

D I V E R T I C U L O S I S O F T H E C O L O N

ESSAY

SUBMITTED FOR PARTIAL FULFILMENT
OF THE MASTER DEGREE IN
GENERAL SURGERY

1C-72/5

BY

WAGIH SAMY MEEKHAIL
M.B.,B.CH.

617-5547
W, S

SUPERVISED BY

Prof. Dr.

KAMEL MOHAMED SAIED
Prof. of General Surgery

26390 ✓

Faculty of Medicine
Ain Shams University

رسالة

1986



ACKNOWLEDGEMENT

I would like to express my sincere gratitude and indebtendness to Prof. Dr. Kamel Mohamed Saied, Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his valuable supervision, constant encouragement and for his continuous support and guidance throughout the whole work.

Wagih Samy Meekhail



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INTRODUCTION

The colon is the commonest site in the alimentary tract for the formation of diverticula. A 'diverticulum' is an abnormal pouch which opens from a hollow organ. In Roman times the word was applied to a wayside house of ill fame and well the diverticula of the colon deserve the name.

Until recently, clinicians, radiologists and pathologists used the term diverticulosis to imply a colon bearing diverticula.

Modern terminology defines three groups of patients. The first and very largest comprises subjects with symptomless diverticula this is termed 'colonic diverticulosis'. The second is made up of those patients presenting with acute inflammation of the diverticulum and its complications, 'termed acute diverticulitis'. The third group is made up of patients with symptomatic disease with no evidence of inflammatory change. The term 'diverticular disease' is a useful description of this state of affairs. (Ellis , 1981).

The first clear pathological description of diverticula of the colon was apparently that of Cruveilhier (1849).

De Quervain (1914) and Case (1914) were the first to demonstrate colonic diverticula by means of X-rays. They suggested the 'diverticulosis' when diverticula were present without evidence of inflammatory changes.

Spriggs and Marxer (1927) were the first who recognized a 'prediverticular stage '. They had excluded "roughage" from the diet in the mistaken belief that it irritated the

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colon . Thus the "low residue diet " became the mainstay of medical treatment for nearly half a century despite the lack of any evidence that it was of benefit. (Goligher, 1975).

The incidence of diverticulitis with colonic diverticula cannot be accurately assessed chiefly for two reasons. First, the number of asymptomatic cases of diverticular disease can't be accurately assessed . Second , it is difficult to accurately determine whether symptoms are due to diverticulosis or diverticulitis.(Almy and Howell,1980).

There is no doubt that the incidence of colonic diverticular disease increases with advancing age. This increase is from about 5% in the fifth decade to approximately 50% in the ninth decade.

It is generally agreed that by age 60 about one third of the population of the western world will, to a certain extent, have diverticuloses coli. One third of these patients will develop inflammatory complications, and about one third of these will have persistent symptoms and will have further complications. (Rosenthal and Colonel , 1982).

While diverticula are common in Europe, North America and Australia they are less common in southern Europe and South America and rare in Africa and the oriental countries. The frequency of diverticula in western countries have been calculated from barium enema studies or by necropsy. In the United States the incidence is about 5% . Thus, about 11 million persons in the States have the disease. Its incidence is increasing at the present time, not only

because of an ageing population but also possibly because of changes in the diet and advances in diagnostic aids.(Storer et al, 1979).

The key to the proper management of diverticular disease of the colon lies in a clear understanding of the physiology, pathology, symptomatology and the early management by non-operative therapy. It is as well important to recognize the point at which the disease has become intractable to the non-operative therapy, when the catastrophic events which may complicate diverticular disease have started.

Medical treatment of diverticulitis was improved by the introduction of sulfonamides and , later antibiotics. On the other hand, improved methods of diagnosis such as air contrast x-rays, angiography, and colonoscopy have been accompanied by important advances in surgical management of the disease. (Rodkey and Welch, 1984).

ANATOMY OF THE COLON

The colon form a large part of the large intestine, and is on average 1.36 metres long. Its calibre variable, comprises the caecum, the ascending transverse, descending and sigmoid colon. In its course it describes roughly an arch which surrounds the coils of the small intestine. It is readily distinguished from the small gut by its greater calibre; its saculated appearance throughout most of its length, its possession in many parts of fatty appendages, the appendices epiploicae, the attachment of a part of it to the greater omentum, and its relatively greater fixity.

The striking feature in the wall of the colon is the concentration of the outer longitudinal muscle coat into three narrow bands or taeniae relatively shorter than the bowel itself so that the latter is puckered with the production of the typical haustrations or sacculations. Between the taeniae the colon wall is extremely thin and this account for the greater and sometimes amazing capacity of this part of the bowel to undergo distension when obstructed.

(Goligher, 1975)

If the taeniae are divided between the sacculations the latter can be drawn apart and the bowel wall flattened. (Last, 1981).

