

Investigations

Investigations

The haematological and biochemical investigations reflect the presence of a chronic infective process: anaemia, leukocytosis, raised inflammatory markers – erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) – hypoalbuminaemia and deranged liver function tests, particularly elevated alkaline phosphatase. Serological tests are more specific, with the majority of patients showing antibodies in serum. These can be detected by tests for complement fixation, indirect haemagglutination (IHA), indirect immunofluorescence, counter-immunoelectrophoresis and enzyme-linked immunosorbent assay (ELISA). These tests are extremely useful in detecting acute infection in non-endemic areas. IHA has a very high sensitivity in acute amoebic liver abscess in non-endemic regions and remains elevated for some time. The persistence of antibodies in a large majority of the population in endemic areas precludes its use as a diagnostic investigation in those locations. A combination of serological tests detecting antibodies in combination with detection of the parasite by antigen detection or DNA polymerase chain reaction is likely to be more beneficial in such cases, though with the limitation of cost and accessibility in developing nations. While amoebiasis may affect the entire colon, it has a predilection for the caecum and ascending colon. A colonoscopy may reveal discrete exudate-covered areas of ulceration with normal areas in between. Investigations

As with most parasitic infestations, an increase in the eosinophil count is common. Stool examination may show ova. Sputum or bronchoscopic washings may show Charcot-Leyden crystals or the larvae. Chest radiograph may show fluffy exudates in Loeffler's syndrome. A barium meal and follow-through may show a bolus of worms in the ileum or lying freely within the small bowel (Figure 6.4). Ultrasonography may show a worm in the gallbladder, the common bile duct (Figure 6.5) or pancreatic duct. On magnetic resonance cholangiopancreatography (MRCP), an adult worm may be seen in the common bile duct in a patient presenting with features of obstructive jaundice (Figure 6.6). In patients with intestinal obstruction, plain abdominal radiograph may show tubular structures within dilated small bowel, denoting the presence of worms, which would also show up on a contrast CT scan as curvilinear structures. - Summary box 6.4 Ascariasis: pathogenesis -

It is the commonest intestinal nematode affecting humans. Typically found in a humid atmosphere and poor sanitary conditions, hence is seen in the tropics and resource-poor countries. Larvae cause pulmonary symptoms; adult worms cause gastrointestinal, biliary and pancreatic symptoms. Distal ileal obstruction is due to a bolus of worms; ascending cholangitis and obstructive jaundice are due to infestation of the common bile duct. Acute pancreatitis occurs when a worm is lodged in the pancreatic duct. Perforation of the small bowel is rare.

BARIUM SEEN INSIDE THE ROUNDWORM Figure 6.4 Barium meal and follow-through showing roundworms in the course of the small bowel with barium seen inside the worms in an 18-year-old

patient who presented with bouts of colicky abdominal pain and bilious vomiting, which settled with conservative management (courtesy of Dr PP Bhattacharyya, Kolkata, India).

Investigations

Raised ESR and CRP, low haemoglobin and a positive Mantoux test are usual, although the last is not significant in a patient from an endemic area. The Mantoux test (tuberculin skin test), although in use for over a hundred years, has now been superseded by interferon-gamma (IFN- γ) release assays. This is an in vitro blood test of cellular immune response. Antigens unique to *M. tuberculosis* are used to stimulate and measure T-cell release of IFN- γ . This helps to earmark patients. A collar-stud abscess is so-called because it resembles a collar stud (which has two parts) used in shirts with detachable collars, now largely out of fashion. Charles Mantoux, 1877–1947, physician, Le Cannet, Alpes Maritimes, France, described the intradermal tuberculin skin test in 1908. Franz Heinrich Paul Ziehl, 1857–1926, German bacteriologist and professor in Lübeck, Germany. With pathologist Ziehl-Neelsen stain, also known as the acid-fast stain, which is used to identify acid-fast bacteria. Friedrich Carl Adolf Neelsen, 1854–1898, pathologist and professor at the Institute of Pathology, University of Rostock, Germany. Summary box 6.22 Tuberculous cervical lymphadenitis /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF who have latent or subclinical tuberculosis and thus will benefit from treatment. Sputum for culture and sensitivity (the result may take several weeks) and staining by the Ziehl-Neelsen method for acid-fast bacilli (the result is obtained much earlier) should be carried out. Specific investigations would include aspiration of the pus from a cold abscess for culture and sensitivity. If the mass is still in the early stages of adenitis, excision biopsy should be done. Here, part of the lymph nodes should be sent fresh and unfixed to the laboratory, which should be warned of the arrival of the specimen so that the tissue can be appropriately processed immediately.

