Whittington Health NHS

Acute Pancreatitis
Diagnosis and Management

Subject:	Acute pancreatitis
Policy Number	N/A
Ratified By:	Clinical Guidelines Committee
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Version:	2.0
Policy Executive Owner:	SCD Divisional Director
Designation of Author:	Mr Dugal Heath (Consultant Upper GI Surgeon) Revised by Mr Omar Khan (Consultant Upper GI Surgeon)
Name of Assurance Committee:	As above
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Target Audience:	ED, General Surgery, Gastroenterology, Critical Care, all other relevant clinical teams
Key Words:	Acute pancreatitis

Version Control Sheet

Version	Date	Author	Status	Comment
1.0	Jan 2011	**Dr Joel Raffel** **Dr Thomas Jacques** **Dr Daniel Wilson** **Mr Raed Tayyem** **Mr Dugal Heath** **(**Consultant Upper GI Surgeon)	OFF LINE	New guideline ratified at CGC
2.0	Feb 2015	Mr O Khan (Consultant Upper GI Surgeon)	LIVE	Reviewed Guidance hasn't really changed but we have softened the emphasis on operating within 2 weeks of admission (unrealistic given current capacity. Otherwise the document is unchanged.

➢ Criteria for use

- This protocol has been designed to aid the diagnosis and management of all suspected cases of **acute pancreatitis** arising in the emergency department or in existing inpatients.

Guideline Contents:

1. Summary of management (see Appendix 1 for management algorithm)

- **Admit** to the hospital under the care of the **general surgeons**.
- **Early oxygen supplementation** – aim for SaO_2 > 95%.
- **Crystalloids fluid resuscitation** – aim for a urine output of > 0.5 ml/kg/hr.
- **Analgesia as per current guidelines**
- Consider **urinary catheter** in mild cases: essential in predicted severe cases.
- **CVP (Central Venous Pressure) measurement** in severe cases.
- **Therapeutic antibiotics**: for *infected necrosis or evident sepsis/cholangitis.*
- **Nutrition:** *Enteral nutrition is preferred to TPN.*
- **Preliminary investigations for all cases:**
    1. **Biochemistry/Haematology**
    2. **Body Mass Index (BMI) measurement**
    3. **Abdominal USS (Ultra Sound scan) within 24 hrs**
- **HDU / ITU** for severe cases.
- **Daily assessment** including: Glasgow score and CRP.
- Clinically deterioration, persistent organ failure and / or signs of sepsis within 6-10 days: consider **CT pancreas.**
- Extensive pancreatic necrosis that requires radiological or surgical intervention: consider referral to a **specialist pancreatic surgeon or unit.**
- **Cholecystectomy** on the same admission or booked as an urgent case for gallstones pancreatitis or where other causes of pancreatitis have been excluded and gallstones remain the most likely cause.

2. Introduction

- Acute pancreatitis is a relatively common, potentially life-threatening condition characterised by inflammation and auto-digestion of the pancreas.

- At the Whittington Hospital, gallstone disease and alcohol excess account for approximately 39% and 35% of cases respectively (2008-9).

- The UK incidence of pancreatitis ranges between 150-420 cases/million each year. At the Whittington Hospital the annual incidence is approximately 65 cases (2008-9); mortality is 5% (the national mortality rate is around 10%).

- Successful management of acute pancreatitis depends on prompt diagnosis, stratification of predicted severity, appropriate management of severe/predicted severe cases, and prompt cholecystectomy in patients in whom the aetiology has been determined to be gallstones.

- The guideline standards below are adapted from the guidelines published in *Gut* by the UK Working Party on Acute Pancreatitis.

3. Guideline standards

1. **Mortality** should be <10% overall, and <30% in severe pancreatitis.
2. The correct **diagnosis** of acute pancreatitis should be made within 48 hours of admission.
3. **Ultrasound imaging of the gall bladder** should be performed within 24hours of diagnosis of acute pancreatitis.
4. The primary **aetiology** should be determined in at least 80% of cases.
5. **Predicted severity stratification** should be made in **all** patients as soon as possible after presentation in order to guide further management. The **Glasgow score** is recommended (see below).However, by 48 hours after admission clinical assessment is as effective in identifying patients with severe disease.
6. Patients with persistent organ failure, signs of sepsis, or deterioration in clinical status 6 -10 days after admission should have Computed Tomography (CT) imaging using a pancreatic protocols in order to identify pancreatic necrosis or collections.
7. Patients with **severe** acute pancreatitis should be managed in a High Dependency Unit/Intensive Therapy Unit (HDU/ITU).
8. **Antibiotic prophylaxis** (currently Augmentin) against infected necrosis, if given, should not be continued for more than 14days in the absence of positive cultures.
9. **Gallstone pancreatitis** should undergo definitive management during the same admission or booked as an expedited case following discharge.
10. Those with extensive necrotising pancreatitis or other complications requiring ITU care, or interventional radiological, endoscopic or surgical procedures should be managed in a specialist unit in appropriate situations.
11. ERCP (Endoscopic Retrograde Cholangiopancreatography) necessary should be performed within 72 hours of the diagnosis of pancreatitis if the patient has evidence of ongoing biliary obstruction or chiolangitis.

