STANDARD TREATMENT GUIDELINES

GENERAL SURGERY

DEPARTMENT OF HEALTH AND FAMILY WELFARE

GOVERNMENT OF KERALA

KERALA.HEALTH

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STANDARD TREATMENT GUIDELINES
for
GENERAL SURGERY

Foreword

At the outset, I appreciate the work done by the respective thematic teams and coordination done by the DME. The Standard Treatment Guidelines (STG) were prepared and published in 2021 in the thick of the Covid pandemic. On the last page of these volumes the road map was mentioned. The few points are mentioned here for the recall.

"The Department of Health has been taking a systematic approach of creating and enabling multiple initiatives with a focus on prevention along with improving health care services. Health care service delivery is one of the most important services and is always seen as a barometer to assess the Governance. While it is important to develop infrastructure, an essential prerequisite is to develop systems and processes to bring in standardization in management of patient care. .....The foundation is laid and we take up the challenge to work on the unfinished agenda."

It was mentioned in the road map to have institutional mechanism to ensure updation of Standard Treatment Guidelines. The next step that was suggested was to do analysis of Karunya Arogya Suraksha Padhati (KASP) and standard treatment guidelines to work on developing a Balance Score Card to give information regarding compliance from the Hospitals and to build a "feedback loop" to improve. These initiatives remained at concept level on the last page! But following detailed discussions with Dr Vishwanathan, Director Medical Education, some of the foundational things were prioritized and given an impetus to take it to finality. In this journey, many committed doctors from various Medical Colleges of respective specialties participated. The previous coordination team members and experts were also consulted and they also participated in discussions and these Standard Treatment Guidelines are prepared.

The standard treatment guidelines will be made available in the Kerala Health portal (health.kerala.gov.in). This will enable the resource book availability not only to people within the state but to all in the country and outside our borders as well. I am confident that it will be used by students and practicing doctors. We request inputs based on the research from the Specialists and Experts. The teams shall continue to update and make any required changes in the STG by doing periodic updates.

The most important thing we all need to internalize is to have a shared vision and

work as a team to reach to a state of 'excellence'. If we take a look at the preparation of the Directorate Medical Education Management Information System, documents of each Medical Colleges, it provides information regarding 'what we are, what we do and what we aspire to do', pandemic preparedness, AMR accreditation and many more such initiatives taken on scale, which are all outcomes of collective TEAM work. This has laid a foundation for involving all the stakeholders including undergraduate and postgraduate students. This should encourage the teams in Medical Colleges to believe in themselves and build future initiatives on such a sound platform.

I express my sincere thanks to Dr Vishwanathan for his patience and bearing with relentless follow ups! I also take this opportunity to thank each and every team and their members and everyone from Directorate Medical Education and Medical Colleges who supported these initiatives.

I would like to express my sincere gratitude to all those who have contributed to publish these Standard Treatment Guidelines.

I wish all the success to DME team to make Kerala MCH as a premier knowledge hub in Medical Science.

Dr Rajan Khobragade IAS

Additional Chief Secretary
Health & Family Welfare and
AYUSH Department
Govt of Kerala.

Message

Patient care today demands evidence-based, standardized, and contextually relevant clinical practice. In this regard, the publication of the **Second Edition of the Standard Treatment Guidelines** marks an important step forward in strengthening the quality, consistency, and accountability of healthcare delivery in Kerala.

The first edition laid a strong foundation for uniform clinical practice across specialties and super specialties. Since then, advances in medical knowledge, evolving treatment modalities, and the growing need for periodic updating have made it essential to revisit and refine these guidelines. The present edition reflects this commitment to continuous improvement and clinical excellence.

I am pleased to note that subject experts from various disciplines of Government Medical Colleges, private institutions and professional bodies have contributed as resource persons in the preparation of these guidelines. Their academic expertise, practical insight, and dedicated involvement have greatly enriched this edition. I deeply appreciate the sincere efforts of all the conveners, contributors, and coordinators whose collective commitment and teamwork made this publication possible.

These guidelines will serve as a valuable reference for clinicians, teachers, trainees, and healthcare institutions, helping to promote evidence-based decision-making and improve patient outcomes. I am confident that this edition will further support standardization of care and contribute to the advancement of medical education and clinical practice in the State.

I congratulate everyone involved in this commendable effort and commend this publication to all healthcare professionals.

Dr. K. V. Viswanathan
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Government of Kerala

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Contents

Section I
Safe Surgery Practice

Introduction

This Standard Practice Guidelines necessary for the safe and appropriate management of Standard Practice Guidelines for Safe Surgery practice. This guideline will act as a reference in the hospitals and primary care centres available to all medical staff involved in patient management in Operation Theatre and intervention areas.

Scope

This Standard Practice Guidelines applicable to all medical staff involved in management guidelines for Safe Surgery practice in Primary health centre / District Hospitals &Tertiary Care centres.

Background

Surgical care is an essential component of worldwide healthcare. While surgical procedures are intended to save lives, unsafe surgical care can cause substantial harm. About 234 million operations are performed globally each year. In industrialized countries major complications are reported to occur in 3 – 16% of inpatient surgical procedures, with permanent disability or death rates of approximately 0.4 – 0.8%.

Who set of ten core standards?

To assist operating teams to reduce the number of patient safety events in the surgical environment, a core set of standards have been identified by the WHO that can be applied universally within any healthcare setting to address issues including correct site surgery, haemorrhage risk, antibiotic prophylaxis, airway management and the risk of allergies. The delivery of safe effective surgical care is complex involving many interventions, processes and safety checks that should be consistently applied for every patient, to achieve the ten essential objectives:

1. **The team will operate on the correct patient at the correct site.**
2. **The team will use methods known to prevent harm from anaesthetic administration, while protecting the patient from pain.**
3. **The team will recognize and effectively prepare for life-threatening loss of airway or respiratory function.**
4. **The team will recognize and effectively prepare for risk of high blood loss.**
5. **The team will avoid inducing any allergic or adverse drug reaction known to be a significant risk for the patient.**
6. **The team will consistently use methods known to minimize risk of surgical site infection.**
7. **The team will prevent inadvertent retention of instruments or swabs in surgical wounds.**
8. **The team will secure and accurately identify all surgical specimens.**
9. **The team will effectively communicate and exchange critical patient information for the safe conduct of the operation.**
10. **Hospitals and public health systems will establish routine surveillance of surgical capacity, volume, and results.**

The surgical safety checklist

The WHO Surgical Safety Checklist is designed to reduce the number of errors and complications resulting from surgical procedures by improving team communication and by verifying and checking essential care interventions. It is modified as per the existing scenario in the state.

A. SIGN IN (Prior to induction of anaesthesia) (To be done by anaesthesiologist)

- **Has the patient confirmed his/her identity, site, procedure and consent?**
- **Is the surgical site marked?**
- **Is the anaesthesia machine and medication check complete?**

- **Does the patient have a known allergy?**
- **Does the patient have a difficult airway/aspiration risk?**
- **Does the patient have a risk of >500 ml blood loss (7ml/kg in children)?**

B. TIME OUT (Prior to start of surgical intervention e.g. skin incision) (To be done by the Surgeon)

- **Have all team members introduced themselves by name and role?**
- **Surgeon, AnaesthetistRegistered Practitioner verbally confirm patient, siteprocedure**
- **Anticipated critical events**
- **Surgeon reviews: What are the critical, expected or unexpected issues, anticipated blood loss, specific requirements and any special investigations?**
- **Anaesthesia team reviews: Are there any patient specific concerns?**
- **Nurse: Has the sterility of the instrumentation been confirmed (including indicator results) and are there any other equipment issues or concerns**
- **Has the Surgical Site Infection (SSI) bundle been undertaken?**
    - **Antibiotic prophylaxis within the last 60 minutes?**
    - **Maintenance of normothermia**
    - **Maintenance of glycaemic control**
- **Has Venous Thrombo Embolism (VTE) prophylaxis been undertaken? (based on risk stratification)**

C. SIGN OUT (Before any team member of the team leaves the operating theatre) (by Scrub nurse Surgeon and Anaesthesiologist)

- **Operating surgeon verbally confirms with the team the name of the procedure recorded**
- **Verify that the instruments, swabs and sharps counts are correct (or not applicable)**
- **Have the specimens been labelled? (including patient name)**
- **Have any equipment problems been identified?**
- **Surgeon, Anaesthetist and Registered Practitioner review the key concerns for recovery and management of this patient**

Requirements for specific specialties

In some instances, specific recommendations may be required to be developed for individual clinical specialities. Some examples of this are as follows:

- **Anaesthesia:**
- **Radiology:**
- **Ophthalmology:**
- **Spinal Surgery:**
- **Neurosurgery:**

Briefing and debriefing within theatre teams

It has been recognised through root cause analysis of adverse events that deficits in 'non-technical' skills such as poor communication, lack of situational awareness and ineffective teamwork were accountable to 60-80% of cases.[20]Although briefing and debriefing sessions are not integral to the checklist, it is considered good practice for these to take place at the beginning and end of a theatre list to remedy deficits in team performance.

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PATIENT DETAILS	
Name:	
Age:	
IP Number*:	
Procedure:	

If the IP Number is not immediately available, a temporary number should be used until it is obtained

SIGN IN (to be read out loud) → TIME OUT (to be read out loud) → SIGN OUT (to be read out loud)

Before induction on anaesthesia

Has the patient confirmed his/her identity, site, procedure and consent?
☐ Yes

Is the surgical site marked?
☐ Yes/not applicable

Is the anaesthesia machine and medication check complete?
☐ Yes

Does the patient have a:
Known allergy?
☐ No
☐ Yes

Difficult airway/aspiration risk?
☐ No
☐ Yes, **equipment/assistance available**
Risk of >500ml blood loss (7ml/kg in children)?
☐ No
☐ Yes, and adequate IV access/fluids planned

Name:	
Signature of Anaesthesiologist	

Before start of surgical intervention (for eg, skin incision)

Have all team members introduced themselves by name & role? Yes

Surgeon, Anaesthetist and Registered Practitioner verbally confirm:
☐ What is the patient's name?
☐ What procedure, site and position are planned?

Anticipated critical events
Surgeon:
☐ How much blood loss is anticipated?
☐ Are there are specific equipment requirements or special investigations?
☐ Are there any critical or unexpected steps you want the team to know about?

Anaesthetist:
☐ Are there any patient specific concerns?
☐ What is the patient's ASA grade?
☐ What monitoring equipment and other specific levels of support are required, for example blood?

Nurse:
☐ Has the sterility of the instrumentation been confirmed (including indicator results)?
☐ Are there equipment issues or concerns?

Has the surgical site infection (SSI) bundle been undertaken?
☐ Yes/not applicable
o Antibiotic prophylaxis within the last 60 minutes
o Patient warming
o Glycaemic control

Has VTE prophylaxis been undertaken?
☐ Yes/not applicable

Name:	
Signature of Surgeon	

Before any member of the team leaves the operating room

Registered Practitioner verbally confirms with the team:
☐ Has the name of the procedure been recorded?
☐ Has it been confirmed that instruments, swabs and sharp counts are complete (or not applicable)?
☐ Have the specimens been labelled (including patient name)?
☐ Have any equipment problems been identified that need to be addressed?

