Case Discussion in Surgery

Acute Abdomen — Case Based Approach For Clinicians

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Acute abdomen refers to the condition where patient experiences sudden onset severe abdominal pain lasting for ≤5 days. It is one of the most common complaints that drives patient to emergency (Approx. 4-5% of total casualty visits). Initial approach directed to rule out most emergency conditions by focused evaluation along with ongoing resuscitation to prevent fatalities is necessary. Ultrasound which is regarded as an extension of clinical examination is an invaluable investigation along with an Abdominal and Chest x-ray, all of which together and clinical examination provides the diagnosis in more than 90% cases. Operative cases need to be identified and conditions requiring conservative management, a further diagnostic / staging workup and management protocol can be followed afterward.

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Key Words : Acute abdomen, Cholecystitis, Pancreatitis, Appendicities, Peritonitis, Acute Intestinal obstruction.

Case Scenario 1 :

A 35 year old lady, presented in surgical emergency with complaints of pain abdomen associated with vomiting for the last 3 days. The pain was acute in onset, dull aching, moderate to severe intensity, radiating to back, it gets aggravated on lying supine and somewhat relieves on sitting and leaning forward. She also has complaints of nausea and multiple episodes of non-bilious, non-projectile, non-blood staining vomiting during the last 3 days. On examination she was conscious, co-operative and oriented. She was dehydrated having pulse rate of 108 beats per minutes and BP of 96/60 mm of Hg. On per abdominal examination guarding and rigidity was present along with rebound tenderness predominantly in central abdomen. Investigations revealed TC 18000 and Serum Amylase 1100 and Lipase 800 while her other blood parameters were normal. Plain abdomen x-ray revealed dilated bowel loop with colon cut-of sign. Ultrasonography showed multiple calculi in the gallbladder with normal biliary tract. A diagnosis of acute gallstone induced pancreatitis made and patient was managed with intravenous fluid, analgesics and antibiotic. She improved well and after a span of 1 month an elective laparoscopic cholecystectomy was performed,she had an uneventful post-operative period and was discharged on POD[1].

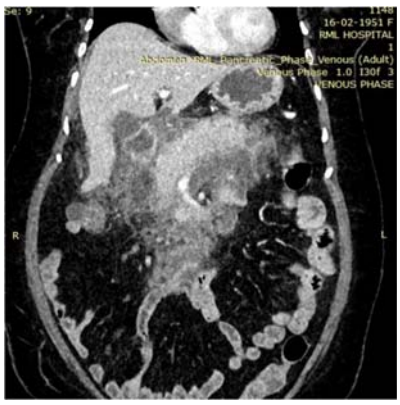

Fig 1 — Coronal Image of Oedematous pancreatitis

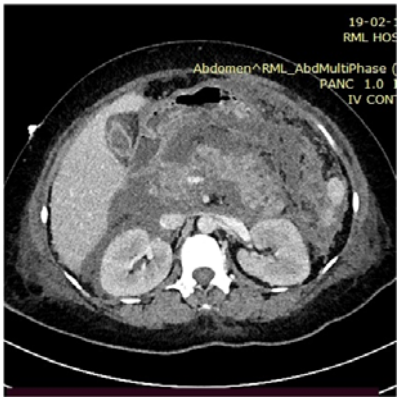

Fig 2 — Axial CECT image showing Haemorrhagic pancreatitis with necrosis

Case Scenario 2 :

A 22 years old gentleman, presented to emergency with complaints of pain abdomen for the last 2 days associated with fever and nausea. The pain was acute in onset, colicky character, moderated to severe intensity, initially in periumbilical region which migrated to right iliac fossa. The fever was high grade and associated with chills but not rigor, not associated with rash, body ache. He has no other significant history and no addictions. On examination patient looked anxious while hydration was adequate &had tachycardia (104/min) and BP of 106/70 mm of Hg. Total leucocyte count was raised 15000 with predominantly high neutrophil count. Other blood investigation were normal. Chest X-Ray and abdomen x-rays were grossly normal. Ultrasonography suggested features of acute appendicitis. Diagnosis of acute appendicitis was made and patient was taken for appendectomy after resuscitation and informed consent. Intraoperatively appendix was inflamed at tip and base was normal. Appendectomy was performed and patient shifted to ward. Post op was uneventful and discharged on POD[2] and sutures removed on POD[8].

History Taking in Acute Abdominal Pain:

Thorough and meticulous history is crucial to diagnose the causes of the overlying pathology. Age, sex, occupation, residence and social status should also be taken into consideration to appropriately localise the cause.

