

NATIONAL CLINICAL GUIDELINES

ASSESSMENT & MANAGEMENT OF ACUTE CHOLECYSTITIS

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المبادئ الإرشادية السريرية لدولة قطر
NATIONAL CLINICAL GUIDELINES FOR QATAR



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Abbreviations

The abbreviations used in this guideline are as follows:

APACHE II	Acute Physiology and Chronic Health Evaluation scoring system
ASA-PS	American Society of Anesthesiologists - Physical Status Classification
CBC	Complete blood count
CCI	Charlson Comorbidity Index
CT	Computed tomography scan
ERCP	Endoscopic retrograde cholangio-pancreatography
MRCP	Magnetic resonance cholangio-pancreatography
NSAIDs	Non-steroidal anti-inflammatory drugs
PT-INR	Prothrombin time - International Normalised Ratio
PTGD	Percutaneous transhepatic gallbladder drainage
Tc-HIDA	Technetium Hepatobiliary Iminodiacetic Acid scan

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1 Information About This Guideline

1.1 Objective and Purpose of the Guideline

The purpose of this guideline is to define the appropriate diagnosis and management of acute cholecystitis in adults. The objective is to reduce inappropriate prescribing and referral of patients presenting to any healthcare provider organisation in Qatar. It is intended that the guideline will be used primarily by physicians in both primary/generalist and secondary/specialist care settings.

1.2 Scope of the Guideline

Aspects of care covered within this guideline include:

- The assessment and management of acute cholecystitis.
- The management of common complications of acute cholecystitis:
 - Acute cholangitis.
 - Biliary pancreatitis.

Aspects of care not covered within this guideline:

- Gallstones in children.
- Non-biliary pancreatitis.
- Common bile duct stones.

1.3 Editorial Approach

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this guideline, has involved the following critical steps:

- Extensive literature search for well-reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising healthcare professionals, subject matter experts and patient representatives, from across Qatar.
- Independent review of the guideline by the National Clinical Guidelines & Pathways Committee, appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Whilst the MOPH has sponsored the development of the guideline, the MOPH has not influenced the specific recommendations made within it.

1.4 Sources of Evidence

The professional literature has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a member of the Editorial Team and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals.
3. Address an aspect of specific importance to the guideline in question.

Further information about the literature search and appraisal process is included in *Appendix A*.

1.5 Evidence Grading and Recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
 - Meta-analyses.
 - Randomised controlled trials with meta-analysis.
 - Randomised controlled trials.
 - Systematic reviews.
- **Level 2 (L2):**
 - Observational studies, examples include:
 - Cohort studies with statistical adjustment for potential confounders.
 - Cohort studies without adjustment.
 - Case series with historical or literature controls.
 - Uncontrolled case series.
 - Statements in published articles or textbooks.
- **Level 3 (L3):**
 - Expert opinion.
 - Unpublished data, examples include:
 - Large database analyses.
 - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A (RGA):** Evidence demonstrates at least moderate certainty of a net benefit from the recommendation.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C (RGC):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.

1.6 Guideline Development Group Members

The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the National Clinical Guidelines & Pathways Committee. The GDG members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

Guideline Development Group members		
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1.7 National Clinical Guidelines & Pathways Committee Members

The following table lists members of the National Clinical Guidelines & Pathways Committee (NCGPC), appointed by the MOPH. The NCGPC members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