Surgeon, Anaesthetist and Registered Practitioner:
☐ What are the key concerns for recovery and management of this patient?

Name& Signature of Anaesthesiologist	
Name &Signature of Surgeon	
Name & Signature of Scrub Nurse	

(To be attached to all case sheets)

Section II
Acute Scrotum

Introduction

This Standard Practice Guideline is necessary for the safe and appropriate management of acute scrotum. This guideline will act as a reference in theTertiary care hospitals and primary care centres available to all medical staff involved in patient management.

The acute scrotum is defined as sudden pain of the scrotum or its contents, accompanied by local signs such as swelling, skin changes or systemic symptoms. In a boy presenting with an acute scrotum, it is imperative to rule out testicular torsion, which is a surgical emergency.

The acute scrotum should be rapidly assessed and assumed to be testicular torsion until proven otherwise.

Other causes of acute scrotal pain are trauma, infection, hydrocoele, inguinal hernia, idiopathic scrotal oedema and systemic disease (e.g. Henoch-Schoenlein purpura)[2-5]. Whilst there are features in the clinical assessment that may point to a specific diagnosis[6 7], suspicion of testicular torsion demands immediate surgical exploration[2 8-13]. The sequelae of non- operative management are well documented[14-18]and include testicular loss and possible impairments to fertility. Torsion has an annual incidence of approximately 3.8 per 100,000 males younger than 18 years[19 20]and accounts for approximately a third of acute paediatric scrotal disease[21].Even with apparently successful testicular salvage fertility can be impaired[18].

Scope

This Standard Practice Guideline is applicable to all medical staff involved in management guidelines for Acute Scrotum in Primary health centre / District Hospitals &Tertiary Care centres.

Diagnosis

Physical examination is unreliable in either diagnosing or ruling out torsion of the testis. If there is suspicion, an immediate referral to secondary care is mandatory.

Clinical Diagnosis

The classical clinical presentation of torsion is the sudden onset of severe, unilateral testicular pain, often accompanied by nausea and vomiting[6 7 21-23]. The pain may be

intermittent but in established torsion it is often continuous. There may be a history of previous attacks of pain representing intermittent torsion / detorsion. The physical examination should encompass the abdomen, inguinal region and scrotum. Clinical features depend upon the duration of the torsion and may include localised swelling/ induration of the surrounding skin with erythema and tenderness. The testis may be high riding, the cord thickened by the twists or the epididymis may be located anteriorly.

Diagnosis of Selected Conditions Responsible for the Acute Scrotum

Condition	Onset of symptoms	Age	Tenderness	Urinalysis	Cremasteric reflex
Testicular torsion	Acute	Early puberty	Diffuse	Negative	Negative
Appendiceal torsion	Subacute	Prepubertal	Localized to upper pole	Negative	Positive
Epididymitis	Insidious	Adolescence	Epididymal	Positive or negative	Positive

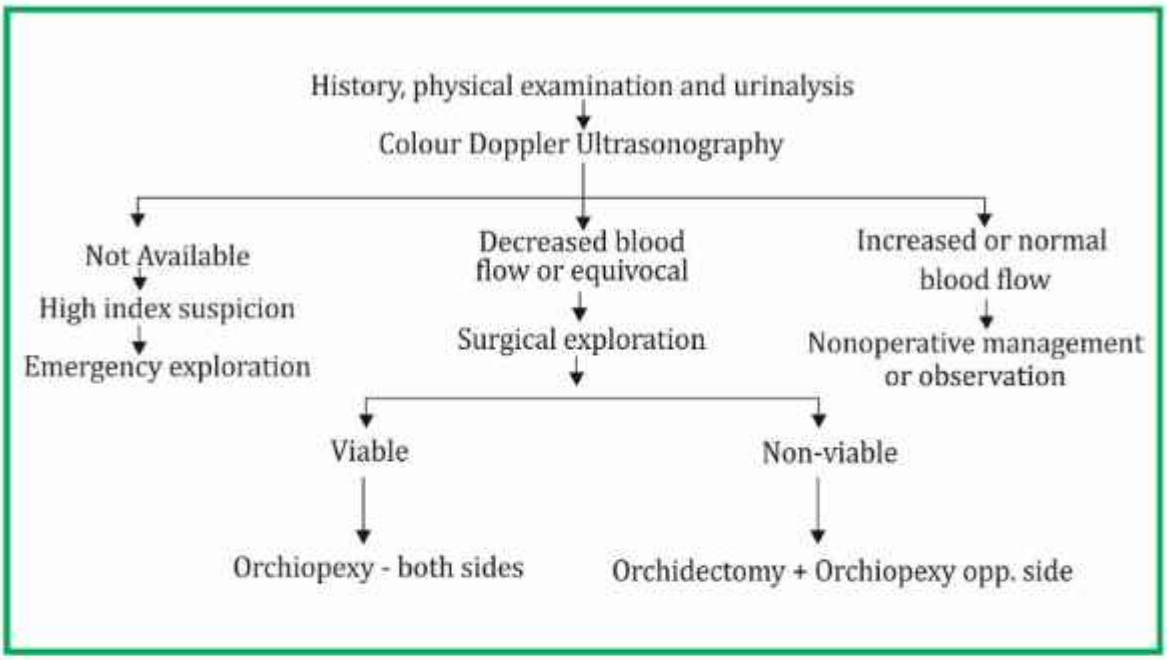
Care pathway for the acute scrotum - summary

Treatment

- **Initial and primary care**
  - Examination of the testes should be performed in all male patients presenting with abdominal pain including hernial orifices.
  - Acute testicular pain, often with abdominal pain and sometimes vomiting has a high predictive value for testicular torsion.
  - The patient should be kept fasted till diagnosis torsion is ruled out
  - Patient should be shown to a surgeon within 2 hours.

- **Secondary and tertiary care centres**
  - Triage and measurement of vital signs should be completed on arrival in an appropriate setting.
  - **The surgical decision maker should assess** all patients on admission.
  - **There must be 24-hour access to appropriate radiology and laboratory facilities.**
  - Urine Analysis
  - **Emergency Doppler Ultrasound scrotum is mandatory without any delay**
  - Doppler USS may be performed in all cases on the direction of the senior surgical decision maker.
  - Patient should be fasting.
  - Emergency surgery should not be delayed whenever possible.
  - Exploration should be done in all cases if scan is delayed
  - All patients should get a Consent for orchidectomy and orchiopexy
  - If testes are non-viable perform orchidectomy and orchiopexy on the contralateral side
  - If the testis is viable fixation of the torted testes and the contralateral testes on primary exploration.
  - All specimens should be biopsied.
- **Follow up:**
  - The patient should be followed up for 6 months.
  - In cases of excision of a non-viable testis, consideration may be made thereafter for testicular prosthesis insertion.

Patient with acute scrotum - management summary



Surgery

The present evidence indicates that early surgery is crucial to prevent the development of permanent ischaemic changes after testicular torsion. The two most important determinants of testicular salvage are the time between onset of symptoms and detorsion, and the degree of cord twisting[8 12]. Severe testicular atrophy can result after torsion for as little as 4 h when the turn is > 360°[12].

During exploration, fixation of the contralateral testis is also performed. The possibly viable testis is detorted, warmed and fixed. Non absorbable suture material and 3-point fixation is commonly used[34].

Treatment

Condition	Onset of symptoms	Age	Tenderness	Urinalysis	Cremasteric reflex	Treatment
Testicular torsion	Acute	Early puberty	Diffuse	Negative	Negative	Surgical exploration
Appendiceal torsion	Subacute	Prepubertal	Localized to upper pole	Negative	Positive	Bed rest and scrotal elevation
Epididymitis	Insidious	Adolescence	Epididymal	Positive or negative	Positive	Antibiotics

- ***Torsion testes should be ruled out in all acute scrotum patients***
- ***Epididymitis, Scrotal oedema / Complicated hernia, Trauma, Tumours should also be considered in acute scrotum.***
- ***Early diagnosis and intervention is critical.***
- ***Doppler scrotum is mandatory in all cases***
- ***If doppler not available clinical suspicion warrants exploration***
- ***Contralateral testes should be fixed during primary surgery***
- ***General Surgeon is credentiated to perform this surgery***
- ***Patient should undergo surgery in the same hospital and not transferred to another hospital if facilities (surgeon, anesthetist, theatre) are available.***
- ***Explore as early as possible***

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Section III
Acute Abdomen (General)

Introduction

Annually, in India, there are around 600,000 emergency admissions under the care of general surgeons (HES data). Of this group, just over half present with abdominal pain. The care of this vast, heterogenous group of patients is beset with challenges, not least because this is an area that has traditionally been underfunded and overlooked.

Patients presenting as an emergency have a greater risk of dying than those admitted electively.[1] Data from the Emergency Laparotomy Network confirm that emergency laparotomy still carries a mortality of 15% overall with even higher risks in the elderly and comorbid.[2] Critical care resource allocation in the past has not reflected the complexity of such cases, and there is significant variability in outcomes between units.

At the other end of the spectrum, many patients are admitted with non-specific abdominal pain, where no further diagnosis is forthcoming. Along with sub-acute conditions such as Gastritis, cholecystitis (where patients may wait up to a week for surgery) these represent a substantial, expensive and potentially avoidable, inpatient burden.

Scope

This Standard Practice Guideline is applicable to all medical staff involved in management guidelines for Acute Abdomen (General) in Primary health centre / District Hospitals &Tertiary Care centres.

Definition

The management of patients with acute abdominal pain comprises two concurrent processes - diagnostic and therapeutic - culminating in the decision to operate or to observe.

Care pathway for emergency general surgery

Assessment of acute abdominal pain

- **Primary care Centres**

  Primary care doctors face the challenge of dealing with a heterogenous group of patients with abdominal pain, without immediate access to the diagnostic facilities available in secondary care. The clear majority of patients with abdominal pain are

effectively managed in Primary health centres and District Hospitals.

Referral Criteria: Acute pain of less than 24 hours duration and localized or general peritonism are the strongest predictors of the need for secondary care referral.[3]

- **Secondary care**

History and examination

The provision of an **experienced surgeon** to see the case in the surgical causality, diverts to other **specialties and provides early assessment has been shown to reduce unnecessary** admission.

Based on the detailed clinical examination a surgical consultant can arrive at various possible surgical diagnoses clinically and plan investigations accordingly. **Never ever forget to examine the Groin and hernial positions in any case of abdominal pain.**

Even though rare Ruptured AAA &mesenteric ischemia should also be in the diagnostic clinical spectrum.

Any Acute Abdominal pain in reproductive age group in female should be suspected of Ectopic pregnancy.

