October-December 2010 Volume 7 Issue 4

INFO MEDICUS

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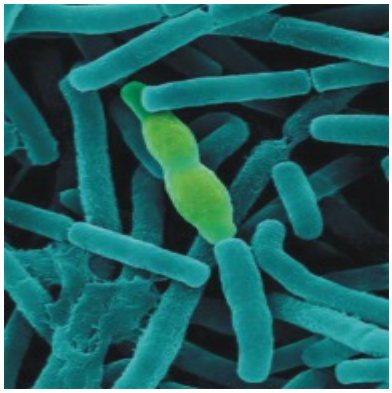
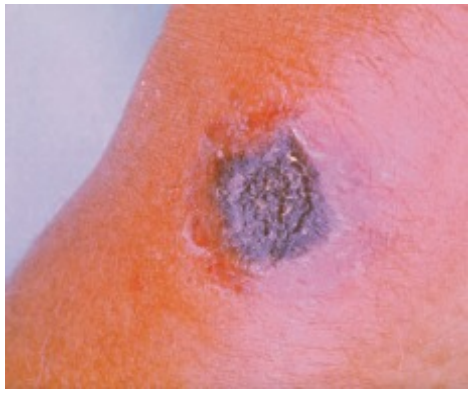
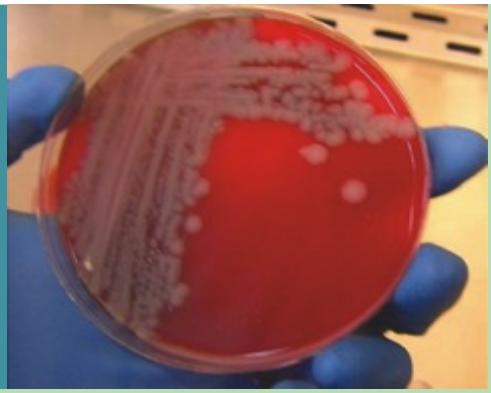
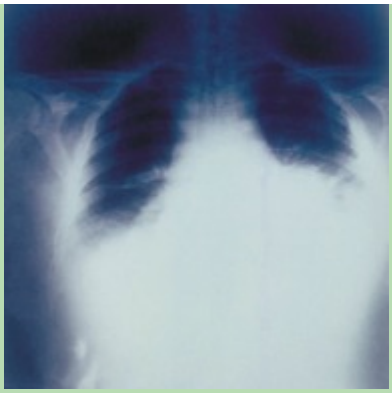
The essence of medical practice

Diagnosis of anthrax









contents

INFO MEDICUS

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Dear Doctor,

Anthrax is primarily a disease of herbivorous mammals, although other mammals have been known to contract it. Humans generally acquire the disease directly or indirectly from infected. Person-to-person spreads exists, but are rare. There are 3 types of anthrax in humans-cutaneous anthrax, acquired when a spore enters the skin through a cut or an abrasion; inhalational anthrax from breathing in airborne anthrax spores and gastrointestinal anthrax, contracted from eating contaminated food, primarily meat from an animal that died of the disease. The cutaneous form accounts for 95% or more of human cases globally. All 3 types of anthrax are potentially fatal if not treated promptly. According to the Institute of Epidemiology, Disease Control and Research (IEDCR), 8 districts out of 64 districts in Bangladesh have been found anthrax infected cases since the disease first broke out in Sirajganj district. In view of this concept we selected diagnosis of Anthrax is the topic of our Review Article.

Cardiopulmonary resuscitation (CPR) is an emergency procedure for people in cardiac arrest or, in some circumstances, respiratory arrest. Cardiopulmonary resuscitation is performed both in hospitals and in pre-hospital settings. Here, in Clinical Method Section we summarize about the method to perform Cardiopulmonary resuscitation. We hope you will be benefited from it.

In case review, we presented two cases of recurrent unilateral nasal bleeding due to leech infestation. Though it is not a common cause of nasal bleeding, a clinician should suspect leech infestation for a recurrent nasal bleeding specially in tropical countries.

This time we have incorporated a new section 'Medical notes'. Besides this our regular features are as usual and we would expect your cooperation as always.

Thanks and best regards
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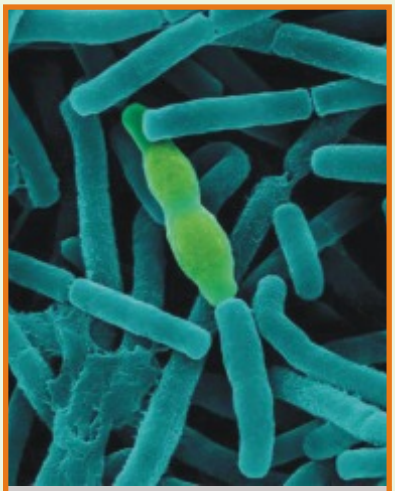
Diagnosis of anthrax

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in mammals and also occasionally infects humans who come into contact with affected animals or animal products. The common forms of human anthrax are cutaneous anthrax, inhalation anthrax, and gastrointestinal anthrax.

Causative organism

Bacillus anthracis is a large, gram-positive, spore-forming, nonmotile bacillus (1-1.5 μm x 3-10 μm) that is closely related to *Bacillus cereus* and *Bacillus thuringiensis*. The organism grows readily on sheep blood agar aerobically and is nonhemolytic under these conditions.



Bacillus anthracis

The colonies are large, rough, and grayish white, with irregular, curving outgrowths from the margin. The organism forms a prominent capsule both in vitro in the presence of bicarbonate and carbon dioxide and in tissue in vivo. In tissue, the encapsulated bacteria occur singly or in chains of two or three bacilli. The organism does not form spores in living tissue; sporulation occurs only after the infected body has been opened and exposed to oxygen. The spores, which causes no swelling of bacilli; oval and occur centrally or paracentrally. The spores are very resistant and may survive for decades in certain soil conditions. Bacterial identification is confirmed by demonstration of the protective antigen (PA) toxin component, lysis by a specific bacteriophage, detection of capsule by fluorescent antibody, and virulence for mice and guinea pigs. Additional confirmatory tests to identify toxin and capsule genes by polymerase chain reaction.

Epidemiology

Anthrax is known to occur globally, though it is more often a risk in countries with less standardized and less effective public health programs. Anthrax is most common in dry agricultural zones. These include South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East. In Bangladesh the outbreak was first detected in the district of Sirajganj in late August, 2010. It was spread to four out of the country's 64 districts. Some north-western areas have repeated anthrax outbreaks. But for the first time, it has been detected in the district of Kushtia. The government has already launched a vaccination drive for cattle, so that the disease does not spread.

Transmission

Animals, such as cattle, deer, goats, and sheep are the main animals affected by this disease. Animals get anthrax by grazing on soils contaminated with anthrax spores. The sources of infection for humans are usually infected animals, contaminated animal products, or environmental contamination by spores from these sources. Cutaneous infection may occur through; contact with contaminated skins, wool, hides, fur, or products made from these materials; contact with tissues of animals that are clinically ill or dead from anthrax; contact with soil contaminated with spores or contact with contaminated bonemeal used in gardening; or, rarely, bites by insects that have bitten infected animals or humans. Cuts or breaks in the skin favor cutaneous infection. Inhalational anthrax may occur after inhalation of spores released during the processing of contaminated animal hides and wool. It may also occur in association with accidental or intentional aerosolization of spores, as may occur with a laboratory accident or bioterrorist event. Intestinal anthrax can occur through ingestion of contaminated food, such as under-cooked contaminated meat from anthrax-infected animals. Although infection may occur through exposure to vegetative bacteria in exudates, wounds, or tissues, it is the spore of the anthrax *Bacillus* that is the predominant infectious form.