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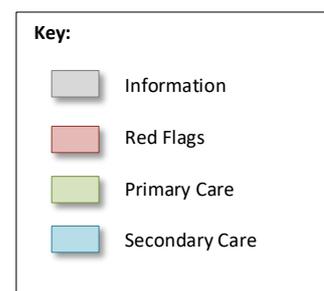
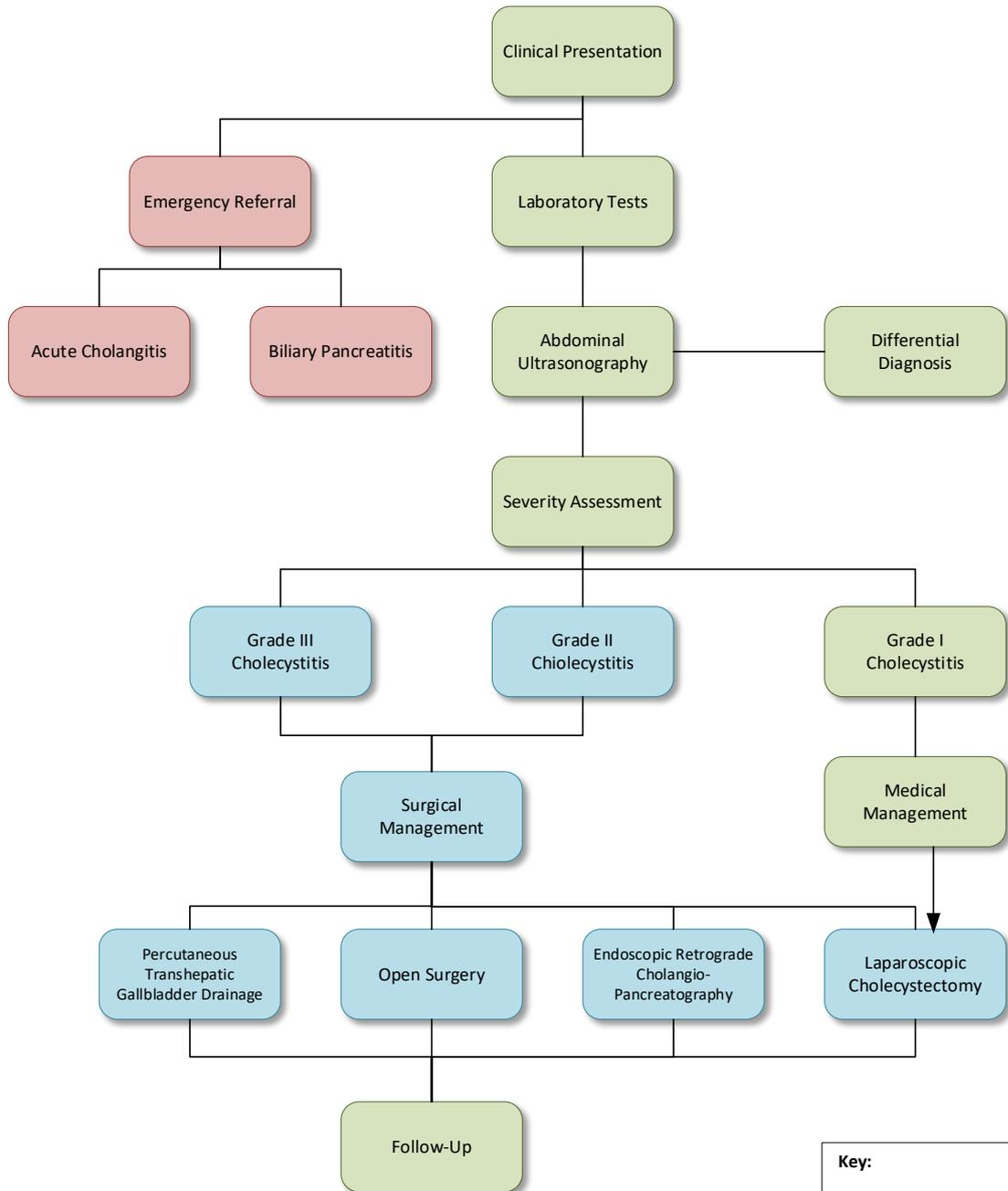
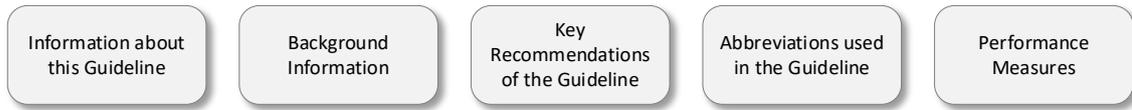
1.8 Responsibilities of Healthcare Professionals

This guideline has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.

The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or caregivers and should consider the individual risks and benefits of any intervention that is contemplated in the patient's care.

2 Cholecystitis Assessment and Management Pathway

Click on a box below to see the relevant page of the Pathway.