	**Please see Whittington Health Guideline:** Endoscopic retrograde-cholangio pancreatography (ERCP) : referral guidelines

4. Diagnosis (see Appendix 2 for clinical features)

- The diagnosis should be made **within 48hrs of presentation**.
- **Clinical history** generally includes upper abdominal pain (with or without radiation to the back), vomiting, and diarrhoea. However, symptoms may be non-specific.
- **Risk factors** include gallstones, alcohol, family history, medication/drugs and prodromal/viral symptoms.
- **Examination findings** may be non-specific, and therefore require a high degree of suspicion. However, many patients will have marked upper abdominal tenderness with or without guarding.
- **Serum amylase** is fairly specific for acute pancreatitis when levels are greater than 300 (or 4 to 5 times the upper limit of normal). However, levels fall 3-4 days after onset and may therefore be factitiously low in patients presenting late.
- **Serum amylase measurements do NOT need to be repeated following a positive result, as it is NOT a marker of severity, or recovery.**
- **Abdominal ultrasound scanning** is of poor diagnostic value, but is essential in determining the aetiology of diagnosed cases.
- **CT scanning** may be of use in establishing the diagnosis or in complicated cases.

5. General management

- **Admit** to the hospital under the care of the **general surgeons**.
- **Provide oxygen supplementation** – aim for SaO_2 > 95%.
- **Fluid resuscitation** – aim for a urine output of > 0.5mls/kg/hr. Be aware that in severe cases 3-6 litres of "third space" fluid loss may occur.
- **Crystalloids** are preferable for acute pancreatitis resuscitation.
- **Urinary catheter** to assist with fluid management.
- **Analgesia** should follow a stepwise manner to control pain. It may include paracetamol, codeine, NSAIDs and pethidine restricted. Liaise with the pain team as indicated.
- Consider **CVP measurement** in severe/predicted severe cases.
- **ECG** and cardiac monitoring for severe cases.
- **Hypocalcaemia** is most commonly caused by a fall in serum albumin concentrations. Therefore corrected calcium should be measured in all patients. Intravenous calcium supplementation is only required where tetany develops. Corrected calcium levels of < 2.00mmol/L should be treated by oral calcium and vitamin D supplementation.
- **Prophylactic antibiotics**:
  - *No consensus for use in the absence of proven sepsis.*
  - *If used – treatment should not exceed 14 days. The choice of antibiotics should be in line with the current policy for surgical infections (at present this is augmentin).*
- **Therapeutic antibiotics**:
  - Consider if proven infected necrosis or evident sepsis.
  - Follow sensitivity results.
  - For empirical treatment use co-amoxiclav (Augmentin) 1.2 g IV tds or contact microbiology department for advice.

	**Please see Whittington Health Guideline:** Antibiotics in Bacterial Infections in Adults - Guidelines for Management

- **Nutrition**
  - If mild pancreatitis – no dietary restrictions should be imposed
  - Severe pancreatitis – intake may be limited by nausea and ileus – start enteral feeding as soon as possible
  - Enteral nutrition (Oral/NG/NJ feeding) is preferred to TPN (protects from gut bacterial translocation and sepsis)

- **Preliminary investigations for all cases:**

    - **Biochemistry/Haematology**
        - Full Blood Count (FBC)
        - Urea & Electrolytes (U+Es)
        - Liver Function Tests (LFTs including AST)
        - C Reactive Protein (CRP)
        - Bone Profile (Calcium and Phosphate)
        - Lactate Dehydrogenase (LDH)
        - Blood glucose
        - Arterial blood gas analysis

    - **Body Mass Index (BMI) measurement**

    - **Abdominal US scan (within 24 hrs)**

    - **Calculate the Glasgow score (or other appropriate scoring system) on admission and at 48 hours**

