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Diverticular disease

What is diverticular disease?

Diverticula can occur throughout the gastrointestinal tract, but are seen most commonly in the sigmoid and descending colon. A diverticulum consists of a herniation of mucosa through the thickened colonic muscle. Diverticula vary from solitary findings to many hundreds. They are typically 5-10 mm in diameter but can exceed 2 cm.[1]

- Diverticulosis is defined as the presence of diverticula which are asymptomatic.
- Diverticular disease is defined as diverticula associated with symptoms.
- Diverticulitis is defined as evidence of diverticular inflammation (fever, tachycardia) with or without localised symptoms and signs.

How common is diverticular disease? (Epidemiology)

- The incidence of perforated sigmoid diverticular disease is estimated to be 3.4 to 4.5 per 100,000 people per year.[2]
- Diverticulosis occurs in 5-10% of people aged 45 years and older. In people aged 85 years and older, it occurs in 80%.
- Approximately 75% of people with diverticula have asymptomatic diverticulosis; of the 25% of people with diverticula who develop symptomatic diverticular disease, approximately 75% will have at least one episode of diverticulitis.
- The presence of diverticula are rare before the age of 40.
- Disease is more virulent in young patients, with a high risk of recurrences or complications.[3]

- The disorder is rare in rural Africa and Asia, with the highest prevalence seen in the USA, Europe, and Australia.[4]
- The most common fistula is colovesicular and then colovaginal fistulas. Colo-enteric, colo-uterine, colo-ureteral and colocutaneous fistulas arise much less often.

Risk factors[5]

- The main risk factors are age over 50 years and low dietary fibre.
- Obesity is an important risk factor in young people .
- Complicated diverticular disease has an increased frequency in patients who smoke, use non-steroidal anti-inflammatory drugs (NSAIDs) and paracetamol, and those who are obese and have low-fibre diets.

Symptoms of diverticular disease (presentation)[6]

Uncomplicated diverticular disease

- Frequently an incidental finding during assessment of a patient for another reason, such as routine screening for colon cancer.
- Patients can present with nonspecific abdominal complaints - eg, lower abdominal pain, usually left-sided. Any further features of inflammation, such as pyrexia or neutrophilia, may indicate diverticulitis.
- Pain is generally exacerbated by eating and diminished with defecation or flatus.
- Other symptoms, such as bloating, constipation or rectal bleeding, may also occur.
- Examination may reveal fullness or mild tenderness in the left lower quadrant.

Diverticulitis

- Generally presents with left lower quadrant pain in Western countries. Patients in Asian countries have predominantly right-sided diverticula and will usually present with right lower quadrant pain. Studies suggest that the risks of right-sided diverticula continue to be higher in patients of Asian or Black African or Black Caribbean origin who have immigrated to the UK but there is no clear data on people of different ethnic origin who have been born in the West.[7]
- Pain may be intermittent or constant and may be associated with a change in bowel habits.
- Fever and tachycardia may be present and their presence is highly predictive of acute diverticulitis; hypotension and shock are unusual.[8]
- Anorexia, nausea and vomiting may occur.
- Examination usually reveals localised tenderness and, occasionally, a palpable mass. Bowel sounds are often reduced but may be normal in mild cases or increased with obstruction.
- Rectal examination may reveal tenderness or a mass, especially with a low-lying pelvic abscess.

- 5% of patients who develop diverticulitis will develop further complications (perforation, abscess, fistula, stricture/obstruction):[5]
    - An abscess may be pericolic or more extensive. Clinical signs of an abscess include a tender mass or persistent fever despite an adequate trial of antibiotics. Features of sepsis may occur.
    - Free perforation into the peritoneum, causing frank peritonitis, can be life-threatening but is rare.
    - During an episode of acute diverticulitis, partial colonic obstruction or colonic pseudo-obstruction may occur.
    - Recurrent episodes of diverticulitis may cause progressive fibrosis and stricturing of the colonic wall, eventually leading to complete obstruction.
    - Colovesicular fistulas often present with pneumaturia and faecaluria. The passage of stool or flatus via the vagina is pathognomonic of a colovaginal fistula, which may also present with frequent vaginal infections or copious vaginal discharge.

Haemorrhage

- Diverticular bleeding is a common cause of lower gastrointestinal haemorrhage.[9] Severe haemorrhage can arise in 3-5% of patients with diverticulosis. The site of bleeding may more often be located in the proximal colon.[1]
- Presentation is usually abrupt painless bleeding. The patient may have mild lower abdominal cramps or the urge to defecate, followed by passage of a large amount of red or maroon blood or clots. Melaena may occur but is uncommon.
- Haemorrhage ceases spontaneously in 70-80% of patients. Re-bleeding rates range from 22-38%.[1]

Differential diagnosis

- Other causes of acute abdominal pain (including other abdominal, urological, and gynaecological causes) must be considered and excluded.

