

## THE ARRIS AND GALE LECTURES ON THE ANATOMY AND SURGERY OF THE PERITONEAL FOSSÆ.

*Delivered at the Royal College of Surgeons of England,*

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### LECTURE I.—THE DUODENAL FOSSÆ.—DUODENAL HERNIA.

MR. PRESIDENT AND GENTLEMEN,—The subject I have chosen for the lectures which, by the grace of the Council of this College I am permitted to deliver, is the anatomy and surgery of the peritoneal fossæ. In the first lecture I propose to consider the anatomy of the duodenal fossæ, and the various forms of duodenal hernia. In the second I shall describe the pericæcal fossæ and discuss the reported cases of hernia occurring in the neighbourhood of the cæcum. In the third lecture the intersigmoid fossa, and intersigmoid hernia and hernia into the foramen of Winslow will be discussed.

#### THE DUODENAL FOSSÆ.

In describing the anatomy of the various fossæ found in the duodenal region it is well to clear the ground a little by referring to the exuberant and redundant nomenclature that has been adopted by various writers at different periods. Most unfortunately the same name has been adopted to describe entirely different fossæ. The name "duodeno-jejunal" has been applied to at least three separate pouches. It is a matter of no little difficulty to choose an exactly appropriate name. I have given the most apt title first, and the alternative names are mentioned in order to avoid misunderstanding.

I have examined for the purposes of these lectures over 200 bodies, not consecutively, but when time and opportunity permitted. In all cases where a vestige of old peritonitis existed I have made no record. I have also examined the bodies of 34 fetuses of all ages.

The varying descriptions given by authors to the same fossa and its determining fold may be readily accounted for. The folds and fossæ vary in their appearance according to the age of the patient. In the fœtus and in children they are very distinctly and clearly seen. In the aged, owing to the deposit of fat, traction effects, and so forth, they may become considerably altered. The true typical forms are seen in the young, and it is upon observation of young subjects that I have based my descriptions.

I recognise the following fossæ as occurring in this neighbourhood:

1. The superior duodenal fossa.
2. The inferior duodenal fossa.
3. The posterior duodenal fossa.
4. The duodeno-jejunal fossa.
5. The intermeso-colic fossa.
6. The infraduodenal fossa.
7. The paraduodenal fossa, the fossa of Landzert.
8. The mesenterico-parietal fossa, the fossa of Waldeyer.
9. The parajejunal fossa, the fossa of Brösike.

1. The superior duodenal fossa (Recessus duodeno-mesocolicus superior) (Fig. 1) is present in from 40 to 50 per cent. of cases. It may exist alone or with the inferior duodenal fossa. It lies to the left of the ascending portion of the duodenum. It is bounded in front by the superior duodenal fold, triangular in shape, presenting a lower free margin, slightly concave, whose inner end is blended with the peritoneum on the duodenum, and whose outer margin is lost on the posterior parietal peritoneum.

2. The inferior duodenal fossa (fossa duodeno-jejunalis of Treitz; recessus duodeno-mesocolicus inferior of Brösike). (Fig. 1.) is the most frequent of all the peritoneal fossæ in this region, being present in from 70 to 75 per cent. of cases. It is placed on the left side of the ascending portion of the duodenum opposite the third lumbar vertebra. The orifice looks upwards, and is opposed to the mouth of the superior fossa. The fossa is bounded by the inferior duodenal fold, thin, sharp, and with a concave upper margin. The

inferior mesenteric vein and the left colic artery are generally found well to the left side of the point of fusion of the fold with the parietal peritoneum. The fossa is liable to variation in size and extent. Treves has figured many of the aberrant forms. In general the first joint of the middle finger can be easily passed into the fossa. The superior and inferior duodenal folds are not infrequently blended at their outer extremities, so that a single oval orifice leads to the two fossæ. The inferior fossa very commonly extends some little distance behind the ascending portion of the duodenum.