3 Key Recommendations of the Guideline

The key recommendations of this guideline are:

Diagnosis (see Section 6):

- Ultrasound sonography should be performed on every patient presenting with suspected acute cholecystitis ^{1,2} [**L2, RGA**].
- A diagnosis of acute cholecystitis is made when the following are present at the same time [**R-GDG**]:
 - Thickening of the gallbladder wall by $\geq 5\text{mm}$.
 - Ultrasonographic Murphy's sign – inhibited inspiration when the probe is pushed against the right upper quadrant.
 - Pericholecystic fluid.
- An assessment of severity should be made in all patients with acute cholecystitis ¹⁻⁴. Use the severity assessment system detailed in Section 8.

Referral Criteria (see Section 9):

- Patients with the following presentations should be referred to the emergency department [**R-GDG**]:
 - Grade II or III cholecystitis.
 - Acute cholecystitis associated with jaundice.
 - Suspected acute cholangitis, biliary pancreatitis or other complication.
- Patients with the following presentations should be referred to be the general surgery outpatient clinic [**R-GDG**]:
 - Biliary colic.
 - Grade I cholecystitis not responding to medical management.

Medical Management (see Section 10):

- Appropriate intravenous fluid administration ³⁻⁶.
- Analgesia:
 - NSAIDs such as (intramuscular) diclofenac prevent progression in acute cholecystitis and reduce pain ^{3,4} [**L2**].
- Antimicrobial agents ³⁻⁵.

Surgical Management options (see Section 11):

- Laparoscopic cholecystectomy:
 - Is recommended in Grade I (mild) cholecystitis ^{3,4,7,8}.
 - Surgeons should convert to open cholecystectomy if experiencing difficulty with laparoscopic cholecystectomy, in order to minimise the risk of major complications ⁷ [**L2, RGA**].
- Open surgery ^{7,8}.
- Endoscopic retrograde cholangio-pancreatography (ERCP) ^{3,4,9,10}.
- Percutaneous transhepatic gallbladder drainage (PTGD):
 - Is recommended in ^{3,4,7,11,12}:
 - Patients with Grade II (moderate) cholecystitis, who do not respond to conservative treatment.
 - Patients with Grade III (severe) cholecystitis.

4 Background Information

4.1 Definitions

Acute cholecystitis is defined as:

- An acute inflammation of the gallbladder which is often, *but not always*, attributable to gallstones¹³.

Acute acalicular cholecystitis is defined as:

- Acute inflammation of the gallbladder in the absence of evidence of gallstones or obstruction of the cystic duct ^{14,15}.

Acute calcular cholecystitis is defined as ¹³⁻¹⁵:

- Acute inflammation of the gallbladder in the presence of gallstones.
- The process typically occurs when gallstones obstruct the cystic duct leading to increased pressure in the gallbladder.
- There are two factors that determine the progression to acute calcular cholecystitis:
 - Degree of obstruction i.e. partial or complete.
 - Degree of duration i.e. short or long.
- If the obstruction is partial and of short duration the patient experiences *biliary colic*. If the obstruction is complete and of long duration, the patient develops *acute cholecystitis*.

Acute cholangitis is defined as:

- Acute inflammation of the common bile duct or biliary tree ¹⁶.

Biliary pancreatitis is defined as:

- Acute inflammation of the pancreas resulting from obstruction of the pancreatic duct by gallstones¹⁷.

4.2 Causes of Acute Cholecystitis

The most common cause of cholecystitis is gallstones in 90-95% of cases ^{1,2}. Other less common causes of acalicular cholecystitis include the following. These causes are also risk factors for the development of calcular cholecystitis ^{13,18}:

- Dehydration.
- Total parenteral nutrition.
- Cardiovascular disease.
- Diabetes mellitus.
- Sepsis.
- Ischaemia, motility disorders or direct chemical injury.
- Infections by micro-organism, protozoa and parasites.
- Collagen disease.
- Allergic reaction.

4.3 Complications

Complications of acute cholecystitis include ^{13,19}:

- Acute cholangitis (see *Section 12.1*).

- Biliary pancreatitis (see *Section 12.2*).
- Mirizzi's syndrome – extrinsic obstruction of the common hepatic duct by impacted gallstones in the gallbladder or cystic duct.
- Biliary peritonitis.
- Pericholecystic abscess.
- Biliary fistula.
- Perforation of gallbladder.
- Gangrenous gallbladder.
- Sepsis.