THE CAECUM which is the commencement of the large intestine, lies in the right iliac fossa. Its surface projection occupies the triangular area bounded by the right lateral plane, the transtubercular plane and the inguinal ligament.

It is a large sac which is continuous above with the ascending colon , and at the point where the one passes into the other the ileum opens into the large intestine from the medial side. Its average length is about 6cm. It is situated in the right iliac fossa above the lateral half of the inguinal ligament: it rests on the Iliacus and on the Psoas major, being separated from both muscles by their covering fasciae and the peritoneum, the lateral cutaneous nerve of the thigh intervenes between it and the Iliacus. In front; it is usually in contact with the anterior abdominal wall but the greater omentum and some coils of small intestine may lie in front of it. It is entirely enveloped by peritoneum, but sometimes the peritoneal covering is complete, the upper part of the posterior surface being uncovered . The caecum enjoys a considerable amount of movement. (Davies and Coupland, 1969).

THE VERMIFORM APPENDIX : is a narrow, worm-shaped tube which springs from the posteromedial wall of the caecum 2cm or less below the end of the ileum and may occupy one of several positions.

The appendix varies from 2cm to 20cm in length, the average about 9cm . It is connected by a short mesentery to the lower part of the mesentery of the ileum.

THE ASCENDING COLON : about 15cm long. It begins at the caecum and ascends to the under surface of the right lobe of the liver, where it is lodged in a shallow depression, termed the colic impression; here it bends forwards and to the left, forming the right colic flexure.

It is covered with peritoneum on its front and sides. Its posterior surface is connected by areolar tissue to the fascia over the Iliacus, ilio-lumbar ligament, quadratus lumborum and the aponeurotic origin of the transversus abdominis, and to the perirenal fascia in front of the lower and lateral part of the right kidney.

The lateral cutaneous nerve of the thigh, the fourth lumbar artery, the ilio-inguinal and iliohypogastric nerves cross behind it. Its relation, in front, with the convolutions of the ileum, the right edge of the greater omentum and the abdominal wall.

SURFACE ANATOMY OF THE ASCENDING COLON:- it runs upwards immediately to the right of the right lateral plane from the transtubercular plane to midway between the subcostal and transpyloric planes. (Davies and Coupland, 1969).

THE RIGHT COLIC FLEXURE:- comprises the terminal part of the ascending colon and commencement of the transverse colon. Behind, it is in relation with the lower and lateral part of the anterior surface of the right kidney. Above and anterolaterally, it is related to the right lobe of the liver; anteromedially, to the descending part of the duodenum and the fundus of the gall bladder. It is not covered by peritoneum on its posterior surface, so that this surface is in direct contact with renal fascia.

THE TRANSVERSE COLON:- about 50cm long, begins at right colic flexure, in right hypochondriac region, passes across the abdomen into the left hypochondriac region, and here curves sharply on itself, downwards and backwards beneath

the lateral end of the spleen, forming the left colic flexure. In its course across the abdomen it describes an arch, the concavity of which is usually directed backwards and upwards. The precise position occupied by the transverse colon is difficult to define, for it is not only shows individual variation but its position varies in the same individual from time to time.

The posterior surface of its right extremity is devoid of peritoneum and is attached by areolar tissue to the front of the descending part of the duodenum and the head of the pancreas. Between the head of the pancreas and the left colic flexure, the transverse colon is almost completely invested by peritoneum and is connected to the anterior border of the body of pancreas by transverse mesocolon. It is in relation by its upper surface with the and the gall bladder, the greater curvature of the stomach and the lateral end of the spleen; by its under surface with the small intestine; by its anterior surface with the posterior layers of the greater omentum; its posterior surface is in relation with the descending part of the duodenum, the head of the pancreas, the upper end of the mesentery, the duodeno-jejunal flexure and some of the coils of the jejunum and ileum.(Davies and Coupland, 1969).

SURFACE ANATOMY OF THE TRANSVERSE COLON:-

It extend from the point situated lateral to the right lateral plane and midway between the subcostal and transpyloric planes to the umbilicus and then upwards and to the left to a point a little above and lateral to the intersection of the left lateral and transpyloric planes.

THE LEFT COLIC FLEXURE:- is situated at the junction of the transverse and descending parts of the colon in the left hypochondriac region, and is in relation with the lateral end of the spleen and the tail of the pancreas above, and with the anterior aspect of the left kidney medially; the flexure is so acute that the end of the transverse colon usually lies in contact with the front of the descending colon. The left colic flexure lies at higher level than, and on a plane posterior to the right colic flexure. (Davies and Coupland, 1969) .

There is a band of peritoneum extending from it laterally to the diaphragm- the phrenico colic ligament- which helps to support the colon and spleen. (Goligher, et al, 1975).