Figure 6.35 Cervical tuberculous ulcer with typical overhanging edges (courtesy of Professor Ahmed Hassan Fahal, FRCS MD MS, Khartoum, Sudan). This is a common condition at any age. A matted lymph nodal mass is the typical clinical feature. In later stages the mass may be cystic, denoting an abscess. The abscess denotes underlying caseation and does not show any features of inflammation – hence called a cold abscess. Ultimately the abscess may burst, forming a sinus. Diagnosis is clinched by culture of pus and biopsy of the lymph node. Involvement of other systems must be excluded. Treatment is mainly medical.

Investigations

General investigations are the same as those for suspected tuberculosis anywhere in the body. They have been detailed in the previous section under investigations for tuberculous cervical adenitis. A barium meal and follow-through (or small bowel enema) shows strictures of the small bowel, particularly the ileum, typically with a high subhepatic caecum with the narrow ileum entering the caecum directly from below upwards in a straight line rather than at an angle (Figures 6.38 and 6.39a). Proctoscopy reveals the typical picture of tubercles on the bowel serosa, multiple strictures, a high caecum, enlarged lymph nodes may be helpful. A chest radiograph is essential (Figure 6.39b) as there may be features of pulmonary tuberculosis. If the patient complains of urinary symptoms, urine is sent for microscopy and culture; the finding of sterile pyuria should alert the clinician to the possibility of tuberculosis of the urinary tract, when the

appropriate investigations should be done. A flexible cystoscopy would be very useful in the presence of sterile pyuria. A contracted bladder ('thimble' bladder) with ureteric orifices that are indrawn ('golf-hole' ureter) may be seen; these changes are due to fibrosis. In the patient presenting as an abdominal emergency, urea and electrolytes may show evidence of gross dehydration. A plain abdominal radiograph shows typical small bowel obstruction – valvulae conniventes (concertina effect) of dilated jejunum and featureless ileum with evidence of fluid between the loops. Summary box 6.25 Intestinal tuberculosis: investigations

- Raised inflammatory markers, anaemia and positive sputum culture IFN-γ release assays for subclinical infection Ultrasonography of the abdomen may show localised areas of ascites Chest radiograph shows pulmonary infiltration Barium meal and follow-through shows multiple small bowel strictures particularly in the ileum, with a subhepatic caecum If symptoms warrant, the genitourinary tract is also investigated

Investigations

The haematological and biochemical investigations reflect the presence of a chronic infective process: anaemia, leukocytosis, raised inflammatory markers – erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) – hypoalbuminaemia and deranged liver function tests, particularly elevated alkaline phosphatase. Serological tests are more specific, with the majority of patients showing antibodies in serum. These can be detected by tests for complement fixation, indirect haemagglutination (IHA), indirect immunofluorescence, counter-immunoelectrophoresis and enzyme-linked immunosorbent assay (ELISA). These tests are extremely useful in detecting acute infection in non-endemic areas. IHA has a very high sensitivity in acute amoebic liver abscess in non-endemic regions and remains elevated for some time. The persistence of antibodies in a large majority of the population in endemic areas precludes its use as a diagnostic investigation in those locations. A combination of serological tests detecting antibodies in combination with detection of the parasite by antigen detection or DNA polymerase chain reaction is likely to be more beneficial in such cases, though with the limitation of cost and accessibility in developing nations. While amoebiasis may affect the entire colon, it has a predilection for the caecum and ascending colon. A colonoscopy may reveal discrete exudate-covered areas of ulceration with normal areas in between. Investigations

