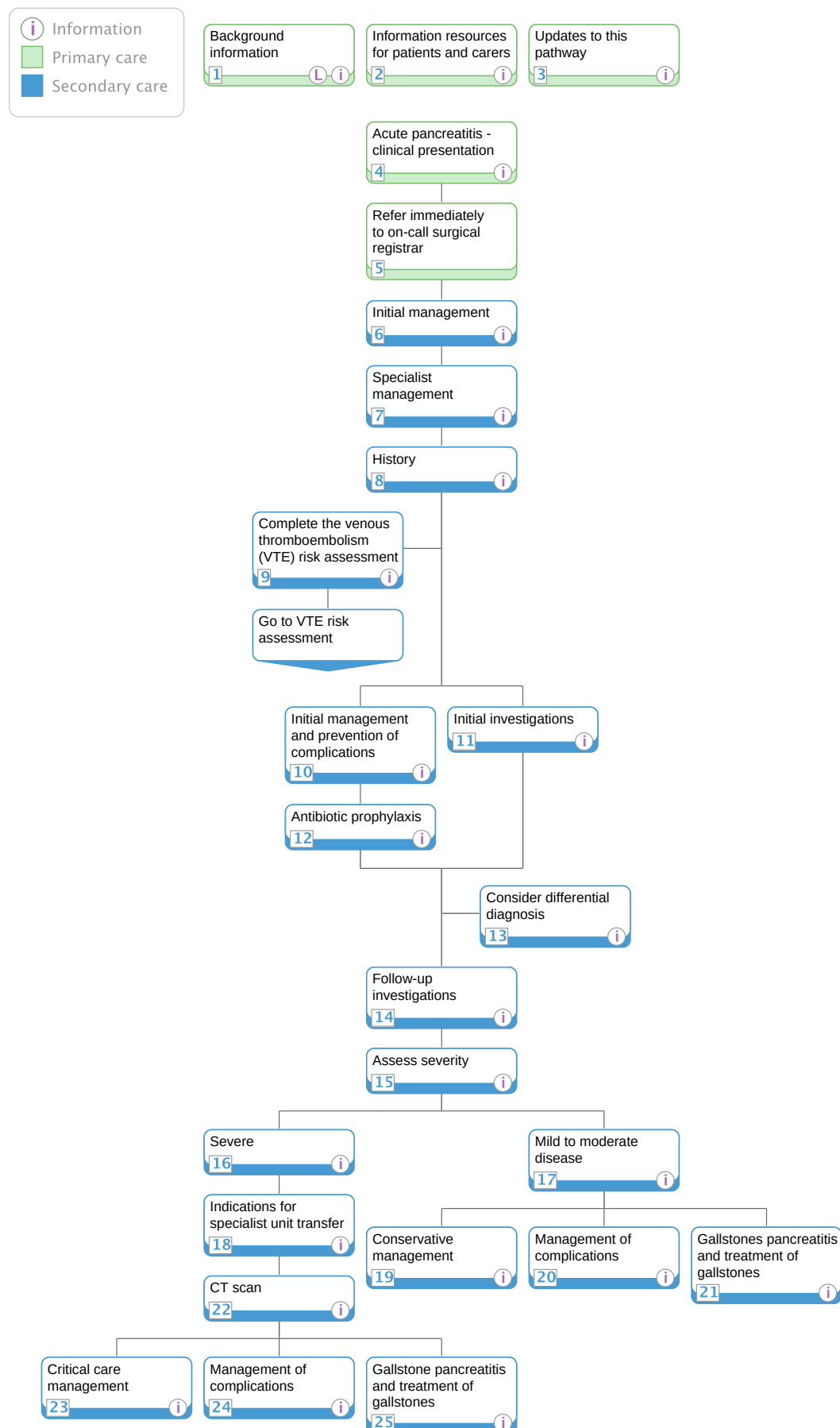


http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html



Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

1 Background information

Quick info:

Scope:

- the diagnosis of acute pancreatitis
- the assessment of acute pancreatitis
- the management of acute pancreatitis and prevention of complications, including the management of pancreatic necrosis
- specific management of pancreatitis secondary to gallstones

Definition:

- acute pancreatitis represents a spectrum of disease ranging from a mild, self-limited course requiring only brief hospitalisation to a rapidly progressive, fulminant illness resulting in the multiple organ dysfunction syndrome with or without accompanying sepsis
- organ failure present within the first week, which resolves within 48 hours, should not be considered an indicator of a severe attack of acute pancreatitis
- the aetiology of acute pancreatitis should be determined in at least 80% of cases [1]
- a residual group has no obvious cause and is labelled 'idiopathic'

Risk factors:

- major risk factors:
 - alcohol
 - cholelithiasis (gallstones)
- other risk factors:
 - endoscopic retrograde cholangiopancreatography (ERCP)
 - surgery, therapeutic medications
 - HIV infection
 - hyperlipidemia
 - biliary tract anomalies
- obesity is a risk factor of severity and mortality in acute pancreatitis

Incidence and prevalence:

- incidence ranges in the UK from 150 to 420 cases per million population [1]
- the incidence of chronic pancreatitis after acute pancreatitis ranges from 3-13% [2]

Complications [2]:

- necrotizing pancreatitis develops in approximately 10-20% of patients and the mortality is high, ranging from 14-25% of these patients
- infected pancreatic necrosis develops in 30-40% of patients with necrotizing pancreatitis and the incidence of multiple organ dysfunction syndrome (MODS) in such patients is high
- after recovering from acute pancreatitis, about 1/3 to 1/2 of acute pancreatitis patients develop functional disorders, eg diabetes mellitus and fatty stool

Prognosis [2]:

- acute pancreatitis is a potentially fatal disease with an overall mortality of 2.1-7.8%
- the outcome of acute pancreatitis is determined by two factors that reflect the severity of the illness:
 - organ failure; and
 - pancreatic necrosis

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [2] Sekimoto M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: epidemiology, etiology, natural history, and outcome predictors in acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 10-24.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [4] Martinez J, Johnson CD, Sanchez-Paya J et al. Obesity is a definitive risk factor of severity and mortality in acute pancreatitis: an updated meta-analysis. Pancreatology 2006; 6: 206-9.