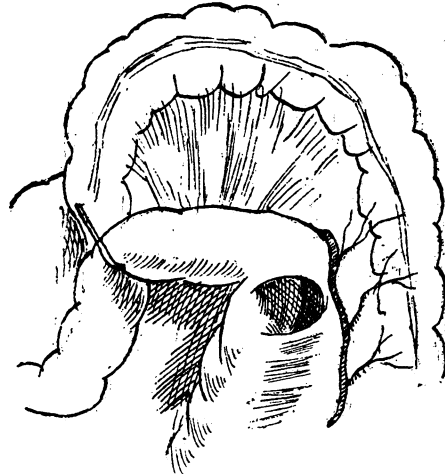


Fig. 1.—The superior and inferior duodenal folds and fossæ.

*Genesis of the Superior and Inferior Duodenal Folds.*—It is to Treitz (1857) that we are indebted for the first explanation given of the formation of the folds. He considered that they were traction folds, due to the dragging of the intestine in the displacement of the cæcum and ascending colon to the right. Waldeyer believed that they were vascular folds, raised up by the inferior mesenteric vein. According to Treves, the inferior duodenal fold represents the remains of the mesoduodenum, and is comparable to the duodenal fold of the hyæna. None of these views are acceptable. As shown long ago by Toldt, the folds are fusion folds. They are caused by the process of "physiological adhesions" between the original left, afterwards anterior, surface of the ascending portion of the duodenum and the right or anterior surface of the descending mesocolon, and date their origin from the time when these two peritoneal surfaces are in close apposition.

3. The posterior duodenal fossa (recessus duodeno-jejunalis posterior of Brösike. The fossa of Grüber (Fig. 2 x). This is

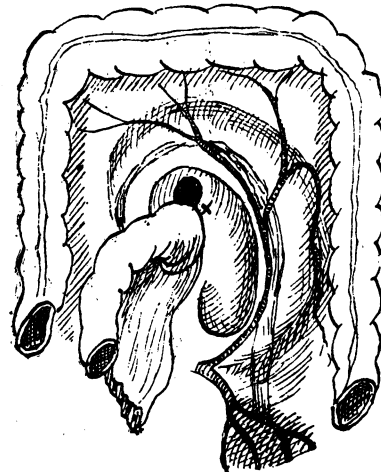


Fig. 2.—The paraduodenal fossa and the posterior duodenal fossa (x). A small fossa lying immediately behind the upper portion of the ascending limb of the duodenum. Its orifice is directed

upwards and to the left, and on its right side is the plica suspensoria, a fold raised up by the muscle of Treitz. It was described as an "accessory sac" by Grüber.

4. *The Duodeno-jejunal Fossa* (recessus duodeno-jejunalis superior) Fig. 3.—On dragging the transverse colon upwards

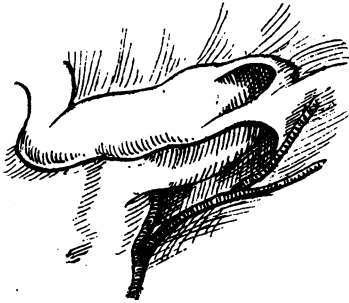


Fig. 3.—The duodeno-jejunal fossa.

and the jejunum downwards, and to the right there can be seen at the root of the transverse meso-colon, a fossa which results from the plunging of the duodeno-jejunal flexure into the root of the transverse meso-colon. This fossa is the duodeno-jejunal; it exists in from 15 per cent. to 20 per cent. of the bodies examined. Its lateral boundaries are two folds, the duodeno-mesocolic, which are in reality the continuations backwards of the two layers of the mesentery. The fossa is bounded above by the pancreas, to the right by the aorta, to the left by the kidney. In the floor lies the left renal vein. The duodeno-jejunal flexure is a hernial content of the sac.

5. *The Intermesocolic Fossa* (recessus intermesocolicus transversus) Fig. 4.—Probably a modification of the last fossa. It

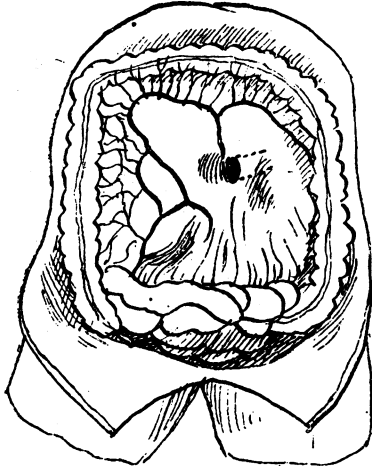


Fig. 4.—The intermesocolic fossa.

runs horizontally in the root of the transverse mesocolon. In all cases there is a marked deviation of the duodeno-jejunal flexure to the left.

