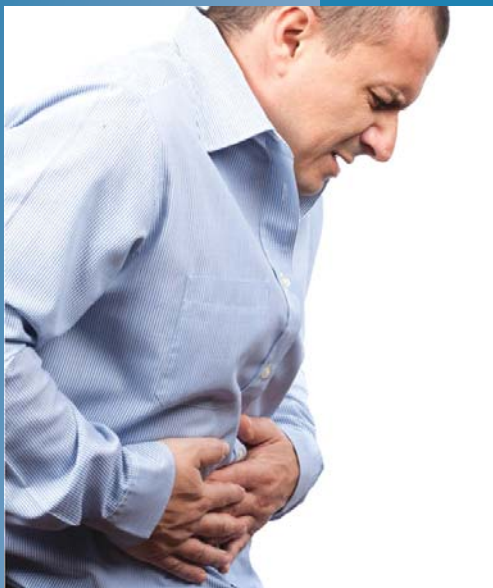


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MEDICUS

The essence of medical practice

Volume 10 Issue 4

**Acute
Abdomen**



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Editorial

Dear Doctor,

With your support and suggestion we have embellished this issue in a new way, we hope you will appreciate our efforts.

In this issue we have selected "Acute abdomen" as a topic of Review Article. Acute abdomen is a common presentation in emergency medicine, some of which require immediate medical care and / or surgery.

Needle aspiration is appropriate for patients with a first episode of primary spontaneous pneumothorax. That's why we would like to emphasize the "Needle aspiration of primary spontaneous pneumothorax" as Clinical Method.

Addition to these in Case Review, we have presented an interesting case on "Brugada syndrome diagnosed after Ramadan". Patients with known Brugada syndrome should be warned about the effects of a large meal, especially after fasting periods.

A new section "Diagnosis at a Glimpse" has been introduced in this issue, which, will be a interesting exercise for you.

We have refocused "Medical Miracles" in this issue; we believe, you will enjoy this section.

Besides these other regular features are there as usual. We expect this issue will be useful to you.

Lastly, to make our endeavor worthwhile we are unremittingly looking forward to your kind cooperation as always.



(Dr. S. M. Saidur Rahman)
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Acute Abdomen

Acute abdomen is the medical term used for pain in the abdomen that usually comes on suddenly and is so severe that one may have to go to the hospital. As opposed to common abdominal pain, which can be caused by minor issues such as constipation or gas, acute abdominal pain can signal a variety of more serious conditions, some of which require immediate medical care and/or surgery. Acute abdomen is a common presentation in emergency medicine. An optimal approach to diagnose the basis for abdominal pain should rely on the likelihood of disease, complaints, and other features of patient history, findings on physical examination, laboratory tests, and imaging studies. In patients with abdominal pain, symptoms that suggest surgical or emergent conditions include fever, protracted vomiting, syncope or presyncope, and evidence of gastrointestinal tract blood loss. Special populations may also be at risk for certain conditions causing abdominal pain, and these should be sought after in these subgroups. For example, women are at risk for genitourinary tract disease, and the elderly population may present with atypical symptoms of a disease.



Etiology

Many intra-abdominal disorders cause abdominal pain; some are trivial but some are immediately life threatening, requiring rapid diagnosis and surgery. These include ruptured abdominal aortic aneurysm (AAA), perforated viscus, mesenteric ischemia, and ruptured ectopic pregnancy. Others (e.g., intestinal obstruction, appendicitis, severe acute pancreatitis) are also serious and nearly

as urgent. Several extra-abdominal disorders also cause abdominal pain. Abdominal pain in neonates, infants, and young children has numerous causes not encountered in adults. These causes include necrotizing enterocolitis, meconium peritonitis, pyloric stenosis, volvulus of a gut with intestinal malrotation, imperforate anus, intussusception, and intestinal obstruction caused by atresia.

Etiology of acute abdomen

Inflammatory

- Acute appendicitis
- Acute cholecystitis
- Acute pancreatitis
- Cholangitis
- Diverticulitis
- Gastritis
- Perforated PU
- Inflammatory Bowel Disease (IBD)

Mechanical (Obstructive conditions)

- Incarcerated hernia
- Post-operative adhesions
- Intussusception
- Neoplastic
- Carcinoma of the colon

Vascular

- Mesenteric arterial thrombosis or embolism
- Ruptured or leaking aortic aneurysm

Congenital defects

- Malrotation of the gut with volvulus
- Congenital arteria or stenosis of the gut (Duodenal arteria)
- Omphalocele or Diaphragmatic hernia

Traumatic

- Stab and gunshot wounds
- Blunt abdominal injuries producing such conditions as splenic rupture

Others

- Urinary Tract Infection (UTI)
- Kidney stones

- Sickle cell crisis
- Diabetic ketoacidosis
- Infectious diarrhea
- Peptic ulcer
- Inferior MI
- Pneumonia
- Irritable Bowel Syndrome (IBS)

In women

- Menstrual cramps
- Endometriosis
- Uterine fibroids
- Twisted ovarian cyst
- Pelvic Inflammatory Disease (PID)
- Miscarriage or Ectopic pregnancy

Pathophysiology

Visceral pain comes from the abdominal viscera, which are innervated by autonomic nerve fibers and respond mainly to the sensations of distention and muscular contraction—not to cutting, tearing, or local irritation. Visceral pain is typically vague, dull, and nauseating. It is poorly localized and tends to be referred to areas corresponding to the embryonic origin of the affected structure. Foregut structures (stomach, duodenum, liver, and pancreas) cause upper abdominal pain. Midgut structures (small bowel, proximal colon, and appendix) cause periumbilical pain. Hindgut structures (distal colon and GU tract) cause lower abdominal pain.

Somatic pain comes from the parietal peritoneum, which is innervated by somatic nerves, which respond to irritation from infectious, chemical, or other inflammatory processes. Somatic pain is sharp and well localized.

Referred pain is pain perceived distant from its source and results from convergence of nerve fibers at the spinal cord. Common examples of referred pain are scapular pain due to biliary colic, groin pain due to renal colic, and shoulder pain due to blood or infection irritating the diaphragm.

Pathophysiology of pain in acute abdomen

Viscus	Segmental innervations	Nerves	Plexuses
Esophagus, Trachea, Bronchi	Vagus		
Heart and Aortic Arch	T ₁ -T ₃ or T ₄		Cardiac Pulmonary
Stomach Biliary tract	T ₅ -T ₇ T ₆ -T ₈		
Small intestine	T ₈ -T ₁₀		
Kidney	T ₁₀ -L ₁		Celiac and adrenal
Colon Uterine fundus	T ₁₀ -L ₁ T ₁₀ -L ₁		Renal Spermatic & Ovarian
Uterine cervix Bladder Rectum	S ₂ -S ₄		Pre-aortic <ul style="list-style-type: none"> ● Inferior mesenteric ● Superior hypogastric ● Bladder ● Prostate ● Uterus

Disorders that give rise to acute abdominal pain

Right upper quadrant (RUQ)

Biliary: cholecystitis, cholelithiasis, cholangitis
Colonic: colitis, diverticulitis
Hepatic: abscess, hepatitis, mass
Pulmonary: pneumonia, embolus
Renal: nephrolithiasis, pyelonephritis

Right lumbar (RL)

Renal: pyelonephritis, nephrolithiasis, urolithiasis, perinephric abscess, renal cell carcinoma, renal papillary necrosis, hydronephrosis, renal infarction
Hepatic: hydatid cyst, liver abscess
Colonic: appendicitis, appendicular abscess

Right lower quadrant (RLQ)

Colonic: appendicitis, colitis, diverticulitis, IBD, IBS
Gynecologic: ectopic pregnancy, fibroids, ovarian mass, torsion, PID
Renal: nephrolithiasis, pyelonephritis

Epigastric (EPI)