4.4 Risk Factors

Risk factors for acute cholecystitis include ^{1,2,13}:

- Female gender.
- Age over 40 years.
- Obesity, including:
 - Obesity treatments.
 - Bariatric surgery.
- Hormonal therapies:
 - Combined oral contraceptive pill.
 - Hormone replacement therapy.
- Repeated pregnancy.
- Haemolytic anaemias.

5 Clinical Presentation

Features suggestive of acute cholecystitis include ^{1-4,9,20,21}:

- Sudden onset of severe abdominal pain.
- Epigastric or right upper quadrant pain, which radiates to the right shoulder or back.
- Pain is colicky in nature and lasts from several minutes to hours often occurring at night.
- Nausea.
- Vomiting.
- Pyrexia.
- Prior history of:
 - Biliary disease.
 - Biliary procedure.
 - Placement of biliary stent.

Examine the abdomen for ^{1,2,13,19,21}:

- Tenderness in the right upper quadrant.
- Inspiration which is inhibited by pain on palpation of the right upper quadrant (Murphy's sign):
 - Murphy's sign has a sensitivity of 50-65% and a specificity of 79-96% for the diagnosis of acute cholecystitis.
 - It is not possible to exclude a diagnosis of acute cholecystitis in the absence of Murphy's sign, due to the low sensitivity.
- A palpable gallbladder.
- Jaundice may indicate Mirizzi's syndrome.

6 Investigations

There are no specific laboratory blood tests for acute cholecystitis^{1-4,9}. The following investigations should be considered¹⁻⁴:

- CBC for leucocytosis.
- Liver function tests.
- C-reactive protein.
- Urea and creatinine.
- Electrolytes.
- Arterial blood gas analysis, can be considered for severe cholecystitis.
- PT-INR, if indicated.
- Serum amylase and lipase.

Ultrasound sonography should be performed on every patient presenting with suspected acute cholecystitis^{1,2} [**L2, RGA**].

A diagnosis of acute cholecystitis is made when the following are present at the same time [**R-GDG**]:

- Thickening of the gallbladder wall by ≥ 5 mm.
- Ultrasonographic Murphy's sign – inhibited inspiration when the probe is pushed against the right upper quadrant.
- Pericholecystic fluid.

Other findings on ultrasound may include^{1,2}:

- The presence, position and size of gallstones.
- Gallbladder enlargement.
- Size of the common bile duct.
- Debris echo.
- Gas imaging.

Other imaging modalities that may be used to definitively diagnose cholecystitis include^{1,2,9}:

- MRCP.
- Tc-HIDA scan.
- CT scanning:
 - Has added risk of radiation and results are inferior to other tests such as ultrasound and MRCP.

Consider additional investigations to exclude other differential diagnoses (see below).

7 Differential Diagnosis of Acute Cholecystitis

Differential diagnosis of acute cholecystitis includes the following^{3,4,13}:

Gastrointestinal:

- Acute pancreatitis.
- Acute cholangitis.
- Peptic ulcer disease.
- Acute hepatitis.
- Subhepatic appendicitis.
- Diverticulitis at the hepatic flexure.
- Crohn's disease.

- Mesenteric ischaemia.
- Gallbladder malignancy.
- Hepatic abscess.
- Perforated colonic carcinoma.

Urological:

- Ureteric/renal calculi.
- Acute pyelonephritis.

Gynaecological:

- Ectopic pregnancy.
- Fitz-Hugh Curtis syndrome – adhesions between liver and abdominal wall secondary to chronic chlamydia infection.

Other:

- Acute coronary syndrome.
- Right lower lobar pneumonia with pleurisy of the right lung.
- Herpes zoster.

8 Severity Assessment

An assessment of severity should be made in all patients with acute cholecystitis¹⁻⁴. Severity can be categorised as follows¹⁻⁴:

- Grade I (mild) cholecystitis:
 - Absence of organ failure and mild inflammatory changes in the gallbladder.
 - Elevated white cell count usually $>11 \times 10^9/L$.
- Grade II (moderate) cholecystitis:
 - Absence of organ dysfunction but with a risk of accompanying serious local inflammation.
 - Is associated with any of the following conditions:
 - Elevated white blood cell count - $>18 \times 10^9/L$.
 - Palpable tender mass in the right upper quadrant.
 - Persistence of symptoms for >72 hours.
 - Marked local gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis.
- Grade III (fulminant or life-threatening) cholecystitis:
 - Dysfunction in any one of the following organs/systems:
 - Cardiovascular dysfunction.
 - Decreased level of consciousness.
 - Respiratory dysfunction.
 - Renal failure.
 - Hepatic dysfunction.
 - Coagulation disorder.

