Current Survey

DIVERTICULA OF COLON

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DIVERTICULA occur in the large bowel and are herniations of the mucous membrane through acquired defects in the muscular coats—the small pouches being covered by serosa; except in the smallest sacs muscle fibres are only found in the neck. When first formed the necks are wide and the diverticula globular—later the necks become attenuated and the pouches flask shaped. The appendices epiploicae when heavily fat laden tend to obscure the diverticula. The diverticula arise between the mesenteric and antimesenteric taeniae near the site of entry of the small perforating vessels, consequently diverticula are not found in the rectum where the longitudinal muscle is complete. The commonest site is the pelvic colon and in many cases is the only part involved. Diverticula in the caecum and ascending colon are rare, tend to be solitary and when inflamed simulate appendicitis. Under 40 years diverticula are uncommon but after the 4th decade 5-10% of adults have diverticulosis. mostly asymptomatic.

Painter (1964) has investigated intracolonic pressure in volunteer subjects by means of three open-ended water-filled polythene tubes with metal tips, inserted through a sigmoidoscope—the tips being 3 inches apart from each other. He did not find any intraluminal hypertension in diverticulosis under resting conditions but after injection of morphine, tracings recorded from the immediate vicinity of diverticula showed very high pressures compared with those from normal bowel after morphine. Continuing his investigations with cine-radiography Painter outlined the colon with thin barium injected through one of the polythene tubes; he demonstrated that diverticula are reducible and vary in size according to local pressure in the bowel. Following an injection of morphine the bowel, bearing diverticula, narrowed, the diverticular necks contracted whilst the diverticula enlarged as barium was forced into them. Colonic movements were generally increased. If probanthine was then given, this caused paralysis of the bowel muscle, the colon dilated, the diverticular necks reopened, barium drained back into the relaxed bowel and the intrasigmoid pressure fell. Painter found after morphine the colon in diverticulosis localised pressure by altering the configuration of its wall, as it was seen to be segmented in the vicinity of any tip which was recording changes of pressure. The segments were defined by interhaustral contraction rings which narrowed and at times completely occluded the colonic lumen, so the

colon functioned as a series of bladders and not as a tube. Very high pressures resulted if one segment, isolated from its fellows, contracted forcibly as its contents could not escape. As segments of colon bearing diverticula produce pressures after morphine differing from those recorded from their neighbours, and from segments of healthy colon, it is possible that the diseased segments also react excessively to natural stimuli such as eating, drinking and emotion which are known to activate the colon. Painter is uncertain whether this ability of affected segments to behave differently precedes the appearance of diverticulosis and is responsible for its causation or whether it is result of the disease. Most probably the differential response is present in the early stages of the disease process and is responsible for the progressive nature of diverticulosis.

The ripple-edge border of the sigmoid colon seen on barium enema examination has been regarded as a prediverticular state but Marcus and Watt (1964) consider it indicates established diverticula at an early stage. Bilateral irregularities of contour indicate small but definite diverticula in the lateral intertaenia areas. When the saw-tooth outline is unilateral it is due to diverticula in the antimesenteric intertaenia area.

Diverticulitis develops in a quarter of the cases of diverticulosis. Pain and tenderness in the left lower abdomen are invariably present. Bed rest, antibiotics and a low residue diet has been the usual treatment at this stage, but Painter has suggested that a low residue diet in the narrow colon present in diverticulosis allows the augmented interhaustral rings to be readily brought into apposition, so segmentation becomes more efficient and pressures are produced more frequently. He considers the use of a low residue may be actually harmful. Pethedine is considered safer than morphine.

Most cases of diverticulitis settle with conservative treatment and it is usually safe to arrange for a barium enema a month after pain and tenderness have subsided. The full extent of the diverticula process will then be apparent and this information will be helpful if surgical treatment later is undertaken. This will be needed if attacks recur in spite of conservative treatment and calls for resection of the affected areas after adequate bowel preparation.

Reilly (1964) believing the hypertrophied

circular muscle found in the lower sigmoid in diverticulitis to be an important feature and seeking an operation less drastic and hazardous than resection has tried myotomy similar to Rammstedt's operation. He incises along the antimesenteric taenia for a distance of 6 inches over the thickest part of the colon deepening carefully until the mucous membrane bulges throughout the length of the incision. There have been no complications and results are stated to be satisfactory. Preoperative and postoperative X-rays have demonstrated the return of almost normal outline to the affected lengths of sigmoid after myotomy.

Perforation occurs in about 2% of cases of diverticulitis (Staunton, 1962). MacLaren divides perforations into those giving rise to a faecal peritonitis and those causing peritonitis of a purulent nature, dependent on the size of the perforation. The neck of the diverticulum may be occluded by inflammation and no faeces escape. Local repair of the perforation and drainage is unsatisfactory; the perforation may not be easily found among coils of matted intestine and the oedematous bowel is unsuitable tissue to suture. Re-perforation is likely to occur with further leakage. When free faeces are present in the peritoneal cavity these should be thoroughly removed. No attempt to find or repair the perforation should be made but a wide corrugated drain placed in the region of the perforation. A transverse colostomy should be positioned to the right of the middle line. About 6 weeks after recovery a barium enema is arranged and will show the extent of the area requiring resection. Closure of the colostomy should not be long delayed as a stricture may develop at the site of anastomosis. An alternative method of treatment is possible by exteriorization of the loop containing the perforation and this ensures elimination of the source of infection. The bowel may however be bound down and the mesentery thickened making mobilisation difficult. The exteriorized loop is excised leaving a colostomy which is closed later. In this method diverticula will probably be left behind but rarely give rise to any trouble.

Haemorrhage probably arises from erosion of vessels in or near the neck of a diverticulum and for which an inflammatory change must be presumed. A massive haemorrhage in an elderly patient in good health is likely to be due to diverticular disease. Conservative treatment with blood replacement is usually effective and bleeding stops as suddenly as it began. Other causes for the bleeding must be excluded by barium enema

and diverticula demonstrated before a final diagnosis is made.

Surgical intervention becomes necessary when conservative measures have failed to control the haemorrhage. Operation may not be entirely satisfactory; it may be impossible to locate the site of bleeding and provided one can exclude a higher source, it is necessary to resect all the colon containing diverticula.

A *pericolic abscess* arising from an inflamed diverticulum presents as a tender swelling in the left iliac fossa with local guarding and fever. The abscess should be drained and consideration given to providing a colostomy, thereby resting the bowel and ensuring a more rapid recovery. A colostomy minimises the likelihood of an external fistula developing at the site of drainage, but if this occurs spontaneously or following drainage the fistulous track with the affected portion of colon should be excised *in toto*.

A vesico-colic fistula is more common in men and gives rise to bladder pain, frequency, foul-smelling urine and pneumaturia. A transverse colostomy diverting faecal contents from the bladder will lessen the risk of ascending pyelonephritis. Radiological examination and resection should follow.

Rarely a firm fibro-fatty mass develops around an area of diverticulitis and causes obstruction by narrowing the bowel lumen. It may be very difficult at operation to distinguish this condition from carcinoma of the colon. Even if a barium enema has shown diverticula to be present it does not follow that the mass is diverticular in origin. However when the obstruction has been relieved by colostomy, the mass if diverticular will have resolved considerably in 10 days' time. But if finally in doubt the bowel condition should be regarded as carcinoma and treated accordingly.

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