Biliary: cholecystitis, cholelithiasis, cholangitis
Cardiac: myocardial infarction, pericarditis
Gastric: esophagitis, gastritis, peptic ulcer
Pancreatic: mass, pancreatitis
Vascular: aortic dissection

Periumbilical (PU)

Colonic: early appendicitis
Gastric: esophagitis, gastritis, peptic ulcer, small-bowel mass or obstruction
Vascular: aortic dissection, mesenteric ischemia

Left upper quadrant (LUQ)

Cardiac: angina, myocardial infarction, pericarditis
Gastric: esophagitis, gastritis, peptic ulcer
Pancreatic: mass, pancreatitis
Renal: nephrolithiasis, pyelonephritis
Vascular: aortic dissection, mesenteric ischemia

Left lumbar (LL)

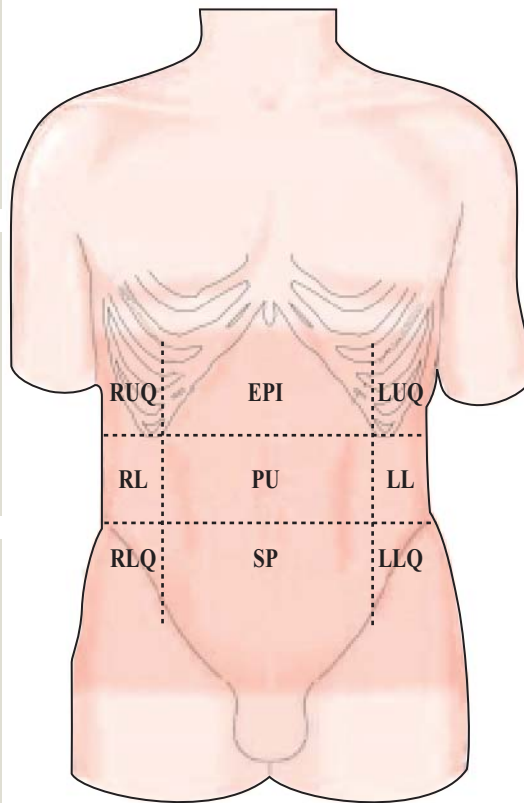
Renal: urinary calculi, pyelonephritis, glomerulonephritis, renal abscesses, obstruction of uretero-pelvic junction, polycystic kidney disease
Vascular: abdominal aortic aneurysms, acute renal infarction

Left lower quadrant (LLQ)

Colonic: colitis, diverticulitis, IBD, IBS
Gynecologic: ectopic pregnancy, fibroids, ovarian mass, torsion, PID
Renal: nephrolithiasis, pyelonephritis

Suprapubic (SP)

Colonic: appendicitis, colitis, diverticulitis, IBD, IBS
Gynecologic: ectopic pregnancy, fibroids, ovarian mass, torsion, PID
Renal: cystitis, nephrolithiasis, pyelonephritis



Clinical evaluation

History

A careful and methodical clinical history should be obtained. Key features of the history include the dimensions of pain (i.e., mode of onset, duration, frequency, character, location, chronology, radiation, and intensity), as well as the presence or absence of any aggravating or alleviating factors and associated symptoms. Often such a history is more valuable than any single laboratory or x-ray finding and determines the course of subsequent evaluation and management.

When possible, the history should be obtained from a nonsedated patient. The initial differential diagnosis can be determined by a delineation of the pain's location, radiation, and movement (e.g., appendicitis-associated pain usually moves from the periumbilical

area to the right lower quadrant of the abdomen). After the location is identified, the physician should obtain general information about onset, duration, severity, and quality of pain and about exacerbating and remitting factors.

Key points on history

- Site
- Nature & character
- Duration
- Intensity
- Precipitating & relieving factors
- Associated symptoms

Symptoms and signs

The symptoms of acute abdomen have a variety of causes.

- Pain in the abdomen: Usually sudden onset, progressively worse, either localized or generalized. Pain may be shifted to other area or may be referred to particular area. Frequently pain is associated with abdominal cramp.
- Vomiting: On several occasions. May be followed by nausea. Sometimes the vomiting may be associated with abdominal cramp.
- Distension: Usually distension is generalized may be localized. It is usually associated with progression of pain.
- Constipation: Less important feature. But whenever present signifies serious form of acute abdomen.
- Diarrhoea: If the nature of stool varies, then it signifies some serious condition.
- Rebound tenderness: May be either localized or generalized. Presence of this sign indicates underlying peritonitis.
- Muscle guarding & Board like rigidity.
- Reduce urine output.

Other Features- Cullen's sign, Rovsing's sign, Grey Turner's sign, Tachycardia, Hypotension etc.

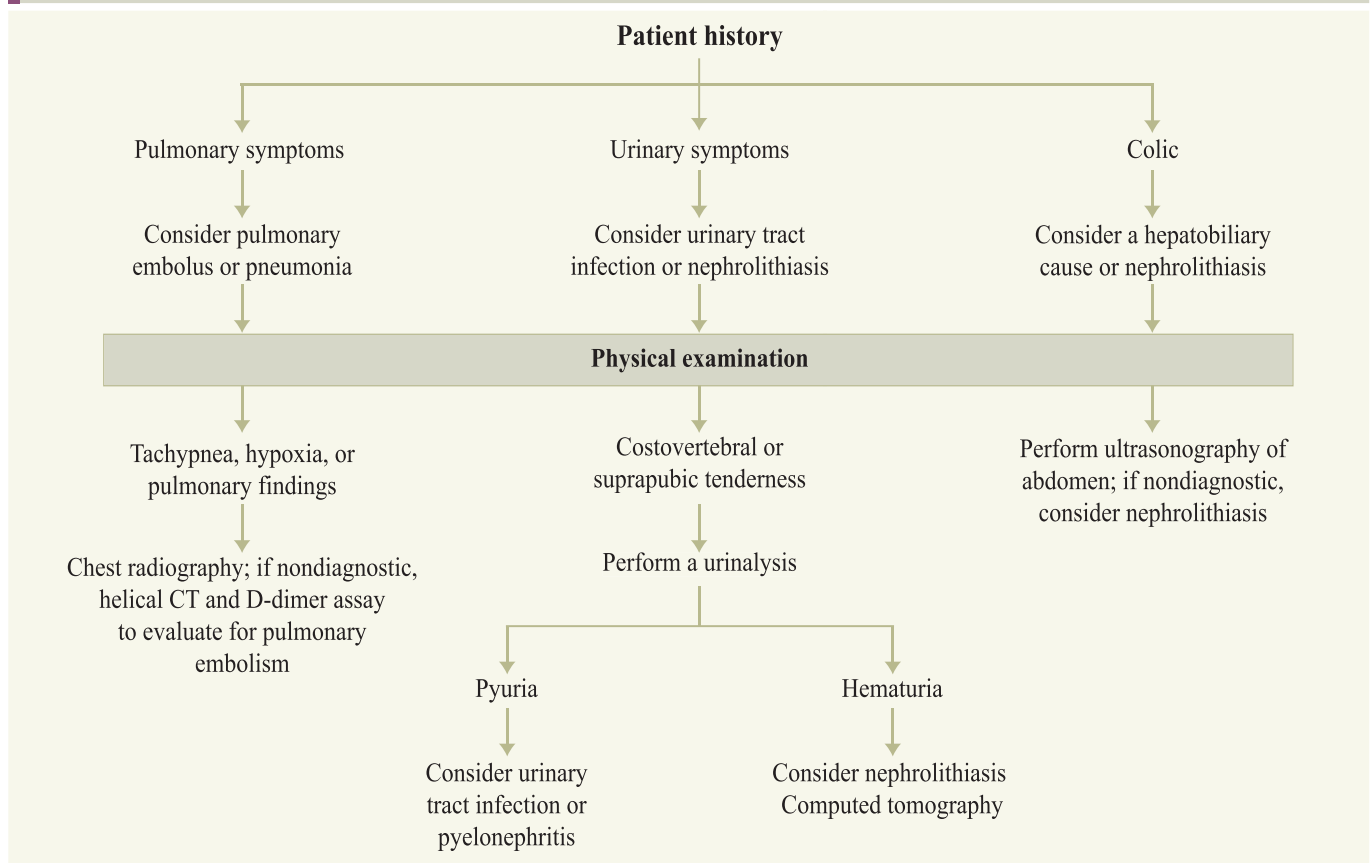
Red flag symptoms

- Possible pregnancy
- Acutely systemically unwell
- Dehydrated
- Post trauma
- Guarding or rebound tenderness
- Abdominal distension
- Unexplained weight loss
- Post trauma