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Symptom Analysis for Acute Abdominal Pain :

Original site of pain — Ask patient to localise by fingertip the site of origin of pain, e.g., hepatitis, acute cholecystitis or pleurisy in the right upper quadrant, peptic ulcer disease or angina in epigastric region, pancreatitis in central abdomen, acute appendicitis periumbilical in origin but migrate to localise in right iliac fossa, diverticulitis in left lower quadrant, renal colic in flanks, cystitis or PID in supra pubic region etc.

Mode of onset — Sudden onset pain may indicate acute pancreatitis, acute appendicitis, rupture of aneurysm, perforation etc.

Character of Pain :

Colicky pain — Sharp intermitted gripping pain which comes suddenly and disappears suddenly often associated with vomiting and sweating, eg, ureteric colic, biliary colic, intestinal colic and appendicular colic.

Constant burning pain — Burning sensation eg, perforation, peptic ulcer disease.

Stabbing pain — Sudden, severe, sharp and short-lived pain eg, acute perforation of peptic ulcer.

Severe agonising pain — eg, acute pancreatitis or torsion

Throbbing pain — throbbing sensation eg, pyogenic abscesses.

Scalding pain — type of burning sensation felt particularly during micturition, eg, cystitis, acute pyelonephritis or urethritis.

Twisting pain — sensation of something twisting inside the body.e.g.,volvulus of intestine, torsion of testis or ovarian cyst.

Change in character of the pain — colicky become constant burning type may indicate strangulation. Pain may become less intense in spite of ongoing disease eg, 2nd stage of peptic perforation due to dilution of gastric contents by peritoneal exudate.

Effect of pressure on pain — colicky pain decreases while inflammatory pain aggravates.

Relation of the pain to jolting, walking, respiration and micturition — ureteric colic gets worse on jolting. Pain during act of micturition or 'strangury' may suggest ureteric colic, vesical calculi, pelvic appendicitis, pelvic abscess. In diaphragmatic pleurisy pain is aggravated during deep inspiration.

Radiating pain — extension to another site whilst the original site persists at its site eg, acute pancreatitis and duodenal ulcer penetrating posteriorly radiates back. This pain is of same character.

Referred pain — Pain felt at a distant site from its source while no pain at the site of disease. eg, irritation of diaphragm in cases of hepatitis, acute cholecystitis may cause referred pain at right shoulder tip.

Migrating or shifting pain — pain felt at one site at beginning and then shifted to another site with no pain at initial site e.g., acute appendicitis pain migrates from umbilical region to right iliac fossa.

Special time of occurrence — acute appendicitis on waking up in the morning, duodenal ulcer at 4 pm in the afternoon and in the early morning at about 2 to 3 a.m. 'hunger pain'.

Aggravating and relieving factors — hunger aggravates duodenal ulcer while food aggravates gastric ulcer, fatty meal aggravates acute cholecystitis. In peritonitis lying down still may reduce pain while rolling about aggravates the pain, forward leaning patient may get some relief in pancreatitis. Vomiting usually relieves peptic ulcer.

Vomiting :

Character — projectile ie, involuntary forceful ejection of a large quantity in high intestinal obstruction, toxic enteritis etc. In case of peritonitis non projectile is seen.

Vomitus — non bilious when obstruction is proximal to D2, bilious when obstruction is distal to D2, more distal obstruction may cause feculent vomiting

Frequency — multiple, profuse, constant in intestinal obstruction and acute pancreatitis. In appendicitis nausea is more prominent.

Relation with pain — pain precedes vomiting e.g., acute appendicitis, acute pancreatitis, peptic ulcer, biliary and renal colics. In high intestine obstruction pain appears almost with vomiting.

Bowel habits — absolute obstipation in intestinal obstruction. In children passage of mucus and blood per annum may suggest intussusception. Diarrhoea is seen in ulcerative colitis, ileitis&acute enteritis.

EXAMINATION :

Meticulous examination is of paramount importance to identify red flag signs and to localise the possible etiology and streamline the essential investigations.

General Physical Examination :

- Appearance: Often the patient with acute abdomen present with anxious look and dehydrated state with alter higher mental function. From local signs of dehydration to typical 'facies Hippocratica'(terminal stage of peritonitis) can be observed.
- In condition like acute pancreatitis patient may be in leaning forward position. In peritonitis patient may lie still avoiding movements or in renal colic placing hand over the flanks.
- Pallor may be present in haemorrhagic conditions like aortic aneurysm rupture, haemorrhagic pancreatitis, bleeding varices, peptic ulcer eroding vessels, ruptured ectopic gestation etc.
- Patient may be icteric in conditions like cholangitis, hepatitis, acute pancreatitis
- Febrile in cases of inflammatory conditions. (eg, liver abscess, lower lobe pneumonia, cholangitis)
- Tachycardia in cases of febrile illness, dehydrated state, haemorrhagic conditions.
- Tachypnoea with decreased abdominal movement and avoiding deep inspiration in cases of peritonitis. Also observed in chest pathologies.