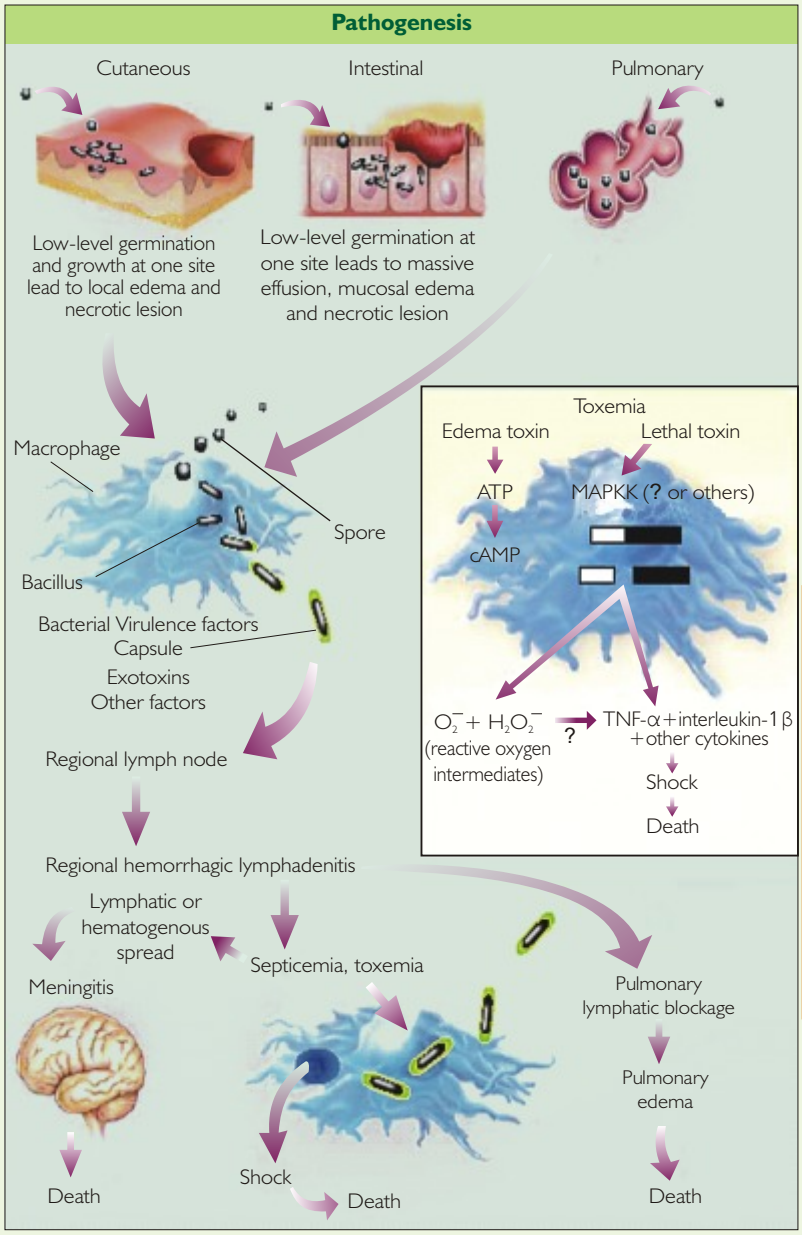
Types

Anthrax is an acute, febrile bacterial disease that most often involves the skin and lymph nodes, but depending on the route of exposure, it may also involve the throat, chest, or intestinal tract. According to the site of infection, anthrax can be classified into three types:

- Cutaneous anthrax
- Inhalational anthrax
- Gastrointestinal anthrax

Pathogenesis

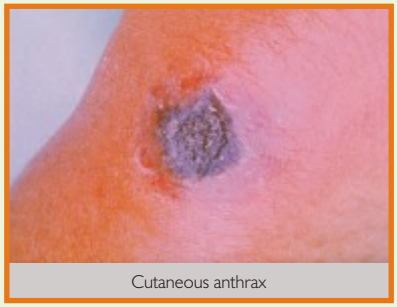
The principal virulence factors of *Bacillus anthracis* are encoded on two plasmids one involved in the synthesis of a polyglutamyl capsule that inhibits phagocytosis of vegetative forms and the other bearing the genes for the synthesis of the exotoxins it secretes. The exotoxins are binary, composed of a B (binding) protein that is necessary for entry into the host cell and an A (enzymatically active) protein. The B component is known as the protective antigen and is common to both toxins. The A component of the edema toxin is the edema factor, a calmodulin-dependent adenylate cyclase that is responsible for the prominent edema at sites of infection, the inhibition of neutrophil function, and the hindrance of the production by monocytes of tumor necrosis factor and interleukin-6. The A component of the second toxin, lethal toxin, is a zinc metalloprotease that inactivates mitogen-activated protein kinase kinase, leading to the inhibition of intracellular signaling. Lethal toxin stimulates the release by macrophages of tumor necrosis factor α and interleukin-1β, a mechanism that appears to contribute to



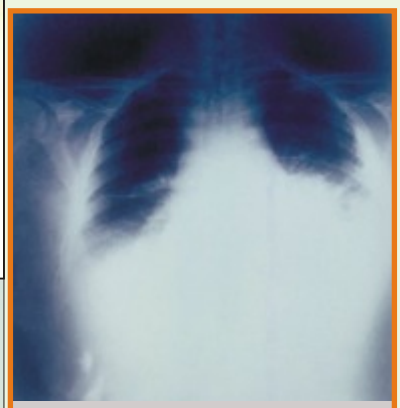
the sudden death from toxic effects that occurs in animals with high degrees of bacteremia (reaching 10^7 to 10^8 bacilli per milliliter of blood, visible on Gram's staining) and terminally high levels of lethal toxin.

Clinical features

Cutaneous anthrax: This form of anthrax affecting the skin. Incubation period is 2-3 days (up to 12 days). Itching of the affected skin occurs first. The itching is followed by development of a small red lesion that progresses to a blister, and ultimately (in 2-6 days), develops into a painless, scabbed ulcer with a central, black eschar and significant surrounding edema and redness. Accompanying fever and lymphadenopathy (swollen lymph nodes) are common, and the lesion can be misdiagnosed as an infected spider bite. Approximately 5-20% of people with untreated cutaneous anthrax die, although prompt treatment with effective antibiotics can significantly improve the clinical outcome.


Cutaneous anthrax

Inhalational anthrax: Initial symptoms of inhalational anthrax are generally mild and nonspecific, with fever, malaise, dry cough, and/or chest pain. Severe symptoms follow within 3-5 days; these include progressively worsening respiratory distress, fever, and shock, with death often following shortly thereafter. Incubation period is 1-7 days (highly variable). X-ray findings typically show a widened mediastinum. Hemorrhagic mediastinitis and/or meningitis are frequent severe complications. Treatment rarely prevents death once severe respiratory symptoms begin.


