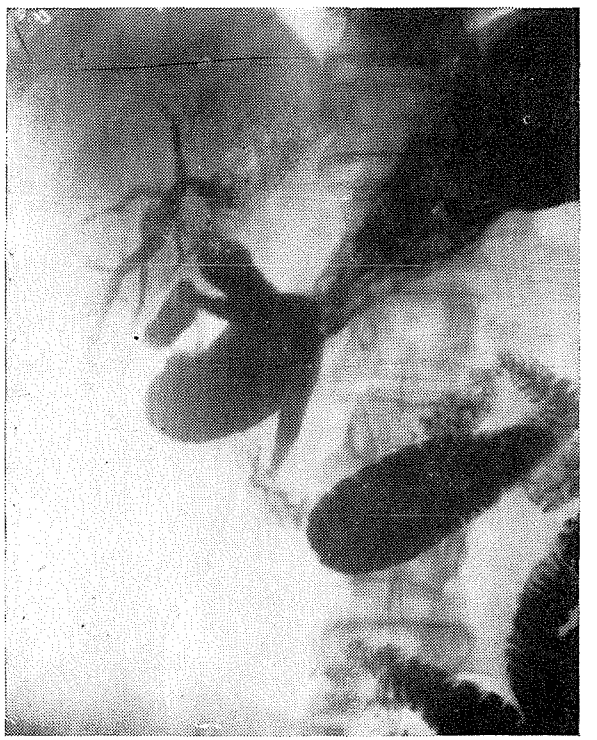

Fig. 2. CHOLECYSTO — DUODENAL FISTULA
Biliary ducts outlined by barium (after barium meal). Fistula of gall-bladder with upper end of duodenal cap. Common bile duct full of barium down to Spincter of Oddi.

Fig. 3. GASTRO — JEJUNO — COLIC FISTULA
Note filling of stomach by barium solution introduced through rectum (barium enema), as the head of the enema reached the mid-transverse colon. Gastric mucosal rugae as distinct from haustration of colon.

Fig. 4. GASTRO — JEJUNO — COLIC FISTULA
Gastrectomy with gastro-enterostomy. This film was taken 1 hour after barium meal. Note filling of descending colon by barium — while caecum and proximal half of colon is empty of barium. This shows that barium has reached this part of the colon through the fistula at middle part of transverse colon.

primary cause of a cholecysto duodenal fistula; 6% are due to duodenal ulcer, the other 4% being attributable to cancer, abscess and other causes. Wakefield et alia reported in 1939 a series of 176 cases operated on at the Mayo Clinic, in which not a single case was due to perforation of a duodenal ulcer or to a carcinoma.

The sex incidence of 3 females to one male in Judd and Burder's series of 153 cases corresponds to the prevalent occurence of cholelithiasis in females.

The gall-bladder adheres to almost any abdominal organ. If there is concomittant obstruction of the duct, it would probably be the determining factor for perforation and hence fistula formation.

The clinical picture is not characteristic; the presenting symptoms being usually those of the original condition, which had given rise to the formation of the fistula. The only sign, which makes diagnosis fairly certain, is the passing of a biliary calculus of considerable size in the faeces or the vomit.

Radiological investigation is the only means for definite pre-operative diagnosis. This is however by-passed in many cases, as these cases present themselves as emergencies with the signs of acute abdomen.

The fundamental radiological sign is the presence of air in the biliary system, noted in a straight film, or the outline of the hepatic and biliary ducts by barium, when a barium meal is done.

Case II. (fig. II)

L.G. Male — age 67 years. He was seen as an out-patient on 17-9-53 complaining of a feeling of oppression in the epigastrium. 4 months ago had a severe epigastric pain, which lasted for 1 hour. Since then these attacks of pain have recurred accompanied by nausea. No relation to meals, but at times pain awakened him at night. No loss of appetite.

Operated upon for enlarged prostate 1½ years ago. 40 years ago had a laparotomy for a gastric complaint, whose exact nature could not be ascertained.

A barium meal was given, and as soon as the barium entered the duodenum it flooded the gall-bladder and the hepatic system. The duodenum showed no deformity, except for the fistulous track which communicated with the base of the gall-bladder.

III. Gastro-jejuno-colic fistula.

Gastro-jejuno-colic fistula is a serious complication which follows posterior gastro-enterostomy, is the treatment of duodenal ulcer. Other causes are cancer of the stomach or adjoining organs and inflammatory processes. But a gastro-jejuno-colic fistula, resulting from these primary diseases, is extremely uncommon. Usually it occurs as a complication of posterior gastro-enterostomy, it may follow any type of gastro-jejunal anastomosis and even gastrotomy.