Primary care hospitals

Investigations

- Bloods including CRP if available
- Urine Analysis with microscopy
- RFT
- Serum Electrolytes
- USG: If Ultra sound is available
- Plain X-Ray Abdomen / Chest X-ray PA

↙ ↘

May be Discharged to home Ref to Secondary Care

- Acute Gastritis
- NSAP
- Young Patient with Non-Specific Abdominal pain
- Biliary Colic
- Patient improves clinically

Management plan

- Resuscitate
- Keep the patient Nil by mouth till a decision is arrived
- IV Fluids to be started preferably Normal saline or Ringer lactate
- Avoid OPIODS / No Antibiotics should be started before diagnosis
- Clinical Assessment of Various Conditions based on Presentations: Look for Peritonitis /Bowel sounds/Free Gas/ Examine the Groin for hernias

District andtertiary care setting

Investigations

- Bloods including CRP if available
- Urine Analysis with microscopy
- RFT
- LFT
- Electrolytes
- Serum lactate and ABG in selective cases
- Lipase / Serum amylase
- Ultrasound
- Plain X-Ray Abdomen / Chest X-ray PA ⟶ Followed by further imaging

  ↓

  May be Discharged to home

  - Acute Gastritis
  - NSAP
  - Young Patient with Non-Specific Abdominal pain
  - Biliary Colic

Management plan

- Resuscitate
- Keep the patient Nil by mouth till decision is arrived.
- IV Fluids to be started preferably Normal saline or Ringer lactate
- Avoid OPIODS
- Clinical Assessment of Various Conditions based on Presentations: Look for Peritonitis /Bowel sounds/Free Gas/ Examine the Groin for hernias

Please Note:

- Clotting and cross match will be required if surgery is anticipated.
- **An ECG** should be performed on those over 50 years of age.
- **An erect chest radiograph** remains the primary investigation of choice for the detection of free intraperitoneal gas and may detect lower lobar pneumonia.
- **Plain abdominal radiography** should be used selectively in the event of suspected intestinal obstruction, fulminant colitis, or perforation.[10]
- **Abdominal ultrasound (USS)** is fundamental to the assessment of acute abdominal pain[11, 12] and is of utility in the evaluation of biliary, gynaecological and renal pathology or the identification of collections.
- **Abdominal CT** is invaluable in the assessment of abdominal sepsis and bowel obstruction. There are relatively few occasions where a patient cannot be stabilized sufficiently for scanning to take place, and the information afforded in terms of accurate diagnosis and therapeutic intervention cannot be underestimated. In patients over the age of 50 presenting with abdominal pain but no sepsis, CT (either on an inpatient or early outpatient basis) is advisable, due to the risk of occult malignancy in this group.
- **In selected cases** for further evaluation

- Haemodynamically

Criteria for admission

Admit

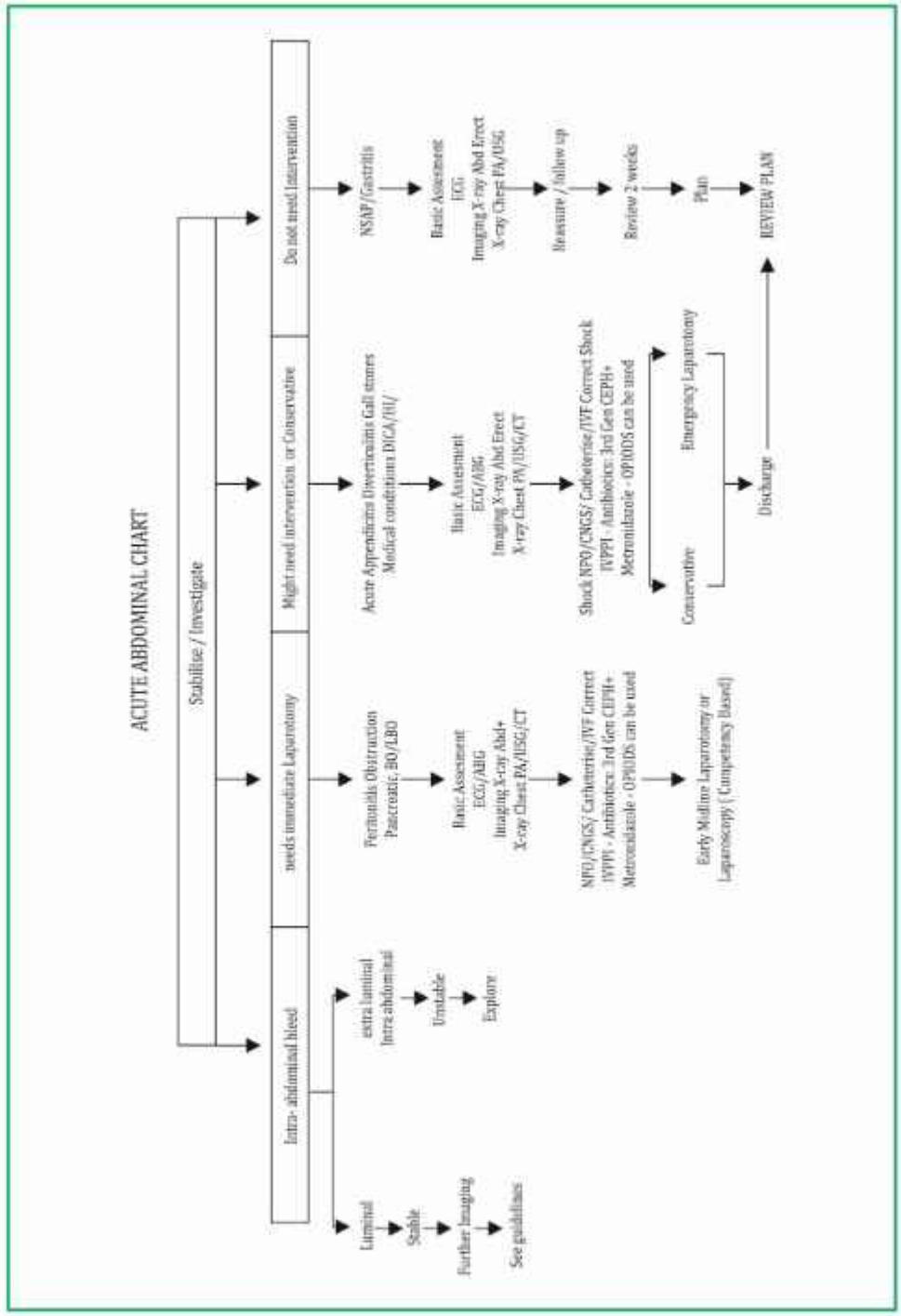
- Admit all with diagnosed cases
- Admit all with undiagnosed cases
- Patient with No relief of pain after 6 hrs on observation

May be discharged and observed in primary care or home – followed in

- Biliary colic or uncomplicated cholecystitis are suitable for early discharge
- Younger patients with non-specific abdominal pain, in the absence of any derangement in inflammatory markers.
- Gastritis
- Nonspecific Abdominal pain

1. BASIC resuscitation IN ACUTE ABDOMEN
2. Nil per oral
3. I V canula no: 16 to be inserted in all patients
4. I V fluids should be started with Normal saline or Ringer lactate
5. Decompress with Ryle's tube in Peritonitis / Pancreatitis / Intestinal Obstruction
6. Avoid OPIODS until diagnosis is attained
7. Analgesics to be given as per need
8. Catheterise urinary bladder and maintain Urinary out put
9. Antibiotics can be started after investigations + diagnosis attained

- ***Ectopic pregnancy should be ruled out in all suspected acute abdomen in reproductive age GP***
- ***Mesenteric ischemia, AAA, Medical conditions like Diabetic ketoacidosis, Ectopic pregnancy***
- ***Acute MI should also be ruled out in all acute abdomen cases especially elderly***


ACUTE ABDOMINAL CHART
Stabilise / Investigate
Intra- abdominal bleed
needs immediate Laparotomy
Might need intervention or Conservative
Do not need Intervention
Luminal
Stable
Further Imaging
See guidelines
extra luminal
Intra abdominal
Unstable
Explore
Perforatis Obstruction
Pancreatic, BO/LBO
Basic Assesment
ECG/ABG
Imaging X-ray Abd+
X-ray Chest PA/USG/CT
NPO/LNGS/ Catheterise/IVF Correct
IVPPI - Antibiotics: 3rd Gen CEPH+
Metronidazole - OPIODS can be used
Early Midline Laparotomy or
Laparoscopy (Competency Based)
Acute Appendicitis Diverticulitis Gall stones
Medical conditions DICA/HU/
Basic Assesment
ECG/ABG
Imaging X-ray Abd Erect
X-ray Chest PA/USG/CT
Shock NPO/CNGS/ Catheterise/IVF Correct Shock
IVPPI - Antibiotics: 3rd Gen CEPH+
Metronidazole - OPIODS can be used
Conservative
Emergency Laparotomy
Discharge
NSAP/Gastritis
Basic Assesment
ECG
Imaging X-ray Abd Erect
X-ray Chest PA/USG
Reassure / follow up
Review 2 weeks
Plan
REVIEW PLAN

Emergency surgery - primary care: new concept of back referal

- **Background**

  Emergency ambulatory care is well established in medicine but not yet within surgery. Pilot studies[19] have shown that up to 30% of patients on a general surgical emergency take can be managed in this way. Further development of this type of service will be common place in the next three years. Presently, about one third of hospitals offer a version of this service.

  We need to develop back referral to Primary health centre and district headquarters hospital once it's decided that patient can be managed without emergency laparotomy or any other acute surgical interventions.

- **Assessment**

  Given the risk associated with a surgical ambulatory pathway the initial assessment should be made by a Consultant Surgeon.

- **Suitable abdominal conditions**

  1. *Depending on local Standard Practice Guidelines, suitable conditions can include:*
     Treated and Stabilised Conditions
  2. **Stable post op patients after initial stabilisation and optimisations**
  3. **Diagnosed patient availing further imaging and consultations**

Unsuitable conditions and Patient exclusions

- Acute pancreatitis
- Acute appendicitis
- Perforated viscus
- Bowel obstruction
- Peritonitis
- Sepsis
- Deranged vital signs and shock states

- Grossly deranged blood tests
- Frail elderly
- Significant co-morbidities
- Inadequate response to analgesia
- **Outpatient review** - Out patient review of those patients placed in this way should include clearly in the discharge summary the following
    - Discharge to primary care with letter
    - Discharge with date for surgery (usually gallstones)
    - Discharge with date for further investigation and reference

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Section IV
Right Iliac Fossa Pain/Appendicitis

Introduction

Right iliac fossa pain is one of the most common presentations to the acute surgical take. The lifetime risk of having appendicitis is 7% - 8% with an overall incidence of 11 cases per 10,000 populations per year[1-3]. Whilst in some patients, who present with a typical history and convincing examination signs, it is easy to determine what their management should be, those with less specific signs can be more of a diagnostic challenge. It is these patients that require further time and investigations to determine the correct diagnosis and subsequent treatment. There is huge intra and inter hospital variability on management of these patients.

Scope

This Standard Practice Guideline is applicable to all medical staff involved in management guidelines for Right iliac fossa pain/appendicitisin Primary health centre / District Hospitals &Tertiary Care centres.

Definition

The management of patients with acute abdominal (Right iliac fossa pain/appendicitis) pain comprises two concurrent processes - diagnostic and therapeutic - culminating in the decision to operate or to observe.

