**General care of the (peritonitis) patient**

Patients are frequently hypovolaemic with electrolyte disturbances. The plasma volume must be restored and electrolyte concentrations corrected. Central venous catheterisation and pressure monitoring may be helpful, particularly in patients with concurrent disease. Plasma protein depletion may also need correction as the inflamed peritoneum leaks large amounts of protein. If the patient’s recovery is delayed for more than 7–10 days, intravenous nutrition is required.

**Gastrointestinal decompression**

A nasogastric tube is passed into the stomach and aspirated. Intermittent aspiration is maintained until the paralytic ileus has resolved. Measured volumes of water are allowed by mouth when only small amounts are being aspirated. If the abdomen is soft and not tender, and bowel sounds return, oral feeding may be progressively introduced. In order to shorten the period of ileus.

Administration of antibiotics prevents the multiplication of bacteria and the release of endotoxins. As the infection is usually a mixed one, initial treatment with parenteral broad-spectrum antibiotics active against aerobic and anaerobic bacteria should be given.

**Correction of fluid loss**

A fluid balance chart must be started so that daily output by gastric aspiration and urine is known. Throughout recovery, the haematocrit and serum electrolytes and urea must be checked regularly.

**Analgesia**

The patient should be nursed in the sitting-up position and must be relieved of pain before and after operation. Freedom from pain allows early mobilisation and adequate physiotherapy in the postoperative period, which help to prevent basal pulmonary collapse, deep vein thrombosis and pulmonary embolism.
Vital system support
Special measures may be needed for cardiac, pulmonary and renal support, especially if septic shock is present.

**Specific treatment of the cause**
If the cause of peritonitis is amenable to surgery, operation must be carried out as soon as the patient is fit for anaesthesia. This is usually within a few hours. In peritonitis caused by pancreatitis or salpingitis, or in cases of primary peritonitis of streptococcal or pneumococcal origin, non-operative treatment is preferred provided the diagnosis can be made with confidence.

**Peritoneal lavage**
In operations for general peritonitis it is essential that, after the cause has been dealt with, the whole peritoneal cavity is explored with the sucker until all seropurulent exudate is removed. The use of a large volume of saline (1–2 litres) containing dissolved antibiotic (e.g. tetracycline) has been shown to be effective.

**Prognosis and complications**
With modern treatment, diffuse peritonitis carries a mortality rate of about 10%.

### Systemic complications of peritonitis
- Bacteraemic/endotoxic shock
- Small bowel obstruction
- Bronchopneumonia/respiratory failure
- Renal failure
- Recurrent abscess
- Bone marrow suppression
- Multisystem failure
- Pyaemia/liver abscess

### Abdominal complications of peritonitis
- Adhesional
- Paralytic ileus
- Residual or recurrent abscess
- Portal

### Management of peritonitis

**General care of patient:**
- Correction of fluid and electrolyte imbalance
- Insertion of nasogastric drainage tube
- Broad-spectrum antibiotic therapy
- Analgesia
- Vital system support
- Operative treatment of cause when appropriate with peritoneal debridement / lavage

**Acute intestinal obstruction due to peritoneal adhesions**
This usually gives central colicky abdominal pain with evidence of small bowel gas and fluid levels sometimes confined to the proximal intestine on radiography. Bowel sounds are increased. It is more common with localised peritonitis. It is essential to distinguish this from paralytic ileus.

**Paralytic ileus**
There is usually little pain, and gas-filled loops with fluid levels are seen distributed throughout the small and large intestines on abdominal imaging. In paralytic ileus, bowel sounds are reduced or absent.