6. Severity stratification

- **Predicted severity stratification:**
    - **Glasgow Score** for acute pancreatitis (score 1 for each parameter):
        - P – **P**aO_2 = <8 kPa
        - A – **A**ge = >55 years
        - N – WCC (***N****eutrophils*) = >15 x10^9/L
        - C – **C**alcium = <2 mmol/L
        - R – Urea (***R****enal*) = >16 mmol/L
        - E – **E**nzymes = LDH >600 iu/L, AST >200iu/L
        - A – **A**lbumin = <32 g/L
        - S – Glucose (***S****ugar*) = >10 mmol/L
    - A Glasgow score of 3 or more **predicts** severe pancreatitis.
    - Discount blood glucose and blood urea levels in the presence of diabetes mellitus and renal impairment respectively.
    - Serum amylase concentrations are an effective diagnostic test but have **NO** place in severity prediction.

- **Severity assessment:**

This differs from *predicted* severity (i.e. Glasgow scoring), as it is a **real-time assessment** of the patient's morbidity, and can change throughout the disease course.

It incorporates the patient's **Glasgow score**, but at all times the **clinical impression** is of primary importance. **Serial CRP levels** are also of use in severity assessment as well as monitoring progress. Clinical features indicating a severe attack include persistent abdominal pain, tachycardia, hypotension, pyrexia, respiratory distress and urinary output <30 ml/hr.

- **Initial assessment** — **Clinical and biochemical impression of severity:**
  BMI >30
  Pleural effusions on Chest X-ray
  Glasgow score

- **24hrs post-admission** — **Clinical impression of severity**
  Glasgow score 3 or more
  Persistent organ failure
  CRP >150 mg/L

- **48hrs post-admission** — **Clinical impression of severity**
  Glasgow score 3 or more
  CRP >150 mg/L
  Persisting organ failure for 48hr
  Multiple or progressive organ failure

- **Management based on severity**
  - **Mild** (Glasgow score <3)
    - As per general management.
  - **Predicted severe** (stable patient)
    - As per general management.
    - Close monitoring – serial CRP.
    - Inform Critical Care Outreach Team (**bleep 2837**).
  - **Severe/Organ Dysfunction/Organ Failure**
    - ITU or high-dependency care.

7. Determination of aetiology (also see Appendix 4)

- **History:** previous gallstones, previous gallstone pancreatitis, excess alcohol intake, hypercalcaemia, previous alcohol-related pancreatitis, specific viral illness/prodromal symptoms, family history or drug intake.

- **First-line investigations (all patients):**

    - Biochemistry – LFTs, Serum calcium and fasting lipids
    - Abdominal ultrasound scan (? gallstones, dilated common bile duct).

- **Second-line investigations (if not clearly gallstone or alcohol-related after initial history and investigations):**
    - Repeat abdominal USS
    - MRCP
    - CT
    - Fasting lipid profile
    - Plasma calcium
    - Mumps antibody titre
    - Autoimmune markers
    - Endoscopic USS
    - ERCP (for anatomy, cytology, crystals),
    - Sphincter of Oddi Manometry,
    - Pancreatic Function Tests (for chronic pancreatitis)

8. Definitive management according to aetiology

- **Gallstone Pancreatitis**

    - **Laparoscopic cholecystectomy** for prevention of further episodes:

        - Laparoscopic cholecystectomy should be performed in the same admission or soon (ideally within 2 weeks of discharge) in uncomplicated gallstone-related pancreatitis, unless there are significant contraindications to surgery.

        - In patients unfit for surgery, endoscopic sphincterotomy alone may be adequate treatment.

        - Ensure duct is clear of stones prior to cholecystectomy (LFTs/imaging)

    - **ERCP** is indicated in:

        1. Cholangitis, jaundice or dilated CBD (common bile duct)

            - Best carried out within 72 hours of onset.
            - If performed, ERCP should be accompanied with sphincterotomy *whether or not gallstones are found*
            - Consider sphincterotomy or duct drainage by stenting to relieve obstruction in presence of cholangitis.

        2. Consider in **Severe** or **predicted severe** acute pancreatitis due to gallstones.

- **Alcohol-related pancreatitis**

    - Prevention of acute alcohol withdrawal:
        - Reducing-dose regimen chlordiazepoxide
        - IV Pabrinex
        - Thiamine supplementation

    - Counseling regarding alcohol misuse and referral to Alcohol Liaison Nurse Specialist

	**Please see Whittington Health Guideline:** Alcohol withdrawal and intoxication

9. Management of complications and the role of CT

- **The role of CT in the management of pancreatitis**

    - CT scanning is indicated in persistent organ failure, signs of sepsis or deterioration of clinical status 6-10 days after admission. It is *occasionally* used when the diagnosis is in doubt.