Examinations and investigations - flow chart

- **Clinical examination is the Key for Diagnosis of Acute appendicitis**
- All patients should have all assessment investigations, urinalysis and CRP.
- In patients with an elevated WCC (neutrophilia) and CRP should prompt Further US imaging to rule out other causes of RIF pain. (See Table)
- Appendicitis once suspected better admitted.
- Not to start anti-biotics unless diagnosis is certain
- Scoring system – Alvarado or Mantral more than 7 may be helpful in doubtful cases.
- **Imaging**

- Imaging is a useful diagnostic tool in right iliac fossa pain and its widespread use is increasing[9]
- The group of patients that most benefits from imaging is those who have an indeterminate diagnosis[10]
- Evidence suggests that its use decreases the negative appendicectomy rate and does not delay operative management or lead to complications[11-13]
- All RIF pain patient should undergo Ultra sound scan for other condition
- Role of CT and MRI for diagnosis should be reserved.

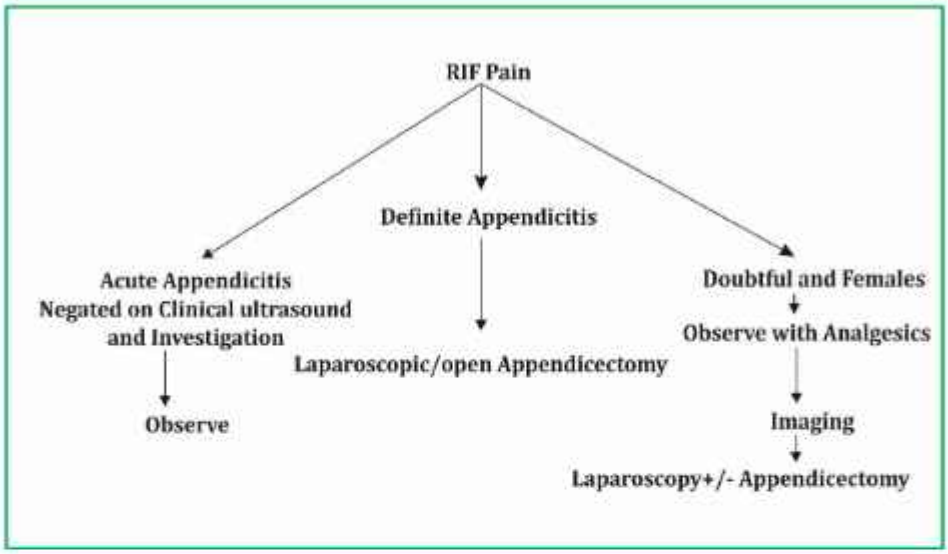
- Imaging Criteria for diagnosis

ULTRA SOUND CRITERIA: Appendix more than 7mm, fat stranding, free fluid, immobile peristaltic appendix. No radiation. Though may not be diagnostic always. Sensitivity 78 to 83 %Specificity 83 to 93 %.Useful in pregnant

CT SCAN: More than 7 mm appendix, fluid collection, fat stranding or free air and Target sign which is the mural enhancement of the appendix due to oedema. -are suggestive. But it is not recommended in all cases. Only done in equivocal cases. If the diagnosis is clear by clinical and lab values, CT is not necessary.

MRI SCAN: It is ideal for equivocal findings in a in pregnant patients, but without contrast. Criteria for diagnosis include >7mm appendix with thickening more than 2 mm and presence of inflammation. It has a sensitivity on 100% and specificity of 98% and negative predictive value of 100%.

Investigations flow chart



Acute uncomplicated appendicitis

- **Patients for immediate appendicectomy**
  - High suspicion of appendicitis.
  - All patients should be kept fasted
  - Antibiotics should be started, and surgery is done without much delay
  - For uncomplicated appendicitis
    - 3rd generation cephalosporin + metronidazole 3 doses
- For complicated appendicitis
  - Antibiotics should be continued for 5 to 7 days
    - 3rd generation cephalosporin + metronidazole
- **Laparoscopic versus open appendicectomy**
  - Laparoscopic appendicectomy is recommended over open appendicectomy in all patient groups where not contraindicated and where technically feasible[17-23]
  - Centres where lap facilities are not available open appendicectomy is the

standard treatment.

Other conditions to be ruled out - RIF Pain

Male	Female	Elderly
Regional Enteritis	Mittelschmerz	Diverticulitis
Ureteric Colic	Pelvic Inflammatory Disease	Intestinal obstruction
Mesenteric adenitis	Pyelonephritis	Colonic Carcinoma
Torsion of Testis	Ectopic Pregnancy	Torsion Appendix epiploic
Pancreatitis	Torsion / Rupture of ovarian cyst	Mesenteric infarction
Rectus Sheath Hematoma	Endometriosis	Leaking aortic aneurism
Mesenteric adenitis	Mesenteric adenitis	

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Section V
Left Iliac Fossa Pain / Diverticulitis

Introduction

Typical clinical features include left iliac fossa pain and tenderness, inflammatory mass in left lower abdomen, tachycardia, and pyrexia. There may be any of nausea, vomiting, constipation, peritonitis and shock. Diverticulitis ranges in severity from a mild self-limiting process to fatal colonic perforation and the assessment process should be sufficiently speedy and senior to assess and triage appropriately.

Full clinical assessment including rectal exam is supported by investigations which include inflammatory blood markers. The diagnosis of acute diverticulitis should be confirmed during the acute attack by radiological means, preferably urgent CT. Other causes of left lower abdominal pain complicated colorectal cancer, various gynaecological pathologies, urinary obstruction or infection and leaking or ruptured abdominal aortic aneurysm.

Scope

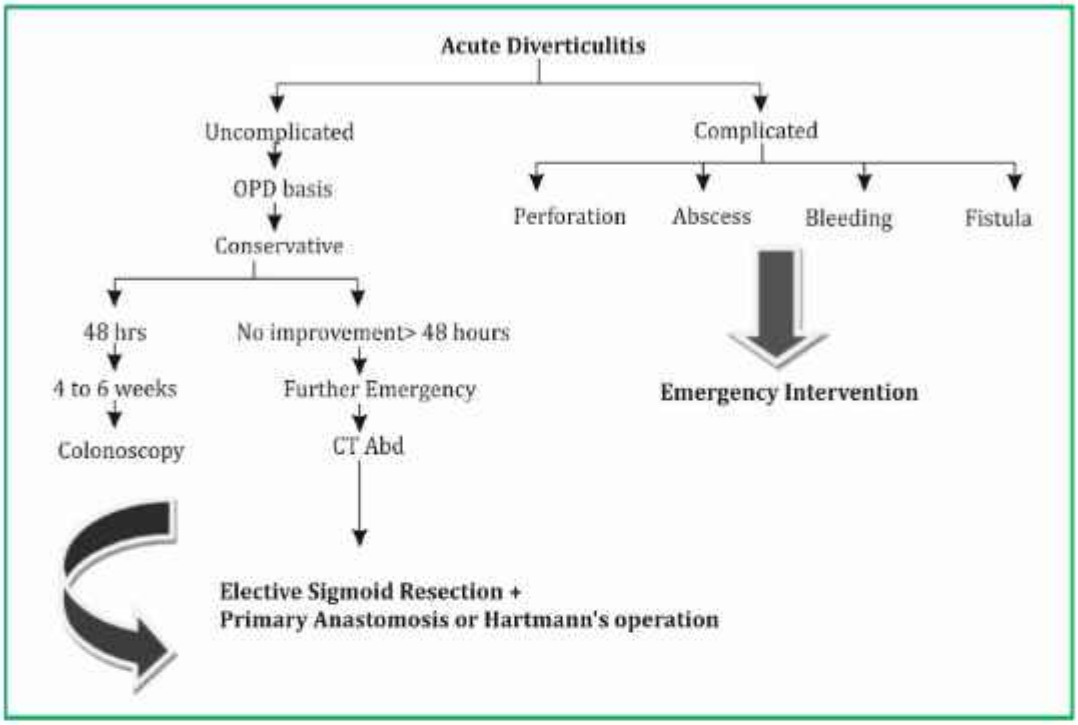
This Standard Practice Guideline is applicable to all medical staff involved in management guidelines for Left iliac fossa pain/diverticulitis in Primary health centre / District Hospitals &Tertiary Care centres.

Definition

The management of patients with acute abdominal pain (Left iliac fossa pain/diverticulitis) comprises two concurrent processes - diagnostic and therapeutic - culminating in the decision to operate or to observe.

Background

Diverticulitis usually refers to acute sigmoid diverticulitis which is caused by inflammation of diverticula of the sigmoid colon and will be further discussed here, being a common condition. Other intestinal diverticula can become inflamed but much less commonly so and occasionally diverticula may also bleed significantly (see rectal bleeding pathway).



Acute diverticulitis – initial management

If suspected ideally managed in tertiary care set up

Tertiary care setting

Investigations

- Bloods including CRP if available
- RFT
- LFT
- Serum Electrolytes
- Serum lactate and ABG in selective cases
- Serum Lipase / Serum amylase
- Plain X-Ray Abdomen / Chest X-ray PA
- Imaging
- **ULTRASOUND SCAN - Primary investigation of Choice**

- **CT scan - Early CT should be planned within 12 hours.** Results are graded and may show localised inflammation, local or more extensive abscess formation, local or free perforation. Bowel obstruction can occur and fistulation into bladder or vagina particularly is seen

Management plan

- Resuscitate
- Keep the patient Nil by mouth till diagnosed
- IV Fluids to be started preferably Normal saline or Ringer lactate
- Avoid OPIODS
- Clinical Assessment of Various Conditions based on Presentations: Look for Peritonitis /Bowel sounds/Free Gas/ Examine the Groin for hernias
- Per rectal examination and proctoscopy should be done in all cases
- Antibiotics
  - Intravenous antibiotics should be started
    - 3rd generation cephalosporin + metronidazole
    - Piperacillin + Tazobactam + metronidazole

Please note:

- Critical illness including shock and peritonitis requires immediate fluid resuscitation, critical care support, diagnosis and treatment of the cause, including antibiotics
- Whenever possible, patients with uncomplicated diverticulitis should be managed medically without recourse to surgery. Traditionally, patients have been admitted to hospital for intravenous antibiotics and fluids. Most settle within 36 to 72 hours.
- It is feasible to manage patients with mild attacks in an emergency ambulatory setting with access to real-time imaging and senior clinical input. Treatment with oral fluids, antibiotics and stool softeners is supported by regular clinical review.

Acute diverticulitis – subsequent management of the acute attack

- Several options exist for patients with both complicated and uncomplicated diverticulitis who fail to respond to conservative management
  - Radiological (either CT or USS) drainage of a pericolic abscess
  - Laparoscopic lavage (with/without drain placement),
  - Emergency surgery (refunctioning stoma, Hartmann's procedure, sigmoid colectomy with primary anastomosis either with/without covering loop stoma)

  All of these treatments have a role to play and the decision as to which one is utilised should be made on an individual patient basis.

- Percutaneous drainage by aspiration or catheter drainage is a useful technique and, in some patients, may prevent subsequent surgery, can make surgery less urgent and enable surgery to be carried out under better physiological control. Access to interventional radiology is therefore an essential requirement. Radiologically guided drainage may be effective treatment of pericolic abscess, however, appropriate follow up and ownership of the patient by a secondary care clinician is essential as ongoing sepsis may occur and may warrant consideration of other treatment pathways.