Inhalational anthrax (pleural effusion)

Gastrointestinal anthrax: This form is rare; it has been reported to occur following ingestion of undercooked meat from animals infected with anthrax. Incubation period is 2-5 days. Symptoms of gastrointestinal anthrax may be difficult to recognize, and the diagnosis is often made late. Initial abdominal pain and distress are typically followed by fever, bloody diarrhea, symptoms of a blood infection (septicemia), and death. Even with treatment, the case-fatality rate for intestinal anthrax can approach 100%.

Clinical features in animal	
Peracute infection	Rapid onset, sudden death, bloody discharge from body orifices, incomplete rigor mortis
Acute infection	Fever, anorexia, decreased rumination, muscle tremors, dyspnea, abortions, disorientation, bleeding from orifices, hemorrhages on internal organs
Chronic infection	Pharyngeal and lingual edema, ventral edema, death from asphyxiation

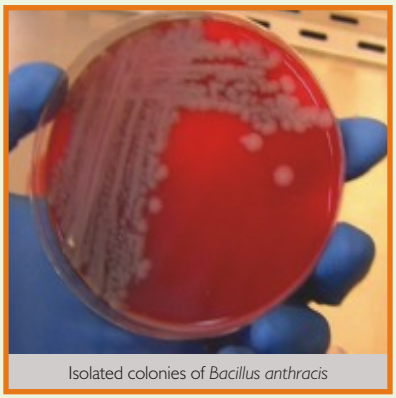
Diagnosis

Laboratory findings are nonspecific. The white blood cell count initially may be normal or modestly elevated, with polymorphonuclear predominance and an increase in early forms. Pleural fluid from patients with inhalational anthrax is typically hemorrhagic with few white cells. Cerebrospinal fluid from meningitis cases is also hemorrhagic. The diagnosis is established by isolation of the organism from culture of the skin lesion (or fluid expressed from it), blood, or pleural fluid or cerebrospinal fluid in cases of meningitis.

Differential diagnosis	
In animals	◆ Blackleg ◆ Botulism toxicosis ◆ Lightning strike ◆ Peracute babesiosis
In humans	◆ Other viral, bacterial or fungal infections ◆ Chest wall edema ◆ Hemorrhagic pleural effusions ◆ Hemorrhagic meningitis

Imaging

The chest radiograph is the most sensitive test for inhalational disease, being abnormal (though the findings can be subtle) initially in every case of bioterrorism-associated disease. Mediastinal widening due to hemorrhagic lymphadenitis, a hallmark feature of the disease, has been present in 70% of the bioterrorism-related cases. Pleural effusions were present initially or occurred over the course of illness in all cases, and approximately three-fourths had pulmonary infiltrates or signs of consolidation.



Isolated colonies of *Bacillus anthracis*

Culture & serology

Specimen collection

Cutaneous anthrax: In early stage vesicular exudate from the lesions by sterile swab can be collected. In later stage swabs to be taken from underneath of eschar after lifting up of eschar with sterile forceps. The swab should be put in Carry-Blair transport medium and with another swab smear on microscopic slide may be prepared and heat fixed. Smear should be made wherever feasible.

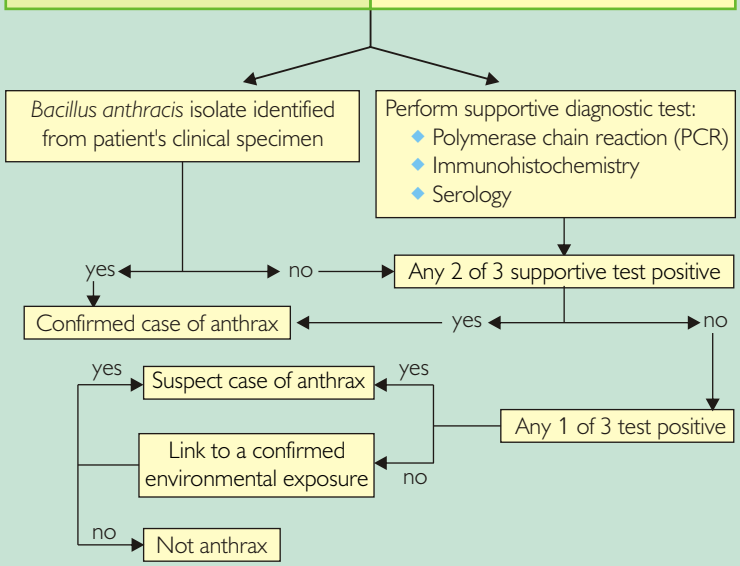
Gastrointestinal anthrax: If patient is not severely ill, a faecal specimen can be collected. If patient is severely ill ascitic fluid (peritoneal fluid) can be collected.

Laboratory diagnosis

Collect the following specimens appropriate for the suspected syndrome

Inhalational anthrax
- Blood for Gram stain, culture and PCR
- If patient has pleural effusion, pleural fluid for Gram stain, culture and PCR
- Pleural and/or bronchial biopsy for immunohistochemistry
- Acute and convalescent sera for serology
- If patient has signs/symptoms of meningitis, CSF for Gram stain, culture and PCR

Cutaneous anthrax
- Swabs of lesion for Gram stain culture and PCR
- Biopsies for PCR and munohistochemistry
- Acute and convalescent sera for serology
- If signs of systemic infection, blood for culture



Inhalational anthrax: If patient is not severely ill, sputum can be collected. In severely ill children gastric lavage should be collected.

Storage & transportation

Storage: All samples collected should be stored properly at room temperature; if delay in transportation takes place then specimen should be stored at 4 - 8°C.

Transportation: Specimen container should be leak proof, break-resistant plastic or glass container. Screw cap, containers are preferable. After the container is closed and sealed - Wipe with a disinfectant - a chlorite solution (sodium hypochlorite). Dry it and send it in a properly labeled packet (3-layer packing)

Laboratory procedures

Laboratory confirmation for anthrax is made by:

Direct demonstration: *Bacillus anthracis* from blood, skin lesion or respiratory secretion by polychrome methylene blue staining and Gram staining which shows encapsulated broad rods in short chain 2-4 cells. Modified acid fast staining should be used to visualize the spores.

Culture: Specimens are cultured on sheep blood agar aerobically at 35-37°C. After 15 to 24 hours of incubation, colonies are well isolated, nonhemolytic, 2-5 mm in diameter, flat or slightly convex, irregularly round with edge that are slightly undulated grayish white and have a ground glass appearance. The edge of the colonies is curled or fringed having a 'medusa head' appearance. The gram stain morphology shows broad gram positive rods (1-1.5 x 3-5μ) in long chain with oval, central to sub-terminal spores: 1 to 1.5μ with no signifi cant swelling of cells.

Biochemical reaction: *Bacillus anthracis* is non-motile, ferment glucose, sucrose and maltose with acid only. Gelatin is liquefied and starch is hydrolyzed. The confirmation of the isolate is done by gammaphagelysis.

Animal pathogenicity: 5-10 mice are injected intra-peritoneally with suspension of culture material. 100% mortality within 24 hours in case of *Bacillus anthracis*. Material (spleen) from dead mice processed for detection of *Bacillus anthracis*.

Molecular methods: Direct polymerase chain reaction and genetic study for 846 bp capsule gene, 639 bp S-layer gene and 596 bp PA genes of *Bacillus anthracis*.