As with most parasitic infestations, an increase in the eosinophil count is common. Stool examination may show ova. Sputum or bronchoscopic washings may show Charcot-Leyden crystals or the larvae. Chest radiograph may show fluffy exudates in Loeffler's syndrome. A barium meal and follow-through may show a bolus of worms in the ileum or lying freely within the small bowel (Figure 6.4). Ultrasonography may show a worm in the gallbladder, the common bile duct (Figure 6.5) or pancreatic duct. On magnetic resonance cholangiopancreatography (MRCP), an adult worm may be seen in the common bile duct in a patient presenting with features of obstructive jaundice (Figure 6.6). In patients with intestinal obstruction, plain abdominal radiograph may show tubular structures within dilated small bowel, denoting the presence of worms, which would also show up on a contrast CT scan as curvilinear structures. Summary box 6.4 Ascariasis: pathogenesis

It is the commonest intestinal nematode affecting humans Typically found in a humid atmosphere and poor sanitary conditions, hence is seen in the tropics and resource-poor countries Larvae cause pulmonary symptoms; adult worms cause gastrointestinal, biliary and pancreatic symptoms Distal ileal obstruction is due to a bolus of worms; ascending cholangitis and obstructive jaundice are due to infestation of the common bile duct Acute pancreatitis occurs when a worm is lodged in the pancreatic duct Perforation of the small bowel is rare

BARIUM SEEN INSIDE THE ROUNDWORM Figure 6.4 Barium meal and follow-through showing roundworms in the course of the small bowel with barium seen inside the worms in an 18-year-old patient who presented with bouts of colicky abdominal pain and bilious vomiting, which settled with conservative management (courtesy of Dr PP Bhattacharyya, Kolkata, India).

Investigations

Raised ESR and CRP , low haemoglobin and a positive Mantoux test are usual, although the last is not significant in a patient from an endemic area. The Mantoux test (tuberculin skin test), although in use for over a hundred years, has now been superseded by interferon-gamma (IFN- γ) release assays. This is an in vitro blood test of cellular immune response. Antigens unique to M. tuberculosis are used to stimulate and measure T-cell release of IFN- γ . This helps to earmark patients A collar-stud abscess is so-called because it resembles a collar stud (which has two parts) used in shirts with detachable collars, now largely out of fashion. Charles Mantoux , 1877–1947, physician, Le Cannet, Alpes Maritimes, France, described the intradermal tuberculin skin test in 1908. Franz Heinrich Paul Ziehl , 1857–1926, German bacteriologist and professor in Lübeck, Germany . With pathologist Ziehl-Neelsen stain, also known as the acid-fast stain, which is used to identify acid-fast bacteria. Friedrich Carl Adolf Neelsen , 1854–1898, pathologist and professor at the Institute of Pathology , University of Rostock, Germany . Summary box 6.22 Tuberculous cervical lymphadenitis /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF /uni25CF who have latent or subclinical tuberculosis and thus will benefit from treatment. Sputum for culture and sensitivity (the result may take several weeks) and staining by the Ziehl-Neelsen method for acid-fast bacilli (the result is obtained much earlier) should be carried out. Specific investigations would include aspiration of the pus from a cold abscess for culture and sensitivity . If the mass is still in the early stages of adenitis, excision biopsy should be done. Here, part of the lymph nodes should be sent fresh and unfixed to the laboratory , which should be warned of the arrival of the specimen so that the tissue can be appropriately processed immediately .

Figure 6.35 Cervical tuberculous ulcer with typical overhanging edges (courtesy of Professor Ahmed Hassan Fahal, FRCS MD MS, Khartoum, Sudan). This is a common condition at any age A matted lymph nodal mass is the typical clinical feature In later stages the mass may be cystic, denoting an abscess The abscess denotes underlying caseation and does not show any features of inflammation – hence called a cold abscess Ultimately the abscess may burst, forming a sinus Diagnosis is clinched by culture of pus and biopsy of the lymph node Involvement of other systems must be excluded Treatment is mainly medical