- Emergency resection, with or without primary anastomosis, carries significant risks and requires senior surgical input and appropriate post-operative care (access to critical care/ high dependency).

- There is minimal evidence investigating the use of laparoscopic resection in patients requiring emergency sigmoid colectomy, but laparoscopic surgery should be considered, if there is appropriate expertise available.

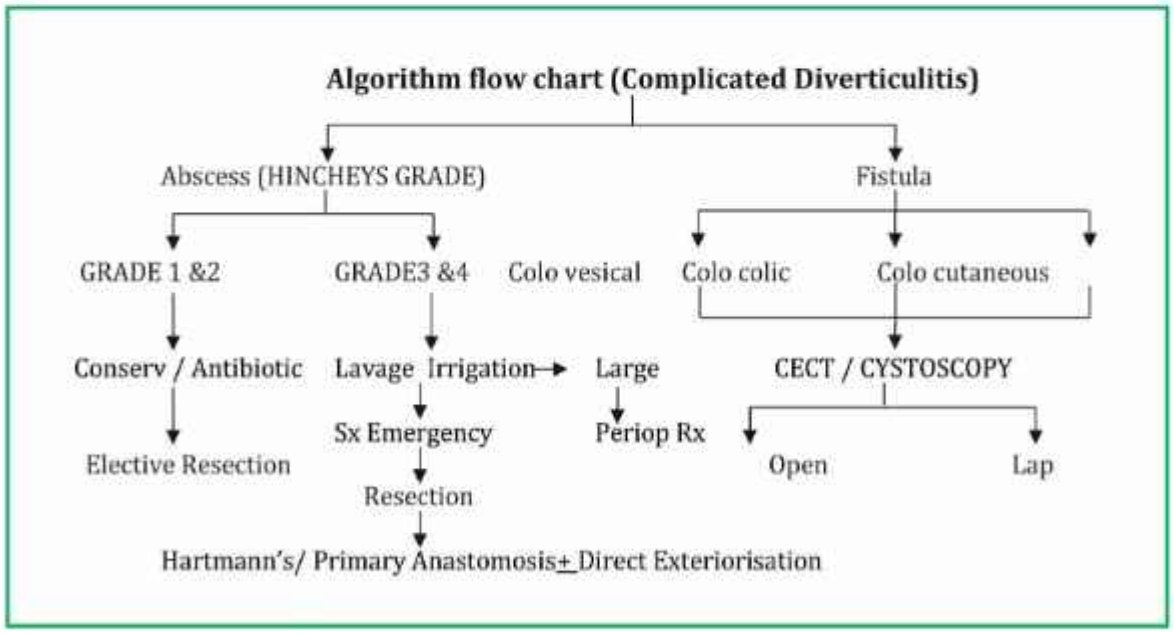
- Uncomplicated diverticulitis- Majority are managed on OP basis with antibiotics, diet modification . Antibiotics should cover gram neg and anaerobes. Uncomplicated cases usually resolve within 48 hours. Any concern regarding any complications, he should be admitted and started on IVF, IV antibiotics and analgesia. Once improved, colonoscopy is planned after 4-6 weeks to confirm diverticula or to exclude cancer

,IBD. Once resolved 33% may have recurrence., But roughly 1% only require surgery.

- Current recommendation for surgery should be individualised, taking into consideration the frequency and severity of recurrences and also the patients overall medical comorbidities. After resection anastomosis should be made into upper rectum, to reduce recurrence. Laparoscopic surgery also can be done

Acute diverticulitis – later management

- All patients require investigation of the colonic lumen by either endoscopy, barium enema or CT colonography ideally after the acute attack has resolved
- Elective resection for a patient with a single episode of uncomplicated diverticulitis is not supported. Patients need to have access to appropriate expert colorectal advice regarding surgery in the future if symptoms recur. This should be done according to ACPGBI guidelines.



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Section VI
Right Upper Quadrant Pain/Gallstones

Introduction

The acute onset of severe right upper quadrant pain most commonly is associated with the presence of gallstones. Between 10-15% of males and 20-25% of females of all ages have gallstones and the incidence of symptoms developing in asymptomatic patients is between 1-2% per annum. Patients present acutely with severe right upper quadrant pain which lasts several hours with minimal systemic upset (biliary colic) or more prolonged pain associated with localised gallbladder inflammation and systemic symptoms (acute cholecystitis). Both of these conditions are referred to as simple acute biliary disease. Patients in whom the severe pain is associated with jaundice and biliary dilatation or gallstone pancreatitis are regarded as having a complex biliary presentation and are managed according to a different pathway.

Scope

This Standard Practice Guideline is applicable to all medical staff involved in management guidelines for Right upper quadrant pain / gallstones in Primary health centre / District Hospitals &Tertiary Care centres.

Definition

The management of patients with acute abdominal upper quadrant pain comprises two concurrent processes - diagnostic and therapeutic - culminating in the decision to operate or to observe.

Initial assessment and diagnosis

Typical clinical features will include right upper quadrant pain, nausea, vomiting, tachycardia and sometimes a pyrexia. Tenderness may be present on examination in the right upper quadrant. Initial blood tests should be performed as per investigation of acute abdominal pain evaluation. Early radiological input is essential with ultrasound scan of abdomen being the most appropriate initial examination. Ultrasound scan findings together with the liver function tests allow an initial triage of acute biliary patients into one of four categories:

- **Biliary colic** –short duration of pain, minimal systemic upset, normal liver function

tests, no biliary dilatation on ultrasound

- **Acute cholecystitis** –pain for over 24 hours, systemic upset (pyrexia, tachycardia), raised white cell count, oedematous thick-walled gallbladder, often with stone stuck in neck on ultrasound (with normal liver function tests unless Mirizzi syndrome)
- **Complex biliary disease** –variable duration of pain, systemic upset possibly including rigors, pyrexia, deranged liver function tests and dilated biliary tree on ultrasound. High suspicion of gallstones being present in the common bile duct in addition to the gallbladder
- **Gallstone pancreatitis** –periumbilical pain that radiates to the back of variable duration and intensity, systemic upset, raised amylase or lipase. May have deranged liver function tests and inflammatory markers. USS may reveal a dilated biliary tree. Should have the disease severity stratified on admission and at 24 hours by a validated prognostic scoring system such as Glasgow, APACHE II or CRP[49]

Primary care hospitals

Investigations

- Bloods including CRP if available
- RFT
- LFT
- Serum Electrolytes
- Serum lactate and ABG in selective cases
- Lipase / Serum amylase
- Plain X-Ray Abdomen / Chest X-ray PA
- ECG / Ultrasound Scan should be done if available

Management plan

- Resuscitate
- Keep the patient Nil by mouth till diagnosed
- IV Fluids to be started preferably Normal saline or Ringer lactate
- Analgesic

- Avoid OPIODS
- Clinical Assessment of Various Conditions based on Presentations: Look for Peritonitis /Bowel sounds/Free Gas/ Examine the Groin for hernias
- Referral to district or tertiary care settings if needed.

District andtertiary care setting

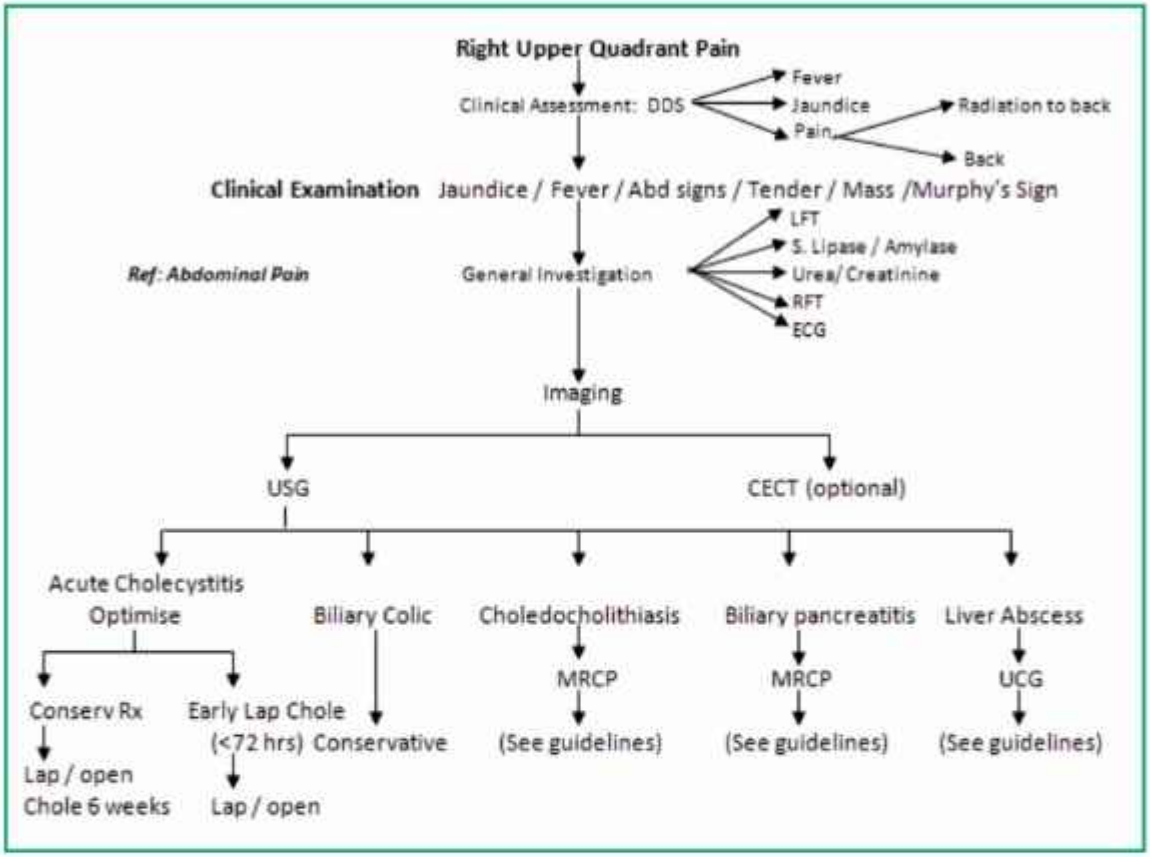
Investigations

- Bloods including CRP if available
- RFT
- LFT
- Serum Electrolytes
- Serum lactate and ABG in selective cases
- Serum Lipase / Serum amylase
- Plain X-Ray Abdomen / Chest X-ray PA
- ECG
- **Ultra sound scan Abdomen is mandatory in all cases asap**
- CT scan abdomen – If indicated by radiological or clinical findings

Management plan

- Resuscitate
- Keep the patient Nil by mouth till diagnosed
- IV Fluids to be started preferably Normal saline or Ringer lactate
- Analgesic
- Avoid OPIODS
- Antibiotics
  - 3rd generation cephalosporin + metronidazole
  - Piperacillin + Tazobactam + metronidazole
- **If the onset is less than 72 hours primary emergency cholecystectomy may be considered (SAGE Guidelines)**
- **Patients on conservative management - Elective cholecystectomy is planned**

after 6 weeks. A review ultrasound may be done prior to Elective Cholecystectomy.