    - CT reports should ideally include information such as the site and extent of necrosis as well as a severity index (see Appendix B).

- All patients with persistent symptoms (7-14 days after onset of pancreatitis) and >30% pancreatic necrosis, or lesser areas of necrosis and clinical suspicion of sepsis should undergo image guided fine needle aspiration (FNA) of necrotic tissue for culture

- Pancreatic debridement is indicated in presence of infected necrosis – this can be performed laparoscopically or at open operation. Consider transfer to specialist centre.

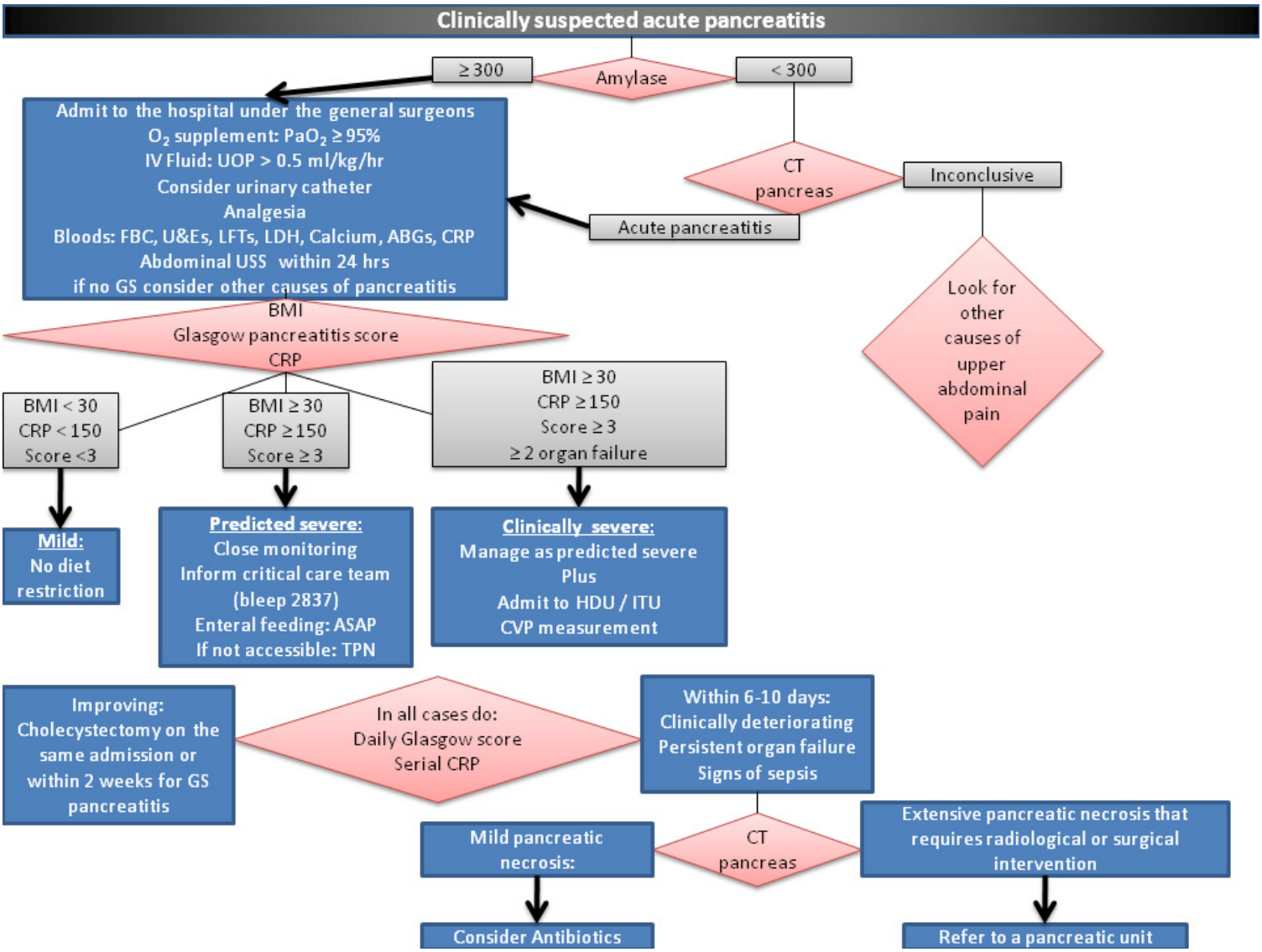
- Consider radiologically-guided drainage in pancreatic abscesses.