It was first reported by Czerny in in 1893, 12 years after the first gastro-enterostomy performed by Wolfer in 1881. By 1940 Thomas had reported 207 cases.

The pathological process which produces the fistula is essentially the same as in peptic ulceration. Craters ulcerate deeply. The surrounding inflammatory reaction forms adhesions with adjacent structures, particularly the colon, with eventual ulceration of the colonic wall. The fistula is near the distant stoma, most frequently in the efferent loop, 4 to 8 cm. distant from the stoma. It is most unusual to find it in the afferent loop. Cases have been described in which the fistula and the ulcer were separated by such a distance as to to lead to the inference that the jejunal

ulcer was not involved in the production of the fistula.

The frequent occurrence after retrocolic gastro-enterostomy is related to the fact that this is the operation which is most frequently permormed in such cases; but fixation of the stoma to the transverse meso-colon is probably also a factor, owing to the closeness of of the colon to the site of the stomal ulceration. In this case, the fistula may result from the penetration of a relatively acute ulcer; it is then an opening of short length with minimal surrounding fibrosis. If, on the other hand, the fistula is the late result of an abscess in the meso-colon it may track 1 to 2 cm. in length through a mass of scar tissue.

The incdience of gastro-jejuno-colic fistula has been reported as follows: Wright (1935) 8.7% of 458 cases. Judd and Hoerner (1935) same proportion in 597 cases. Walters and Glogett (1939) 13.6%. Dowdin (1948) gives the highest figure of 22.4%. These estimates may be however exaggerated as they are based on patients who return for treatment of gastro-jejunal ulcer.

The sex incidence is computed to be 5 women in about 400 cases. Judd and Hoerner had one female in 52 cases. Time after operation varies from one month to 27 years.

When a gastro-jejuno-colic fistula is established, a serious state of affairs exists. The food passes directly into the colon. The physiological mechanism is altered and digestion becomes inadequate. Gastric Juices cause irritation of the colon, which consequently gives rise to diarrhoea with undigested food particles. Nutritional deficiency supervenes and renders the patient a poor operative risk.

Diagnosis.

1*st. Stage.* The symptoms of the primary disease, usually a duodenal ulcer, predominate.

2*nd. Stage.* Post-operative period. This is usually a period of relative freedom of symptoms and well being, which lasts from a few months to several years. Atfer this free period, complaints related to the presence of the jejunal ulcer reappear. This is different from the picture of the primary duodenal ulcer. The site of the ulcer pain shifts to the left side of the abdomen in the region of the umbilicus. The discomfort is irregular in occurrence .Bleeding is present and may be silent.

3*rd. Stage.* The formation of the fistula is marked by diarrhoea usually persistent and severe. This is a striking feature which should suggest the development of a fistula. Pain may be relieved at the onset of diarrhoea (this occurred in 12 out of 46 cases).

It was assumed that the diarrhoea is due to the passage of gastric contents into the colon. There are however many reasons for believing that the fundamental disturbance is a small intestine diarrhoea, caused by the passage of the colonic contents into the stomach and jejunum. The amount of gastric contents which passes directly into the colon is small and clinically unimportant. Observations which support this view are as follows:—

(a) The appearance of undigested food in the stools is comparatively rare.

(b) The results of fat analysis of the stool are more consistent with hurried passage through the small intestine than with short circuiting.

(c) Barium introduced into the stomach passes directly into the colon in less than half the cases; while barium in the transverse colon invariably passes into the stomach and jejunum.

(d) Inflammatory changes are present in the mucosa of the small intestine.

(e) Finally it is observed that opera-

tions which short circuit the transverse colon lead to prompt relief of the diarrhoea and other symptoms.

Vomiting is also prominent and may be faecal. Depletion of calcium result in carpo-pedal spasms or latent tetany. Loss of weight occurs and nutrition deficiency and anaemia are a common finding .

The symptoms occur in this order: Diarrhoea 100%—Loss of weight 84%. — Pain 49%. — Vomiting 42%.

X-Ray examination.

Barium enema under screen control is the best method. It shows the presence of a communication between the colon, stomach, and jejunum with hardly any exception.

Barium meal however may fail to reveal it. It has shown it in only 8 out of 14 cases.

It is not clear why the main flow through the fistula should be from the colonic to the gastro-jejunal end. Some attribute it to a valvular mechanism, but is appears more probably to be due to difference in physiological pressures.

Case III. (Fig. III).

F.S. Male. 42 years of age. Complained of irregular dyspepsia since 1946. Operated upon for duodenal ulcer in 1948, post. gastro-enterostomy, (transcolic). Gall bladder normal Had vigue pains after operation. Reported for abdominal colic six months later. Readmitted at S.L.H. in May 1951 for emaciation and diarrhoea. No pus, R.B.C., or amoeba were present in the faeces. A barium meal was given and follow-through was performed which showed increased mucosal folds of stomach and jejunum (jejunitis), with temporary arrest of barium at proximal loops of jejunum (adhesions were suspected). No evidence of fistula.