Local administrative info:

The NHS Institute for Innovation & Improvement have produced '[Focus On: Cholecystectomy – A Guide for Commissioners](#)' which aims to help commissioners and their local health communities improve the quality and value of care for Cholecystectomy patients.

2 Information resources for patients and carers

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

Quick info:

Recommended resources for patients and carers, produced by organisations certified by [The Information Standard](#):

- 'Acute Pancreatitis' (PDF) from Patient UK at <http://www.patient.co.uk>
- 'Pancreatitis' (URL) from Bupa at <http://www.bupa.co.uk/>
- 'Pancreas' (PDF) from Patient UK at <http://www.patient.co.uk>

The following resources have been written or recommended by national policy bodies or guideline producers whose content has informed this pathway:

- 'Pancreatitis patient leaflet' (URL) from Clinical Knowledge Summaries (CKS) at <http://www.cks.nhs.uk>

For details on how these resources are identified, please see Map of Medicine's document on [Information Resources for Patients and Carers](#) (URL).

3 Updates to this pathway

Quick info:

Date of publication: 31-Jan-2012

Interim update: Updated in response to user feedback. The scoring system for the Glasgow score has been added.

Date of publication: 29-Oct-2010

Interim update: Updated in response to user feedback. Patients are now referred specifically to the on-call surgical registrar

Date of publication: 30-Jul-2010

Interim update: A link node to the 'Venous thromboembolism (VTE) risk assessment' pathway has been included at relevant points to encourage secondary care providers to risk assess patients for VTE on admission to hospital.

Date of publication: 29-Apr-2010

Three nodes now appear at the top of each pathway page. These provide:

- easy access to scope and background information on each page of the pathway whilst reducing repetition between nodes
- easy access to patient resources/leaflets
- information on pathway updates

The pathway has been updated in line with the following guidelines:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [2] Sekimoto M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: epidemiology, etiology, natural history, and outcome predictors in acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 10-24.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [5] Koizumi M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 25-32.
- [7] Takeda K, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: medical management of acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 42-47.
- [14] Isaji S, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: surgical management. J Hepatobiliary Pancreat Surg 2006; 13: 48-55.
- [21] Kimura Y, Takada T, Kawarada Y. Japanese guidelines on acute pancreatitis: treatment of gallstone-induced acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 56-60.
- [22] Mayumi T, Takada T, Kawarada Y. Management strategy for acute pancreatitis in the JPN Guidelines. J Hepatobiliary Pancreat Surg 2006; 13: 61-67.

Further information was provided by the following references: [4,6,8-13,15-20,23-26]. For further information, please see the pathway's Provenance certificate.

The pathway has been completely restructured and redrafted in line with the Map of Medicine editorial methodology and to bring in line with current clinical practice.

4 Acute pancreatitis - clinical presentation

Quick info:

Clinical features:

- abdominal pain
- tenderness in the upper abdomen
- pain radiating to the back
- anorexia

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- fever
- nausea and vomiting
- decreased bowel sounds
- elevation of plasma concentrations of pancreatic enzymes
- 3% of the patients present with discoloration of the skin, eg [5]:
 - Grey Turner's sign (on the lateral abdominal wall)
 - Cullen's sign (around the navel)
 - Fox's sign (over the lower portion of the inguinal ligament)

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [2] Sekimoto M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: epidemiology, etiology, natural history, and outcome predictors in acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 10-24.
- [5] Koizumi M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 25-32.

6 Initial management

Quick info:

Initial assessment in A&E [6]:

- full systemic enquiring and physical examination:
- careful attention to abdominal examination

Commence initial resuscitation [1]:

- oxygen by administration
- intravenous (IV) fluid resuscitation
- maintain fluid and electrolyte balance
- analgesia (narcotic often required)

Blood tests including [6]:

- full blood count (FBC);
- urea and electrolytes
- liver function tests (LFTs)
- bone profile
- C reactive protein (CRP)
- amylase

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [6] Map of Medicine (MoM). London: MoM; 2010.

7 Specialist management

Quick info:

Every hospital that receives acute admissions should have a single nominated clinical team to manage all patients with acute pancreatitis [1].

Management in, or referral to, a specialist unit is necessary for patients with [1]:

- extensive necrotising pancreatitis
- other complications who may require:
 - intensive care
 - interventional radiological, endoscopic, or surgical procedures

Features of a specialist unit for the treatment of severe acute pancreatitis include [1]:

- a multidisciplinary team of specialists in:
 - surgery
 - endoscopy
 - intensive care
 - anaesthesia
 - gastroenterology
 - nutrition
 - full support staff

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- a surgeon or gastroenterologist with specific knowledge of and interest in pancreaticobiliary disease
- facilities for intensive care management of critically ill patients including renal and respiratory support
- radiology expertise permitting the use of dynamic helical or multislice CT, percutaneous needle aspiration, and drainage procedures – magnetic resonance (MR) and angiography are helpful but not essential
- endoscopy facilities for endoscopic retrograde cholangiopancreatography (ERCP) and all therapeutic endoscopy (on an emergency basis) by an experienced endoscopist
- endoscopic ultrasound (EUS) available as an elective diagnostic procedure

Reference:

[1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.

8 History

Quick info:

Ask about symptoms and sign of acute pancreatitis:

- upper abdominal pain
- nausea and/or vomiting
- pain radiating to the back
- anorexia
- meteorism
- diarrhoea
- fever
- rigors
- loss of consciousness
- general fatigue

Ask about history of:

- previous gallstones
- alcohol intake
- family history
- recreational substance use
- current medications
- exposure to known viral causes or prodromal symptoms

This information has been drawn from the following references:

[1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.

[5] Koizumi M, Takada T, Kwarada Y et al. Japanese guidelines on acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 25-32.

9 Complete the venous thromboembolism (VTE) risk assessment

Quick info:

All patients should undergo venous thromboembolism (VTE) risk assessment as per National Institute for Health and Clinical Excellence (NICE) guidance:

- upon admission
- for a second time, within 24 hours of initial assessment
- regularly thereafter for the duration of the inpatient stay, and, in some cases, following discharge
- whenever the clinical situation changes

Reference:

National Institute for Health and Clinical Excellence (NICE). Venous thromboembolism: reducing the risk. Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital. Clinical guideline 92. London: NICE; 2010.