6. *The Infraduodenal Fossa* (fossette rétroduodénale of Jonsesco) Fig. 5.—The orifice of this fossa looks downwards; its apex reaches the duodeno-jejunal angle, the muscle of Treitz, and the pancreas. It is bounded in front by the posterior aspects of the horizontal and ascending portions of the duodenum, behind by the aorta, and laterally by two folds, the duodeno-parietal.

7. *The Paraduodenal Fossa* (recessus venosus, fossa of Landzert) Fig. 2.—The complications of this fossa are frequent. In its typical form it may be thus described:—It is placed to the left and some distance from the ascending limb of the duodenum. The fossa is caused by the raising up of a fold the plica venosa, by the inferior mesenteric vein, a fold which may be not inaptly described as a "mesentery" for that vein. Behind, the sac is bounded by the parietal peritoneum covering the psoas, the renal vessels and ureter, and a portion of the left kidney. Below it is limited by the mesenterico-

mesocolic fold. The orifice of the sac is wide, and looks downwards and to the right. The plica venosa consists of a

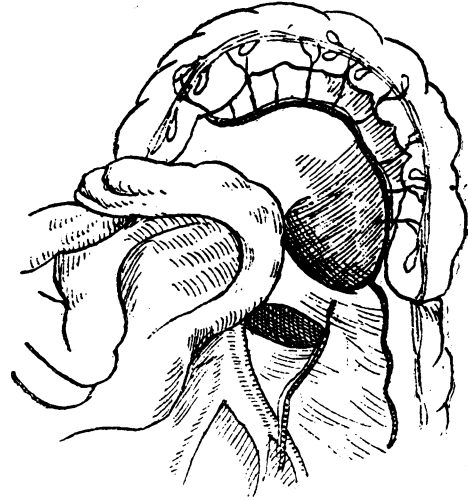


Fig. 5.—The infraduodenal fossa.

vertical and a horizontal portion, the vertical being to the left and below the fossa, the horizontal bounding the fossa above.

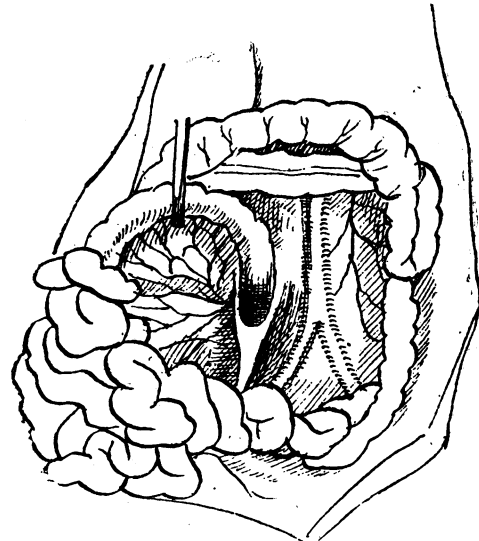


Fig. 7.—The fossa para-jejunalis of Brösike.

The inferior duodenal fossa may be present with the para-duodenal. In that case there is always an amalgamation of the determining folds. Such a fossa was described by Treitz, and was considered by him as the normal condition.

8 and 9. *The Mesenterico-Parietal Fossa* (Fig. 6) and *the Fossa Para-jejunalis* (Fig. 7).—These may conveniently be studied

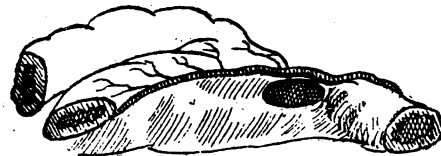


Fig. 6.—The mesenterico-parietal fossa: fossa of Waldeyer. together, for they are practically the same fossa under different conditions. The fossa is situate in the first part of the meso-jejunum, immediately behind the superior mesenteric artery and immediately below the duodenum. Waldeyer, who is the only observer who has noticed a fossa, in this

position with the intestines normal, has described it as existing only in the fœtus. I have, however, seen two well-marked examples in the adult. Brösike, who describes a similar, or more probably the same, fossa, asserts that it can only be found when the first portion of the jejunum is adherent to the posterior abdominal wall. As the fossa in any case lies immediately behind the first portion of the superior mesenteric artery, the jejunal adhesion is probably merely an episode, and in no causal relationship with the fossa. The peritoneum of the left leaf of the mesentery lines the pouch, whose opening is to the left and fundus to the right. A forcible enlargement of the fossa results in the lifting up of the posterior parietal peritoneum in the right half of the abdomen.