Evaluation of right upper quadrant abdominal pain

A stepwise approach to abdominal pain requires identification of specific high risk population. For right quadrant pain, the history focuses on differentiating pulmonary, urinary, and hepatobiliary pain. If urinary tract infection or nephrolithiasis is suspected, urinalysis is appropriate. Patients with colic, fever, steatorrhea, or a positive Murphy's sign should receive ultrasonography.

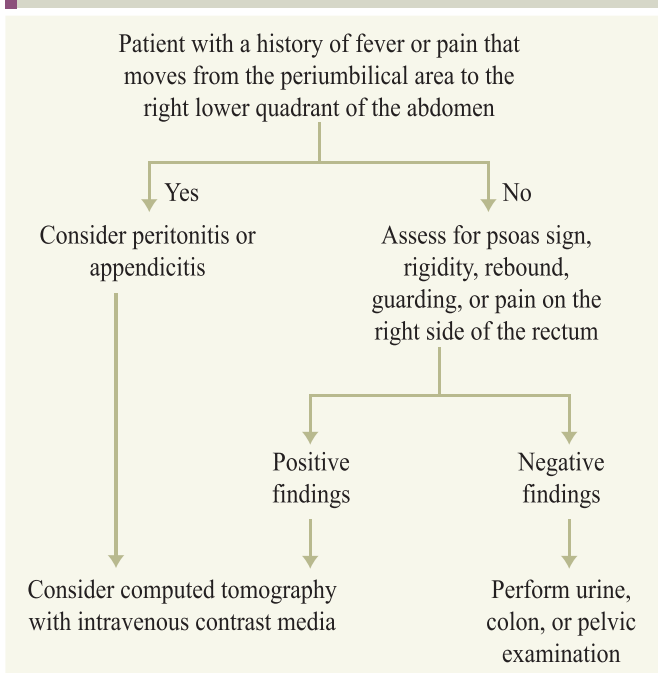
Evaluation of right upper quadrant abdominal pain



Evaluation of right lower quadrant abdominal pain

The evaluation of right lower quadrant pain is guided by the patient's history. Patients with symptoms (e.g., fever, relocation of pain) or signs (e.g., psoas sign, rigidity, rebound, guarding) suggestive of appendicitis should receive CT and urgent surgical consultation. Normal CT findings should trigger additional urine, colon, or pelvic examination.

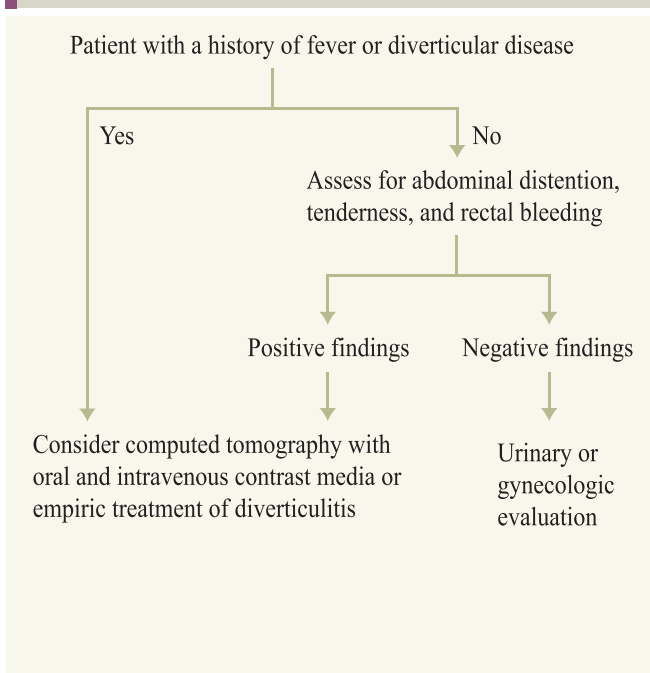
Evaluation of right lower quadrant abdominal pain



Evaluation of left lower quadrant abdominal pain

Left lower quadrant abdominal pain focuses on evaluation for diverticulitis. Fever, previous diverticular disease, or suggestive physical examination findings (e.g., distention, tenderness, and rectal blood) should prompt empiric therapy or CT. A normal evaluation should prompt further consideration of urinary or gynecologic pathology.

Evaluation of left lower quadrant abdominal pain



Physical examination

The physical examination begins with a brief but thorough evaluation of the patient's general appearance and ability to answer questions. The degree of obvious pain should be estimated. The patient's position in bed should be noted. A patient who lies motionless with flexed hips and knees is more likely to have generalized peritonitis. A restless patient who writhes about in bed is more likely to have colicky pain.



Examination of abdomen

The area of maximal pain should be identified before the physical examination is begun. The examiner can do this simply asking the patient to cough and then to point with two fingers to the area where pain seems to be focused. This allows the examiner to avoid the area in the early stages of the examination and to confirm it at a later stage without causing the patient unnecessary discomfort in the meantime.

A pelvic examination should be in women, and an examination of the rectum and the groin should be performed in all patients. It should not be assumed that advanced imaging technology (e.g., CT, MRI, or USG) will provide the diagnosis most likely or with the highest level of confidence. The sensitivity and specificity (not to mention the cost-effectiveness) of any laboratory or imaging study are grounded in the intelligent gathering and categorization of signs and symptoms.

The first step in the abdominal examination is careful inspection of the anterior and posterior abdominal walls, the flanks, the perineum, and the genitalia for previous surgical scars (possible adhesions), hernias (incarceration or strangulation), distention (intestinal obstruction), obvious masses (distended gall bladder, abscesses, or tumors), ecchymosis or abrasions (trauma), striae (pregnancy or ascites), an everted umbilicus (increased intra-abdominal pressure), visible pulsation (aneurysm), visible peristalsis (obstruction), or engorged veins (portal hypertension).

The next recommended step in the abdominal examination is auscultation. Although it is important to note the presence (or absence) of bowel sounds and their quality, auscultations probably

the least rewarding aspect of the physical examination.

The third step is percussion to search for any areas of dullness, fluid collections, section of gas-filled bowel, or pockets of free air under the abdominal wall. Tympany may be present in patients with bowel obstruction or hollow viscus perforation.

The last step, palpation, is the most informative aspect of the physical examination. Palpation of the abdomen must be done very gently to avoid causing additional pain early in the examination.

Rectal, genital and (in women) pelvic examination are essential to the evaluation of all patients with acute abdominal pain.