- Symptomatic diverticular disease may closely resemble irritable bowel syndrome.
- The differential diagnosis of diverticulitis includes acute appendicitis, Crohn's disease and colorectal cancer.
- Elderly people with diverticulosis are also at risk of ischaemic colitis. Features helpful to differentiate between these disorders include presence of thumb-printing on abdominal radiographs and haematochezia (passage of bright red blood with bowel movements), both suggesting ischaemia. [1]
- Gynaecological disorders, such as ruptured ovarian cysts, ovarian torsion, ectopic pregnancy, or pelvic inflammatory disease, can resemble acute diverticulitis in female patients. Pelvic ultrasound can be helpful in obtaining an accurate diagnosis.
- Other forms of colitis, such as pseudomembranous or amoebic, can also mimic diverticulitis.

Diagnosing diverticular disease (investigations) [5] [6]

Asymptomatic diverticulosis

No investigations are needed.

Diverticular disease

- A thorough investigation, including colonoscopy, may be required for patients with symptomatic disease to confirm the diagnosis and rule out other possible diagnoses, especially bowel cancer.
- Initial blood haematology should be normal in patients with uncomplicated diverticular disease. The white cell count is often raised in patients with diverticulitis or abscess. Bleeding may cause a raised platelet count and anaemia.

Diverticulitis

Suspected complicated diverticulitis

- FBC, urea and electrolytes and C-reactive protein are required.

- Contrast CT scan within 24 hours of hospital admission should be offered to all people with raised inflammatory markers.
- If contrast CT scan is contra-indicated, perform a non-contrast CT scan, MRI or ultrasound, depending on local availability and expertise.
- If inflammatory markers are not raised, consider other diagnoses.
    - *Fistulas*:
        - Cystoscopy, cystography and contrast radiographs or methylthioninium chloride (methylene blue) studies can show colovesicular fistula tracts.
    - *Haemorrhage*:
        - Flexible sigmoidoscopy is an appropriate initial approach to rule out an obvious rectosigmoid lesion.
        - If no cause is identified, further assessment with non-invasive (nuclear scintigraphy) or invasive (angiography, colonoscopy) techniques can be undertaken in an attempt to localise and treat the bleeding source.

Management of diverticular disease [5] [6]

- No treatment or follow-up needs to be offered to patients who are asymptomatic, although there may be a prophylactic benefit of a high-fibre diet. It should be accompanied by an adequate fluid intake. There is no need to avoid seeds, nuts, fruit skins or popcorn, which were previously suspected of blocking diverticulae and triggering diverticulitis. A gradual increase in fibre may obviate flatulence and bloating.
- The risk of perforation may be increased by the use of NSAIDs and long-term use of opioids.
- No rationale exists for use of antibiotics or narcotic analgesics in uncomplicated diverticular disease.

Diverticular disease

- Arrange admission for people with significant blood loss from rectal bleeding, as blood transfusion may be required.

- Advise a high-fibre diet; the diet should contain whole grains, fruit and vegetables. It may take several weeks for the benefits of a high-fibre diet to become manifest. If tolerated, it should be maintained for life.
- Adequate fluid intake is also very important.
- Bulk-forming laxatives (eg, ispaghula, sterculia, methylcellulose) may be beneficial to supplement the diet if a high-fibre diet is not effective or acceptable, or if constipation or diarrhoea occurs.
- Other medication such as antibiotics, osmotic laxatives, or aminosalicylates is not recommended.
- Paracetamol should be used for pain if required.
- An antispasmodic may help abdominal cramping.
- Consider alternative diagnoses in people who do not respond to treatment.

Diverticulitis

- Hospital admission is required for people with diverticulitis when:
    - Pain cannot be managed with paracetamol.
    - Hydration cannot be easily maintained with oral fluids, or oral antibiotics cannot be tolerated.
    - The person is frail or has a significant comorbidity that is likely to complicate their recovery, particularly if they are immunocompromised.
    - There is rectal bleeding that may require transfusion.
    - Symptoms persist after 48 hours despite conservative management at home.
    - Features of complicated diverticulitis develop (symptoms suggesting abscess formation or peritonitis).[10]

- For people managed at home:
    - Consider a no antibiotic strategy and advise the person to seek further medical help if symptoms persist or worsen. In such cases, consider hospital referral for further assessment.
    - Offer oral antibiotics to people who are systemically unwell, are immunosuppressed or have significant comorbidity. A week's course of co-amoxiclav is recommended first-line, or a combination of cefalexin with metronidazole, trimethoprim with metronidazole, or ciprofloxacin with metronidazole if co-amoxiclav is unsuitable or the person is allergic to penicillin.
    - Offer oral antibiotics to people who are systemically unwell but do not meet the criteria for complicated acute diverticulitis.
    - Paracetamol should be used for pain.
    - Recommend clear liquids only; gradually reintroduce solid food as symptoms improve over 2-3 days.
- For people managed in hospital:
    - Intravenous antibiotics should be offered for people with suspected complicated diverticulitis. Co-amoxiclav is first-line, whilst second-line options include cefuroxime with metronidazole, amoxicillin with gentamicin and metronidazole, and ciprofloxacin.
    - For alternatives, a microbiologist may need to be consulted.
    - Review in 48 hours or after scanning if earlier and consider stepping down to oral antibiotics where possible.
    - If CT confirms uncomplicated diverticulitis, review the need for antibiotics and consider discharge depending on any co-existing comorbidities.