Investigations

General investigations are the same as those for suspected tuberculosis anywhere in the body . They have been detailed in the previous section under investigations for tuberculous cervical adenitis. A barium meal and follow-through (or small bowel enema) shows strictures of the small bowel, particularly the ileum, typically with a high subhepatic caecum with the narrow ileum entering the caecum directly from below upwards in a straight line rather than at an angle (Figures 6.38 and 6.39a ar oscopy r eveals the typical picture of tubercles on the bowel serosa, multiple strictures, a high caecum, enlarged lymph fluid may be helpful. A chest radiograph is essential (Figur e 6.39b) as there may be features of pulmonary tuberculosis. If the pa tient complains of urinary symptoms, urine is sent for microscopy and culture; the finding of sterile pyuria should alert the clinician to the possibility of tuberculosis of the uri - nary tract, when the appropriate investig ations should be done. A flexible cystoscopy would be very useful in the presence of sterile pyuria. A contracted bladder ('thimble' bladder) with ureteric orifices that are in- dra wn ('golf-hole' ureter) may be seen; these changes are due to fibrosis. In the patient presenting as an abdominal emergency , urea and electrolytes may show evidence of gross dehydration. A plain abdominal radiograph shows typical small bowel obstruc - tion - valvulae conniventes (concertina e ff ect) of dilated jeju - num and featureless ileum with evidence of fluid between the loops. Summary box 6.25 Intestinal tuberculosis: investigations /uni25CF - /uni25CF γ /uni25CF /uni25CF /uni25CF - /uni25CF

- Raised in /f_l ammatory markers, anaemia and positive sputum culture IFN- release assays for subclinical infection Ultrasonography of the abdomen may show localised areas of ascites Chest radiograph shows pulmonary in /f_i ltration Barium meal and follow-through shows multiple small bowel strictures particularly in the ileum, with a subhepatic caecum If symptoms warrant, the genitourinary tract is also investigated

Investigations

The haematological and biochemical investigations reflect the presence of a chronic infective process: anaemia, leukocytosis, raised inflammatory markers - erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) - hypoalbuminaemia and deranged liver function tests, particularly elevated alkaline phosphatase. Serological tests are more specific, with the majority of patients showing antibodies in serum. These can be detected by tests for complement fixation, indirect haemagglutination (IHA), indirect immunofluorescence , counter-immunoelectro - phoresis and enzyme-linked immunosorbent assay (ELISA). These tests are extremely useful in detecting acute infection in non-endemic areas. IHA has a very high sensitivity in acute amoebic liver abscess in non-endemic regions and remains ele - vated for some time. The persistence of antibodies in a large majority of the population in endemic areas precludes its use as a diagnostic investigation in those loca tions. A combination of serological tests detecting antibodies in combination with detection of the parasite by antigen detection or DNA poly - merase chain reaction is likely to be more beneficial in such cases, though with the limitation of cost and accessibility in developing nations. While amoebiasis may a ff ect the entire colon, it has a pre - dilection for the caecum and ascending colon. A colonoscopy may rev eal discrete exudate-covered areas of ulceration with normal areas in between. Investigations

As with most parasitic infestations, an increase in the eosinophil count is common. Stool examination may show ova. Sputum or bronchoscopic washings may show Charcot-Leyden crystals or the larvae. Chest radiograph may show fluffy exudates in Loeffler's syndrome. A barium meal and follow-through may show a bolus of worms in the ileum or lying freely within the small bowel (Figure 6.4). Ultrasonography may show a worm in the gallbladder, the common bile duct (Figure 6.5) or pancreatic duct. On magnetic resonance cholangiopancreatography (MRCP), an adult worm may be seen in the common bile duct in a patient presenting with features of obstructive jaundice (Figure 6.6). In patients with intestinal obstruction, plain abdominal radiograph may show tubular structures within dilated small bowel, denoting the presence of worms, which would also show up on a contrast CT scan as curvilinear structures.

- Summary box 6.4 Ascariasis: pathogenesis -

It is the commonest intestinal nematode affecting humans Typically found in a humid atmosphere and poor sanitary conditions, hence is seen in the tropics and resource-poor countries Larvae cause pulmonary symptoms; adult worms cause gastrointestinal, biliary and pancreatic symptoms Distal ileal obstruction is due to a bolus of worms; ascending cholangitis and obstructive jaundice are due to infestation of the common bile duct Acute pancreatitis occurs when a worm is lodged in the pancreatic duct Perforation of the small bowel is rare

BARIUM SEEN INSIDE THE ROUNDWORM Figure 6.4 Barium meal and follow-through showing roundworms in the course of the small bowel with barium seen inside the worms in an 18-year-old patient who presented with bouts of colicky abdominal pain and bilious vomiting, which settled with conservative management (courtesy of Dr PP Bhattacharyya, Kolkata, India).