9 Referral Criteria

Patients with the following presentations should be referred to the emergency department [R-GDG]:

- Grade II or III cholecystitis.
- Acute cholecystitis associated with jaundice.
- Suspected acute cholangitis, biliary pancreatitis or other complication.

Patients with the following presentations should be referred to the general surgery outpatient clinic [R-GDG]:

- Biliary colic.
- Grade I cholecystitis not responding to medical management.

10 Medical Management

Medical management of acute cholecystitis includes ³⁻⁶:

- Appropriate intravenous fluid administration.
- Analgesia:
 - NSAIDs such as (intramuscular) diclofenac prevent progression in acute cholecystitis and reduce pain ^{3,4} [L2].
 - NSAIDs are effective in impacted gallstone disease for prevention of acute cholecystitis ^{3,4} [L1, RGA].
- Antimicrobial agents ³⁻⁶:
 - In patients with acute cholecystitis (confirmed by a raised white cell count), start empirical antimicrobial treatment according to local antibiogram and the advice of a microbiologist.
- Consideration of indications for surgery and emergency drainage.

11 Surgical Management

The following options are available. Which option is selected will depend upon the severity of the presentation and other patient factors [R-GDG].

11.1 Laparoscopic Cholecystectomy

Laparoscopic cholecystectomy ^{3,4,7,8}:

- Is recommended in Grade I (mild) cholecystitis.
- Must be undertaken by laparoscopic surgeons with suitable experience.
- Surgeons should convert to open cholecystectomy if experiencing difficulty with laparoscopic cholecystectomy, in order to minimise the risk of major complications ⁷ [L2, RGA].

Early laparoscopic cholecystectomy:

- Should be performed within 1 week of diagnosis ⁹ [L1, RGA]:
- Particularly when less than 72 hours have passed since the onset of symptoms ^{7,8} [L1, RGA].
- Associated with decreased hospital stay, a lower chance of readmission and does not increase complications compared to delayed laparoscopic cholecystectomy ^{9,22} [L1, RGA].
- Some cases of Grade III acute cholecystitis can benefit from early laparoscopic cholecystectomy, providing the procedure is performed by specialised and experienced surgeons at advanced centres.

- These cases include patients with ⁴ [**L1, RGA**]:
 - Favourable organ system failure.
 - Charlson Comorbidity Index (CCI) ≤ 3 .
 - American Society of Anesthesiologists Physical Status Classification (ASA-PS) ≤ 2 .
- Grade I patients and Grade II patients with CCI ≤ 5 and ASA-PS ≤ 2 can benefit from early laparoscopic cholecystectomy ⁴ [**L1, RGA**].
- If early surgery cannot be performed, an early biliary drainage is recommended, followed by a delayed laparoscopic cholecystectomy, providing the improvement of the patient's condition ⁴ [**L1, RGA**].

Associated complications following laparoscopic cholecystectomy include ^{7,8}:

- Bile duct injury.
- Hepatic injury (vascular or traumatic).
- Bowel injury.
- Wound infection.
- Urinary tract infection.

11.2 Open Surgery

Open surgery ^{7,8}:

- Laparoscopic cholecystectomy is preferable to open surgery ^{7,8} [**L1, RGA**].
- Open surgery is indicated in the following [**R-GDG**]:
 - Malignancy is suspected or confirmed.
 - Portal hypertension.
 - Stoma with ascites.
 - Cardiorespiratory impairment.
 - History of multiple upper abdominal surgeries.
 - History of coagulation disorder.
 - Difficulty during laparoscopic cholecystectomy.

11.3 Endoscopic Retrograde Cholangio-Pancreatography

Endoscopic retrograde cholangio-pancreatography (ERCP):

- Is indicated in the following cases ^{3,4,9,10}:
 - Suspicion of a stone in the common bile duct:
 - Symptoms or signs of obstructive jaundice.
 - Symptoms or signs of acute pancreatitis.
 - Confirmed stone on ultrasound.
 - Dilated common bile duct on ultrasound.
 - Elevation of bilirubin and liver enzymes, especially alkaline phosphatase.
- Can be done pre-, intra- or post-operatively.