10 Initial management and prevention of complications

Quick info:

Initial management:

- adequate prompt fluid resuscitation is crucial in the prevention of systemic complications [1,3,7]
- if acute pancreatitis is accompanied by persistent severe abdominal pain adequate analgesia is crucial [7]

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- ensure that all patients with acute pancreatitis receive adequate oxygen and fluids until it is clear that the danger of organ failure has passed [1,3]
- measure oxygen saturation continuously and administer supplemental oxygen to maintain an arterial saturation greater than 95% [1]
- give intravenous (IV) fluids (crystalloid or colloid as required) to maintain urine output more than 0.5ml/kg body weight [1]
- monitor the rate of fluid replacement by frequent measurement of central venous pressure in appropriate patients [1]
- continuous IV infusion of a large dose of a protease inhibitor reduces the incidence of complications in the early phase of severe acute pancreatitis [7]
- it is wise to treat every patient aggressively until disease severity has been established [1,3]

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [7] Takeda K, Takada T, Kawarada Y. Japanese guidelines on acute pancreatitis: medical management of acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 42-7.

11 Initial investigations

Quick info:

Initial investigations [1]:

- pancreatic enzymes in plasma:
 - although amylase is widely available and provides acceptable accuracy of diagnosis, where lipase is available it is preferred for the diagnosis of acute pancreatitis [1,5]
- liver function tests
- fasting plasma lipids
- fasting plasma calcium
- ultrasound of gall bladder
 - ultrasound may show pancreatic swelling but the pancreas is visualised in only 25-50% of patients with acute pancreatitis
 - the value of ultrasonography lies in its ability to demonstrate gall bladder stones and dilatation of the common bile duct, as well as other pathology unrelated to the pancreas such as abdominal aortic aneurysm

Macroamylase [6]:

- serum amylase levels may be elevated in settings in which amylase is bound to other macromolecules like immunoglobulins and polysaccharides, forming complexes known as macroamylase [8]
- because of the size of macromolecules, renal excretion is reduced and the amylase level as measured by serologic tests is increased – such patients typically have chronically elevated serum amylase levels, although the degree of elevation can fluctuate [9]

Amylase-to-creatinine clearance ratio (ACCR) [6]:

- calculation of the ratio of the clearance of amylase to the clearance of creatinine is primarily of value in patients with macroamylasemia [10]
- in this setting, the ratio is reduced because of poor filtration of the large macroamylase complexes
- a ratio less than 1% on a 24 hour collection strongly supports the diagnosis
- the ratio is measured by the following formula:
 - $ACCR = (\text{amylase [urine]} \times \text{creatinine [serum]} \times 100) / (\text{amylase [serum]} \times \text{creatinine [urine]})$

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [6] Map of Medicine (MoM). London: MoM; 2010.
- [8] Berk, JE, Kizu, H, Wilding, P, Searcy, RL. Macroamylasemia: a newly recognized cause for elevated serum amylase activity. N Engl J Med 1967; 277: 941.
- [9] Sachdeva, CK, Bank, S, Greenberg, R, et al. Fluctuations in serum amylase in patients with macroamylasemia. Am J Gastroenterol 1995; 90: 800.
- [10] Levitt, MD. Clinical use of amylase clearance and isoamylase measurements. Mayo Clin Proc 1979; 54: 428.

12 Antibiotic prophylaxis

Quick info:

There remains no consensus view on the value of antibiotic prophylaxis [1]:

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- the Japanese Guidelines for the management of acute pancreatitis recommend that prophylactic administration of broad-spectrum antibiotics with good tissue penetration is necessary to prevent infection in severe acute pancreatitis [7]
- several meta-analyses and systematic reviews have shown that prophylactic antibiotics cannot reduce:
 - infected pancreatic necrosis and mortality in patients with severe acute pancreatitis (SAP) [11,12] and acute necrotic pancreatitis (ANP) [13]
 - frequency of surgical intervention [11]
- a meta-analysis suggests the use of antibiotic prophylaxis in patients with necrotic pancreatitis [12]

Antibiotic prophylaxis:

- if antibiotic prophylaxis is used, it seems sensible to limit the duration of prophylaxis to 7-14 days [1]
- do not continue treatment beyond that time without evidence of infection provided by bacterial growth on culture [1]

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [7] Takeda K, Takada T, Kawarada Y. Japanese guidelines on acute pancreatitis: medical management of acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 42-7.
- [11] Jafri NS, Mahid SS, Idstein Sr et al. Antibiotic prophylaxis is not protective in severe acute pancreatitis: a systematic review and meta-analysis. Am J Surg; 197: 806-13.
- [12] Xiong GS, Wu SM, Wang ZH. Role of prophylactic antibiotic administration in severe acute pancreatitis: a meta-analysis. Med Princ Pract 2006; 15: 106-10.
- [13] Bai Y, Gao J, Zou DW et al. Prophylactic antibiotics cannot reduce infected pancreatic necrosis and mortality in acute necrotizing pancreatitis: evidence from a meta-analysis of randomized controlled trials. Am J Gastroenterol 2008; 103: 104-10.

13 Consider differential diagnosis

Quick info:

Conditions associated with elevation of serum amylase [5]:

- pancreatic diseases:
 - trauma (including surgery and endoscopic retrograde cholangiopancreatography [ERCP])
 - ductal obstruction
 - pancreatic carcinoma
 - cystic fibrosis (early)
- salivary diseases:
 - infection (mumps)
 - trauma (including surgery)
 - radiation
 - ductal obstruction
- gastrointestinal (GI) diseases:
 - perforated/penetrating peptic ulcer
 - perforated/obstructed bowel
 - mesenteric infarction
 - appendicitis
 - liver disease (hepatitis, cirrhosis)
- gynaecological diseases:
 - ruptured ectopic pregnancy
 - ovarian or fallopian cysts
 - pelvic inflammatory disease
- extrapancreatic neoplasms:
 - solid tumors of ovary, prostate, lung, esophagus, breast, thymus
 - multiple myeloma
 - pheochromocytoma
- miscellaneous:
 - renal failure
 - renal transplant
 - macroamylase
 - burns
 - acidosis (ketotic and nonketotic)
 - pregnancy
 - cerebral trauma
 - medication-induced (morphine, diuretics, corticosteroids)
 - abdominal aortic aneurysm