Common abdominal signs and findings on physical examination

Sign	Finding	Association clinical condition
Cullen's sign	Bluish periumbilical discoloration	Retroperitoneal haemorrhage
Kehr's sign	Severe left shoulder pain	Splenic rupture Ruptured ectopic pregnancy
McBurney's sign	Tenderness located 2/3 distance from anterior iliac-spine to umbilicus on right side	Appendicitis
Murphy's sign	Abrupt interruption of inspiration on palpation of right upper quadrant	Acute cholecystitis
Iliopsoas sign	Hyperextension of right hip causing abdominal pain	Appendicitis
Obturator's sign	Internal rotation of flexed right hip causing abdominal pain	Appendicitis
Grey-Turner's sign	Discoloration of the flank	Retroperitoneal haemorrhage
Chandelier sign	Manipulation of cervix causes patient to lift buttocks off table	Pelvic inflammatory disease
Rovsing's	Right lower quadrant pain with palpation of the left lower quadrant	Appendicitis



Plain radiograph film of dilated loops of small bowel in small bowel obstruction

Investigation

Laboratory tests and imaging studies rarely, if ever, establish a definitive diagnosis by themselves; however, if used in the correct clinical setting, they can confirm or exclude specific diagnosis suggested by the history and physical examination.

Laboratory tests

In all patients except those in extremis, a complete blood count, blood chemistries, and a urinalysis are routinely obtained before a decision to operate. The hematocrit is important in that it allows the surgeon to detect significant changes in plasma volume

(e.g., dehydration caused by vomiting, diarrhea, or fluid loss into the peritoneum or the intestinal lumen), preexisting anemia, or bleeding. An elevated White blood cell (WBC) count is indicative of an inflammatory process and is a particularly helpful finding if associated with a marked left shift; however, the presence or absence of leukocytosis should never be the single deciding factor as to whether the patient should undergo an operation. A low WBC count may be a feature of viral infections, gastroenteritis, or non-specific abdominal pain. Other tests, such as C-reactive protein assay, may be useful for increasing confidence in the diagnosis of an acute inflammatory condition. An important consideration in the use of any such test is that derangements develop over time, becoming more likely as the illness progresses; thus, serial examinations might be more useful than a single test result obtained at an arbitrary point. Indeed, for the diagnosis of acute appendicitis, serial observations of the leukocyte count and the C-reactive protein level

have been shown to possess greater predictive value than single observation.

Serum electrolyte, blood urea nitrogen, and creatinine concentrations are useful in determining the nature and extent of fluid losses. Blood glucose and other chemistries may also be helpful. Liver function tests (serum bilirubin, alkaline phosphatase, and transaminase levels) are mandatory when abdominal pain is suspected of being hepatobiliary in origin. Similarly, amylase and lipase determinations are mandatory when pancreatitis is suspected, although it must be remembered that amylase levels may be low or normal in patients with pancreatitis and may be markedly elevated in patients with other conditions (e.g., intestinal obstruction, mesenteric thrombosis, and perforated ulcer). Electrocardiography is mandatory in elderly patients and in patients with a history of cardiomyopathy, dysrhythmia, or ischemic heart disease.

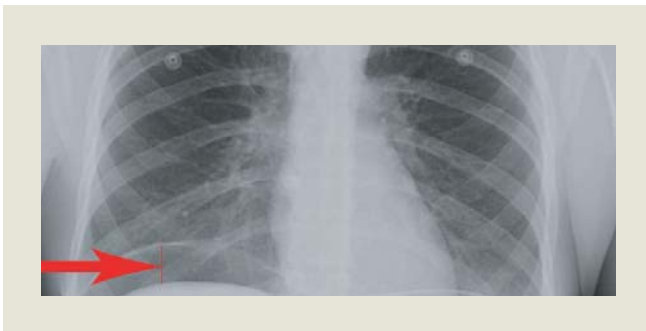
Laboratory and imaging studies for diagnosing patients with acute abdominal pain

Study	Etiology
Abdominal CT	Appendicitis; diverticulitis; bowel obstruction; pancreatitis (necrosis); abdominal aortic aneurysm in stable patient; mesenteric ischemia
Abdominal radiography	Bowel perforation; bowel obstruction/volvulus; abdominal aortic aneurysm; mesenteric ischemia (dilated loops, air-fluid levels, pneumatosis intestinalis, thumb printing [edema of bowel wall with convex indentations of lumen])
Amylase	Pancreatitis (less specific than lipase); bowel obstruction; peptic ulcer perforation; bowel perforation; mesenteric ischemia
Angiography	Mesenteric ischemia
Blood cultures	Infection
Chest radiography	Pneumonia; free air under diaphragm
Electrocardiography	Nonabdominal emergencies such as myocardial infarction or pulmonary embolism
Electrolytes	Diabetic ketoacidosis; electrolyte abnormalities; metabolic acidosis with bowel infarction (mesenteric ischemia)
Leukocytosis	Infection; intestinal ischemia; perforated peptic ulcer
Lipase	Pancreatitis; bowel obstruction; duodenal ulcer
Liver function test and transaminases	Cholecystitis (most commonly elevated alkaline phosphatase, H-glutamyltransferase, elevated bilirubin); mesenteric ischemia (possible elevated alkaline phosphatase)
Pulse oximetry	Pneumonia; pulmonary embolism
Ultrasonography	Cholecystitis; appendicitis (less accurate than CT, more operator dependent); abdominal aortic aneurysm in unstable patient
Urinalysis	Urinary tract infection

Imaging tests

Radiologic imaging plays a key role in the evaluation and management of the acute abdomen. Based on the location of abdominal pain, different imaging studies are recommended by the American College of Radiology as part of the diagnostic workup. Ultrasonography is preferred for evaluation of right upper quadrant pain and suprapubic pain versus computed tomography (CT) for right and left lower quadrant pain. CT with intravenous contrast media is recommended for workup of right lower quadrant pain, and CT with oral and intravenous contrast media is preferred for left lower quadrant pain. Initial radiologic evaluation of the patient with acute abdominal pain included plain films of the abdomen in the supine and standing positions and chest radiographs. Currently CT scanning is generally considered more likely to be helpful in most situations. Still, some situations remain in which plain films may be a more useful and safe form of investigations.

Although in most settings, CT is the preferred modality for primary evaluation of acute abdominal pain, there are certain settings in



Plain radiograph film showing free air under the right dome of diaphragm

which Ultrasonography (USG) should be considered. When gallstones are considered a likely diagnosis, USG is more appropriate to be diagnostic than CT is, given that about 85% of gallstones are not detected by X-rays.

Management

The primary goals in the management of patient's with acute abdominal pain are to establish a differential diagnosis and a plan for confirming the diagnosis through appropriate imaging studies, to determine whether operative intervention is necessary, and to prepare the patient for operation in a manner that minimizes perioperative morbidity and mortality. These steps can usually be completed in less than 1 hour and should be insisted on in the evaluation of most patients.