#### DUODENAL HERNIA.

Duodenal hernia is of two kinds. In the first the hernial sac is situated on the left side of the abdomen; in the second, to the right. In both cases there may be also an upward and downward increase, but the essential difference between the two forms lies in the varying direction of their lateral deviation. In the later stages of each the sac may practically fill the abdominal cavity. I propose to apply the terms "left duodenal hernia" and "right duodenal hernia" to the two varieties, to emphasise the fact that there is an intrinsic difference not only in the mode of growth but also, and chiefly, in the points of origin of the two forms.

#### LEFT DUODENAL HERNIA.

The commoner variety; 57 cases are recorded. A perfectly typical case, for which I am indebted to Dr. T. Wardrop Griffith, is here depicted. (Fig. 8) Without discussing the



Fig. 8.—Left duodenal hernia.

matter closely it may be affirmed that only one of the fossæ above described is capable of developing into the sac of a hernia—that one is the paraduodenal fossa, or fossa of Landzert. In all the cases recorded it has been found that in the anterior margin of the orifice of the sac lies the inferior mesenteric vein. With it, for a shorter or longer distance, there runs the ascending branch of the left colic artery. The anterior margin of the sac is formed, in fact, by the plica venosa. The plica venosa normally bounds the fossa of Landzert, and it is in that fossa alone that a hernia can develop. A left duodenal hernia is characterised by three points:

1. The presence of the inferior mesenteric vein in the neck of the sac.
2. The hernia spreads either outwards towards the descending mesocolon, or upwards towards the transverse mesocolon, or both.

3. The hernial sac consists of a single layer of peritoneum. Behind the sac lies in contact with the posterior abdominal wall, and in front of it there is the posterior parietal peritoneum.

The orifice of the sac is situated at the back of the hernia in close approximation to the lumbar vertebræ. In a large hernia it is necessary, in order to expose the neck of the sac, to drag the whole tumour well over to the left side. The orifice is then seen close down to the third lumbar vertebra. The average size of the opening is 6 cm. long and 4 cm. broad. The size of the hernia varies enormously. The smallest is recorded by Brösike. It occurred in a child 14 days old, and the length of intestine in the sac was between 2 and 3 cm. In several cases, including the first recorded by Neubauer, the whole of the jejunum and ileum lay in the sac. As the hernia increases in size it reaches the descending colon on the outer side.

In some cases the colon is pushed backwards and covered by the hernia; in other cases the hernia passes behind the colon, which then lies in the anterior wall of the sac, the hernial tumour appearing therefore on the outer side of the colon. The difference in the behaviour of the colon I believe to be due to the condition of its peritoneal surroundings: When no descending mesocolon is present the colon is pushed backwards by the hernial swelling; when a descending mesocolon is present it is used up, so to speak, as a covering for the sac, and the hernia, passing behind the colon, comes to lie on its outer side.

#### RIGHT DUODENAL HERNIA.

This is the rare variety. Only 13 cases, exclusive of the specimen shown, are recorded. This specimen (Fig. 9) for

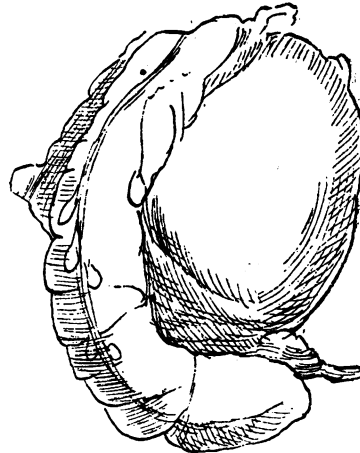


Fig. 9.—Right duodenal hernia.

which I am indebted to Dr. T. Wardrop Griffith, has been preserved for some years in the *post-mortem* room of the Leeds Infirmary. The notes of the case have not been traced, but Dr. Griffith's recollection is that the death of the patient was unconnected with the hernia.