Treatment

Penicillin has been the drug of choice for anthrax for many decades, and only very rarely has penicillin resistance been found in naturally occurring isolates. *Bacillus anthracis* is also susceptible to most other commonly used antimicrobial drugs, such as ciprofloxacin, ofloxacin, levofloxacin, tetracyclines, chloramphenicol, macrolides, aminoglycosides, clindamycin, imipenem, rifampin, vancomycin, cefazolin and other first-generation cephalosporins. The required duration of therapy is variable. In naturally occurring disease, treatment for 7-10 days for cutaneous disease and for at least 2 weeks following clinical response for disseminated, inhalational or gastro-intestinal infection have been standard recommendations. Prophylaxis with ciprofloxacin (500 mg 12 hourly) is recommended for anyone at high risk of exposure to biological warfare. The total duration of treatment (initial therapy plus subsequent optimal therapy) should be 60 days.

Recommendations for postexposure prophylaxis

Types of therapy	Adults*	Children
Initial therapy	Ciprofloxacin, 500 mg orally every 12 hr or Doxycycline, 100 mg orally every 12 hr	Ciprofloxacin, 10-15 mg/kg of body weight orally ever 12 hr or Doxycycline, 100 mg orally twice a day in children >8 yr old and >45 kg
Optimal therapy if strain has proved susceptible	Amoxicillin, 500 mg orally every 8 hr or Doxycycline, 100 mg orally every 12 hr	Amoxicillin, 500 mg orally every 8 hr in children ≥20 kg; 40 mg/kg orally, divided into 3 doses (every 8 hr), in children <20 kg

*Including pregnant women and the immunocompromised

Vaccination

It helps to prevent spread of anthrax. An intramuscular vaccine is given at 0 and 4 weeks followed by at 6, 12 and 18 months, and there after annual booster doses are recommended for ongoing protection. In conjunction with 40 days of antibiotic administration to cover the time required for a protective antibody response to develop.

Prognosis

The prognosis in cutaneous infection is excellent. Death is unlikely if the infection has remained localized and lesions heal without complications in most cases. The reported mortality rate for gastrointestinal and inhalational infections is up to 85%. No cases of anthrax have occurred among the several thousand individuals receiving antimicrobial prophylaxis following exposure to spores.

References:
1. N. Engl. J. Med, Vol. 341, No. 11: 815-26
2. N. Engl. J. Med, Vol. 345, No. 22: 1621-26
3. Anthrax in humans and animals 4th ed. WHO
4. Guidelines for Prevention & Control of Anthrax, DG of Health, India
5. Medical Aspects of Biological Warfare, C 4;69-90
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Cardiopulmonary resuscitation

Cardiopulmonary resuscitation (CPR) is also termed as rescue breathing and chest compressions. It is an emergency life saving procedure that is performed when a person's own breathing or heart beat has stopped, such as in cases of shock, electric shock, heart attack, or drowning. Permanent brain damage or death can occur within minutes if blood flow stops. Therefore, it is critical that blood flow and breathing be continued. Time is very important when dealing with an unconscious person who is not breathing. Permanent brain damage begins after only 4 minutes without oxygen and death can occur as soon as 4-6 minutes later. Chest compressions keep oxygen-rich blood circulating until an effective heartbeat and breathing can be restored. CPR techniques vary slightly depending on the age or size of the patient; CPR adult, CPR infant & child (1-8 years).

Indication	
Adults	■ Drug overdose ■ Excessive bleeding ■ Heart disease (heart attack or abnormal heart rhythm) ■ Infection in the bloodstream (sepsis), injuries and accidents
Infant & children	■ Choking ■ Drowning ■ Electrical shock ■ Excessive bleeding ■ Head trauma or serious injury ■ Lung disease ■ Poisoning ■ Suffocation

CPR for adult

Airway

■ If a person has collapsed, determine if the person is unconscious. Gently prod the victim and shout, "Are You okay?"

■ If the person is not laying flat on his or her back, roll him or her over, moving the entire body at one time.

■ Open the person's airway. Lift up the chin gently with one hand while pushing down on the forehead with the other to tilt the head back. Do not try to open the airway using a jaw thrust for injured victims. Be sure to employ this head tilt-chin lift for all victims, even if the person is injured.

■ If the person may have suffered a neck injury, in a diving or automobile accident, for example, open the airway using the chin-lift without tilting the head back. If the airway remains blocked, tilt the head slowly and gently until the airway is open.

■ Once the airway is open, check to see if the person is breathing.

■ Take 5 to 10 seconds (not more than 10 seconds) to verify normal breathing in an unconscious adult or for the existence or absence of breathing in an infant or child who is not responding.

■ If opening the airway does not cause the person to begin to breathe, it is advised that you begin providing rescue breathing (or, minimally, begin providing chest compressions).

Breathing

■ Pinch the person's nose shut using the thumb and forefinger. Keep the heel of hand on the person's forehead to maintain the head tilt. Other hand should remain under the person's chin lifting up.

■ Inhale normally (not deeply) before giving a rescue breath to a victim.

■ Immediately give two full breaths while maintaining an air-tight seal with mouth on the person's mouth. Each breath should be one second in duration and should make the victim's chest rise. (If the chest does not rise after the first breath is delivered, perform the head tilt-chin lift a second time before administering the second breath). Avoid giving too many breaths or breaths that are too large or forceful.

Circulation (Chest compressions)

■ After giving two full breaths, immediately begin chest compressions (and cycles of compressions and rescue breaths). Do not take the time to locate the person's pulse to check for signs of blood circulation.

■ Kneel at the person's side, near his or her chest.

■ With the middle and forefingers of the hand nearest the legs, locate the notch where the bottom ribs of the rib cage meet in the middle of the chest.

■ Place the heel of the hand on the breastbone (sternum) next to the notch, which is located in the center of the chest, between the nipples. Place other hand on top of the one that is in position. Be sure to keep fingers up off the chest wall; find it easier to do this if interlock the fingers.

■ Bring the shoulders directly over the person's sternum. Press downward, keeping arms straight. Push hard and fast. For an adult, depress the sternum about a third to a half the depth of the chest. Then, relax pressure on the sternum completely. Do not remove hands from the person's sternum, but do allow the chest to return to its normal position between compressions. Relaxation and compression should be of equal duration. Avoid interruptions in chest compressions (to prevent stoppage of blood flow).

■ Use 30 chest compressions to every two breaths (or about five cycles of 30:2 compressions and ventilations every two minutes) for all victims (excluding newborns). Compress at the rate of about 100 times per minute.

■ Continue CPR until advanced life support is available.

CPR for infants

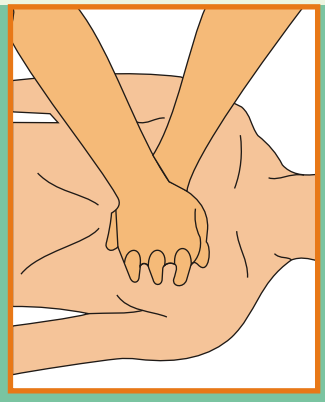
Airway

■ With infants, be careful not to tilt the head back too far.

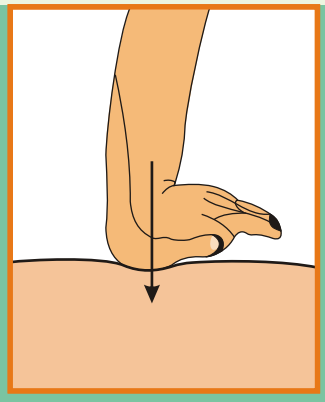
Tilt the head back and lift the chin until the teeth almost touch

Look, listen and feel for breathing

Pinch the nose closed and place moth over the person's mouth and exhale



Put the hands in the center of the person's chest between the nipples. Place one hand on top of the other



Push down 30 times. Continue with 2 breaths then 30 pushes until the person starts moving

- An infant's neck is so pliable that forceful backward tilting might block breathing passages instead of opening them.