THE DESCENDING COLON:- about 25cm long, passes downwards through the left hypochondriac and lumbar region. At first it follows the lower part of the lateral border of the left kidney, and then, at the lower pole of that organ, it descends in the angle between Psoas major and quadratus lumborum, to the crest of the ilium, it then curves downwards and medially in front of the iliacus and Psoas major, and ends in the sigmoid colon at the inlet of the lesser pelvis. The peritoneum covers its anterior surface and sides, while its posterior surface is connected by areolar tissue with fascia over the lower and lateral part of the left kidney, the aponeurotic origin of the transversus abdominis, the quadratus lumborum, the iliacus and the Psoas major. Numerous structures cross behind it. They include:- the subcostal vessels and nerve, the iliohypogastric and ilio-inguinal nerves, the fourth lumbar artery, femoral and genitofemoral nerves, the testicular

(or ovarian) vessels and the external iliac artery, all of the left side. Anteriorly it is related to coils of the jejunum, except its lower part, which can be felt through the anterior abdominal wall when the abdominal muscles are relaxed.

SURFACE ANATOMY OF THE DESCENDING COLON:- It passes downwards, just lateral to the left lateral plane, from a point situated a little above and to the left of the intersection of the transpyloric and left lateral planes, as far as the inguinal ligament. (Davies and Coupland, 1969)

THE SIGMOID COLON (PELVIC COLON): begins at the inlet of the lesser pelvis, where it is continuous with the descending colon; it forms a loop which varies greatly in length, but averages about 40cm, and normally lies within the lesser pelvis . The loop consists of three parts; the first part descends in contact with the left pelvic wall; the second crosses the pelvic cavity, between the rectum and bladder in the male, and the rectum and uterus in the female; the third arches backwards and reaches the median plane at the level of the third piece of the sacrum, where it bends downwards and ends in the rectum. The sigmoid colon is completely surrounded by peritoneum, which forms a mesentery, termed the sigmoid mesocolon; this diminishes in length from the centre towards the ends of the loop, where it disappears, so that the loop is fixed at its junctions with the descending colon and rectum, but enjoys a considerable range of movement in its central portion. Laterally it is related to the external iliac vessels, the obturator nerve, the ovary (in the female), the ductus deferens (in the male) and the

lateral pelvic wall. Posteriorly it is related to the internal iliac vessels, the ureter the piriformis and the sacral plexus all of the left side. Inferiorly it rests of the bladder, in the male, and on the uterus and bladder, in the female. Above and on its right side, it is in contact with the terminal coils of the ileum.

The position and shape of the sigmoid colon vary very much and depend on (a) its length; (b) the length and freedom of its mesocolon; (c) the condition of distension; (d) the condition of the rectum and bladder and the uterus in the female. (Davies and Coupland , 1969).

STRUCTURE OF THE COLON:

It has four coats (1) The serous coat is the peritoneum which invests the different portions of the colon to a variable extent and thrown into a number of small pouches filled with fat, called appendices epiploicae. (2) The muscular coat consists of the an external longitudinal, and an internal circular layer of unstripped muscular fibres. The longitudinal fibres form longitudinal bands, termed taeniae coli, and in the intervals between them the longitudinal coat is less than half the thickness of the circular coat.

Three taeniae are present, ranging from 6 to 12 mm in width one (the taeniae libera) is placed anteriorly in the ascending, descending and sigmoid colon, but is placed inferiorly on the transverse colon; the second (the taeniae mesocolica) is situated on the posteromedial surface of the ascending, descending and sigmoid colon, but posteriorly on the transverse colon; the third (the taeniae omentalis) is

placed posterolaterally in the ascending, descending and sigmoid colon, but is situated on the anterosuperior surface of the transverse colon. These bands are shorter than the other coats of the colon, and serve to produce the sacculi which are characteristic of the colon. The circular fibres form a thin layer over the colon, being especially accumulated in the interval between the sacculi. (3) The submucous coat connects the muscular and mucous layers closely together. (4) The mucous membrane of the colon is pale, smooth, destitute of villi and arises into numerous crescentic folds which correspond with the intervals between the sacculi.

BLOOD SUPPLY OF THE COLON.

ARTERIES:-

THE SUPERIOR MESENTERIC ARTERY: supplies the caecum and the ascending colon and most of the transverse colon. It arises from the front of the aorta about 1 cm. below the coeliac trunk, and descends between the layers of the mesentery and near its root until it reaches the right iliac fossa, where it anastomoses with the ileocolic artery.

Its branches which supply the colon are:-

THE ILEOCOLIC ARTERY:- which divides into a superior and inferior branches; the superior branch anastomoses with the right colic artery, the inferior with the end of the superior mesenteric artery.

THE RIGHT COLIC ARTERY: arises from near the middle of the concavity of the superior mesenteric artery. It passes to the right behind the peritoneum and in front of the