Per Abdomen Examination :

Inspection :

Shape — Distension of abdomen is seen in acute intestinal obstruction (central in small bowel obstruction whereas peripheral in large bowel obstruction), ascites secondary to perforation, severe complicated pancreatitis, chronic liver disease etc.However,shape is normal in acute appendicitis, acute cholecystistis, renal or biliary colic.

Abdominal Movement with respiration — restricted /absent in diffuse peritonitis (perforation), haemorrhage into peritoneal cavity (ruptured ectopic gestation). Localised restriction of movement in cases of acute cholecystitis, liver abscess, appendicitis etc.

Umbilicus — everted in ascites, displaced from central position in cases of abdominal distension (supra pubic distension may cause umbilicus shifted upward)

Skin — visualised skin may have signs of inflammation like in abdominal wall cellulitis, abscess (parietal or intraabdominal seeping through abdominal wall). Discolouration in flanks (Grey Turner sign) or bluish hue around umbilicus(Cullen's sign) in cases of acute haemorrhagic pancreatitis

Dilated/engorged veins — portal hypertension or IVC thrombosis

Peristaltic movements — step ladder pattern in small bowel obstruction, from left to right over upper abdomen in cases of gastric outlet obstruction and opposite direction in colonic obstruction.

Hernial site with expansile cough impulse should be inspected

Palpation :

Temperature — Rise in local temperature in inflammatory conditions.

Hyperaesthesia — Cutaneous hypersensitivity in presence of underlying inflamed abdominal organ (e.g., sherren's triangle in case of acute appendicitis, Boas's sign in acute cholecystitis)

Tenderness — There may be localised tenderness (eg, just below the tip of 9th costal cartilage on lateral border of right rectus in acute cholecystitis, tenderness at 1 inch to the right of midline in transpyloric plane (duodenal point) in duodenal ulcer, right iliac fossa tenderness in acute appendicitis also on palpation on left iliac fossa tenderness can be elicited on right iliac fossa suggestive of acute appendicitis (Rovsing'sign) or generalised tenderness (eg, peritonitis, pancreatitis etc.)

Rigidity — Protective mechanism in parietal peritonitis, can be involuntary (underlying parietal peritonitis) and voluntary (guarding: abdominal muscle contraction by patient himself due to fear of being hurt). Board like rigidity in end stage of peritonitis.

Lump — Appendicular lump in appendicitis, sausage shaped lump in intussusception in epigastric or left lumbar region associated with empty right iliac fossa (Sign-de-dance), cold abscess, phlegmon, interstitial hernia.

All hernial sites should also be palpated.

Percussion :

Shifting dullness to look for presence of free fluid (Perforation, acute pancreatitis, ruptured ectopic gestation)

Fluid thrill large amount of fluid in abdominal cavity. Eg, Gross Ascites

Obliteration of liver dullness by resonant sound in cases of free gas under diaphragm (perforation).

Auscultation :

Silent abdomen in diffuse peritonitis whereas noisy abdomen in acute intestinal obstruction later become silent.

Digital rectal examination should be done in all cases (Red currant jelly in intussusception, fresh blood staining and clots in lower GI bleed, black colored foul smelling staining in upper GI bleed).

Vaginal examination in suspicion of PID.

INVESTIGATIONS :

Laboratory :

- **Complete hemogram**
  Anaemic in haemorrhagic conditions
  Leucocytosis indicates inflammatory conditions
  Platelets may be decreased in severe sepsis.
- Liver function test, kidney function test, Serum electrolytes
  Deranged ALT/AST in hepatitis
  Increased ALP with bilirubin level in biliary obstruction (eg, cholangitis, pancreatitis), hypocalcemia in pancreatitis
- Serum amylase / lipase
  Increased in acute pancreatitis (lipase is more specific)
- Arterial blood gas analysis to assess base excess, lactate level, saturation, metabolic abnormalities etc.
- Coagulation profile
- Tridot
- ESR/CRP as sepsis marker
- Urinalysis (dealing with urinary tract pathology)
- Urine Pregnancy Test (in reproductive age group of female)
- Serum glucose
- Trop-T (to rule out MI)

Radiologic Investigations :

- ECG (to rule out cardiac cause)
- Chest x-ray (pneumothorax, hydro/hemothorax, pneumohemothorax, pleural effusion, consolidation in basal pneumonia, raised hemidiaphragm in case of subphrenic abscess or liver abscess, free gas under right hemidiaphragm & as a work up for surgery)
- Abdomen x-ray erect and supine (dilated bowel loops, air fluid levels, colon cut-of sign, volvulus, calculi etc)
- Ultrasound abdomen (to look for free fluid in the peritoneal cavity (perforation, SBP, ascites), look for signs of cholecystitis, dilated biliary tract, pancreatitis, appendicitis, liver abscess, pyonephrosis.
- NCCT KUB (urinary tract calculi)
- CECT abdomen & pelvis in cases of diagnostic dilemma or complications.
- CECT angiography as diagnostic approach for uncontrolled bleeding (eg, Lower GI Bleed)
- Endoscopy: GI Bleed

Exploratory laparotomy in case of acute abdomen and patient not improving and diagnosis not confirmed.

