Primary peritonitis

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Primary pneumococcal peritonitis may complicate nephrotic syndrome or cirrhosis in children.

Otherwise healthy children, particularly girls between three and nine years of age, may also be affected, and it is likely that the route of infection is sometimes via the vagina and Fallopian tubes.
At other times, and always in males, the infection is blood-borne and secondary to respiratory tract or middle ear disease. The prevalence of pneumococcal peritonitis has declined greatly and the condition is now rare.
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, peritonism is usually diffuse but less prominent than in most cases of a perforated viscus leading to peritonitis.
**Investigation and treatment**

- A leukocytosis _30 000 μL with approximately 90 per cent polymorphs suggests pneumococcal peritonitis rather than another cause, e.g. appendicitis.
- 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.
• Assuming that no other cause for the peritonitis is discovered, some of the exudates is aspirated and sent to the laboratory for microscopy, culture and sensitivity tests.
• Thorough peritoneal lavage is carried out and the incision closed.
• Antibiotic and fluid replacement therapy are continued and recovery is usual.
Other organisms are now known to cause some cases of primary peritonitis in children, including *Haemophilus*, other streptococci and a few Gram-negative bacteria.

Underlying pathology (including an intravaginal foreign body in girls) must always be excluded before primary peritonitis can be diagnosed with certainty.

Idiopathic streptococcal and staphylococcal peritonitis can also occur in adults.
Tuberculous peritonitis
Tuberculous peritonitis

- Intra-abdominal tuberculosis is very common in the developing world where all general surgeons are familiar with its presentation and management.

- The incidence is however also rising in areas of the developed world as a consequence of migration and immunosuppression where *Mycobacterium avium-intracellulare* is becoming increasingly prevalent with the widespread increase in human immunodeficiency virus (HIV) coinfection.
Tuberculosis can spread to the peritoneum through the

• GI tract (typically ileocaecal region)
• mesenteric lymph nodes
• directly from the blood, usually from the ‘miliary’ but occasionally the ‘cavitating’ form of pulmonary TB.
• Fallopian tubes.
• Clinical or subclinical ascites is reported in virtually all patients with TB peritonitis and is frequently a presenting feature.
• In the most common form of the disease, wet-type peritonitis, ascites may be localised or generalised throughout the peritoneal cavity.
• Multiple tubercle deposits appear on both layers of the peritoneum.
The main features are

- Acute (may be clinically indistinguishable from acute bacterial peritonitis) and chronic forms
- Abdominal pain, sweats, malaise and weight loss are frequent
- Ascites common, may be loculated
- Caseating peritoneal nodules are common – distinguish from metastatic carcinoma and fat necrosis of pancreatitis
- Intestinal obstruction (may respond to antituberculous treatment without surgery)
Previously classified as ascetic form, purelent form, encysted form and fibrous form.
Diagnosis is via

• abdominal ultrasound or CT to detect ascites and lymphadenopathy ± diffuse thickening of the peritoneum, mesentery and/or omentum.
• Ascitic fluid is typically a straw-coloured exudate (protein >25–30 g/L) with white cells >500 mm3 and lymphocytes >40 per cent.
• Unfortunately, diagnostic smears for acid-fast bacilli are diagnostic in <3 per cent of patients and culture may take up to 4–8 weeks with no guarantee of a positive result.
• Laparoscopy and peritoneal biopsy may thus be helpful to couple typical appearances with histology.
Management is principally supportive (nutrition and hydration) and medical (systemic antituberculous therapy) although surgery may be required for specific complications such as intestinal obstruction.
ASCITISES
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Ascites is defined as an accumulation of excess serous fluid within the peritoneal cavity.
Pathophysiology

• The balanced effects of plasma and peritoneal colloid osmotic and hydrostatic pressures determine the exchange of fluid between the capillaries and the peritoneal fluid.
• Protein-rich fluid enters the peritoneal cavity when capillary permeability is increased, as in peritonitis.
• Capillary pressure may be increased because of generalised water retention, cardiac failure, constrictive pericarditis or vena cava obstruction.
Causes of ascites

Transudates (protein <25 g/L)
• Low plasma protein concentrations
Malnutrition
Nephrotic syndrome
Protein-losing enteropathy
• High central venous pressure
Congestive cardiac failure
• Portal hypertension
Portal vein thrombosis
Cirrhosis
Exudates (protein >25 g/L)
• Tuberculous peritonitis
• Peritoneal malignancy
• Budd–Chiari syndrome (hepatic vein occlusion or thrombosis)
• Pancreatic ascites
• Chylous ascites
• Meigs’ syndrome
Clinical features

- Ascites can usually only be recognised clinically when the amount of fluid present exceeds 1.5 L depending on body habitus: in the obese a greater quantity than this is necessary before there is clear evidence.
- The abdomen is distended evenly with fullness of the flanks, which are dull to percussion.
- Usually, shifting dullness is present but when there is a very large accumulation of fluid this sign is absent.
- In such cases, on flicking the abdominal wall, a characteristic fluid thrill is transmitted from one side to the other.
- In women, ascites must be differentiated from an enormous ovarian cyst.
Investigation

• In addition to relevant investigations that may determine the underlying cause, e.g. liver and cardiac function tests, ultrasound and/or CT imaging will determine much smaller quantities of ascites than possible clinically. These will often also diagnose aetiology, e.g. carcinomatosis, liver disease.
• Ascitic aspiration or tap is now most commonly performed under imaging guidance to minimise the risk of visceral injury.
• Fluid is sent for microscopy/cytology, culture, including mycobacteria, and analysis of protein content and amylase.
**Treatment**

• Treatment of the specific cause is undertaken whenever possible.
• Dietary sodium restriction to 200 mg/day may be helpful, but diuretics are usually required.
• In rare cases in which ascites accumulates rapidly after paracentesis and the patient is otherwise fit, permanent drainage of the ascitic fluid via a peritoneovenous shunt (e.g. LeVeen, Denver) may render the patient more comfortable.