Surgery

- Most patients admitted with acute diverticulitis will respond to conservative treatment, but 15-30% will need surgery.

- The indications for surgery are:[4]
    - Purulent or faecal peritonitis.
    - Uncontrolled sepsis.
    - Fistula.
    - Obstruction.
    - Inability to exclude carcinoma.
- Free perforation with generalised peritonitis, although uncommon, carries a high mortality rate (up to 35%) and needs urgent surgical intervention. The options include laparoscopic lavage and resectional surgery. There are benefits and risks associated with both procedures, and these should be discussed with the patient.
- Risk of recurrent symptoms after an attack of acute diverticulitis is about one in three. Recurrent attacks are less likely to respond to medical treatment and they have a high mortality rate. Recent evidence indicates that prophylactic resection is unlikely to be effective in the majority of cases.[11]
- For routine or emergency surgery, primary anastomosis (join in the bowel) with or without diverting stoma or Hartmann's procedure (resection of the bowel with an end stoma) are the recommended options. The age of the patient and comorbidities should be considered.

Management of further complications

Abscess formation

- Pericolic abscesses <3 cm can generally be treated conservatively with continued antibiotics and bowel rest.
- CT-guided percutaneous drainage of abdominal abscesses is now used in preference to surgery when feasible.
- In patients in whom surgery is needed, primary anastomosis (join in the bowel) with or without diverting stoma or Hartmann's procedure should be considered.

Fistulas

- Colovesical fistulas: single-stage resection with fistula closure can be undertaken in most patients.
- Colovaginal fistulas: surgical resection of the diseased colon with repair of the vagina.

Obstruction

- Acute diverticulitis may cause small bowel obstruction or ileus, which will usually improve as the inflammation subsides with effective treatment.
- Strictures in which malignant disease cannot be excluded should be resected. [1]
- A trial of endoscopic balloon dilation can be attempted in patients in whom neoplasm can be excluded.
- Stenting can provide temporary decompression, allowing for bowel preparation and subsequent single-stage resection without diversion.

Haemorrhage

- Immediate fluid and blood product resuscitation is often required.
- For most patients, diverticular bleeding is self-limited. Subsequent colonoscopy should be performed to establish the source of the bleeding and to exclude neoplasia.
- Intra-arterial vasopressin at angiography can control haemorrhage in more than 90% of patients. The benefit is usually only temporary but may allow time to prepare the patient adequately for surgery.
- Angiographic embolisation of very distal bleeding branches is also effective and safe.
- Surgery in lower gastrointestinal bleeding is usually reserved until endoscopic or angiographic treatments fail.
- Segmental resection is most usually done if the bleeding site is clearly identified from a therapeutically unsuccessful angiographic or endoscopic procedure. In patients with persistent bleeding and no angiographic or endoscopic identification of a definite bleeding site, subtotal colectomy may be required.

- The chance of a third bleeding episode can be as high as 50%, so many authorities recommend surgical resection after a second bleeding episode.

When to refer to a specialist[6]

- Many investigations can be organised in primary care, although access to more specialised procedures such as endoscopy may be variable.
- People with suspected complicated diverticulitis require same-day assessment.
- People with features suggestive of colitis should be referred.
- People who meet the criteria for the suspected cancer pathway should be referred via this route.

Prognosis

- Approximately three quarters of patients with anatomical diverticulosis remain asymptomatic.
- Most complications of diverticulitis are associated with the initial attack, after which the disease tends to run a benign course.
- Mortality and morbidity are related to complications of diverticulosis, which are mainly diverticulitis and lower gastrointestinal bleeding. These occur in 10-20% of patients with diverticulosis during their lifetime.
- Morbidity has traditionally been reported to be worse in younger patients, but this has not been shown to be true.[12]

Prevention of diverticular disease[6] [13]

- Dietary fibre may prevent development of diverticular disease but, once symptoms develop, the benefit from fibre supplementation is unclear.
- Physical exercise has been shown to help prevent the development of diverticular disease.

- Reducing excess body weight may help to prevent the onset of symptoms.
- Stopping smoking may also be beneficial.

Further reading

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