Red flags for Abdominal Pain:

- Acute onset abdominal pain
- Hematemesis, hematochezia
- Jaundice

- Bilious / feculent vomiting
- Guarding/rigidity
- Rebound tenderness
- Absent bowel sounds
- Absolute constipation
- Gross abdominal distension
- Intolerance to feed
- Presence of other co-morbidities and old age
- Previous history of abdominal surgery

Management :

- Triage to rule out most emergency conditions, which require urgent intervention.
- ABCDE
- Intravenous fluid replacement and then maintenance
- Intravenous analgesics and antibiotics
- Ryles tubes placement to decompress the GI tract in cases of obstruction, recurrent vomiting, ileus, perforation, etc.
- Foley catheterization to monitor urine output.
- Vital charting and blood sugar charting as needed

Intervention as per the Disease Requirement :

Pigtail/needle aspiration — Liver abscess, localised collection (appendicular abscess, subphrenic abscess, splenic abscess, pyonephrosis etc.)

Conditions Requiring Emergency Surgeries :

Perforated peptic ulcer, typhoid perforation peritonitis, tuberculous perforation, acute complicated appendicitis, GB perforation, ishaemic bowel disease, irreducible/obstructed/strangulated hernias, ruptured liver abscess, torsion testes, complicated diverticulitis, acute intestinal obstruction, ruptured aortic aneurysm, etc.

Diffuse Pain Abdomen :

- Peritonitis
- Bowel ischemia
- Obstruction
- Pancreatitis
- Aortic aneurysm

RUQ Pain :

- Biliary: cholecystitis, cholangitis
- Colonic: colitis, diverticulitis
- Hepatic: abscess, hepatitis, mass
- Pulmonary: pneumonia
- Renal: calculi, pyelonephritis

Epigastric Pain :

- Cholecystitis, cholangitis
- MI, angina
- Gastritis, PUD
- Pancreatitis

LUQ Pain :

- Gastric: PUD, gastritis
- Cardiac: angina, MI
- Spleen: abscess, infection
- Renal: calculi, pyelonephritis
- Pancreas: pancreatitis
- Pulmonary: pneumonia

RLQ Pain :

- AppendicItis, Colitis, Diverticulitis, IBD, IBS
- Ectopic Pregnancy, Ovarian Cyst, Torsion, PID
- Nephrolithiasis, Pyelonephritis

Suprapubic Pain :

- Appendicitis
- Colitis, Diverticulitis, IBD, IBS
- Ectopic pregnancy, Ovarian cyst
- Cystitis, pyelonephritis

LLQ Pain :

- Diverticulitis, Colitis, IBD, IBS
- Ectopic pregnancy, ovarian cyst, torsion
- Nephrolithiasis, pyelonephritis

Ultrasonography :

- Cholecystitis, liver abscess, biliary tract calculi and dilatation, pancreatitis
- Intra-abdominal collection, splenic abscess, pyonephrosis, renal calculi,
- Acute appendicitis, appendicular lump, typhilitis, ovarian cyst and torsion, PID, testicular torsion
- Obstruction, hernial defect its content and vascularity, aortic aneurysm

Chest X-ray PA View & Abdominal X-ray (erect & supine) :

Thoracic causes : Opacities(pneumonia)
Abdominal causes :

- free gas under right hemidiaphragm (perforation),
- elevated hemidiaphragm (subphrenic abscess, liver abscess)
- Urinary tract calculi
- Colon cut of in pancreatitis
- Multiple air fluid level (intestinal obstruction)
- Coffee bean sign (sigmoid volvulus)
- Ground glass appearance (ascites)

Approach to Acute Abdomen :

- ABCDE
- History and examination
- Resuscitation: I/V fluids, analgesics, antibiotics
- Laboratory investigations: hemogram, LFT, KFT, Serum electrolytes, amylase, lipase, CRP/ESR, PT/INR, viral markers, UPT, HCG, Trop-T
- Electrocardiogram

In cases of diagnostic dilemma and complications, CECT (abdomen+pelvis) should be done provided Kidney functions are normal.

In certain situations of acute abdomen exploratory laparotomy may be required where investigations fails to delineate the cause.

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