The point of origin of this hernia has never been satisfactorily explained. Jonnesco gives an unintelligible description of the process by which a left duodenal hernia is supposed to turn over to the right. Brösike believes that in all specimens that are recorded there has been a jejunal adhesion to the posterior abdominal wall.

The fossa of Waldeyer (mesenterico-parietal) has entirely escaped observation by other authors. I believe it to be in this fossa that a right duodenal hernia develops.

On examining the orifices of the case recorded by Dr. Barrs, and the specimen placed at my disposal by Dr. Griffith, this opinion seems beyond disproof. The drawing of Dr. Barrs's case (Fig. 10), shows the orifice of the sac in precisely the spot occupied by the fossa of Waldeyer. Brösike figures a case observed by himself in which the jejunum was adherent posteriorly. In order to clear this point as to jejunal adhesion, up, I have carefully examined the reports of all the cases recorded. In 7 of them we may take it that this adhesion was present. In the remaining 7 it was certainly absent. We

may, therefore, describe two forms of right duodenal hernia, the former as hernia mesenterico-parietalis parajejunalis, and the latter as hernia mesenterico-parietalis paraduodenalis. In both varieties the anterior margin of the sac contains the

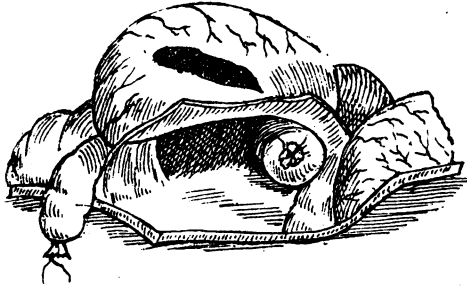


Fig. 10.—Orifice of the sac of a right duodenal hernia.

superior mesenteric artery. It is interesting to note that in two recorded cases, Zwaardemaker's and Neumann's, there was a twisting of the bowel at the orifice of the sac, amounting, it is said, to volvulus.

#### DIAGNOSIS.

Duodenal hernia, unless strangulated, gives rise to practically no symptoms. In many cases the hernia has been found accidentally on *post-mortem* examination. When strangulation occurs, in addition to the symptoms of acute intestinal obstruction a characteristic appearance of the abdomen has been noted. (Fig. 11.) There is a tumour in the central part of

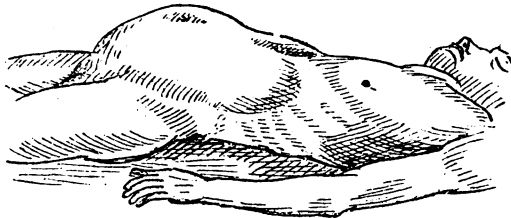


Fig. 11.—Aspect of abdomen of Dr. Barrs's case of right duodenal hernia. The abdomen and around it a flattened area. The tumour has the following attributes.

1. It is limited to a definite region of the abdomen. In left duodenal hernia it lies at first to the left and upper, in right duodenal to the left and lower parts of the abdomen, but in each case spreads eventually over almost the whole abdominal cavity. Around the tumour is an area of depression corresponding to the position of the colon. In size the tumour may vary. It has been described as being of the size "of a child's head." In Dr. Barrs's case it was "equal to a nine months pregnancy." It is slightly movable, but fixed during respiration.

2. The tumour is marked out distinctly by palpation. On percussion it is always resonant. The degree of resonance varies in different cases, and in different parts of the same tumour. But the striking feature is that the tumour is a palpable, definite, resonant mass. In the centre of the tumour or over its whole mass may be seen coils of intestine. The tumour may bear a very obvious relation to the clinical condition of the patient, becoming more tense and prominent and very much more tender when the symptoms undergo exacerbation. As the symptoms decline the tumour becomes less aggressive.