- **Pancreatic pseudocysts** less than 6 cm in size and present for less than 6 weeks can be observed and will usually resolve spontaneously. Larger pseudocysts will require drainage, especially where they cause symptoms. They can be drained percutaneously but this risks forming a pancreatic fistula and so internal drainage into the stomach or bowel is preferred. This can be achieved endoscopically or at laparoscopic/ open operation. These cases should be discussed at an MDT.

- **Pancreatic fistulas** can prove problematic. Assessment should include examination of the pancreatic duct (either at ERCP or MRCP) to look for strictures. Strictures should be stented. The production of pancreatic juice can be reduced by the use of octreotide. If conservative measures fail then pancreatic resection or pancreatic duct drainage may be required.

- See also the **Atlanta criteria** for complications of acute pancreatitis.

10. Appendix 1 – Acute Pancreatitis Management Algorithm



11. Appendix 2 – Common physical signs and X-ray findings in acute pancreatitis

Common Physical Signs:

Signs on physical examination vary with the severity of the disease:

- Fever (76%).
- Tachycardia (65%).
- Abdominal tenderness, upper abdominal muscular guarding (68%), abdominal distension (65%), hypoactive bowel sounds.
- Jaundice (28%).
- Dyspnoea (10%)
    - This may be due to diaphragmatic irritation, pleural effusion, or acute respiratory distress syndrome (ARDS).

Findings which may indicate **severe** pancreatitis:

- Haemodynamic instability (10%).
- Haematemesis or melaena (5%).
- Pallor, sweatiness, lethargy, drowsiness.

Uncommon physical findings associated with **severe necrotising pancreatitis:**

- ***Cullen's sign:*** peri-umbilical mottled blue discolouration resulting from haemoperitoneum.
- ***Grey-Turner's sign:*** red-brown discolouration along the flanks resulting from retroperitoneal blood dissecting along tissue planes.
- ***Erythematous skin nodules:*** may result from focal subcutaneous fat necrosis.

Abdominal X-Ray findings:

- Are uncommon and of **limited value**.
- ***Sentinel loop sign*** – (Single loop of bowel gas in epigastrium) Indicative of peri-pancreatic inflammation and small bowel ileus. **Obliteration of Psoas shadow**. – indicating retroperitoneal oedema.
- Presence of calcifications in chronic pancreatitis.

12. Appendix 3 – CT scan severity grading – Balthazar score

CT grade	Score
A – Normal pancreas	0
B – Oedematous pancreatitis	1
C – [B] plus mild extra-pancreatic changes	2
D – Severe extra-pancreatic changes (inc. one fluid collection)	3
E – Multiple or extensive extra-pancreatic collections	4

Necrosis	
None	0
<33%	2
33-50%	4
>50%	6

Score = CT grade + Necrosis score

Score	Complications
0-3	8%
4-6	35%
7-10	92%

Score	Deaths
0-3	3%
4-6	6%
7-10	17%

13. Appendix 4 – Aetiologies of acute pancreatitis

- **Gallstone disease (45%)**
- **Alcohol excess (35%)**
- **Trauma (1- 5%)**
  - Surgical
  - Blunt
  - Penetrating
  - Post-ERCP
  - Aortography
- **Drugs (1-2%)**

Azathioprine	Tetracyclines	Sulfonamides	Methyldopa
Oestrogens	Metronidazole	Furosemide	Thiazide Diuretics
5-Aminosalicylates	Corticosteroids	Octreotide	Nitrofurantoin
Cancer Chemotherapeutic Agents			

- **Metabolic Disorders (<1%)**
  - Hyperparathyroidism
  - Hyperlipidaemia
- **Infections (<1%)**
  - Mumps
  - *Coxsackie B* virus
  - *Mycoplasma pneumoniae*
  - Infectious Mononucleosis
  - Septicaemia
- **Congenital mechanical obstruction of pancreatic duct (<1%)**
  - Pancreas divisum
- **Peri-ampullary cancer (<1%)**
- **Hereditary pancreatitis (<1%)**
- **Vascular disease / Vasculitis (<1%)**

14. Appendix 5 – Common Complications of Acute Pancreatitis

Local

- Necrosis
- Pseudocyst (Fluid Collection)
- Abscess
- Ileus
- Fistula formation
- GI Haemorrhage
- Pseudoaneurysm