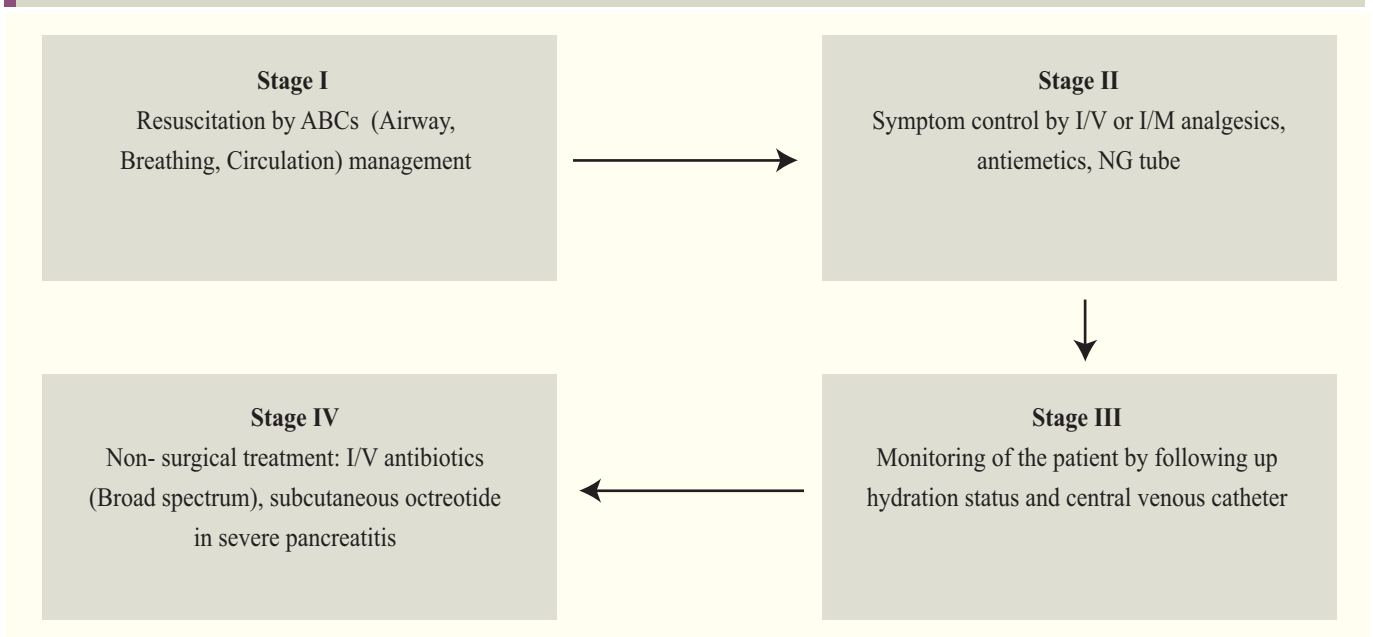
Primary

Resuscitation

Primary management of acute abdomen is to follow up Airway, Breathing and Circulation that is ABCs management.

- Patients should be kept in nothing by mouth
- Intravenous access by large bore IV cannula (beware of over transfusion in acute myocardial infarction)
- Cardiac monitoring and oxygen supplementation with pulse oximetry monitor
- Adequate blood transfusion is essential if sepsis or acute blood loss occur
- Continue transfusing until haemoglobin not reached more than 10 gm/dl and further bleeding or major surgery is planned

Stages of primary management



Symptom control

It is widely recognized that of all patients admitted for acute abdominal pain, only a minority require immediate or urgent operation.

A major point of contention in the management of patients with acute abdominal pain is the use of narcotic analgesics during the observation period.

- Intravenous or intramuscular opioid analgesics
- Antiemetic therapy
- Nasogastric tube if vomiting

Monitoring the patient

A final point is that over the course of a 24 to 48 hour observation period, the patient's condition may neither deteriorate nor improve, and supplemental investigation may be considered.

- Foley's catheter to follow hydration status and to obtain urinalysis
- Central venous catheter

Non-surgical treatment

Antibiotic must be consider when treating suspected abdominal sepsis or diffuse peritonitis. Coverage should be aimed at anaerobes and aerobic gram negatives. If spontaneous bacterial peritonitis suspected, must cover for gram positive aerobes.

- Intravenous gentamycin, amoxicillin, (suspected perforated peptic ulcer, mesenteric ischemia)
- Subcutaneous octreotide in severe pancreatitis

Definite

- **Perforated peptic ulcer:** Laparotomy followed by highly selective vagotomy (proximal gastric, or parietal cell vagotomy) combined with simple omental patch closure of the perforation and thorough peritoneal toileting.
- **Appendicitis:** Appendectomy within 4 hours. Should be done in at least tertiary level Hospital.
- **Ruptured abdominal aortic aneurysm:** Abdominal aortic aneurysms (AAAs) are typically repaired by an operative intervention. The possible approaches are the traditional open laparotomy, newer minimally invasive methodologies, or by the placement of endovascular stents. The aorta may be approached either transabdominally or through the retroperitoneal space. Approach juxtarenal and suprarenal aortic aneurysms from the left retroperitoneal space. Depending on the patient's anatomy, the aorta can be reconstructed with a tube graft, an aortic iliac bifurcation graft, or an aortofemoral bypass.
- **Mesenteric infarction:** In transmural colonic ischemia following

aortic aneurysm surgery resection of the affected bowel segment should be performed. Closing the distal end of the colon blindly and an end colostomy (the Hartmann procedure) is then a safe operation. If there is significant bowel infarction at the time of surgery all that could be done is removal of the dead gut. In case that the remaining part of the gut would allow oral nutrition and a normal life, resection should be performed. It is often advised to perform a second look 24 hours later and this decision should be made at the time of primary surgery.

- **Acute pancreatitis:** Intravenous fluid replacement, Oxygen mask, Antibiotics, Octreotide (+/-). Observe for progressive abdominal signs, features of intra-abdominal sepsis. Monitor full blood count, liver function tests, blood glucose level & arterial blood gases. ERCP, endoscopic sphincterotomy can be used to treat gallstone pancreatitis.
- **Acute cholecystitis:** Conservative treatment followed by interval cholecystectomy (6-8 weeks) with per operative cholangiogram.
- **Pneumoperitoneum:** If associated with peritonitis, immediate laparotomy, should be done in a centre where facility for laparotomy available.
- **Ruptured ectopic pregnancy:** Immediate laparotomy along with Blood Transfusion.

Prognosis

Outcome of acute abdomen depends on diagnosis, severity of symptoms, and prompt, effective treatment. Surgical outcome depends on the underlying condition that requires surgical repair. Prognosis for the majority of surgeries is good (i.e., appendicitis or cholecystectomy). The prognosis is more variable when an aneurysm or malignancy is the underlying cause. In women, a ruptured fallopian tube from an ectopic pregnancy can be life threatening, especially when hemorrhage occurs. Outcome may also be guarded if severe or widespread infection (e.g., peritonitis or sepsis) is present, especially in older individuals or individuals with increased risk of co-morbidities (e.g., obesity, diabetes, immunodeficiency, or other chronic conditions).

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Needle aspiration of primary spontaneous pneumothorax

P rimary spontaneous pneumothorax occurs in patients without clinically apparent lung disease or trauma. Observation may be the only requirement for patients with small primary spontaneous pneumothorax. For a large pneumothorax or one that causes clinically significant breathlessness, active intervention is required. This intervention may involve simple aspiration, the placement of a chest tube, or needle aspiration. Needle aspiration is considered to be as effective and safe as chest-tube thoracostomy for the management of primary spontaneous pneumothorax. Needle aspiration results in less discomfort and pain, a shorter hospital stay, and fewer hospital admissions than does chest-tube thoracostomy. Emergency-department physicians should be familiar with this technique and be able to explain it to patients as part of the decision making process involved in determining the best treatment. This supplement reviews the information provided in this article on the techniques and equipment required to perform needle aspiration of primary spontaneous pneumothorax in adults. Although needle aspiration may also be indicated for select patients with secondary pneumothorax, its use in patients with this condition is not addressed in this article.

Indications

Needle aspiration is appropriate for patients with a first episode of primary spontaneous pneumothorax. Patients should have no evidence of underlying lung disease but should have either shortness of breath or a pneumothorax with a rim of air measuring at least 2 cm when assessed at the level of the hilum.

Equipments

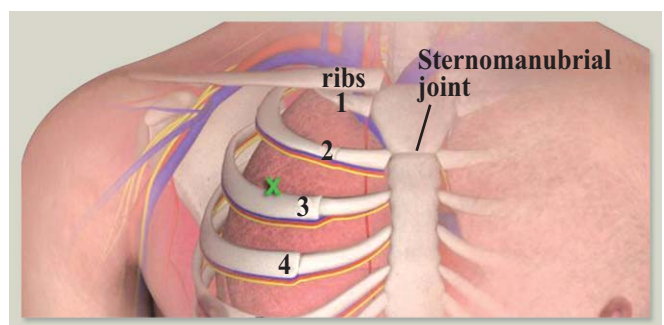
Different types of catheters can be used to perform needle aspiration. The procedure requires-

- A 16 gauge or 18 gauge over the needle catheter, tubing with a three way stopcock, and a 50 ml or 60 ml syringe.
- To administer a local anesthetic agent, it will need 1% or 2% lidocaine, a 10 ml syringe, and one small gauge needle (size 25).
- For anesthetizing deeper layers of tissue, it will also need one larger gauge needle (size 22).
- Sterile gloves, a protective or sterile gown, a face mask, chlorhexidine or another antiseptic solution, a sterile preparation kit, and sterile drapes are also required for the procedure.