Ongoing management

This is entirely dependent on the cause of the right upper quadrant pain and varies according to the classification outlined above:

- **Patients with biliary colic** are suitable for treatment in the ambulatory care setting or by early inpatient cholecystectomy. If the severe pain has settled patients may be either:
  - Discharged to have an early outpatient ultrasound with follow up in general surgical clinic. Most patients who are medically fit will be offered an elective laparoscopic cholecystectomy (within 6 weeks ideally) after one severe attack of

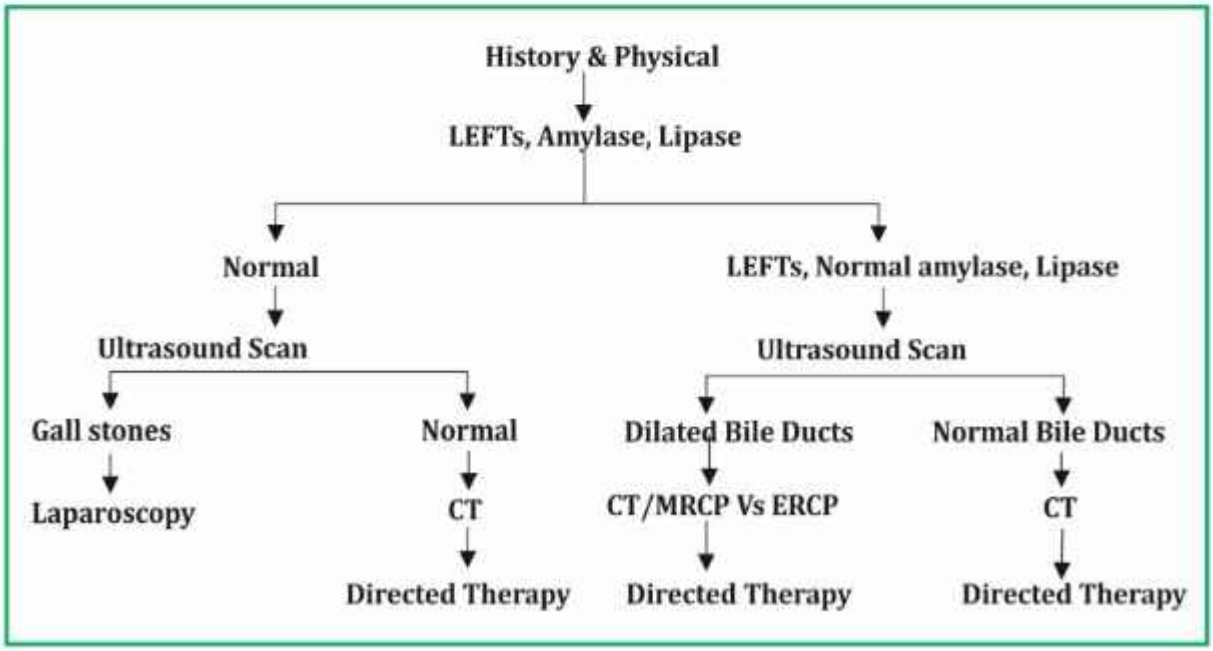
biliary colic as the likelihood of symptomatic recurrence is high.

- **Patients with acute cholecystitis on ultrasound scan** should be admitted to hospital to have fluid resuscitation, antibiotics and analgesia. Treatment options in this situation are either:

  Conservative management followed by elective cholecystectomy or ,Early cholecystectomy during the first admission, particularly if the pain is of less than 2 days duration. Early cholecystectomy has been shown to be safe and cost effective in this setting.

  However, in patients with conservatively managed acute cholecystitis approximately 10% of patients will not settle and will require cholecystectomy (or percutaneous cholecystostomy if frail /elderly) whilst in hospital. If treated conservatively a date should be offered for elective surgery, ideally around 6 weeks following discharge. Prior Ultrasound at 6 weeks should be done before cholecystectomy.
- **Patients with complex biliary disease (See guidelines)**
- **Patients with gallstone pancreatitis (See guidelines)**

Algorithm – treatment of right upper quadrant abdominal pain



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Section- VII
SMALL BOWEL OBSTRUCTION

Introduction

SBO is characterised clinically by abdominal pain (intestinal colic), vomiting and distension. Patients with this symptom pattern or where SBO is suspected should be referred urgently to secondary care for assessment and management. Initial assessment and management include clinical examination for peritonism or hernia, fluid resuscitation, analgesia, placement of a nasogastric tube (which should be aspirated regularly) and urinary catheter, blood tests (including lactate) and plain radiography of the chest and abdomen. Other medical conditions including diabetes and anti-coagulation should be attended to. Early surgery is indicated without the need for further imaging if there is clinical (pyrexia/ tachycardia/ peritonitis/ increasing pain) or biochemical (white cell count/ C-reactive protein/ metabolic acidosis) evidence of potential ischaemia, strangulation or if an obstructed hernia is detected. [52]

Scope

This Standard Practice Guideline is applicable to all medical staff involved in management guidelines for Small Bowel Obstruction in Primary health centre / District Hospitals &Tertiary Care centres.

Definition

The management of patients with acute abdominal (Small bowel obstruction) pain comprises two concurrent processes - diagnostic and therapeutic - culminating in the decision to operate or to observe.

Background

Small bowel obstruction (SBO) results from a partial or complete mechanical blockage preventing food, fluid or gas moving through the intestines. SBO accounts for 12-16% of emergency surgery admissions and 20% of emergency laparotomies.

Primary care hospitals

Investigations

- Bloods including CRP if available
- RFT
- Serum Electrolytes
- Serum lactate and ABG in selective cases
- S. Lipase / Serum amylase
- Plain X-Ray Abdomen AP / Chest X-ray PA erect
- Abdomen supine AP

Management plan

- Resuscitate
- Keep the patient Nil by mouth till diagnosed
- Ryle's Tube Aspiration
- IV Fluids to be started preferably Normal saline or Ringer lactate
- Avoid OPIODS
- Clinical Assessment of Various Conditions based on Presentations: Look for Peritonitis /Bowel sounds/Free Gas/ Examine the Groin for hernias
- Per rectal examination is mandatory

District andtertiary care setting

Investigations

- Bloods including CRP if available
- RFT
- LFT
- S Electrolytes
- Serum lactate and ABG in selective cases
- S. Lipase / Serum amylase
- Plain X-Ray Abdomen / Chest X-ray PA
- Ultrasound Abdomen

- **Emergency CT scan is advisable in selective cases when diagnosis is not confirmed.**

Management plan

- Resuscitate
- Keep the patient Nil by mouth till diagnosed
- Ryle's tube aspiration
- IV Fluids to be started preferably Normal saline or Ringer lactate
- Analgesic
- Antibiotics should be started
- Avoid OPIODS
- Clinical Assessment of Various Conditions based on Presentations: Look for Peritonitis /Bowel sounds/Free Gas/ Examine the Groin for hernias

Further radiological imaging

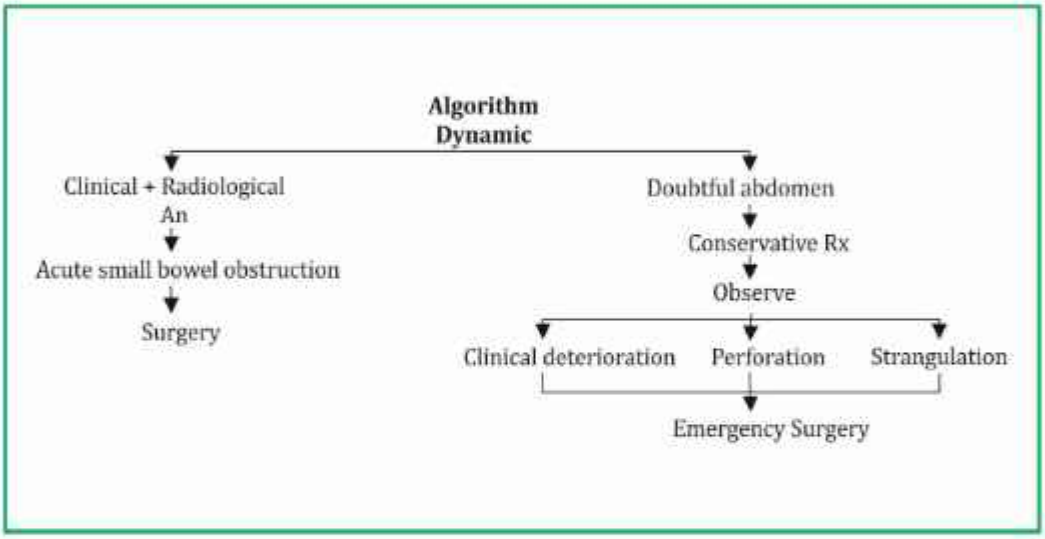
- Strangulation/bowel ischaemia may be challenging to detect clinically; serial examinations by an experienced surgeon and/or CT scanning are required.
- Delaying surgery in the context of strangulation is associated with poor outcomes. If early surgery is not indicated, CT scans provide incremental information and are valuable in management.
- CT can confirm the diagnosis of SBO when plain films are ambivalent and in addition determine the level of obstruction and the cause.[52, 53]
- Surgery is indicated if the CT has demonstrated a non-adhesion cause (tumour, hernia, volvulus or gallstone) or shows evidence of bowel ischaemia.[52] Surgery is not indicated if the CT has demonstrated that the clinical scenario results from a functional problem (ileus – particularly post-operatively, pseudo-obstruction, diabetes or opiate related).

Primary management

- All patients should be kept nil orally. I V Canula No.16 should be inserted.
- I V fluid and electrolyte imbalance should be corrected with ringer lactate and

potassium supplementation.

- All patients should be catheterised
- Antibiotics
  - 3rd generation cephalosporin + metronidazole
- All patients should have N G tube with decompression
- Brought spectrum antibiotics with metronidazole should be administered.
- Urine output should be maintained 50 to 60 ml per hour.
- All patients should receive consent for ostomy



Adhesional obstruction

Adhesion obstruction is common among patients who have had previous abdominal surgery and many episodes settle with conservative management. However, the timing of emergency surgery for the obstruction can be challenging. Clinically stable patients with confirmed adhesion obstruction can safely be managed conservatively for 72 hours (3 days).[1,3] If obstruction has not resolved at this point surgery is recommended and should not be delayed beyond 120 hours (day 5) as the risk of mortality then increases further.[1,3]A gastrographic contrast study can be an aid to decision making after 48 hours of conservative management. Contrast reaching the colon predicts resolution without surgery. The hypertonic contrast medium itself can be therapeutic.[1,2]

Surgery

If there is suspected ischaemia or strangulation, surgery should be carried out as soon as possible and in any event within 6 hours of the suspected onset of ischaemia or strangulation. Laparoscopic surgery may be considered as an alternative to open surgery by experienced laparoscopic surgeons particularly if imaging has suggested a technically straightforward obstruction.[2] Successful laparoscopic surgery is associated with a shorter length of stay.[4]

Reference

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Sction VIII
LARGE BOWEL OBSTRUCTION

Introduction

Large-bowel obstruction (LBO) is an emergency condition that requires early identification and intervention. Causes include cancer (60%), diverticular strictures (20%) and volvulus (5%). Up to 30% of colorectal cancer cases initially present in the emergency setting. Emergency surgery performed for LBO is associated with a high morbidity and peri-operative mortality ranges from 10-20%, compared with rates less than 5% in elective surgery. Mortality rates increase to 40% if there is colonic perforation. Surgery in these patients should ideally occur during the day by colorectal surgeons experienced surgeons.