**Abdominal and pelvic abscesses**
Abscess formation following local or diffuse peritonitis usually occupies one of the spaces. The symptoms and signs of a purulent collection may be vague and consist of nothing more than lassitude, anorexia and malaise; pyrexia (often low-grade), tachycardia, leucocytosis, raised C-reactive protein and localised tenderness are also common. Later, a palpable mass may develop that should be monitored by marking out its limits on the abdominal wall and meticulous daily examination. More commonly, its course is monitored by repeat ultrasound or CT scanning. In most cases, with the aid of antibiotic treatment, the abscess or mass gradually reduces in size until, finally, it is undetectable. In others, the abscess fails to resolve or becomes larger, in which event it must be drained. In many situations, by waiting for a few days the abscess becomes adherent to the abdominal wall, so that it can be drained without opening the general peritoneal cavity. If facilities are available, ultrasound- or CT-guided drainage may avoid further operation. Open drainage of an intraperitoneal collection should be carried out by cautious blunt finger exploration to minimise the risk of an intestinal fistula.

**Pelvic abscess**
The pelvis is the commonest site of an intraperitoneal abscess because the vermiform appendix is often pelvic in position and the fallopian tubes are frequent sites of infection. A pelvic abscess can also occur as a sequel to any case of diffuse peritonitis and is common after anastomotic leakage following colorectal surgery.

The most characteristic symptoms are diarrhoea and the passage of mucus in the stools. Rectal examination reveals a bulging of the anterior rectal wall, which, when the abscess is ripe, becomes softly cystic. Left to nature, a proportion of these abscesses burst into the rectum, after which the patient nearly always recovers rapidly. If this does not occur, the abscess should be drained deliberately. In women, vaginal drainage through the posterior fornix is often chosen. In other cases, when the abscess is definitely pointing into the rectum, rectal drainage is employed. If any uncertainty exists, the presence of pus should be confirmed by ultrasound or CT scanning with needle aspiration if indicated. Laparotomy is almost never necessary. Rectal drainage of a pelvic abscess is far preferable to suprapubic drainage, which risks exposing the general peritoneal cavity to infection. Drainage tubes can also be inserted percutaneously or via the vagina or rectum under ultrasound or CT guidance.

**SPECIAL FORMS OF PERITONITIS**

**Postoperative**
The patient is ill with raised pulse and peripheral circulatory failure. Following an anastomotic dehiscence, the general condition of a patient is usually more serious than if the patient had suffered leakage from a perforated peptic ulcer with no preceding operation. Local symptoms and signs are less definite. Abdominal pain may not be prominent and is often difficult to assess because of normal wound pain and postoperative analgesia. The patient’s deterioration may be attributed wrongly to cardiopulmonary collapse, which is usually concomitant. Antibiotic therapy alone is inadequate;

Pain is frequently slight or absent. Physical signs are similarly vague and misleading.

**In children**
The diagnosis can be more difficult, particularly in the preschool child. Physical signs should be elicited by a gentle, patient and sympathetic approach.

**In patients with dementia**
Such patients can be fractious and unable to give a reliable history. Abdominal tenderness is usually well localised, but guarding and rigidity are less marked because the abdominal muscles are often thin and weak.

**Bile peritonitis**
Unless there is reason to suspect that the biliary tract was damaged during operation, it is improbable that bile as a cause of peritonitis will be thought of until the abdomen has been opened.

Unless the bile has extravasated slowly and the collection becomes shut off from the general peritoneal cavity, there are signs of diffuse peritonitis. After a few hours a tinge of jaundice is not unusual. Laparotomy (or laparoscopy) should be undertaken with evacuation of the bile and peritoneal lavage. The source of bile leakage should be identified. A leaking gall bladder is excised or a cystic duct ligated. An injury to the bile duct may simply be drained or alternatively intubated; later,

**Pneumococcal peritonitis**
Primary pneumococcal peritonitis may complicate nephritic syndrome or cirrhosis in children. Otherwise healthy children, particularly girls between 3 and 9 years of age, may also be affected, and it is likely that the route of infection is sometimes via the vagina and fallopian tubes.

**Clinical features**
The onset is sudden and the earliest symptom is pain localised to the lower half of the abdomen. The temperature is raised to 39°C or more and there is usually frequent vomiting. After 24–48 hours, profuse diarrhoea is characteristic. There is usually increased frequency of micturition. The last two symptoms are caused by severe pelvic peritonitis. On examination, abdominal rigidity is usually bilateral but is less than in most cases of acute appendicitis with peritonitis.