11.4 Percutaneous Transhepatic Gallbladder Drainage

Percutaneous transhepatic gallbladder drainage (PTGD) ^{3,4,7,11,12}:

- Is a procedure in which the gallbladder is punctured via a transhepatic approach under ultrasound guidance in order to drain infected bile.
- Is an alternative to early/urgent cholecystectomy in high risk/surgically unfit patients.
- Is recommended in:
 - Patients with Grade II (moderate) cholecystitis who do not respond to conservative treatment.
 - Patients with Grade III (severe) cholecystitis.

The timing of cholecystectomy following gallbladder drainage remains controversial, and it may be guided by the condition of the patient post-drainage ^{11,12}.

11.5 Follow-Up

Patients should be provided with an information leaflet and advised ⁹:

- They do not need to alter their diet after gallstones or gallbladder removal.
- To seek further advice if eating or drinking triggers existing symptoms or causes new symptoms after gallstones or gallbladder have been removed.

12 Management of Complications

12.1 Acute Cholangitis

Diagnosis:

- Acute cholangitis is classically indicated by Charcot's triad of ^{3,4,13}:
 - Abdominal pain.
 - Obstructive jaundice.
 - Fever.
- Rigors and a positive history of gallstones or stent placement, strongly support the diagnosis ^{3,4}.

Investigations:

- Blood tests for acute cholangitis include ^{3,4}:
 - CBC (for confirmation of an elevated white cell count and the platelet count).
 - C-reactive protein.
 - Liver function tests.
 - Urea and creatinine.
 - PT-INR.
 - Albumin level.
 - Arterial blood gas analysis.
 - Blood cultures.

Imaging studies:

- All patients should undergo ultrasound imaging to assess for ^{3,4}:
 - Presence of biliary obstruction; and
 - The level and cause of the obstruction, if present.
- Consider performing an abdominal CT scan for further assessment of the biliary obstruction ^{3,4}.

Management:

- Initial management comprises of the following ^{3,4}:
 - IV fluid resuscitation.
 - IV antibiotics – according to local protocol and the advice of microbiology.
 - ERCP to drain the common bile duct:
 - Endoscopic sphincterotomy should be performed at ERCP.
 - Early laparoscopic cholecystectomy (i.e. instead of ERCP) may be considered in patients with mild acute cholangitis.

- Further management:
 - Following initial management, all patients with confirmed gallstones, should undergo:
 - A laparoscopic or open cholecystectomy at 4-6 weeks after ERCP [R-GDG].
 - 4-6 weeks is necessary to allow the inflammation to subside.
 - As indicated by decrease in the white cell count, bilirubin, and CRP; and resolution of symptoms [R-GDG].

12.2 Biliary Pancreatitis

Diagnosis:

The diagnosis of acute pancreatitis is made if at least two of the following are present ²³ [L2, RGA]:

- Abdominal pain consistent with acute pancreatitis i.e.:
 - Upper abdominal pain radiating to the back which is classically relieved on leaning forwards.
- Serum amylase ≥ 3 times the upper limit of normal.
- Characteristic findings on abdominal imaging.
 - All patients with acute pancreatitis should undergo abdominal ultrasound ²³ [L2, RGA].

Biliary pancreatitis is typically caused by a stone in the pancreatic duct or at the distal end of the common bile duct, which is causing obstruction to pancreatic outflow ¹⁷.

Initial assessment and management:

- Assess haemodynamic status upon presentation and resuscitate as needed ²³ [L2, RGA].
- Risk stratify patients according to their risk of mortality using the APACHE II scoring system [R-GDG].
- Consider early intensive care admission for patients with organ failure ²³.
- Ensure aggressive rehydration with frequent reassessment of fluid status within the first 6 hours of admission and for up to 48 hours post admission ²³ [L2, RGA].
- Routine use of antibiotics is not indicated, unless concomitant acute cholangitis or signs of other extra-pancreatic infection are present ²³ [L1].

Nutrition:

- Enteral nutrition is preferable to parenteral nutrition to prevent infectious complications ²³.

ERCP:

- Patients with acute pancreatitis and evidence of biliary obstruction from gallstones or concomitant acute cholangitis should undergo urgent ERCP within 24 hours of presentation ²³ [L2, RGA].