Patient preparation

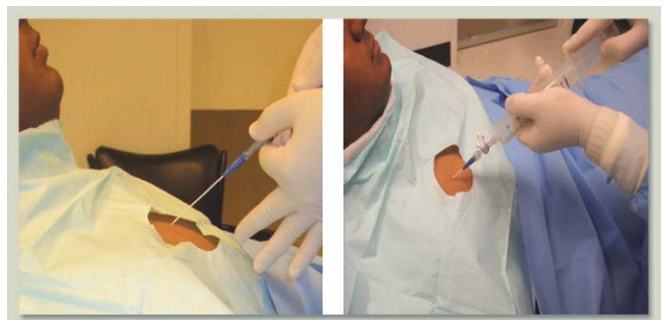
- To prepare the patient, explain the procedure, confirm the patient's identity, and obtain written informed consent.
- Verify the absence of contraindications, confirm that the patient has no allergy to lidocaine, and verify whether the pneumothorax is on the right or the left side.
- Place the patient in a semisupine position (with the torso at an angle of 30 to 45 degrees) to allow the air to collect at the apex of the lung.
- Administer oxygen and monitor the oxygen saturation of the

arterial blood with pulse oximetry. Heart rate and blood pressure should also be monitored, and an intravenous catheter should be in place.



Site of Needle Insertion

- The preferred location for placement of a needle for aspiration of pneumothorax is the second intercostals space at the midclavicular line, on the side with the pneumothorax. A skin marking pen can be used to mark the insertion site.



Confirmation of Penetration of Pleural Space

- The appearance of air bubbles in the syringe, which is partially filled with the local anesthetic, indicates that the catheter has penetrated the pleural space.

Procedure

- Put on the face mask, the protective or sterile gown, and the sterile gloves.
- Use chlorhexidine or another antiseptic solution to clean the patient's skin, and then position the sterile drape.
- Aspirate lidocaine into the 10 ml syringe.
- Using the 25 gauge needle, inject a wheal of lidocaine at the superior edge of the third rib, at the midclavicular line.
- Switch to a 22 gauge needle and anesthetize the deeper tissue layers by inserting the needle perpendicular to the skin.
- Always aspirate the site before injecting the anesthetic, to make sure the needle has not entered a blood vessel. With the needle positioned just over the top of the third rib, advance it in the direction of the pleural space.
- Place the needle just above the third rib will prevent injuries to the intercostal vessels and nerves, which lie just below the rib. Once the needle has been inserted through the intercostal space, continue to aspirate slightly. When it penetrates the pleural space, air bubbles will appear.
- Before removing the needle, note the depth of the penetration. The depth of the inserting needle can be used as a reference point.
- Connect over the needle catheter to the 10 ml lidocaine syringe, which should be partially filled with the remainder of the local anesthetic. Using the same landmarks that would be used for the local anesthetic, slowly advance the needle in the direction of the pleural space while continuing to aspirate with the syringe.
- Again, when the needle penetrates the pleural space, air bubbles will appear in the syringe. At this time, advance the needle by a few more millimeters to allow the catheter tip to fully penetrate the pleural space.
- Remove both the catheter needle and the 10 ml syringe as the patient exhales or coughs. Quickly obstruct the opening of the catheter with finger to prevent the entry of additional air into the pleural space.

After air is aspirated from a pneumothorax, it is returned to the ambient air through the side port of a three way stopcock.

- Attach the tubing with the three way stopcock to the catheter, and use the 50 ml or 60 ml syringe to gently aspirate the air from the pleural space.
- The evacuation of more than 2.5 liters is an indication that there may be an air leak, and the procedure should be stopped. Continue manual aspiration should be done until any more air cannot be aspirated. Remove the catheter and put a sterile dressing on the site of insertion.
- A postprocedural chest radiograph should be obtained with the patient in an upright position. When needle aspiration is

successful, the patient's symptoms will improve, and only minimal residual pneumothorax or no pneumothorax should be present on the chest film.



Aspiration of Air from a Pneumothorax

Contraindications

Needle aspiration is contraindicated when a patient has-

- Traumatic pneumothorax, pneumothorax in each lung
- Tension pneumothorax
- Hemodynamic instability
- Underlying pulmonary disease
- History of recurrent pneumothorax, or a bleeding disorder
- An age older than 50 years is a relative contraindication, because the procedure is less likely to be successful in patients in this age group

Complications

Complications from needle aspiration of primary spontaneous pneumothorax may include-

- Localized subcutaneous emphysema
- Infection
- Lung laceration
- Air embolism, or bleeding
- Technical failure may occur

Summary

Needle aspiration is an alternative treatment to the placement of a chest tube for patients with a first episode of primary spontaneous pneumothorax. A careful preprocedural evaluation is needed to be certain that there are no contraindications. All patients should be monitored closely during the procedure. After the anatomical landmarks have been identified and the local anesthetic agent has been administered, the intrapleural air can be evacuated through a large-bore catheter. The success of the procedure is confirmed by clinical improvement and by a chest film showing no or minimal residual pneumothorax.

Reference: N. Engl. J. Med. May 9, 2013, 368; 19: e24(1-3)

Brugada syndrome diagnosed after Ramadan

A 53 year old muslim man came to the emergency department with repeated transient loss of consciousness. He had been fasting for the previous 4 weeks, but had subsequently eaten a large meal when celebrating Eid Ul Fitr. In the early morning after this meal, while in bed, he had many sudden attacks of loss of consciousness. The patient's wife and children stated that during these episodes, the patient would suddenly stop breathing, drop his head back, and stare at the ceiling while losing strength in his limbs. The attacks were accompanied by amnesia and urinary incontinence. The patient had no significant medical history, nor did he use any medication, alcohol, or illicit drugs. Physical examination and laboratory tests at admission (haemoglobin, haematocrit, leucocytes, CRP, renal function, electrolytes, liver function, thyroid function, and troponin I) were unremarkable. Shortly after admission the patient again lost consciousness. The heart rhythm monitor showed several episodes of polymorphic ventricular tachycardia (VT) with spontaneous recovery to sinus rhythm (Figure A). The episodes of VT spontaneously intensified and eventually led to several episodes of sustained polymorphic VT and ventricular fibrillation (VF) requiring acute electrocardioversion twice. After the first electro cardioversion the patient was given a 300 mg bolus of intravenous amiodarone. Soon thereafter, the episodes of ventricular arrhythmia ended and the patient became haemodynamically stable.

The electrocardiogram shortly before and after the ventricular arrhythmia showed sinus rhythm with persistent coved type ST segment elevation in lead V1 and V2, characteristic for Brugada syndrome type I (Figure B). The patient did not have a history of syncope or aborted sudden cardiac death, nor was there a family history of sudden cardiac death. The criteria for Brugada syndrome were met, on the basis of typical Brugada type I electrocardiographic findings, sustained polymorphic VT, and a structurally normal heart on echocardiography. Treatment with oral quinidine 200 mg once daily was started, and several days later an implantable cardioverter defibrillator was inserted. At last follow up in March, 2013, the patient was in good condition. He had not had new episodes of ventricular tachycardia, and his electrocardiogram was normal. Genetic and family screening for Brugada syndrome was initiated.

increased insulin release. Characteristic ECG changes in patients with Brugada syndrome can be augmented by a large meal. If these changes occur, patients with this syndrome are at high risk of life-threatening arrhythmia and sudden cardiac death. In this patient with previously unknown Brugada syndrome, there were no initiating factors that might have caused the increased susceptibility for ventricular arrhythmia, apart from consuming a large meal. This case shows a first episode of sustained polymorphic VT induced by consumption of a large meal after a month of daily fasting in a patient with previously unknown Brugada syndrome. Patients with known Brugada syndrome should be warned about the effects of a large meal, especially after fasting periods. When assessing previously healthy patients with episodes of transient loss of consciousness at night, or after a large meal, physicians should be aware of Brugada syndrome.