Breathing

- Do not pinch the nose of an infant who is not breathing.

- Cover both the mouth and the nose with mouth and breathe slowly (one to one and a half seconds per breath), using enough volume and pressure to make the chest rise.

- With a small child, pinch the nose closed, cover the mouth with mouth and breathe at the same rate as for an infant.

- Rescue breathing should be done in conjunction with chest compressions.

Chest compressions

- If alone with an unresponsive infant, give five cycles of CPR (compressions and ventilations) for about two minutes.

- Use only the tips of the middle and ring fingers of one hand to compress the chest at the sternum (breastbone), just below the nipple line. The other hand may be slipped under the back to provide a firm support. (However, encircle the hands around the chest of the infant, using the thumbs to compress the chest, this is better than using the two-finger method).

- Depress the sternum between a third to a half the depth of the chest at a rate of at least 100 times a minute.

- Two breaths should be given during a pause after every 30 chest compressions (a 30:2 compressionto-ventilation ratio or two breaths about every two minutes) on all infants (excluding newborns).

- Continue CPR until emergency medical help arrives.

Caution

Adult

- If the person has normal breathing, coughing, or movement, do not begin chest compressions. Doing so may cause the heart to stop beating.

- Check for a pulse.

Infants

- Lift the infant's / child's chin while tilting the head back to move the tongue away from the windpipe. If a spinal injury is suspected, pull the jaw forward without moving the head or neck. Don't let the mouth close.

- If the infant / child have signs of normal breathing, coughing, or movement, do not begin chest compressions. Doing so may cause the heart to stop beating

- Check for a pulse.

References:
1. Circulation, 2005; 112 (24 Suppl)
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3. Rosen's Emergency Medicine: Concepts and Clinical Practice, 5th Ed. St. Louis, MO: Mosby; 2002; 64-83
4. http://www.nlm.nih.gov

Unilateral epistaxis: nasal leech infestation

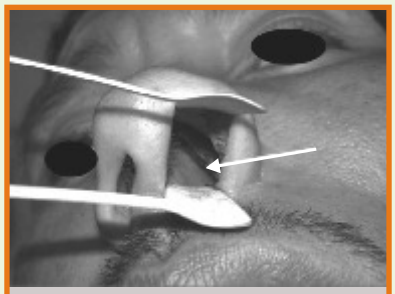
Here we present two cases of recurrent unilateral nasal bleeding due to leech infestation. Though it is not a common cause for nasal bleeding, a clinician should suspect leech infestation for a recurrent nasal bleeding specially in tropical countries. Sometimes, a diagnostic dilemma may occur, as in one of our cases. But in tropical regions, leech infestation should also be considered an important cause for unilateral epistaxis.

Case 1

A sixty three year old male presented with a history of recurrent left-sided nasal bleeding for 5 months. The bleeding was intermittent and 2-5 ml per episode and his blood pressure was 130/96 mm Hg. Anterior rhinoscopy did not reveal any nasal pathology that could have caused epistaxis. There was no active nasal bleeding and no bleeding point could be identified. Routine blood investigations were normal. The coagulation profile was normal and computed tomography of paranasal sinuses did not show any abnormality. He had been treated with oxymetazoline nasal drops, antibiotics and systemic decongestants from other clinics. Endoscopic evaluation of the nasal cavity revealed a blackish mobile leech attached to the lateral aspect of the middle turbinate. The leech retracted into the deep part of the middle meatus when the endoscope was introduced. The leech was removed with forceps after applying a 10% lidocaine spray. The patient attended a follow-up after two weeks. He was totally asymptomatic.

Case 2

A thirty eight year man presented with a history of recurrent, painless, left-side nasal bleeding for one month. The bleeding used to stop spontaneously. There was no history of trauma, high blood pressure or bleeding disorders. On anterior rhinoscopy of the left side, there was a blackish live worm on the middle

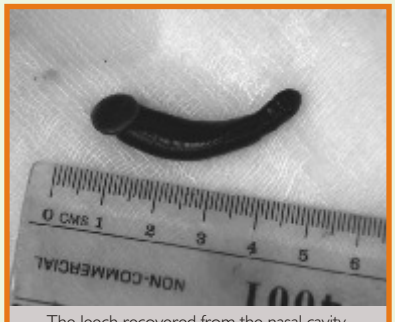


A live leech (white arrow) inside the left nostril revealed by anterior rhinoscopy

turbinate. The first attempt of removal was unsuccessful because the worm retracted and disappeared. Then a 10% of lidocaine spray was administered into the nasal cavity to paralyze the worm. Five minutes later, anterior rhinoscopy was done and the worm was seen in the anterior part of the nose and was removed with forceps. It was black in color, measuring 5 cm in length and 0.5 cm in width. After a one-month of follow-up he was asymptomatic.

Discussion

Leeches are annelids or segmented worms with a powerful clinging sucker at each end. Common species that can infest humans are *Dinobdella ferox, Hirudinea granulose* and *Hirudinea viridis*. Both aquatic and land leeches are known to attack humans. Leeches are generally found in puddles of water and streams. When water is drunk from these streams and from puddles, leeches can infest the human body; they can then be located anywhere in the upper respiratory tract from the nose to the larynx. They adhere to the mucosa with the anterior sucker and they live on blood here. Both of the cases used to drink water directly from the river and that may be the source of entry of the leech into the nasal cavity. The saliva of the leech contains hirudin, which inhibits thrombin in the clotting process, and histamine-like substances which may cause continuous bleeding by preventing closure of capillaries. The leech saliva also has local anesthetic properties. That's why the wound caused by the leech is not painful. Epistaxis is a common problem and most of the time its cause is obvious. But nasal bleeding caused by leech infestation sometimes may cause a diagnostic dilemma as in our first case. This is because every corner of the nasal cavity can not be visualized easily and the leech inside the nose may retract to the areas which are difficult to visualize during anterior rhinoscopy. In such a situation, endoscopic evaluation of the nose is helpful. In our first case, the leech could not be seen until the endoscopy was done. Respiration by the leech takes place through its body wall. It can be paralyzed with anesthetic agents like lidocaine. The suffocation caused by anesthetic agents causes the worm to migrate towards the surface and it also makes the attachment of the leech to the mucosa weak. It can then be removed easily. In both cases, we used 10% lidocaine spray to paralyze the worm before its removal.



The leech recovered from the nasal cavity

Conclusion

Leech infestation should be considered in the differential diagnosis for epistaxis, particular in leech-endemic areas. Every attempt should be made to locate the source of epistaxis that does not respond to simple compression. Endoscopic evaluation of the nasal cavity is mandatory in recurrent epistaxis, particularly when the cause is not obvious.