**Differential diagnosis**
A leucocytosis of 30 000 \(1\text{–}1\) (30 \(\cdot\) 109 \text{l}–1) or more with approximately 90% polymorphs suggests pneumococcal peritonitis rather than appendicitis. Even so, it is often impossible to exclude perforated appendicitis. The other condition that can be difficult to differentiate from primary pneumococcal peritonitis in its early stage is basal pneumonia. An unduly high respiratory rate and the absence of abdominal rigidity are the most important signs supporting the diagnosis of pneumonia, which is usually confirmed by a chest radiograph.

**Treatment**

After starting antibiotic therapy and correcting dehydration and electrolyte imbalance, early surgery is required unless spontaneous infection of pre-existing ascites is strongly suspected, in which case a diagnostic peritoneal tap is useful. Laparotomy or laparoscopy may be used. Should the exudate be odourless and sticky, the diagnosis of pneumococcal peritonitis is practically certain, but it is essential to perform a careful exploration to exclude other pathology. Thorough peritoneal lavage is carried out and the incision closed. Antibiotic and fluid replacement therapy are continued. Nasogastric suction drainage is essential.

**TUBERCULOUS PERITONITIS**

**Acute tuberculous peritonitis**

Tuberculous peritonitis sometimes has an onset that so closely resembles acute peritonitis that the abdomen is opened. Straw coloured fluid escapes and tubercles are seen scattered over the peritoneum and greater omentum. Early tubercles are greyish and translucent. They soon undergo caseation and appear white or yellow and are then less difficult to distinguish from carcinoma.

**Chronic tuberculous peritonitis**

The condition presents with abdominal pain (90% of cases), fever (60%), loss of weight (60%), ascites (60%), night sweats (37%) and abdominal mass (26%).

**Origin of the infection**

Infection originates from:

- tuberculous mesenteric lymph nodes;
- tuberculosis of the ileocaecal region;
- a tuberculous pyosalpinx;
- blood-borne infection from pulmonary tuberculosis, usually the ‘miliary’ but occasionally the ‘cavitating’ form.

**Varieties of tuberculous peritonitis**

There are four varieties of tuberculous peritonitis: ascitic, encysted, fibrous and purulent.
NEOPLASMS OF THE PERITONEUM

Carcinoma peritonei

This is a common terminal event in many cases of carcinoma of the stomach, colon, ovary or other abdominal organs and also of the breast and bronchus. The peritoneum, both parietal and visceral, is studded with secondary growths and the peritoneal cavity becomes filled with clear, straw-coloured or blood-stained ascitic fluid.

The main forms of peritoneal metastases are:

- **discrete nodules** – by far the most common variety;
- **plaques** varying in size and colour;
- **diffuse adhesions** – this form occurs at a late stage of the disease and gives rise, sometimes, to a ‘frozen pelvis’.

Differential diagnosis

Early discrete tubercles common in tuberculous peritonitis are greyish and translucent and closely resemble the discrete nodules of peritoneal carcinomatosis. Fat necrosis can usually be distinguished from a carcinomatous nodule by its opacity. Peritoneal hydatids can also simulate malignant disease after rupture of a hydatid cyst, with seeding of daughter cysts.

Treatment

Ascites caused by carcinomatosis of the peritoneum may respond to systemic or intraperitoneal chemotherapy or to endocrine therapy in the case of hormone receptor-positive tumour.

Pseudomyxoma peritonei

This rare condition occurs more frequently in women. The abdomen is filled with a yellow jelly, large quantities of which are often encysted. The condition is associated with mucinous cystic tumours of the ovary and appendix. Recent studies suggest that most cases arise from a primary appendiceal tumour with secondary implantation on to one or both ovaries. It is often painless and there is frequently no impairment of general health.