Readmitted in 6-11-51 for severe diarrhoea, six motions daily, and marked asthenia. At barium enema was performed and fistula was discovered when the barium reached the transverse colon.

Case IV. (Fig. IV)

G.C. Male 39 years old. Dsypepsia 11 years.

2½ years ago operated on for duodenal ulcer — Partial gastrectomy with posterior gastro-enterostomy. About one year ago he started complaining of cramplike pain in hypogastrium radiating to hips and inguinal regions. with feeling of oppression and bearing down in lower abdomen. Sometimes the pain was relieved by taking food. Tarry stools were observed. Since 4 months attacks of pain became more frequent with feeling of distension and nausea and occasional vomiting, at times blood-stained.

Diarrhoea with very loose stools since one month. Loss of weight. Tenderness was present in the epigastrium.

Barium meal showed the presence of a gastro-jejunal colic fistula, with small intestine and distal half of colon outlined with barium in 1½ hours film, while the proximal half of the colon was empty.

Case V.

J.D. 55 years old — male. Since 2 years complained of diarrhoea, watery brownish stools — loss of weight and asthenia.

Since 1 week complained of persistent vomiting, with faecal smelling eructations. 15 years ago was operated on for D.U. and a retro-colic gastro-enterostomy was performed.

A gastro-jejuno-colic fistula was suspected and confirmed by barium enema, which showed the passage of barium into the stomach and jejunum as it reached the middle of the transverse colon.

IV. Utero-colic fistula.

Spontaneous utero-colic fistula is extremely rare, apart from cases due to malignant disease.

When a uterine fistula develops, which is not the result of instrumentation during labour or in the treatment of abortion or other uterine haemorrhages it is usually the terminal event of a pregnancy which has taken a very unusual course.

In fact such cases are, in most instances, accidentally discovered during abdominal operations, post-mortems or X-Ray examination of the abdominal organs for some other reason.

The case which is being described here, is that of a lithopaedion, which after many years became infected and formed a fistula with the sigmoid portion of the colon.

Calcification in a retained dead foetus may take the following forms:

(a) Calcification of the membranes alone.

(b) Both the membranes and the foetus are calcified.

(c) The fœtus is infiltrated with calcium salts, while calcification of the membranes is negligible.

The conditions which lead to the development of lithopaedion are the following:

(i) The pregnancy must be extra-uterine.

(ii) The foetus must survive in the abdomen for more than three months (otherwise it is absorbed).

(iii) The condition must escape medical notice.

(iv) The foetus must remain sterile.

(v) The necessary conditions for the the deposition of calcium must be present (i.e. poor blood supply).

The incidence has been reported as 1.% of ectopic pregnancies. Up to 1941 Reeves and Lipman collected 236 reported cases, covering five centuries. The patients' ages range from 30 to 100 years with a period of retention from 4 to 60 years. Umnowa reported a case of a double lithopaedion in the same patient, one was of 2 or 3 months development and 11 years duration; the other was of 6 months development and nine years duration. Another interesting report is the finding of a bilateral tubal pregnancy with transformation into a lithopaedion on one side and into a secondary abdominal pregnancy carried to term on the other side.

Should the sac become infected and occasionally even without infection the disintegrated contents of the shrunken sac may find an outlet through the intestine, vagina, abdominal wall or even bladder. This termination is rarely observed nowadays, as ectopic pregnancies are usually diagonsed and treated and also because the advent of X-Rays has made it easier to discover such cases.

Case VI.

C.G., 52 years old, was admitted to hospital for the passage of blood per rectum.

She had been complaining, since 8 months, of fever (up to 103°F.), pain over lower abdomen and diarrhoea with pain during defaection.

Since 2 months blood escaped from the anus irrespective of defaecation.

On examination a mass in the lower abdomen was noted which extended towards the left side and was tender. She gave the information that she had been told she had a fibroma uteri since 23 years, that is since about the time of her last pregnancy.

Another most important point, which was missed at the time she was in hospital, was the discovery of a small bone passed with the faeces. The nurse, attending the case, thought it was not relevant to report such a finding having

assumed that the patient had swallowed a rabbit bone.

In view of the presence of melaena, a barium enema was performed and in the lumbo-sacral region a round calcified mass was noted ,into which the barium flowed. On close examination however foetal bones could be identified in this mass.

The patient was operated upon and a lithopaedion was found which was infected and communicated with the sigmoid colon. This was removed but patient's condition, which was already rather poor from the effects of sepsis and loss of blood, did not improve, and she died a few days later.

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