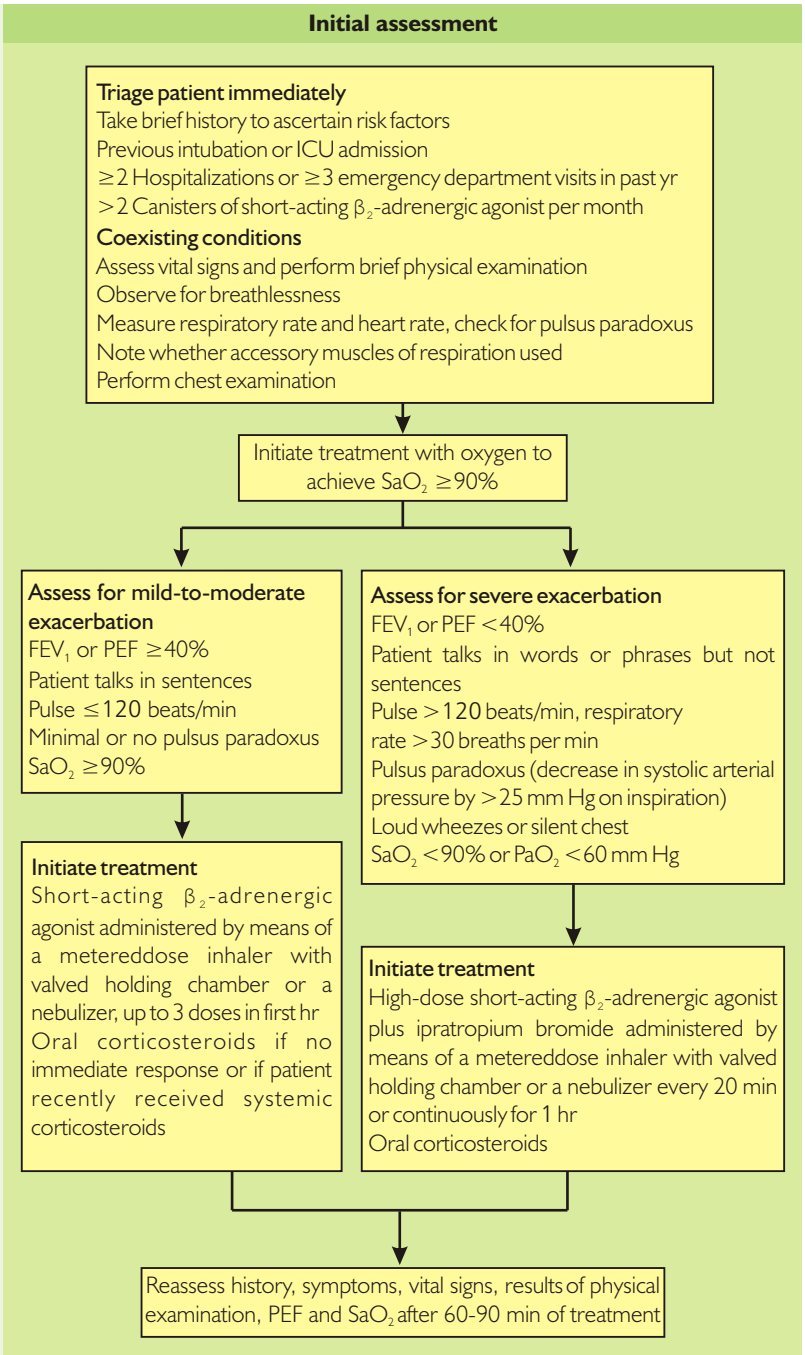
Reference:
J. Nepal Med. Assoc. Vol.47, No.169: 38-40

Emergency treatment of asthma

Asthma is one of the most common diseases in developed countries and has a worldwide prevalence of 7 to 10%. Asthma is a heterogeneous disease, with varied triggers, manifestations, and responsiveness to treatment. Some patients with acute severe asthma presenting to the emergency department have asthma that responds rapidly to aggressive therapy, and they can be discharged quickly; others require admission to the hospital for more prolonged treatment. The reasons for this difference in responsiveness to treatment include the degree of airway inflammation, presence or absence of mucus plugging, and individual responsiveness to β_2-adrenergic and corticosteroid medications. The major challenge in the emergency department is determining which patients can be discharged quickly and which need to be hospitalized.

Initial assessment

Patients presenting to the emergency department with asthma should be evaluated and triaged quickly to assess the severity of the exacerbation and the need for urgent intervention. A brief history should be obtained, and a limited physical examination performed. This assessment should not delay treatment; it can be performed while patients receive initial treatment. Clinicians should search for signs of life-threatening asthma (e.g., altered mental status, paradoxical chest or abdominal movement, or absence of wheezing), which necessitate admission. The measurement of lung function (e.g., forced expiratory volume in 1 second [FEV_1] or peak expiratory flow [PEF]) can be helpful for assessing the severity of an exacerbation and the response to treatment but should not delay the initiation of treatment. Laboratory and imaging studies should be performed selectively.



FEV_1=forced expiratory volume in 1 second, ICU=intensive care unit, $PaCO_2$=partial pressure of arterial carbon dioxide PaO_2=partial pressure of arterial oxygen, PEF=peak expiratory flow and SaO_2= arterial oxygen saturation

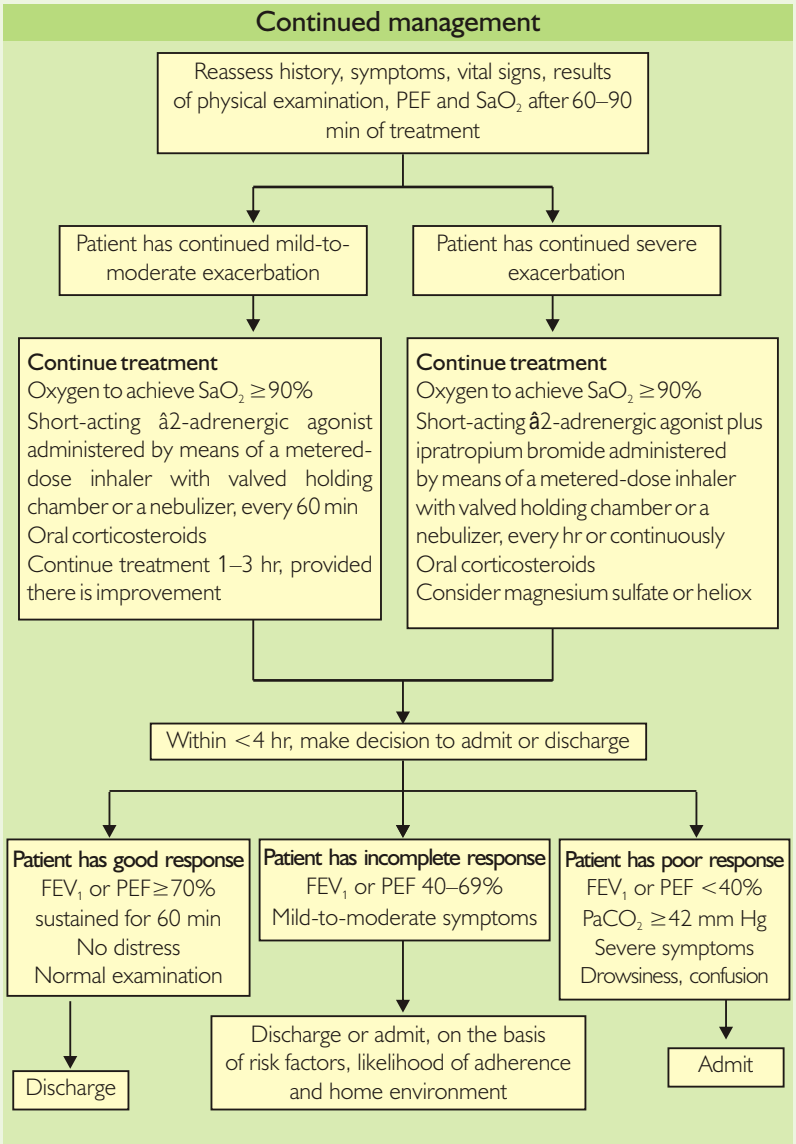
Treatment

All patients should be treated initially with supplementary oxygen to achieve arterial oxygen saturation of 90% or greater, inhaled short-acting β_2-adrenergic agonists, and systemic corticosteroids. The dose and timing of these agents and the use of additional pharmacologic therapy depend on the severity of the exacerbation.