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- anorexia, bulimia nervosa
- idiopathic elevation

Macroamylase [6]:

- serum amylase levels may be elevated in settings in which amylase is bound to other macromolecules like immunoglobulins and polysaccharides, forming complexes known as macroamylase [8]
- because of the size of macromolecules, renal excretion is reduced and the amylase level as measured by serologic tests is increased – such patients typically have chronically elevated serum amylase levels, although the degree of elevation can fluctuate [9]

Amylase-to-creatinine clearance ratio (ACCR) [6]:

- calculation of the ratio of the clearance of amylase to the clearance of creatinine is primarily of value in patients with macroamylasemia [10]
- in this setting, the ratio is reduced because of poor filtration of the large macroamylase complexes
- a ratio less than 1% on a 24-hour collection strongly supports the diagnosis
- the ratio is measured by the following formula:
 - $ACCR = (\text{amylase [urine]} \times \text{creatinine [serum]} \times 100) / (\text{amylase [serum]} \times \text{creatinine [urine]})$

References:

- [5] Koizumi M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 25-32.
- [6] Map of Medicine (MoM). London: MoM; 2010.
- [8] Berk, JE, Kizu, H, Wilding, P, Searcy, RL. Macroamylasemia: a newly recognized cause for elevated serum amylase activity. J Engl J Med 1967; 277: 941.
- [9] Sachdeva, CK, Bank, S, Greenberg, R, et al. Fluctuations in serum amylase in patients with macroamylasemia. Am J Gastroenterol 1995; 90: 800.
- [10] Levitt, MD. Clinical use of amylase clearance and isoamylase measurements. Mayo Clin Proc 1979; 54: 428.

14 Follow-up investigations

Quick info:

Further investigations:

- magnetic resonance imaging (MRI) [5]:
 - MRI scanning visualizes pancreatic enlargement and the inflammatory changes around the pancreas and can distinguish the intestinal tract from the necrotic part of the pancreas
- magnetic resonance cholangiopancreatography (MRCP) [5]:
 - MRCP is often required to identify the aetiology of acute pancreatitis, eg:
 - cholelithiasis
 - abnormal pancreaticocholedochal junction
- viral antibody titres [1]
- X-ray [5]:
 - perform chest and abdominal X-ray examinations to check for the presence of any abnormal findings caused by acute pancreatitis
- repeat biliary ultrasound [1]
- CT scan (helical or multislice with pancreas protocol) [1,3,5]:
 - CT scan is occasionally indicated for diagnosis, if clinical and biochemical findings are inconclusive, especially when abdominal signs raise the possibility of an alternative abdominal emergency, such as a perforation or infarction of the bowel
 - in the UK is not current practice to perform early CT for the detection and staging of severe cases of acute pancreatitis [1]

Aetiology of acute pancreatitis [5]:

- determine the etiology of acute pancreatitis promptly and accurately – may have a crucial impact on treatment policy as well as the severity assessment
- it is particularly important to differentiate acute gallstone pancreatitis, which requires treatment of the biliary system, from acute alcoholic pancreatitis, which requires a different form of treatment

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [5] Koizumi M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 25-32.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

15 Assess severity

Quick info:

Severity assessment [5]:

- severity assessment is essential to the selection of appropriate initial treatment
- mild or moderate acute pancreatitis may quickly progress to severe – continuous assessment is required, particularly during the first 3 days after onset
- assessment by a severity scoring system is important when deciding on treatment policy and the need for transfer to a specialist unit

NB: Features that may predict a severe attack, present within 48 hours of admission to hospital [1].

Initial assessment [1]:

- clinical impression of severity
- body mass index more than 30kg/m²
- pleural effusion on chest radiograph
- acute Physiology and Chronic Health Evaluation (APACHE) II score more than 8

Reassess 24 hours after admission [1]:

- clinical impression of severity
- APACHE II score more than 8
- Glasgow score 3 or more, measured as 1 point for each of the following criteria [27]:
 - age older than 55 years
 - leukocyte count greater than 15x10⁹/L
 - glucose greater than 10mMol/L
 - urea greater than 16mMol/L
 - PaO₂ less than 60mmHg
 - calcium less than 2mMol/L
 - albumin less than 32g/L
 - lactate dehydrogenase greater than 600units/L
 - aspartate/alanine aminotransferase greater than 100units/L
- persisting organ failure, especially if multiple
- C reactive protein (CRP) more than 150mg/L

Reassess 48 hours after admission [1]:

- clinical impression of severity
- Glasgow score 3 or more
- CRP more than 150mg/L
- persisting organ failure for 48 hours
- multiple or progressive organ failure

References:

[1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.

[5] Koizumi M, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 25-32.

[27] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 1998; 42 S1-S13.

16 Severe

Quick info:

Severe pancreatitis [6]:

- consider severity based on predictive factors noted in 'Assess severity' node and clinical assessment
- distinguishing severe pancreatitis from mild disease can be difficult
- clinical assessment in severe disease may reveal:
 - anorexia, nausea and vomiting
 - symptoms and signs of generalised abdominal involvement
 - peritonism
 - tachycardia, fever, tachypnoea and reduced urine output
 - signs of pulmonary insufficiency
 - jaundice
 - renal dysfunction

Reference:

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

[6] Map of Medicine (MoM). London: MoM; 2010.

17 Mild to moderate disease

Quick info:

Mild/moderate pancreatitis [6]:

- consider severity based on predictive factors noted in 'Assess severity' node and clinical assessment
- distinguishing severe pancreatitis from mild disease can be difficult
- clinical assessment in severe disease may reveal:
 - anorexia, nausea and vomiting
 - symptoms and signs of generalised abdominal involvement
 - peritonism
 - tachycardia, fever, tachypnoea and reduced urine output
 - signs of pulmonary insufficiency
 - jaundice
 - renal dysfunction

Reference:

[6] Map of Medicine (MoM). London: MoM; 2010.

18 Indications for specialist unit transfer

Quick info:

Specialist unit transfer [3]:

- admit to intensive care patients meeting conventional criteria for admission to a critical care unit
- consider a step-down unit or intensive care specialist for patients who are at high risk of rapid deterioration, eg:
 - the elderly
 - the obese
 - patients requiring ongoing volume resuscitation
 - patients with substantial pancreatic necrosis

Reference:

[3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.