Further management:

- In patients with confirmed biliary pancreatitis a laparoscopic cholecystectomy should be performed prior to discharge²³ [**L2, RGA**].
- In patients with necrotising biliary acute pancreatitis laparoscopic cholecystectomy should be performed 4-6 weeks after acute inflammation subsides²³ [**L2, RGA**].

13 Key Considerations for Patient Preferences

Patient preferences refer to patient perspectives, beliefs, expectations, and goals for health and life, and to the steps employed by individuals in assessing the potential benefits, harms, costs, and limitations of the management options in relation to one another. Patients may have preferences when it comes to defining their problems, identifying the range of management options and selecting or ranking the outcomes used to compare these options.

It is important for healthcare professionals to develop an understanding of the patient as an individual and the unique way in which each person experiences a condition and its impact on their life.

The following recommendations are therefore made for physicians and other healthcare professionals regarding general principles of patient care in Qatar:

- **Respect Patients:** Treat patients with respect, kindness, dignity, courtesy and honesty. Ensure that the environment is conducive to discussion and that the patient's privacy is respected, particularly when discussing sensitive, personal issues. Ask the patient how they wish to be addressed and ensure that their choice is respected and used.
- **Maintain Confidentiality:** Respect the patient's right to confidentiality and avoid disclosing or sharing patients' information without their informed consent. In this context, students and anyone not directly involved in the delivery of care should first be introduced to the patient before starting consultations or meetings, and let the patient decide if they want them to stay.
- **Clarify Third-Party Involvement:** Clarify with the patient at the first point of contact whether and how they like their partner, family members or carers to be involved in key decisions about their care or management and review this regularly. If the patient agrees, share information with their partner, family members or carers.
- **Obtain Informed Consent:** Obtain and document informed consent from patients, in accordance with MOPH policy and guidance.
- **Encourage Shared Decision Making:** Ensure that patients are involved in decision making about their own care, or their dependent's care, and that factors that could impact the patient's participation in their own consultation and care including physical or learning disabilities, sight, speech or hearing impairments and problems with understanding, reading or speaking English are addressed.
- **Disclose Medical Errors:** Disclose errors when they occur and show empathy to patients.
- **Ensure Effective Communication:** Explore ways to improve communication including using pictures, symbols or involving an interpreter or family members. Avoid using medical jargon. Use words the patient will understand and confirm understanding by asking questions.
- **Ensure Continuity of Care:** Provide clear and timely sharing of patient information between healthcare professionals especially at the point of any transitions in care.

14 Performance Measures

A list of performance measures is given in the table below. Healthcare organisations are encouraged to monitor service performance using the indicator definitions below ²⁰.

Number	Numerator	Denominator
C01	Number of patients who had an emergency cholecystectomy.	Total number of admitted patients diagnosed with acute cholecystitis.
C02	Number of patients with bile duct injury after laparoscopic cholecystectomy.	Total number of patients undergoing laparoscopic cholecystectomy.
C03	Number of patients who are readmitted within 30 days of cholecystectomy.	Total number of patients who had a cholecystectomy.
C04	Number of patients who had a planned open cholecystectomy.	Total number of patients who had a cholecystectomy.

Table 14.1: Performance measures ²⁰.

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Appendix: Detailed Description of the Literature Search

A systematic search for existing literature on acute cholecystitis was performed in the period September 2nd to September 9th, 2019.