β_2-Adrenergic agonists: Inhaled short-acting β_2-adrenergic agonists should be administered immediately on presentation, and administration can be repeated up to three times within the first hour after presentation. Most guidelines recommend the use of nebulizers for patients with severe exacerbations; metered-dose inhalers with holding chambers can be used for patients with mild-to-moderate exacerbations, ideally with supervision from trained respiratory therapists or nursing personnel. The dose administered by means of metered-dose inhalers for exacerbations is substantially greater than that used for routine relief: four to eight puffs of albuterol can be administered every 20 minutes for up to 4 hours and then every 1 to 4 hours as needed. Albuterol can be delivered by means of a nebulizer either intermittently or continuously. Albuterol is the inhaled β_2-adrenergic agonist most widely used for emergency management. Levalbuterol, the R-enantiomer of albuterol, has been shown to be effective at half the dose of albuterol. Oral or parenteral administration of β_2-adrenergic agonists is not recommended, since neither has been shown to be more effective than inhaled β_2-adrenergic agonists, and both are associated with an increased frequency of side effects.

Anticholinergic agents: Because of its relatively slow onset of action, inhaled ipratropium is not recommended as monotherapy in the emergency department but can be added to a short-acting β_2-adrenergic agonist for a greater and longer-lasting bronchodilator effect.

Systemic corticosteroids: In most patients with exacerbations that necessitate treatment in the emergency department, systemic corticosteroids are warranted. The most recent guidelines from the National Asthma Education and Prevention Program (NAEPP) (Expert Panel Report 3) recommend the use of 40 to 80 mg per day in one dose or two divided doses.



FEV$_1$=forced expiratory volume in 1 second, PaCO$_2$=partial pressure of arterial carbon dioxide, PEF=peak expiratory flow and SaO$_2$=arterial oxygen saturation

Inhaled corticosteroids: Although high-dose inhaled corticosteroids are often used to treat worsening of asthma control and to try to prevent exacerbations, the evidence does not support the use of inhaled corticosteroids as a substitute for systemic corticosteroids in the emergency department. Inhaled corticosteroids are, however, preferred for long-term asthma control. At the time of discharge from the emergency department, these agents should be continued in patients who have been taking them for long-term control and should be prescribed for patients who have not previously taken them.

Advice for discharge

Medications

- Continue inhaled short-acting β_2-adrenergic agonists every 1-2 hr, as needed
- Continue oral corticosteroids at a dose of 40-80 mg/day for 3-10 days
- If course is <1 wk, no need to taper the dose
- If course is 7-10 days, probably no need to taper, especially if patients are

concurrently receiving inhaled corticosteroids
- Continue or start an inhaled corticosteroid at a "medium dose" (e.g., beclomethasone, 240-480µg/day; budesonide, 600-1200µg/day; or fluticasone, 300-500µg/day)

Education
- Review purposes and doses of asthma medications with patient
- Review inhaler technique with patient.
- Teach patient to monitor for signs and symptoms of poor asthma control
- Provide patient with an asthma action plan

Follow-up
- Advise patient to call primary care provider within 3-5 days after discharge
- Follow-up within 1-4 wk

Indications for admission

After treatment in the emergency department for 1 to 3 hours, patients who have an incomplete or poor response, defined as an FEV_1 or PEF of less than 70% of the personal best or predicted value, should be evaluated for admission to the hospital. Patients who have an FEV_1 of less than 40%, persistent moderate-to-severe symptoms, drowsiness, confusion, or a $PaCO_2$ of 42 mm Hg or greater should be admitted. Patients who have an FEV_1 of 40 to 69% and mild symptoms should be assessed individually for risk factors for death, ability to adhere to a prescribed regimen, and the presence of asthma triggers in the home. The NAEPP Expert Panel Report 3 suggests that the decision to admit or discharge a patient should be made within 4 hours after presentation to the emergency department.

Medications of asthma

Drug and available formulation	Dose
Short-acting β_2-adrenergic agonists	
Albuterol	
Metered-dose inhaler	4-8 puffs every 20 min up to 4 hr, then every 1-4 hr as needed
Nebulizer solution	2.5-5 mg every 20 min over the first hr, then 2.5-10 mg every 1-4 hr as needed or 10-15 mg/hr continuously
Levalbuterol	
Metered-dose inhaler	4-8 puffs every 20 min up to 4 hr, then every 1-4 hr as needed
Nebulizer solution	1.25-2.5 mg every 20 min over the first hr, then 1.25-5 mg every 1-4 hr as needed
Bitolterol	
Metered-dose inhaler	4-8 puffs every 20 min up to 4 hr, then every 1-4 hr as needed
Nebulizer solution	1.25-2.5 mg every 20 min over the first hr, then 1.25-5 mg every 1-4 hr as needed
Pirbuterol	
Metered-dose inhaler	4-8 puffs every 20 min up to 4 hr, then every 1-4 hr as needed
Anticholinergic agents	
Ipratropium bromide	
Metered-dose inhaler	8 puffs every 20 min as needed, for up to 3 hr
Nebulizer solution	0.5 mg every 20 min for 1 hr (three doses), then as needed; can be used with albuterol in one nebulizer
Ipratropium bromide and albuterol	
Metered-dose inhaler	8 puffs every 20 min as needed, up to 3 hr
Nebulizer solution	3 ml every 20 min for 3 doses, then as needed
Systemic corticosteroids	
Prednisone Prednisolone and Methylprednisolone	40-80 mg/day in one dose or two divided doses, given until peak expiratory flow reaches 70% of predicted value or a personal best value

Reference:
N. Engl. J. Med, Vol.363, No.8: 755-64

Info Quiz Participants

- Have you selected the correct answer(s) you still have time to put your entry submission together for Info Quiz Prize
- The closing date for entries is 31 December 2010
- We look forward to receive your winning entry

Info Quiz Answers
July-September 2010

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

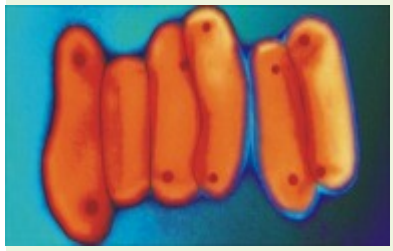
E. coli linked to heart risk

Catching the most dangerous strain of *E. coli* O157 could increase the risk of high blood pressure and heart problems years later, say researchers. They suggested

that the powerful toxin released by *E. coli* O157 could trigger inflammation that could affect blood vessel linings, and making heart and blood pressure problems more likely and they recommend annual blood pressure checks for people who had been seriously affected by the strain.