3. On auscultation distinct gurgling sounds may be heard anywhere in the tumour.

It is important to remember that, owing to the position of the inferior mesenteric vein in the neck of a left duodenal sac the radicles of this vein may become enlarged, as in the case of the hæmorrhoidal veins; or venous trunks on the anterior abdominal wall may be so increased in size as to form a striking feature of the case.

The medical practitioners of Yukon have, it is announced, organised a Yukon College of Physicians and Surgeons to examine all practitioners seeking to settle at Klondyke.

## THE MILROY LECTURES

ON THE

### EARTH IN RELATION TO THE PRESERVATION AND DESTRUCTION OF CONTAGIA.

Delivered at the Royal College of Physicians of London

By G. V. POORE, M.D., F.R.C.P. LOND.,

Professor of Medical Jurisprudence and Clinical Medicine, University College; Physician to University College Hospital.

#### LECTURE II.<sup>1</sup>

##### ENTERIC FEVER.

MR. PRESIDENT AND GENTLEMEN,—Enteric fever has of late years much occupied the attention of epidemiologists and bacteriologists, and our knowledge of its definite relationship to filth, milk, and water has undergone considerable increase. The laboratory experiments connected with enteric fever are of great interest and value, but it would be, to say the least, hazardous to build upon them any measures intended for practical sanitation. It must never be forgotten that the typhoid bacillus does not fulfil one of Koch's postulates. The disease produced by the inoculation of guinea-pigs with pure cultivation of typhoid bacillus has but a remote resemblance to the disease which we clinically know as enteric fever, a disease which seems limited to the human species. Sidney Martin<sup>2</sup> finds that hitherto "none of the ordinary cultures of the typhoid bacillus obtainable in the laboratories will kill an animal, but that it may be rendered virulent by inoculation and transference through a succession of peritoneal cavities, and also by injecting simultaneously the products of other micro-organisms, such as streptococcus or bacillus coli communis. It is noteworthy that the bacillus coli communis and Gaertner's bacillus, when subjected to similar manipulations, are as toxic to rabbits as is the typhoid bacillus. It must be remembered that "pure cultivations" of the bacillus typhosus cannot be said to exist in Nature. We recognise, and it may be taken as proven, that the main cause of the endemicity and epidemicity of enterica in this country is to be found in the fæces of the patient, and yet Martin tells us that while the bacillus is invariably found in the spleen and mesenteric glands and in intestinal lesions, "it is found in some cases in the motions of typhoid fever and also in the urine."

Dr. Carver, working under Delépine at Manchester, found the typhoid bacillus twice in twenty samples of typhoid fæces and once in sixteen samples of typhoid urine.<sup>3</sup> Martin, working with sterilised soils, has shown that in soils which are more or less "polluted" with organic matter, the bacillus typhosus will continue to live and spread at ordinary temperatures, but that in virgin soils the pure cultivations of the bacillus die out from some unexplained cause. Martin gives one experiment<sup>4</sup> to show that in unsterilised soil containing much organic matter the bacillus may continue to live, but as yet there has been no evidence of spreading.\* Robertson and Maitland Gibson<sup>5</sup> collected thirty samples of soil from areas which they considered likely to be infected. "In not one single instance was bacillus typhosus found."

Laboratory experiments tend to show that vegetation (grass) prevents the growth of the organism, which may explain "why typhoid fever is so much more prevalent in towns than in rural districts." Attempts to prove the aerial conveyance of the organism from liquid filth have failed.

Let us now turn from these experiments to the practical experiences of sanitarians. It may be premised that Martin's experiments show that the bacillus typhosus will grow in any soil rich in organic matter, and that, although aerobic, it can be cultivated as an anaërope, even in an atmosphere of carbonic acid,<sup>6</sup> and that it is destroyed by sandy or peaty "virgin" soils. Robertson and Gibson cultivated the bacillus on a soil in which clay predominated. Sir Charles Cameron is of opinion that it flourishes in gravel.

Dr. Scurfield of Sunderland has said that "the greater part of the county of Durham in which typhoid fever had been prevalent during the last few years was covered with stiff boulder clay, and in the urban district of Sunderland typhoid

\* The persistence of the bacillus typhosus appears to depend on feeding it with fluid nourishment. A sewer leaking into the soil would do this or liquid filth in a privy.