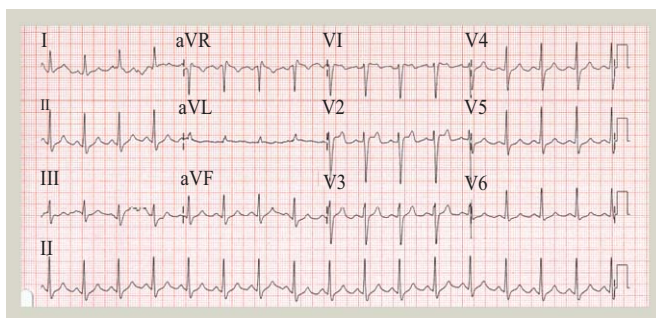


Figure: (A) Frequent ventricular ectopy and sustained polymorphic ventricular tachycardia

Brugada syndrome is electrocardiographically characterized by specific coved type ST segment elevation in leads V1-V3. Patients with Brugada syndrome have an increased risk of sudden cardiac death due to VT and VF. In these patients, ST segment elevations are modified by several factors including fever, medication, autonomic activity, and raised plasma insulin concentration. VF and sudden cardiac death have a circadian pattern in Brugada patients and occur more frequently at night and after meals. A high vagal tone and autonomic activity, and high glucose concentration and insulin release may be important factors in inducing VT in these patients. Food intake leads to both higher autonomic activity and

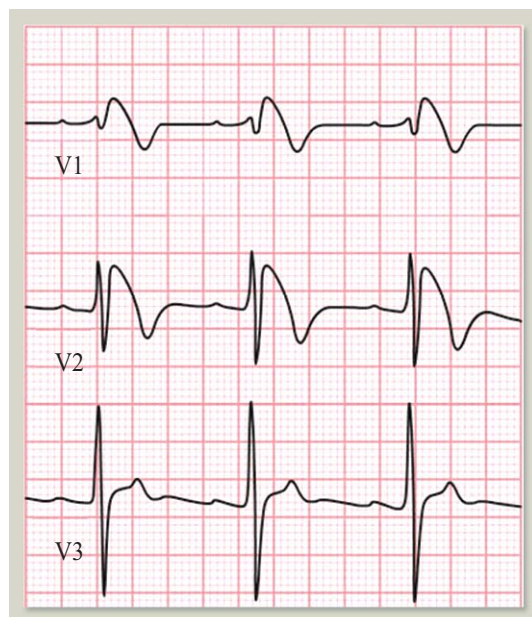


Figure: (B) Persistent coved type ST segment elevation in lead V1 and V2 characteristic for Brugada type I

Reference: *The Lancet*, July 06, 2013; 382:100

Ultrasound 'may stop kidney injury' from surgery

Blood flow problems in surgery can cause kidney injury. The researchers suggest that ultrasound treatments could be used to prevent a common kidney complication that can arise after major surgery. According to the Journal of the American Society of Nephrology, there could be a "rapid translation" to human studies because the treatment for acute kidney injury (AKI) was simple and routine.



AKI is the sudden loss of kidney function, which can easily develop in any sick person through infection such as pneumonia, diarrhoea or a heart attack. AKI can develop after major surgery, such as some kinds of heart surgery, because the kidneys can be deprived of normal blood flow during the procedure. Once it has developed, there are few treatment options. The University of Virginia team exposed anaesthetised mice to ultrasound using a routine clinical imaging system 24 hours before disrupting the blood supply to the kidneys. They then found the mice still had healthy kidneys after blood flow was restored. It suggests that there are protective strategies over and above good basic fluid and medicines management care that are the cornerstones of prevention. But in other mice, who were given a "sham" ultrasound, the same disruption led to significant kidney injury. The researchers suggest the ultrasound treatment stimulated an anti-inflammatory response from the spleen that then protected the kidneys.

Clean water and soap 'boost growth' in young children

Access to clean water and soap not only improves hygiene but also may boost growth in young children, research suggests. A review of global data found evidence of a small increase in height about 0.5 cm in under-fives living in households with good sanitation. The studies took place in Bangladesh, Ethiopia, Nigeria, Chile, Guatemala, Pakistan, Nepal, South Africa, Kenya and Cambodia. Poor growth affects 265 million children globally with long term health impacts. The evidence from 14 studies involving nearly 10,000 children comes from a review of evidence known as the Cochrane review, led by the London School of Hygiene & Tropical Medicine (LSHTM) and the international charity WaterAid. Providing clean water, sanitation and hygiene is an effective way to reduce deaths from symptoms such as diarrhoea. It makes absolute sense that there should be a link between dirty water, diarrhoea and growth outcomes

but it's interesting that it's never been shown before. According to the WHO, Poor height growth, or stunting, affects 165 million children worldwide, increasing the risk of death and reducing productivity in adulthood. Under nutrition is a cause of 3.1 million deaths annually - nearly half of all deaths in children under five.



Artificial human ear grown in lab

US scientists moved a step closer to being able to grow a complete human ear from a patient's cells. In a new development in tissue engineering, they have grown a human like ear from animal tissue. The ear has the flexibility of a real ear.



The technique may one day be used to help people with missing or deformed outer ears. Tissue engineering is a growing field in

medical science, where substitute organs are made in the laboratory in the hope of using them to replace damaged ones. This research is a significant step forward in preparing the tissue engineered ear for human clinical trials. The US research team is working on artificial living ears to help people born with malformed ears or who have lost them in accidents or trauma. In the latest development, published in the Journal of the Royal Society Interface, the researchers took living tissues from cows and sheep and grew them on a flexible wire frame that has the 3D shape of a real human ear. This was then implanted into a rat whose immune system they had suppressed enabling the ear to grow. The cells were grown on a titanium wire scaffold that is modeled on the dimensions of a real human ear, taken from CT scans. The new work shows that in theory it is possible to grow up enough cells - at least in animals - to make a full size human ear.

Reference: bbc.co.uk

Diagnosis at a Glimpse

Problem 1



A 69 years old man presented to the emergency department for evaluation of an ankle sprain. During intake, multiple papules were noted on his forehead and cheeks. Patient stated the papules developed approximately 2 years ago and, with the exception of occasional trauma while shaving, are asymptomatic. He denied any family history of skin disorders, including skin cancer. Examination revealed multiple flesh-colored to slightly yellowish 2 to 3 mm papules of the affected areas. Several lesions had a central umbilication, and magnification reveals occasional telangiectasias.

What is your diagnosis?

Problem 2



Figure-1



Figure-2

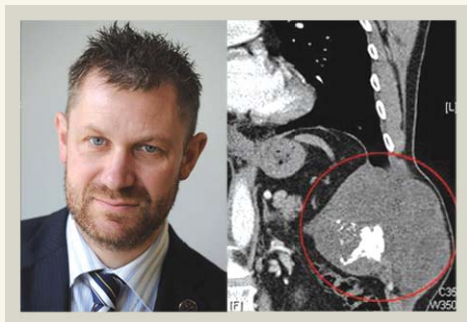


Figure-3

A 60 years old woman presented with a 2 weeks history of a flexion deformity of the fifth digit of her left hand, which, she stated, developed after she "jammed" her finger in a door. She described intermittent pain in the distal joint of the fifth digit. Examination revealed, decreased active extension and normal passive extension at the Distal Interphalangeal (DIP) joint. Radiographs of the left hand are completed (Figures 1-3).