19 Conservative management

Quick info:

Patients should be [6]:

- made nil by mouth
- rehydrated with intravenous (IV) fluids
- given oxygen therapy
- given adequate analgesia

Patients with signs of organ dysfunction require close monitoring and critical care support [6].

Reference:

[6] Map of Medicine (MoM). London: MoM; 2010.

20 Management of complications

Quick info:

Most patients with acute pancreatitis do not require surgical treatment of the pancreatic disease although many will subsequently undergo cholecystectomy [1].

Remove if possible stones found in the common bile duct – the minimum manoeuvre would be external tube drainage of the common bile duct [1].

Pancreatic necrosis [1]:

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- perform image guided fine-needle aspirations (FNA) to obtain material for culture 7-14 days after the onset of the pancreatitis, to discriminate between sterile and infected necrosis, in patients with [1,3]:
 - persistent symptoms and greater than 30% pancreatic necrosis
 - smaller areas of necrosis and clinical suspicion of sepsis
- patients with infected necrosis will require intervention to completely debride all cavities containing necrotic material
- patients with sterile pancreatic necrosis should be managed conservatively and undergo surgical intervention only in selected cases, eg those with [14]:
 - persistent organ complications
 - severe clinical deterioration despite maximum intensive care
- early surgery is not recommended for necrotizing pancreatitis unless there are specific indications [14]
- infected pancreatic necrosis accompanied by signs of sepsis is an indication for surgical intervention [14]

Antibiotic prophylaxis:

- prophylactic antibiotics in necrotising pancreatitis reduced the length of hospital stay and rate of nonpancreatic infections [15,16] but did not decrease mortality, infected necrosis, or surgical intervention [15-17]
- prophylactic antibiotics is not recommended in patients with necrotizing pancreatitis in light of inconclusive evidence and divided expert opinion [3]

Pancreatic abscess [14]:

- perform surgical or percutaneous drainage for pancreatic abscess
- if the clinical findings of pancreatic abscess are not improved by percutaneous drainage, perform surgical drainage immediately

Pancreatic pseudocysts [14]:

- treat by drainage pancreatic pseudocysts that give rise to symptoms and complications or if the diameter of the pseudocyst increases
- manage surgically pancreatic pseudocysts that do not tend to improve in response to percutaneous drainage or endoscopic drainage

Choice of interventional or surgical procedure [1]:

- there is controversy over the roles of radiological drainage and surgical necrosectomy in the management of infected pancreatic and peripancreatic necrosis:
 - standard surgical practice is that all patients with infected necrosis should undergo necrosectomy
 - retrospective studies from referral centres have described good outcome in patients managed by percutaneous drains
 - the choice of surgical technique for necrosectomy, and subsequent postoperative management depends on individual features and locally available expertise
- perform pancreatic debridement or drainage in patients with confirmed infected pancreatic necrosis and/or abscess [3]:
 - when possible, delay operative necrosectomy and/or drainage at least 2-3 weeks to allow for demarcation of the necrotic pancreas
- in predicted mild pancreatitis early endoscopic retrograde cholangiopancreatography (ERCP) has no advantage compared to conservative management [18]
- a meta-analysis has shown that early ERCP in patients with predicted mild and predicted severe acute biliary pancreatitis without acute cholangitis did not lead to a significant reduction in the risk of overall complications and mortality [19,20]

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [14] Isaji S, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: surgical management. J Hepatobiliary Pancreat Surg 2006; 13: 48-55.
- [15] Hart PA, Bechtold ML, Marshall JB et al. Prophylactic antibiotics in necrotizing pancreatitis: a meta-analysis. South Med J 2008; 101: 1126-31.
- [16] Xu T, Cai Q. Prophylactic antibiotic treatment in acute necrotizing pancreatitis: results from a meta-analysis. Scand J Gastroenterol 2008; 43: 1249-58.
- [17] Mazaki T, Ishii Y, Takayama T. Meta-analysis of prophylactic antibiotic use in acute necrotizing pancreatitis. Br J Surg 2006; 93: 674-84.
- [18] Moretti A, Papi C, Aratari A et al. Is early endoscopic retrograde cholangiopancreatography useful in the management of acute biliary pancreatitis? A meta-analysis of randomized controlled trials. Dig Liver Dis 2008; 40: 379-85.
- [19] Petrov MS, Uchugina AF, Kukosh MV. Does endoscopic retrograde cholangiopancreatography reduce the risk of local pancreatic complications in acute pancreatitis? A systematic review and metaanalysis. Surg Endosc 2008 ; 22: 2338-43.
- [20] Petrov MS, van Santvoort HC, Besselink MG et al. Early endoscopic retrograde cholangiopancreatography versus conservative management in acute biliary pancreatitis without cholangitis: a meta-analysis of randomized trials. Ann Surg 2008; 247: 250-7.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

21 Gallstones pancreatitis and treatment of gallstones

Quick info:

Manage gallstones in all patients with biliary pancreatitis during the same hospital admission [1].

Management of bile duct stones in gallstone associated acute pancreatitis [21]:

- an emergency endoscopy endoscopic retrograde cholangiopancreatography (ERCP) approach is beneficial in patients with acute pancreatitis in whom bile duct obstruction is suspected or there are complications from cholangitis [3,21]:
 - the procedure is best carried out within the first 72 hours after the onset of pain
- all patients undergoing early ERCP for severe gallstone pancreatitis require endoscopic sphincterotomy whether or not stones are found in the bile duct [1]
- if ERCP cannot be accomplished because it is not technically feasible or available, consider alternative methods of biliary drainage [3]
- surgical approach [21]:
 - open choledochotomy or sphincterotomy (operative removal of CBD stones is recommended)
 - consider performing laparoscopic cholecystectomy after recovery from an attack of gallstone pancreatitis

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [21] Kimura Y, Takada T, Kawarada Y. Japanese guidelines on acute pancreatitis: treatment of gallstone-induced acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 56-60.

22 CT scan

Quick info:

Contrast-enhanced CT scanning and magnetic resonance imaging (MRI) are essential for severity assessment and for making decisions about management policy [22].

Patients with persisting organ failure, signs of sepsis, or deterioration in clinical status 6-10 days after admission will require CT scan [1].