Investigations

Raised ESR and CRP, low haemoglobin and a positive Mantoux test are usual, although the last is not significant in a patient from an endemic area. The Mantoux test (tuberculin skin test), although in use for over a hundred years, has now been superseded by interferon-gamma (IFN- γ) release assays. This is an in vitro blood test of cellular immune response. Antigens unique to *M. tuberculosis* are used to stimulate and measure T-cell release of IFN- γ . This helps to earmark patients A collar-stud abscess is so-called because it resembles a collar stud (which has two parts) used in shirts with detachable collars, now largely out of fashion. Charles Mantoux, 1877–1947, physician, Le Cannet, Alpes Maritimes, France, described the intradermal tuberculin skin test in 1908. Franz Heinrich Paul Ziehl, 1857–1926, German bacteriologist and professor in Lübeck, Germany. With pathologist Ziehl-Neelsen stain, also known as the acid-fast stain, which is used to identify acid-fast bacteria. Friedrich Carl Adolf Neelsen, 1854–1898, pathologist and professor at the Institute of Pathology, University of Rostock, Germany.

Summary box 6.22 Tuberculous cervical lymphadenitis

who have latent or subclinical tuberculosis and thus will benefit from treatment. Sputum for culture and sensitivity (the result may take several weeks) and staining by the Ziehl-Neelsen method for acid-fast bacilli (the result is obtained much earlier) should be carried out. Specific investigations would include aspiration of the pus from a cold abscess for culture and sensitivity. If the mass is still in the early stages of adenitis, excision biopsy should be done. Here, part of the lymph nodes should be sent fresh and unfixed to the laboratory, which should be warned of the arrival of the specimen so that the tissue can be appropriately processed immediately.

Figure 6.35 Cervical tuberculous ulcer with typical overhanging edges (courtesy of Professor Ahmed Hassan Fahal, FRCS MD MS, Khartoum, Sudan). This is a common condition at any age. A matted lymph nodal mass is the typical clinical feature. In later stages the mass may be cystic, denoting an abscess. The abscess denotes underlying caseation and does not show any features of inflammation – hence called a cold abscess. Ultimately the abscess may burst, forming a sinus. Diagnosis is clinched by culture of pus and biopsy of the lymph node. Involvement of other systems must be excluded. Treatment is mainly medical.

Investigations

General investigations are the same as those for suspected tuberculosis anywhere in the body. They have been detailed in the previous section under investigations for tuberculous cervical adenitis. A barium meal and follow-through (or small bowel enema) shows strictures of the small bowel, particularly the ileum, typically with a high subhepatic caecum with the narrow ileum entering the caecum directly from below upwards in a straight line rather than at an angle (Figures 6.38 and 6.39a). Arthroscopy reveals the typical picture of tubercles on the bowel serosa, multiple strictures, a high caecum, enlarged lymph nodes may be helpful. A chest radiograph is essential (Figure 6.39b) as there may be features of pulmonary tuberculosis. If the patient complains of urinary symptoms, urine is sent for microscopy and culture; the finding of sterile pyuria should alert the clinician to the possibility of tuberculosis of the urinary tract, when the appropriate investigations should be done. A flexible cystoscopy would be very useful in the presence of sterile pyuria. A contracted bladder ('thimble' bladder) with ureteric orifices that are indrawn ('golf-hole' ureter) may be seen; these changes are due to fibrosis. In the patient presenting as an abdominal emergency, urea and electrolytes may show evidence of gross dehydration. A plain abdominal radiograph shows typical small bowel obstruction – valvulae conniventes (concertina effect) of dilated jejunum and featureless ileum with evidence of fluid between the loops. Summary box 6.25 Intestinal tuberculosis: investigations

- Raised inflammatory markers, anaemia and positive sputum culture. IFN- release assays for subclinical infection. Ultrasonography of the abdomen may show localised areas of ascites. Chest radiograph shows pulmonary infiltration. Barium meal and follow-through shows multiple small bowel strictures particularly in the ileum, with a subhepatic caecum. If symptoms warrant, the genitourinary tract is also investigated.

Revision #1

Created 2025-12-31 15:22:33 UTC by Omar Ayman

Updated 2025-12-31 15:22:33 UTC by Omar Ayman