Scope

This Standard Practice Guideline is applicable to all medical staff involved in management guidelines for management of Large Bowel Obstruction in Primary health centre / District Hospitals &Tertiary Care centres.

Definition

The management of patients with acute abdominal (Large bowel obstruction) pain comprises two concurrent processes - diagnostic and therapeutic - culminating in the decision to operate or to observe. Large bowel obstruction is a surgical emergency where mechanical interruption (either complete or partial) obstructs the flow of intestinal contents, with multiple potential causes (e.g., malignant colorectal disease, colonic volvulus, benign stricture). This topic covers acquired obstruction in adults.

Symptoms

Include abdominal distension, absolute constipation (of stool and flatus), nausea, vomiting and colicky lower abdominal pain. Vomiting typically occurs later in large bowel compared with small bowel obstruction and may be faeculent in nature. Continuous pain is an ominous symptom heralding bowel ischaemia. An abrupt onset of symptoms makes an acute obstructive event (e.g. volvulus) a more likely diagnosis. A longer history with a change in bowel habit, tenesmus, rectal bleeding and weight loss favours malignancy.

Signs

Abdominal distension, perhaps with a palpable mass. Tenderness over the caecum implies impending perforation. A digital rectal examination performed can diagnose low rectal cancer, faecal impaction and pelvic mass. Examine hernial orifices to detect an obstruction secondary to an irreducible hernia. Sudden deterioration with fever, tachycardia, tachypnoea, and confusion may indicate a perforated bowel with peritonitis. Tenderness with rigidity implies peritonitis and demands urgent resuscitation and surgery within 6 hours.

Referral

All patients with a history consistent with LBO need urgent referral to secondary care. Where possible, within 24 hours of admission, such patients should be under the care of a colorectal surgeon. Specialist surgeon.

Investigation of LBO

Patients suspected to have LBO should undergo an urgent CT scan within 24 hours maximum. CT is the most sensitive way of confirming LBO, identifying colonic perforation / dilatation and staging malignant disease.[1,2] A water soluble contrast study can be performed; however it is less sensitive than CT in identifying perforation and cannot stage malignant disease. Contrast studies are most useful for excluding pseudo obstruction. CT with rectal contrast is performed in some units. Xray abdomen is unreliable and diagnosis usually requires further imaging with CT; it should only be used when CT is unavailable. In sigmoid volvulus it may be diagnostic.

Colonic pseudo-obstruction

One needs to differentiate a mechanical obstruction from colonic pseudo-obstruction. Several conditions are associated with the development of colonic pseudo-obstruction. These include chest infection, myocardial infarction, renal failure, and Parkinson's disease. Colonic pseudo-obstruction is also associated with trauma, recent major orthopaedic surgery such as hip replacement, the use of neuroleptics or opiates, and metabolic disturbances. However, it is still important to rule out a mechanical obstruction in these patients. Use a CT scan to differentiate the two.

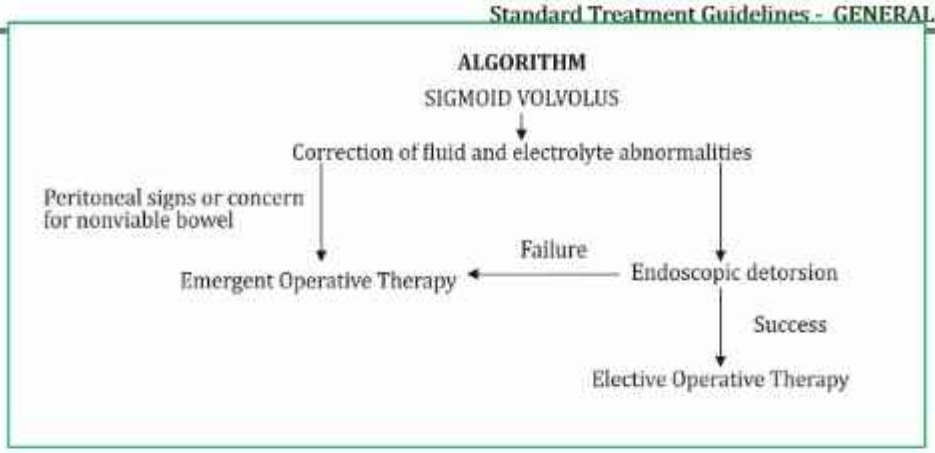
Management

Primary management

- All patients should be kept nil orally. I V Canula No.16 should be inserted.
- IV fluid and electrolyte imbalance should be corrected with ringer lactate and potassium supplementation.
- All patients should be catheterised
- All patients should have N G tube with decompression
- Brought broad spectrum antibiotics with metronidazole should be administered.
- Urine output should be maintained 50 to 60 ml per hour.
- All patients should receive consent for ostomy

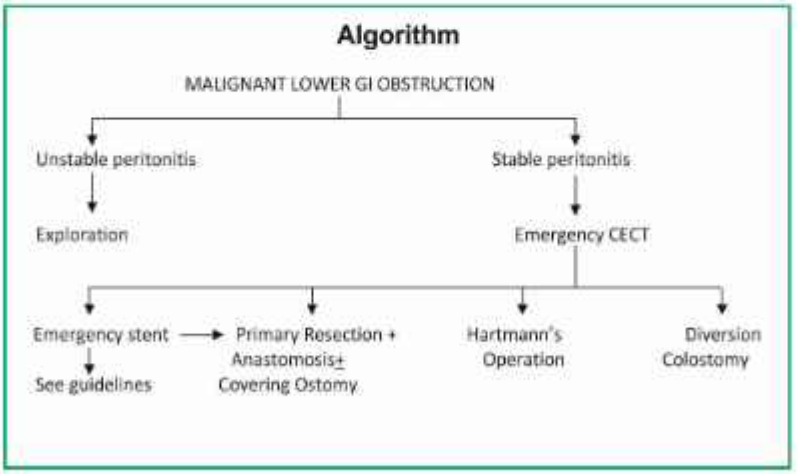
Management thereafter depends on the underlying pathology and clinical state of the patient.

- Malignant obstruction: - Malignant LBO without peritonism does not require emergency surgery and should be assessed by an experienced surgeon. Options should include colonic stenting (see below). Surgical options include a defunctioning stoma, resection and exteriorisation and resection with primary anastomosis. In the presence of non-viable bowel or perforation or intra-op bleeding and hypotension, primary anastomosis should be avoided, and all non-viable bowel resected.
- Benign strictures: - Usually require surgery if causing LBO.
- Volvulus: - Is most common in the sigmoid colon and caecum. Most can be treated with endoscopic decompression followed by elective resection in selected patients. If symptoms and signs suggest ischaemia or if decompression fails, surgery is indicated.



Stenting for malignant LBO

Self-expanding metal stents allow endoscopic decompression of LBO in an attempt to avoid emergency surgery. Following decompression, elective surgery should take place within 2 weeks.[3] In the frailest patients, stenting may be definitive management for their disease. Stents are most effective in left-sided colonic obstruction and are not suitable in low rectal obstructions.[4] Patients with benign strictures are rarely appropriate for stenting. Tertiary care centres should ensure that there is an endoscopic and stenting service available and offer a service within 24-48 hours of referral.



Summary

- Large bowel obstruction is a surgical emergency.
- The classic signs and symptoms are intermittent abdominal pain, distention,

vomiting, nausea, and absolute constipation but will depend on the underlying cause.

- Consider malignancy in all patients who present with large bowel obstruction.
- An urgent computed tomography (CT) scan of the abdomen and pelvis should be performed as soon as possible to differentiate genuine mechanical obstruction from pseudo-obstruction.
- Consult the surgical team early, as emergency surgery may be required. The type of surgery necessary will depend on the site and cause of the obstruction.
- Suspect bowel perforation where there is persistent tachycardia, fever, and/or abdominal pain and
- tenderness.

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Section IX
BLUNT TRAUMA ABDOMEN

Introduction

Blunt abdominal trauma commonly results from road traffic accidents, falls from height, assault, and crush injuries. It may lead to injury of solid organs (liver, spleen, kidneys), hollow viscera (stomach, intestines), retroperitoneal structures, abdominal wall, or major vascular structures.

Patients may present with abdominal pain, distension, vomiting, shock, bruising (seatbelt marks), or signs of peritonitis. Early identification of life-threatening intra-abdominal bleeding is crucial.

Initial evaluation follows the ATLS primary survey, focusing on airway protection, breathing assessment, restoring circulation, rapid control of hemorrhage, provision of oxygen, IV access, fluid resuscitation, and early imaging (FAST/CECT). Patients with physiological compromise, suspected internal bleeding, or polytrauma should be urgently referred to a higher center.

Scope

This guideline applies to all medical professionals involved in the evaluation and management of blunt abdominal trauma at Primary Health Centres, District Hospitals, and Tertiary Care Centres across Kerala.

Definition

Blunt Abdominal Trauma is a non-penetrating injury to the abdomen caused by external force leading to structural or functional damage to organs within the peritoneal cavity, retroperitoneum, abdominal wall, or major blood vessels.

Background

Blunt abdominal trauma accounts for a major proportion of trauma-related morbidity and mortality. Rapid assessment and timely intervention significantly improve outcomes.

Common clinical entities include:

- Liver injury
- Splenic injury

- Renal trauma
- Pancreatic injury
- Hollow viscus perforation
- Mesenteric tears
- Retroperitoneal hematoma
- Abdominal wall injuries (seatbelt sign)
- Major vascular injury

High-risk features:

- Hypotension
- Altered sensorium
- Seatbelt marks / abdominal ecchymosis
- Polytrauma
- High-speed RTA

Primary care hospitals

Investigations

- Pulse oximetry
- Urine output assessment
- FAST (if available)
- Chest & Pelvic X-ray (if polytrauma)
- Basic blood tests (Hb, PCV, blood group & crossmatch)

Management plan

- Ensure airway patency
- Give supplemental oxygen
- Establish two large-bore IV lines

- Control external bleeding if present
- Immobilize cervical spine if indicated
- Assess for clinical red flags:
  - Hypotension
  - Tachycardia
  - Abdominal distension
  - Peritonism
  - Seatbelt sign
- If FAST positive OR shock persists → urgent referral to higher centre
- Avoid oral intake (NPO)

District & tertiary care hospitals

Investigations

All primary care investigations Plus:

- Serial Hb / PCV
- Serum lactate
- ABG
- ECG & continuous monitoring
- Ultrasound FAST (extended eFAST)
- Contrast-enhanced CT abdomen/pelvis (gold standard for stable patients)
- Focused spine assessment (if suspicion)
- Urinalysis for hematuria
- Serum amylase/lipase (if pancreatic injury suspected)

Management plan

- Continue ABC stabilization per ATLS

- Maintain SBP ≥ 90 mmHg.
- Maintain SpO_2 > 94%
- early use of blood products if hemorrhagic shock
- Early surgical team involvement