CT scan protocol [1]:

- inadequate information often results from poor CT scan technique
- a pancreas protocol will ensure best use of resources
- spiral or multislice CT scan is required for assessment of acute pancreatitis
- the speed and flexibility of these scanners are beneficial for these sick patients
- precise technique will depend on scanner specifications but all patients should be given approximately 500mL of oral contrast by mouth or nasogastric tube
- an initial scan without intravenous (IV) contrast allows pancreatic levels to be identified and demonstrates the extent of peripancreatic change
- a post contrast series is obtained after a bolus IV injection of nonionic contrast delivered using a power injector
- images through the pancreatic bed should be obtained using thin collimation (5mm or less) commencing approximately 40 seconds after the start of the injection
- non-opacification of at least one third of the pancreas, or an area more than 3cm diameter, indicates necrosis
- a second series of images beginning at 65 seconds after injection (portal venous phase) will give information about patency of the main peripancreatic veins
- CT of the pancreas without IV contrast enhancement gives suboptimal information and should be avoided

Follow-up CT scan [1]:

- patients with mild pancreatitis, or patients with a CT severity index of 0-2, require further CT only if there is a change in the patient's clinical status that suggests a new complication
- in patients with a CT severity index of 3-10, additional follow-up scans are recommended only if the patient's clinical status deteriorates or fails to show continued improvement
- some would advise a single further scan in patients who make an apparently uncomplicated recovery, before the patient is discharged from hospital, to detect the presence of asymptomatic complications such as pseudocyst or arterial pseudoaneurysm

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [22] Mayumi T, Takada T, Kawarada Y. Management strategy for acute pancreatitis in the JPN Guidelines. J Hepatobiliary Pancreat Surg 2006; 13: 61-7.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

23 Critical care management

Quick info:

Critical management:

- critical management includes [22]:
 - infusion management
 - strict cardiovascular and respiratory management
 - prevention and management of organ failure and infection:
 - usual sequence of organ failure is first respiratory failure, then shock, then renal failure [6]
- manage all patients with severe acute pancreatitis in a high dependency unit or intensive therapy unit with full monitoring and systems support [1]
- continuous regional arterial infusion of protease inhibitors and antibiotics may possibly reduce the mortality rate and incidence of infectious complications in necrotizing pancreatitis [7]
- consider blood purification therapy in the management of severe acute pancreatitis [22]
- enteral nutrition starting in the early phase of severe acute pancreatitis is superior to total parenteral nutrition unless ileus is present [7]
- if nutritional support is required, use the enteral route if that can be tolerated [1,7,23,24]:
 - when parenteral route is used, it should be initiated after 5 days [22]
- enteral nutrition results in clinically relevant and statistically significant risk reduction for [25,26]:
 - infectious complications
 - pancreatic infections,
 - mortality in patients with predicted severe acute pancreatitis

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [6] Map of Medicine (MoM). London: MoM; 2010.
- [7] Takeda K, Takada T, Kawarada Y. Japanese guidelines on acute pancreatitis: medical management of acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 42-7.
- [22] Mayumi T, Takada T, Kawarada Y. Management strategy for acute pancreatitis in the JPN Guidelines. J Hepatobiliary Pancreat Surg 2006; 13: 61-7.
- [23] Cao Y, Xu Y, Lu T et al. Meta-analysis of enteral nutrition versus total parenteral nutrition in patients with severe acute pancreatitis. Ann Nutr Metab 2008; 53: 268-75.
- [24] McClave SA, Chang WK, Dhaliwal R et al. Nutrition support in acute pancreatitis: a systematic review of the literature. J Parenter Enteral Nutr 2006; 30: 143-56.
- [25] Petrov Ms, Pylypchuk RD, Emelyanov NV. Systematic review: nutritional support in acute pancreatitis. Aliment Pharmacol Ther 2008; 28: 704-12.
- [26] Petrov MS, van Santvoort HC, Besselink MG et al. Enteral nutrition and the risk of mortality and infectious complications in patients with severe acute pancreatitis: a meta-analysis of randomized trials. Arch Surg 2008; 143: 1111-7.

24 Management of complications

Quick info:

Most patients with acute pancreatitis do not require surgical treatment of the pancreatic disease although many will subsequently undergo cholecystectomy [1].

Remove if possible stones found in the common bile duct - the minimum manoeuvre would be external tube drainage of the common bile duct [1].

Pancreatic necrosis [1]:

- perform image guided fine-needle aspirations (FNA) to obtain material for culture 7-14 days after the onset of the pancreatitis, to discriminate between sterile and infected necrosis, in patients with [1,3]:
 - persistent symptoms and greater than 30% pancreatic necrosis
 - smaller areas of necrosis and clinical suspicion of sepsis
- patients with infected necrosis will require intervention to completely debride all cavities containing necrotic material
- patients with sterile pancreatic necrosis should be managed conservatively and undergo surgical intervention only in selected cases, eg those with [14]:
 - persistent organ complications
 - severe clinical deterioration despite maximum intensive care
- early surgery is not recommended for necrotizing pancreatitis unless there are specific indications [14]
- infected pancreatic necrosis accompanied by signs of sepsis is an indication for surgical intervention [14]

Antibiotic prophylaxis:

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- prophylactic antibiotics in necrotising pancreatitis reduced the length of hospital stay and rate of nonpancreatic infections [15,16] but did not decrease mortality, infected necrosis, or surgical intervention [15-17]
- prophylactic antibiotics is not recommended in patients with necrotizing pancreatitis in light of inconclusive evidence and divided expert opinion [3]

Pancreatic abscess [14]:

- perform surgical or percutaneous drainage for pancreatic abscess
- if the clinical findings of pancreatic abscess are not improved by percutaneous drainage, perform surgical drainage immediately

Pancreatic pseudocysts [14]:

- treat by drainage pancreatic pseudocysts that give rise to symptoms and complications or if the diameter of the pseudocyst increases
- manage surgically pancreatic pseudocysts that do not tend to improve in response to percutaneous drainage or endoscopic drainage

Choice of interventional or surgical procedure [1]:

- there is controversy over the roles of radiological drainage and surgical necrosectomy in the management of infected pancreatic and peripancreatic necrosis:
 - standard surgical practice is that all patients with infected necrosis should undergo necrosectomy
 - retrospective studies from referral centres have described good outcome in patients managed by percutaneous drains
 - the choice of surgical technique for necrosectomy, and subsequent postoperative management depends on individual features and locally available expertise
- perform pancreatic debridement or drainage in patients with confirmed infected pancreatic necrosis and/or abscess [3]:
 - when possible, delay operative necrosectomy and/or drainage at least 2-3 weeks to allow for demarcation of the necrotic pancreas
- in predicted mild pancreatitis early endoscopic retrograde cholangiopancreatography (ERCP) has no advantage compared to conservative management [18]
- a meta-analysis has shown that early ERCP in patients with predicted mild and predicted severe acute biliary pancreatitis without acute cholangitis did not lead to a significant reduction in the risk of overall complications and mortality [19,20]

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [14] Isaji S, Takada T, Kawarada Y et al. Japanese guidelines on acute pancreatitis: surgical management. J Hepatobiliary Pancreat Surg 2006; 13: 48-55.
- [15] Hart PA, Bechtold ML, Marshall JB et al. Prophylactic antibiotics in necrotizing pancreatitis: a meta-analysis. South Med J 2008; 101: 1126-31.
- [16] Xu T, Cai Q. Prophylactic antibiotic treatment in acute necrotizing pancreatitis: results from a meta-analysis. Scand J Gastroenterol 2008; 43: 1249-58.
- [17] Mazaki T, Ishii Y, Takayama T. Meta-analysis of prophylactic antibiotic use in acute necrotizing pancreatitis. Br J Surg 2006; 93: 674-84.
- [18] Moretti A, Papi C, Aratari A et al. Is early endoscopic retrograde cholangiopancreatography useful in the management of acute biliary pancreatitis? A meta-analysis of randomized controlled trials. Dig Liver Dis 2008; 40: 379-85.
- [19] Petrov MS, Uchugina AF, Kukosh MV. Does endoscopic retrograde cholangiopancreatography reduce the risk of local pancreatic complications in acute pancreatitis? A systematic review and metaanalysis. Surg Endosc 2008 ; 22: 2338-43.
- [20] Petrov MS, van Santvoort HC, Besselink MG et al. Early endoscopic retrograde cholangiopancreatography versus conservative management in acute biliary pancreatitis without cholangitis: a meta-analysis of randomized trials. Ann Surg 2008; 247: 250-7.

25 Gallstone pancreatitis and treatment of gallstones

Quick info:

Manage gallstones in all patients with biliary pancreatitis during the same hospital admission [1].

Management of bile duct stones in gallstone associated acute pancreatitis [21]:

- an emergency endoscopic retrograde cholangiopancreatography (ERCP) approach is beneficial in patients with acute pancreatitis in whom bile duct obstruction is suspected or there are complications from cholangitis [3,21]:
 - the procedure is best carried out within the first 72 hours after the onset of pain
- all patients undergoing early ERCP for severe gallstone pancreatitis require endoscopic sphincterotomy whether or not stones are found in the bile duct [1]
- if ERCP cannot be accomplished because it is not technically feasible or available, consider alternative methods of biliary drainage [3]

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

- surgical approach [21]:
 - open choledochotomy or sphincterotomy (operative removal of CBD stones is recommended)
 - consider performing laparoscopic cholecystectomy after recovery from an attack of gallstone pancreatitis

References:

- [1] UK Working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
- [3] Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis Critical Care Medicine; 32: 2524-36.
- [21] Kimura Y, Takada T, Kawarada Y. Japanese guidelines on acute pancreatitis: treatment of gallstone-induced acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 56-60.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

Key Dates

Published: 13-Jan-2012, by International

Valid until: 31-May-2012

Accreditations

The editorial process used to create this care map is accredited by:

The Chief Knowledge Officer of the NHS:

[Disclaimer](#)



Evidence summary for Acute pancreatitis

This pathway has been developed according to the Map of Medicine editorial methodology (<http://mapofmedicine.com/whatisthemap/editorialmethodology>). The content of this pathway is based on high-quality guidelines [1,2,3,5,7,14,21,22,27] and critically appraised meta-analyses and systematic reviews [4,11-13,15-20,23-26]. Practice-based knowledge has been added by the Map of Medicine's Clinical Editorial Team and Fellows [6]. The evidence-based pathway has then been peer-reviewed by experts and any literature endorsed by them has also been included [8,9,10].

Search date: Dec-2009

References

This is a list of all the references that have passed critical appraisal for use in the care map Acute pancreatitis

ID Reference

- 1 UK working Party on Acute Pancreatitis. UK guidelines for the management of acute pancreatitis. Gut 2005; 54 Suppl III: iii1-iii9.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1867800/pdf/v054p0iii1.pdf>
- 2 Sekimoto M, Takada T, Kawarada Y et al. JPN Guidelines for the management of acute pancreatitis: epidemiology, etiology, natural history, and outcome predictors in acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 10-24.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2779368/pdf/534_2005_Article_1047.pdf
- 3 Nathens AB, Curtis JR, Beale RJ et al. Management of the critically ill patient with severe acute pancreatitis. Crit Care Med 2004; 32: 2524-2536.
<http://www.ncbi.nlm.nih.gov/pubmed/15599161>
- 4 Martinez J, Johnson CD, Sanchez-Paya J et al. Obesity is a definitive risk factor of severity and mortality in acute pancreatitis: an updated meta-analysis. Pancreatology 2006; 6: 206-209.
<http://www.ncbi.nlm.nih.gov/pubmed/16549939>
- 5 Koizumi M, Takada T, Kawarada Y et al. JPN Guidelines for the management of acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 25-32.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2779365/pdf/534_2005_Article_1048.pdf
- 6 Map of Medicine (MoM). London: MoM; 2010.
- 7 Takeda K, Takada T, Kawarada Y et al. JPN Guidelines for the management of acute pancreatitis: medical management of acute pancreatitis. J Hepatobiliary Pancreat Surg 2006; 13: 42-47.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2779395/pdf/534_2005_Article_1050.pdf
- 8 Berk JE, Kizu H, Wilding P et al. Macroamylasemia: a newly recognized cause for elevated serum amylase activity. N Engl J Med 1967; 277: 941-946.
<http://www.ncbi.nlm.nih.gov/pubmed/4167531>
- 9 Sachdeva CK, Bank S, Greenberg R et al. Fluctuations in serum amylase in patients with macroamylasemia. Am J Gastroenterol 1995; 90: 800-803.
<http://www.ncbi.nlm.nih.gov/pubmed/7537446>
- 10 Levitt MD. Clinical use of amylase clearance and isoamylase measurements. Mayo Clin Proc 1979; 54: 428-431.
<http://www.ncbi.nlm.nih.gov/pubmed/449415>
- 11 Jafri NS, Mahid SS, Idstein SR et al. Antibiotic prophylaxis is not protective in severe acute pancreatitis: a systematic review and meta-analysis. Am J Surg 2009; 197: 806-813.
<http://www.ncbi.nlm.nih.gov/pubmed/19217608>
- 12 Xiong GS, Wu SM, Wang ZH. Role of prophylactic antibiotic administration in severe acute pancreatitis: a meta-analysis. Med Princ Pract 2006; 15: 106-110.
<http://www.ncbi.nlm.nih.gov/pubmed/16484836>