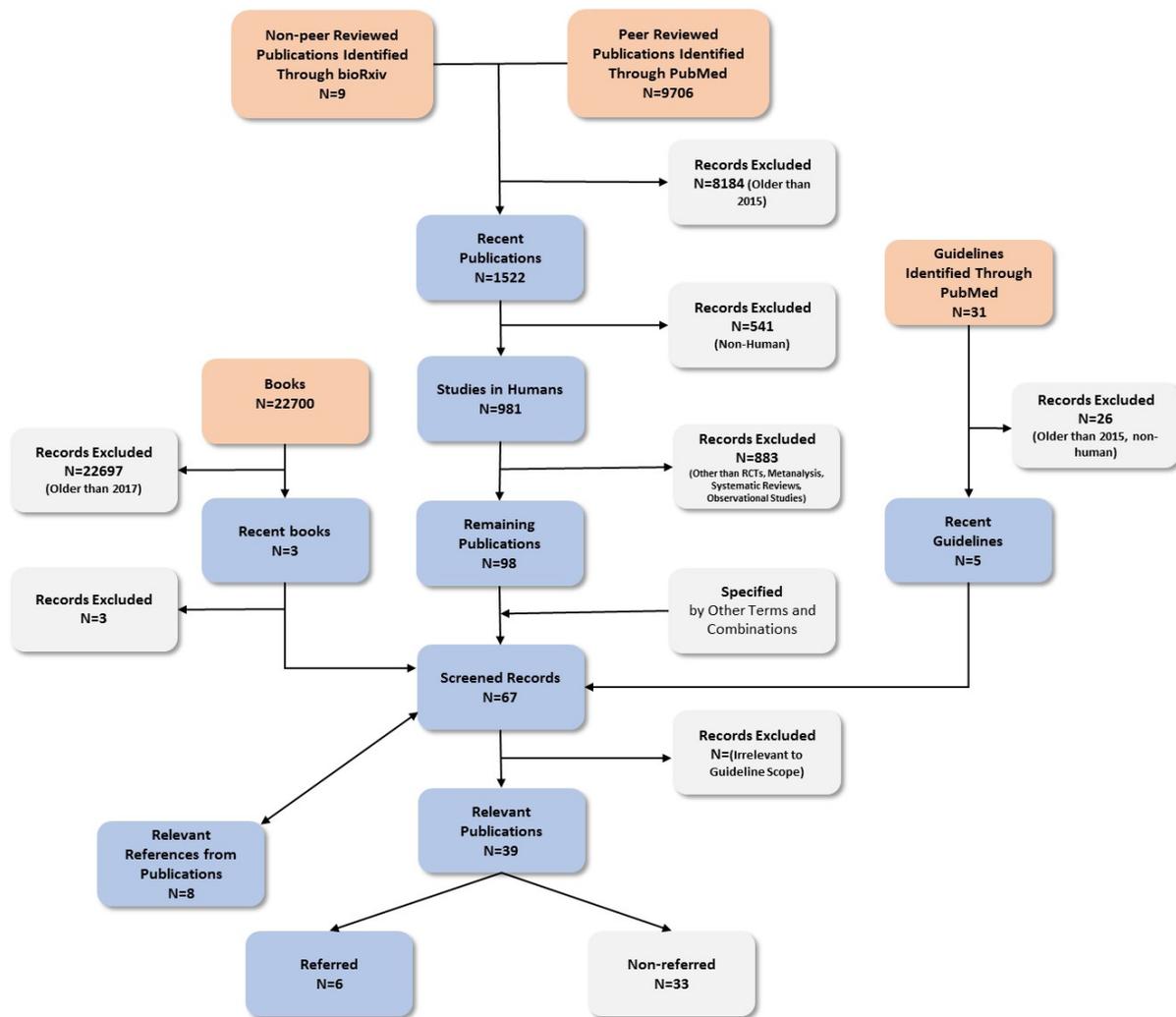
All existing references were evaluated and where necessary and applicable, the latest version of the specific manuscript was used to update the guideline and replace the older reference. The search for clinical practice guidelines on acute cholecystitis diagnosis and/or management was performed in the *PubMed* database and websites of relevant organisations and societies including the *American College of Gastroenterology*, and the *Royal College of Surgeons*. The present guideline is primarily based on UK NICE, and Tokyo guidelines and is supplemented with other relevant studies.

Peer-reviewed scientific publications were found in PubMed and via *Google Scholar* Internet search engine. Non-peer reviewed studies were identified in *bioRxiv*. Books were checked on *Amazon* and via *Google* and *Google Scholar* search engines.

The included publications were identified using the terms “acute cholecystitis” and specified with the following terms in combinations:

guideline, epidemiology, definition, prevalence, risk factors, screening, diagnosis, differential diagnosis, symptoms, management, treatment, referral, pharmacological therapy, antimicrobial, laparoscopic cholecystectomy, endoscopic retrograde cholecystectomy, surgery, drainage, follow-up, complications, cholangitis, biliary pancreatitis.

Figure A.1 on the next page demonstrates graphically the results of the search and application of exclusion criteria.



Key:

- Type of Publication
- Process
- Notes

Fig A.1: Literature search results and application of exclusion criteria.

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