What is your interpretation of these radiographic images?

Please see the answers-18



Growth: The tumour inside Marek's chest is circled

Doctors use cement to repair man's chest after tumor operation

A man who had a rare melon sized tumour removed from his ribs has had his chest rebuilt with concrete. Three surgeons spent six hours getting the 1.5 kg cancerous growth out of Marek Barden, 40 years. They also removed six ribs, the lining of his left lung and part of his diaphragm. The medics then replaced his ribs with a 25 cm square acrylic cement panel and used muscle from his shoulder to repair the diaphragm. The church worker, of Knowle, Bristol, noticed a lump in his side about a year ago but ignored it thinking it was from a cycling accident. But a scan last August revealed a rare chondrosarcoma cancerous tumour and doctors gave him just six months to live without treatment. Plastic surgeon Paul Wilson, who helped perform the operation five weeks later, said Marek's tumour was one of the largest his team had ever seen. He spent six days in intensive care before being discharged from hospital and amazingly did not need any further treatment.

Reference: www.mirror.co.uk

Living as One

The life expectancy for conjoined twins who are unable to be separated strongly depends on what organs they share. Conjoined twins that share a heart for example have a low survival rate. Ronnie and Donnie Gaylon are currently the world's oldest living conjoined twins at 61 years old. They have separate stomachs, lungs, and hearts, but share one large intestine and a single set of male reproductive organs. While their longevity is a medical miracle by itself, the real miracle is that these two brothers who are said to have polar opposite personalities have managed not to kill each other by now.

Reference: www.mandatory.com



Children with the Werewolf Syndrome

Indian boy Prithviraj Patil and Thai girl Supatra Sasuphan have dreams and behave just like other children around the world: they love to be included in activities and games; they enjoy swimming or painting, and most of all, eating ice-cream. What makes them different is the fact that both children were born with congenital hypertrichosis, known also as the Werewolf Syndrome. This terrible disease is very rare and unusual. There have been fewer than 50 cases documented since 1638. The children are suffering from uncontrollable hair growth. Thick animal like fur covers their head and parts of the body. Unfortunately, science and medicine haven't found an answer for their disease. It's

so sad to read headlines such as "Half human, half wolf" or "Real Wolf Kids". The cruelty doesn't come from the syndrome, but from society.

Reference: www.toptenz.net

Doctors save man's life by injecting his heart with ALCOHOL

Medics used the rare treatment to induce a controlled heart attack and the patient was out of hospital in three days. Doctors have saved a patient's life by killing off part of his heart with neat ALCOHOL. Cardiologist Dr. Tom Johnson said his patient Ronald Aldom would never have left the Bristol Heart Institute if his condition could not be treated. The 77 years old was suffering from a life threatening heart rhythm called Ventricular Tachycardia (VT) which occurred as a result of a previous heart attack. The team decided to treat Mr. Aldom, with "ethanol ablation". The treatment has only been conducted a handful of times in the UK to treat VT, Dr. Johnson said. The procedure involves passing a catheter to the heart from the groin which identifies which part of the heart the dangerous rhythms are coming from. A tiny balloon is then blown up in the heart artery supplying that area and a small amount of absolute alcohol is injected into the artery to produce a small controlled heart attack. This kills the area of the heart muscle causing the problem allowing the heart's rhythm to return to normal. Dr. Johnson has previously performed the procedure for patients with Hypertrophic cardiomyopathy - a condition in which the heart muscle becomes thick - but this was his first use of the procedure to treat VT.



Reference: www.mirror.co.uk

Answer 1



Sebaceous hyperplasia is a benign condition resulting from an overgrowth of sebaceous glands. Each lesion is associated with a hair follicle situated at the root of the umbilicated center. The condition commonly occurs in middle age and older and is characterized by the appearance of asymptomatic flesh to orange yellow colored papules. The most common areas of involvement are the cheeks, forehead, and nose. These lesions have no malignant potential but may clinically resemble basal cell carcinoma. Although not clinically indicated, treatment with either shave excision or electrodesiccation is usually sought for cosmetic reasons. Cryosurgery with liquid nitrogen has also proved effective in treating this condition.

Answer 2



The three radiographic images (Figures 1-3) reveal an avulsion fracture at the dorsal aspect of the base of the distal phalanx of the left fifth finger (white arrows), with mild palmar subluxation of the joint (Figure 1, white arrow). This injury, also known as mallet finger, is relatively common in athletes. It involves a sudden force applied to the end of a finger, causing flexion at the Distal Interphalangeal (DIP) joint while the finger is in extension. This forced flexion overcomes the strength of bone or the extensor tendon at the base of the distal phalanx, resulting in the deformity. Patients with mallet finger present with flexion deformity and inability to actively extend at the DIP joint of the affected finger. Full passive extension, however, is usually achievable during examination. Radiographs aid in diagnosing the condition; the lateral view will reveal avulsion as well as subluxation, if any, of the DIP joint. Most cases of mallet finger can be treated with continual use of a DIP joint extension splint for 5 weeks. Surgery is typically required in cases of displaced bone fragments with greater than 30% joint involvement with or without palmar subluxation to restore joint congruity. The patient in this case deferred surgical intervention and was treated in a DIP joint extension splint for 6 weeks.

Reference: Emergency Medicine, July 2013

Jog your memory

Please select the correct answer by (✓) against a, b, c, d of each question in the Business Reply Card and send it through our colleagues or mail within 17 November 2013; this will ensure eligibility for the Raffle Draw and the lucky winners will get attractive prizes !

1. **Abdominal angina is caused due to:**
 - a. Superior mesenteric artery
 - b. Inferior mesenteric artery
 - c. Celiac trunk
 - d. Abdominal aorta
2. **Posterior displacement of knee is prevented by:**
 - a. Anterior cruciate ligament
 - b. Posterior cruciate ligament
 - c. Tibial collateral ligament
 - d. Fibular collateral ligament
3. **Prolonged coma is because of lesion of:**
 - a. Both frontal lobes lesions
 - b. One frontal lobes lesion
 - c. Periaqueductal area lesion
 - d. Midbrain lesion
4. **Hamartoma is a:**
 - a. Neoplastic condition with no malignant potential
 - b. Non-neoplastic condition
 - c. Completely benign
 - d. Malignant
5. **Which nerve lies in the cavernous sinus cavity:**
 - a. III, V
 - b. IV, VI
 - c. VI
 - d. IX
6. **Adult Polycystic Disease is:**
 - a. Autosomal recessive
 - b. X- linked recessive
 - c. X linked dominant
 - d. Autosomal dominant
7. **Severe infection in a post-transplant patient is due to:**
 - a. Influenza virus
 - b. Streptococcus
 - c. Staphylococcus
 - d. Cytomegalovirus
8. **In Pneumothorax following happens:**
 - a. Lung collapses and chest expands
 - b. Lung collapses and chest indraws
 - c. Lung expands and chest expands
 - d. Lung expands and chest indraws
9. **Patient is having bone pains, PO_4 is decreased, Ca^{++} is raised, most probable cause is:**
 - a. Pagets disease
 - b. Osteoporosis
 - c. Osteopenia
 - d. Hyperparathroidism
10. **In Rh-isoimmunization the most sensitive prognostic test is:**
 - a. Spectrophotometry of the amniotic fluid
 - b. The previous history
 - c. Maternal toxemia
 - d. The antibody titer

Info Quiz Participants

- Have you selected the correct answer (s).
- You still have time to put your entry submission together for Info Quiz Prize.
- We look forward to receiving your winning entry.

Info Quiz Answers

July-September 2013

1. a	2. a	3. a	4. d	5. c
6. c	7. d	8. a	9. a	10. b



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