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.

Acute pancreatitis

http://healthguides.mapofmedicine.com/choices/map/acute_pancreatitis1.html

ID Reference

- 13 Bai Y, Gao J, Zou DW et al. Prophylactic antibiotics cannot reduce infected pancreatic necrosis and mortality in acute necrotizing pancreatitis: evidence from a meta-analysis of randomized controlled trials. *Am J Gastroenterol* 2008; 103: 104-110.
<http://www.ncbi.nlm.nih.gov/pubmed/17925000>
- 14 Isaji S, Takada T, Kawarada Y et al. JPN Guidelines for the management of acute pancreatitis: surgical management. *J Hepatobiliary Pancreat Surg* 2006; 13: 48-55.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2779397/pdf/534_2005_Article_1051.pdf
- 15 Hart PA, Bechtold ML, Marshall JB et al. Prophylactic antibiotics in necrotizing pancreatitis: a meta-analysis. *South Med J* 2008; 101: 1126-1131.
<http://www.ncbi.nlm.nih.gov/pubmed/19088522>
- 16 Xu T, Cai Q. Prophylactic antibiotic treatment in acute necrotizing pancreatitis: results from a meta-analysis. *Scand J Gastroenterol* 2008; 43: 1249-1258.
<http://www.ncbi.nlm.nih.gov/pubmed/18609129>
- 17 Mazaki T, Ishii Y, Takayama T. Meta-analysis of prophylactic antibiotic use in acute necrotizing pancreatitis. *Br J Surg* 2006; 93: 674-684.
<http://www.ncbi.nlm.nih.gov/pubmed/16703633>
- 18 Moretti A, Papi C, Aratari A et al. Is early endoscopic retrograde cholangiopancreatography useful in the management of acute biliary pancreatitis? A meta-analysis of randomized controlled trials. *Dig Liver Dis* 2008; 40: 379-385.
<http://www.ncbi.nlm.nih.gov/pubmed/18243826>
- 19 Petrov MS, Uchugina AF, Kukosh MV. Does endoscopic retrograde cholangiopancreatography reduce the risk of local pancreatic complications in acute pancreatitis? A systematic review and metaanalysis. *Surg Endosc* 2008; 22: 2338-2343.
<http://www.ncbi.nlm.nih.gov/pubmed/18528624>
- 20 Petrov MS, van Santvoort HC, Besselink MG et al. Early endoscopic retrograde cholangiopancreatography versus conservative management in acute biliary pancreatitis without cholangitis: a meta-analysis of randomized trials. *Ann Surg* 2008; 247: 250-257.
<http://www.ncbi.nlm.nih.gov/pubmed/18216529>
- 21 Kimura Y, Takada T, Kawarada Y et al. JPN Guidelines for the management of acute pancreatitis: treatment of gallstone-induced acute pancreatitis. *J Hepatobiliary Pancreat Surg* 2006; 13: 56-60.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2779396/pdf/534_2005_Article_1052.pdf
- 22 Mayumi T, Takada T, Kawarada Y et al. Management strategy for acute pancreatitis in the JPN Guidelines. *J Hepatobiliary Pancreat Surg* 2006; 13: 61-67.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2779393/pdf/534_2005_Article_1053.pdf
- 23 Cao Y, Xu Y, Lu T et al. Meta-analysis of enteral nutrition versus total parenteral nutrition in patients with severe acute pancreatitis. *Ann Nutr Metab* 2008; 53: 268-275.
<http://www.ncbi.nlm.nih.gov/pubmed/19136822>
- 24 McClave SA, Chang WK, Dhaliwal R et al. Nutrition support in acute pancreatitis: a systematic review of the literature. *JPEN J Parenter Enteral Nutr* 2006; 30: 143-156.
<http://www.ncbi.nlm.nih.gov/pubmed/16517959>
- 25 Petrov MS, Pylypchuk RD, Emelyanov NV. Systematic review: nutritional support in acute pancreatitis. *Aliment Pharmacol Ther* 2008; 28: 704-712.
<http://www.ncbi.nlm.nih.gov/pubmed/19145726>
- 26 Petrov MS, van Santvoort HC, Besselink MG et al. Enteral nutrition and the risk of mortality and infectious complications in patients with severe acute pancreatitis: a meta-analysis of randomized trials. *Arch Surg* 2008; 143: 1111-1117.
<http://www.ncbi.nlm.nih.gov/pubmed/19015471>
- 27 United Kingdom guidelines for the management of acute pancreatitis. *British Society of Gastroenterology. Gut* 1998; 42 Suppl 2: S1-13.
http://gut.bmj.com/content/42/suppl_2/S1.full

Disclaimers

The Chief Knowledge Officer of the NHS

It is not the function of the Chief Knowledge Officer of the NHS to substitute for the role of the clinician, but to support the clinician in enabling access to know-how and knowledge. Users of the Map of Medicine are therefore urged to use their own professional judgement to ensure that the patient receives the best possible care. Whilst reasonable efforts have been made to ensure the accuracy of the information on this online clinical knowledge resource, we cannot guarantee its correctness or completeness. The information on the Map of Medicine is subject to change and we cannot guarantee that it is up-to-date.

Published: 13-Jan-2012 Valid until: 31-May-2012 © Map of Medicine Ltd All rights reserved

This care map was published by International. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.