Non-Operative Management (NOM) — for stable patients

- Preferred for liver, spleen, renal injuries
- Serial vitals every 30–60 mins
- Serial Hb monitoring
- Bed rest and restricted activity
- ICU monitoring for high-grade injuries

Operative Management — indications

- Hemodynamic instability
- Hollow viscus injury
- Peritonitis
- Free air under diaphragm
- Expanding retroperitoneal hematoma
- CT evidence of active contrast extravasation
- Failure of non-operative management

Further radiological imaging

CECT Abdomen is indicated when:

- Diagnosis uncertain
- Persistent abdominal pain or tenderness
- Polytrauma
- Clinical–radiological discrepancy

- High suspicion of:
  - Solid organ injury
  - Hollow viscus perforation
  - Pancreatic trauma
  - Vascular injury
  - Retroperitoneal hematoma

Immediate surgical review for CT findings of:

- Active contrast leak (arterial blush)
- Free intraperitoneal air
- Bowel wall discontinuity
- Mesenteric tear
- Large hemoperitoneum
- Devitalized bowel loops
- Expanding retroperitoneal hematoma

Specific injury management

Liver Injury

- Non Operative Management in most cases
- Blood transfusion as needed
- Angioembolization if arterial blush
- Surgery for uncontrolled bleeding

Splenic Injury

- Splenectomy if shock persists
- Vaccination post-splenectomy

Renal Trauma

- Avoid excessive fluids
- Monitor urine output
- CT with delayed phase
- Surgery only if expanding hematoma / pedicle injury

Pancreatic Trauma

- Serum amylase often normal early
- CT/MRCP if suspected
- Early surgical intervention for ductal injury

Bowel / Mesenteric Injury

- Peritonitis or free air → surgery
- Mesenteric tear → risk of delayed ischemia
- Monitor lactate and abdominal signs

Retroperitoneal Hematoma

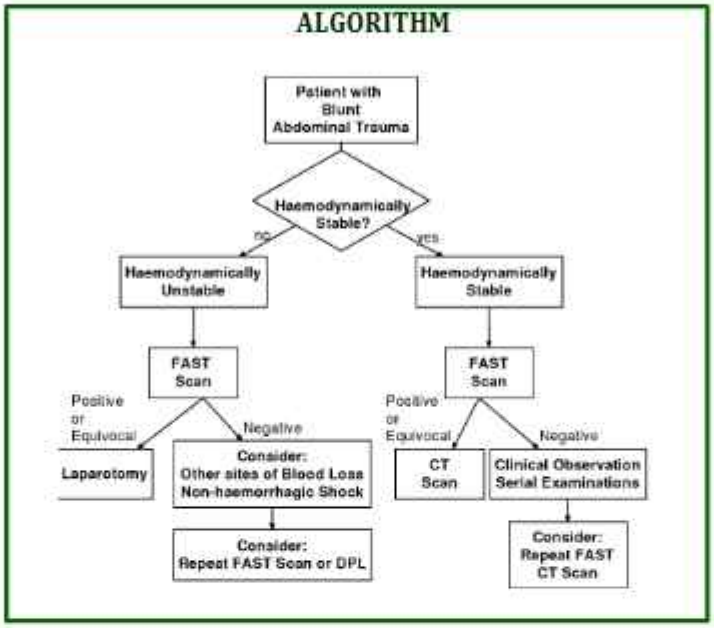
- Zone I → explore
- Zone II (renal) → selective exploration
- Zone III (pelvic) → usually non-surgical; pelvic binder

Surgical options

- Midline exploratory laparotomy
- Damage control surgery
- Packing, temporary closure
- Bowel resection/anastomosis
- Splenectomy / splenorrhaphy
- Repairs of liver, pancreas, mesentery

- Vascular repair
- Endovascular embolization (in stable patients)

Early and appropriate intervention reduces mortality.



Referral Pathway (Kerala Government Medical College System)

- **Primary Care / Taluk Hospital**
  - ABC stabilization + E-FAST → refer if suspected bleeding
- **District Hospital**
  - CT Abdomen if stable → refer early to GMC/trauma centre if intervention needed
- **Tertiary Trauma Centre**
  - Definitive surgical or IR management available

Communication: Trauma Team Activation – Early call to Surgery + Anaesthesia + Radiology

References

1. ATLS – Advanced Trauma Life Support, Latest Edition
2. WSES Guidelines for Abdominal Trauma
3. Eastern Association for the Surgery of Trauma (EAST) Guidelines
4. WHO Trauma Care Manual
5. Bailey & Love's Short Practice of Surgery, 28th Edition
6. Govt. of India – Standard Treatment Guidelines for Trauma

Section X
BLUNT TRAUMA CHEST

Introduction

Blunt chest trauma commonly results from road traffic accidents, falls, and workplace injuries. It may cause injuries to the chest wall, lungs, pleura, heart, diaphragm, or great vessels. Patients commonly present with chest pain, respiratory distress, tachypnoea, reduced oxygen saturation and may have chest wall deformity or subcutaneous emphysema.

Initial assessment follows an ATLS-based approach: airway with cervical spine protection, breathing assessment, control of any pneumothorax/hemothorax, supplemental oxygen, IV access, fluid resuscitation, analgesia, and early imaging. Early detection of life-threatening conditions such as tension pneumothorax, massive hemothorax , flail chest, cardiac tamponade, and major airway injury is critical.

Patients with significant physiological compromise, associated polytrauma, or suspected intrathoracic injuries should be urgently referred to higher centres.

Scope

This Standard Practice Guideline is applicable to medical professionals involved in the management of blunt chest trauma across Primary Health Centres, District Hospitals, and Tertiary Care Centres in Kerala.

Definition

Blunt Chest Trauma is a non-penetrating injury to the thorax resulting from direct external force leading to pathological changes in the thoracic structures including ribs, lungs, pleura, mediastinum and diaphragm.

Background

Blunt thoracic injuries constitute around 25% of trauma-related deaths. Appropriate and timely intervention prevents mortality in most cases.

Common clinical entities include:

- Rib fractures (single / multiple)
- Flail chest
- Pulmonary contusion

- Pneumothorax / Hemothorax
- Sternal fracture
- Cardiac contusion
- Tracheobronchial and diaphragmatic injury (rare but fatal if missed)

Primary care hospitals

Investigations

- Pulse oximetry
- Chest X-ray PA (or portable AP)
- ECG in polytrauma or chest wall tenderness

Management plan

- Ensure Airway patency; give oxygen
- Control external bleeding if present
- IV access with crystalloids (judicious use)
- Adequate analgesia (avoid respiratory depression)
- If suspected pneumothorax: needle decompression followed by referral
- Assess for life-threatening signs:
    - Respiratory distress / absent breath sounds
    - Tracheal deviation
    - Hypotension / distended neck veins
- Immobilize spine if polytrauma

District & tertiary care setting

Investigations

- All primary care tests plus:
- Serial ABG / Lactate as indicated

- ECG & Continuous monitoring
- Ultrasound FAST to detect hemothorax, tamponade
- CECT Chest (including CT angiography if vascular injury suspected)

Management Plan

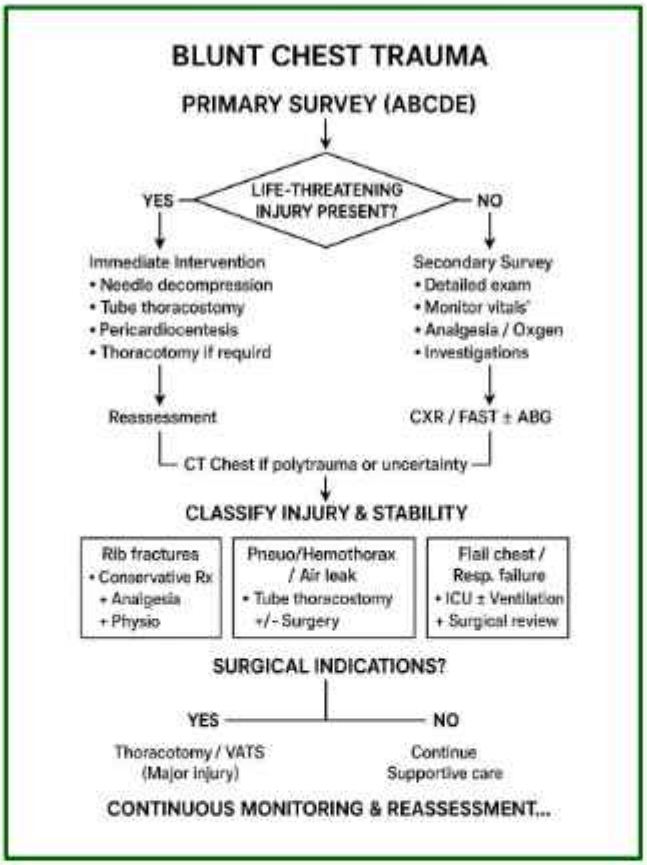
- Continue ABC stabilization as per ATLS
- Oxygen therapy: maintain SpO_2 > 94%
- Analgesics:
- Tube thoracostomy for:
    - Hemothorax / pneumothorax
- Broad-spectrum antibiotics only if tube inserted or open fracture
- Respiratory physiotherapy and incentive spirometry
- Early ICU involvement if:
    - Flail chest
    - Bilateral severe contusions

Further radiological imaging

- CECT is advised if:
    - Diagnosis uncertain
    - Evaluate rib fractures, sternum, diaphragm, major airways
    - Risk of vascular injury (mediastinal widening)
- Immediate surgical team review if CT suggests:
    - Massive hemothorax (>1500 ml initially or >200 ml/hr For 3- 4hrs)
    - Major airway disruption
    - Diaphragmatic rupture
    - Active vascular injury / Aortic injury

ALGORITHM

BLUNT CHEST TRAUMA – DYNAMIC ALGORITHM



Specific injury management

Rib Fractures

- Good analgesia + physiotherapy
- Elderly or ≥3 rib fractures → consider ICU admission

Flail Chest

- Early analgesia ± regional technique
- CPAP / Mechanical ventilation if severe respiratory compromise

Pneumothorax / Hemothorax

- Chest tube insertion
- Thoracotomy if uncontrolled bleeding or persistent air leak

Pulmonary Contusion

- Oxygen, non-invasive ventilation if needed
- Avoid fluid overload
- Early physiotherapy

Cardiac / Great Vessel Injury

- ECG and cardiac enzymes
- CT angiography
- Cardiothoracic surgery referral

Surgery

Indications:

- Massive hemothorax
- Cardiac tamponade
- Tracheobronchial rupture
- Diaphragmatic rupture
- Ongoing air/blood leak despite drainage

Surgical options:

- Thoracotomy
- VATS in stable patients with retained hemothorax or persistent leaks

Early intervention improves outcomes.

References

1. ATLS – Advanced Trauma Life Support, Latest Edition.
2. Eastern Association for the Surgery of Trauma (EAST) Guidelines.
3. World Society of Emergency Surgery (WSES) Trauma Guidelines.
4. British Thoracic Society Pleural guidelines.
5. Bailey & Love's Short Practice of Surgery, 28th Edition
6. Standard Treatment Guidelines for Management of Trauma – Govt of India