Systemic

- Cardiovascular collapse
- Respiratory failure +/- ARDS.
- Renal failure
- Coagulopathy/DIC
- Metabolic Derangements
    - Hypocalcaemia
    - Hyperglycaemia

15. Appendix 6 – Useful contacts

On Call General Surgical Registrar	Bleep 3376	
Duty Medical Registrar (DMR)	Bleep 3300	
Gastroenterology Registrar	Bleep 3113	Bleep 3036
On Call Radiology Registrar	Via Switchboard	
Gastroenterology Nurse Specialist	Ext 5692	Bleep 2893
Alcohol Liaison Nurse	Ext 5487	Bleep 2634
Endoscopy Unit Co-ordinator	Ext 3675	
Royal Free Hospital	Hepatopancreaticobiliary Surgical Registrar on-call Bleep 2929	

16. Appendix 7 – Abbreviations used

Abbreviations used:

- ABG = Arterial Blood Gas
- AST = Aspartate Transaminase
- BMI = Body Mass Index
- CBD = Common Bile Duct
- CRP = C Reactive Protein
- CT = Computed Tomography
- CVP= Central Venous Pressure
- ECG = Electro Cardio Graph
- ERCP = Endoscopic Retrograde Cholangio Pancreatography
- FBC = Full Blood Count
- FNA = Fine Needle Aspiration
- g = gram
- g/dL = gram / decilitre
- GS = Gallbladder Stones
- HDU/ITU = High Dependency Unit / Intensive Therapy Unit
- IU/L = International Unit / Litre
- IV = Intra Venous
- LDH = Lactate Dehydrogenase
- LFTs = Liver Function Tests
- mg/dL = milligram / decilitre
- ml/kg/hr = millilitre / kilogram / hour
- mm Hg = millimetre mercury
- mmol/L = millimol / Litre
- MRCP = Magnetic Resonance Cholangio Pancreatography
- NG / NJ = Naso Gastric / Naso Jejunal
- NHS = National Health Service
- NSAID = Non Steroidal Anti Inflammatory Drug
- PaO_2 = Partial Oxygen tension
- SaO_2 = Oxygen saturation
- TPN = Total Parenteral Nutrition
- U+Es = Urea & Electrolytes
- UK = United Kingdom
- USS = Ultra Sound Scan
- WCC = White Cell Count

17. References

1. Johnson CD, (2005), UK guidelines for the management of acute pancreatitis, *GUT*, 54 (Suppl. III): iii1-iii9.

18. Acknowledgement

We acknowledge Dr Reshid Berber, Dr Rajesh Nair and Mr Antony Pittathankal for their work on a previous draft of these guidelines.

Appendix A

Plan for Dissemination and implementation plan of new Procedural Documents

To be completed and attached to any document which guides practice when submitted to the appropriate committee for consideration and approval.

Acknowledgement: University Hospitals of Leicester NHS Trust

Title of document:	Acute Pancreatitis: Diagnosis and Management		
Date finalised:	20.12.2010, re-issues Feb 2015	**Dissemination lead: Print name and contact details**	Mr Dugal Heath Mr O Khan (v2)
Previous document already being used?	No		
If yes, in what format and where?			
Proposed action to retrieve out-of-date copies of the document:			
To be disseminated to:	**How will it be disseminated/implemented, who will do it and when?**	**Paper or Electronic**	**Comments**
Trust wide	**Via intranet**	**E**	
Whittington Hospital	Departmental meeting	Both	
Is a training programme required?	No		
Who is responsible for the training programme?			

Appendix B

Equality Impact Assessment Tool

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

Impact (= relevance) 1 Low 2 Medium **3** High	Evidence for impact assessment (monitoring, statistics, consultation, research, etc	Evidential gaps (what info do you need but don't have)	Action to take to fill evidential gap	Other issues
Race	1	1	N/A	
Disability	1	1	N/A	
Gender	1	1	N/A	
Age	1	1	N/A	
Sexual Orientation	1	1	N/A	
Religion and belief	1	1	N/A	

Once the initial screening has been completed, a full assessment is only required if:

- **The impact is potentially discriminatory under equality or anti-discrimination legislation**
- **Any of the key equality groups are identified as being potentially disadvantaged or negatively impacted by the policy or service**
- **The impact is assessed to be of high significance.**

If you have identified a potential discriminatory impact of this procedural document, please refer it to relevant Head of Department, together with any suggestions as to the action required to avoid/reduce this impact.