One-hour for TB test

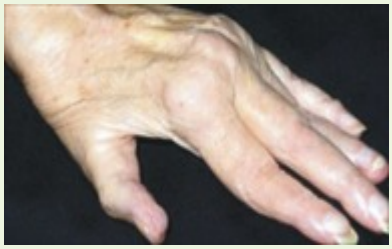
Researchers have developed a new ultra-sensitive test which can diagnose the presence of the tuberculosis bacterium in one hour. The new, highly sensitive test works by identifying a single molecule of DNA in the tuberculosis bacterium. The



genetic signature of tuberculosis bacterium can be identified by polymerase chain reaction where DNA volume amplifies in the available sample. Researchers say the test can reduce both the incidence and the consequences of the disease worldwide.

Statins cut arthritis risk

Researchers suggest taking statins may reduce the risk of rheumatoid arthritis. They say statins might inhibit the



development of rheumatoid arthritis by affecting immune system signalling pathways. Patients who regularly took statins were found to have a 42 per cent reduced risk of rheumatoid arthritis compared compared with those not taking the drugs. Statins were associated with only a small short-term reduction in the risk of developing osteoarthritis. They said further studies were needed to confirm the findings.

Broccoli boosts healthy gut

Fibers from the vegetables may boost the body's natural defenses against stomach infections, researchers say. They found that fibers from the broccoli and banana are particularly beneficial to passage of

harmful bacteria through M-cells, which line the gut and ward off invading bacteria. They say these fibers help to prevent the relapse of Crohn's diseases and knowledge of the M-cell role offers a more detailed explanation as to why a healthy diet can improve the health and well being for people with Crohn's disease and healthy individuals alike.

Early meningitis diagnosis

Researchers developed a new model to identify the most dangerous form of meningitis. The new model has a simple set of three criteria which helps doctors tell the difference without having to wait for conclusive spinal fluid results. The first two criteria are blood tests positive for two specific chemicals associated with bacterial meningitis, the third is the presence of the "classic" meningitis rash of spots which do not disappear when pressed with a glass. The three results are combined to provide a score which then

tells the doctor how likely bacterial meningitis is. However, they say that doctors should stick with existing protocols for diagnosing and treating meningitis until the new version had been fully tested.

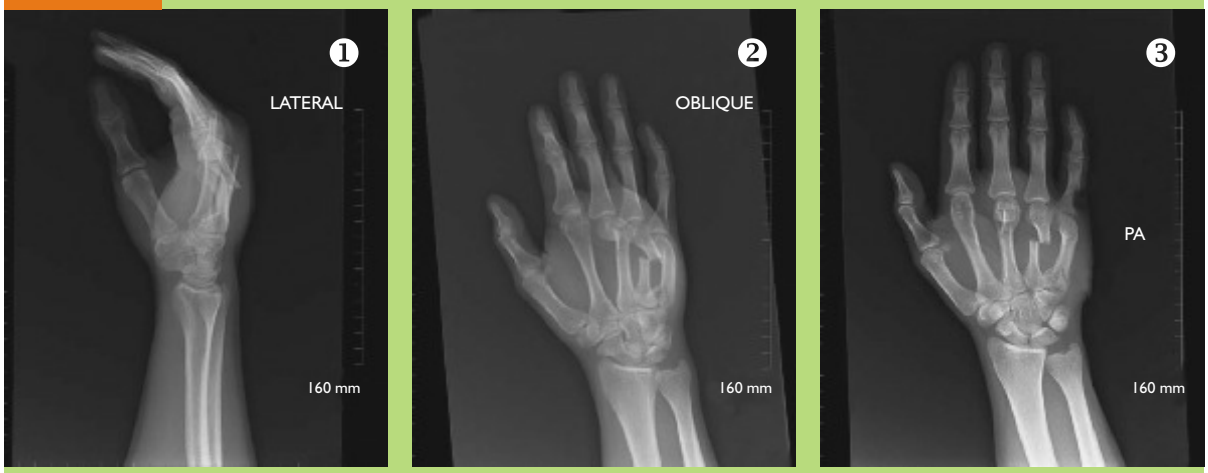
Obesity's link to sense of smell

People who are overweight have a greater sense of smell for food. Part of our brain that processes information about odour is also connected to the feeding centres of the brain, say researchers. People who are overweight those with a higher BMI have a far heightened sense of

smell for food compared to slim people, this keener sense of smell might compel the individual to carry on eating, even when they have eaten a full meal. Researchers speculated that for those with a propensity to gain weight, their higher sense of smell for food related odours might actually play a more active role in food intake.

Reference:
http://news.bbc.co.uk

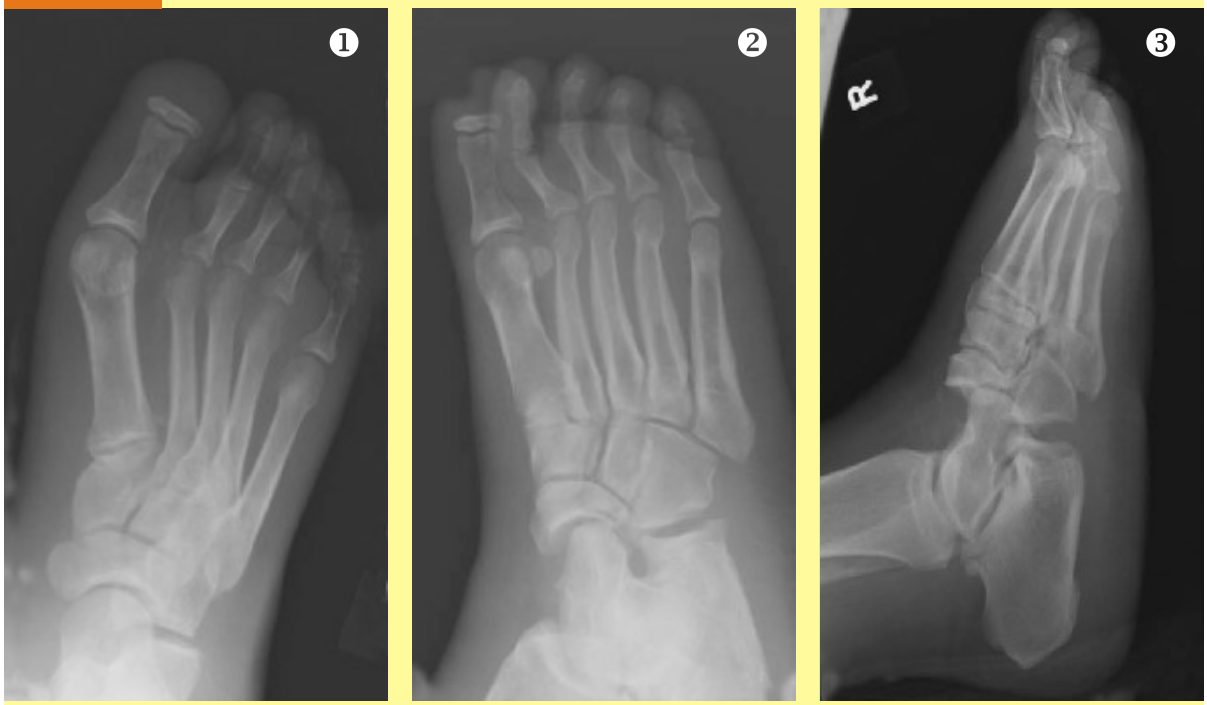
Case 1



A 18 years old male presents 4 days after falling directly on his right hand. Since the incident, he has had pain and swelling in his right hand. Examination reveals a severely swollen right hand with decreased range of motion in all digits. Radiographs of the hand are obtained (Figures 1-3).

What is the diagnosis?

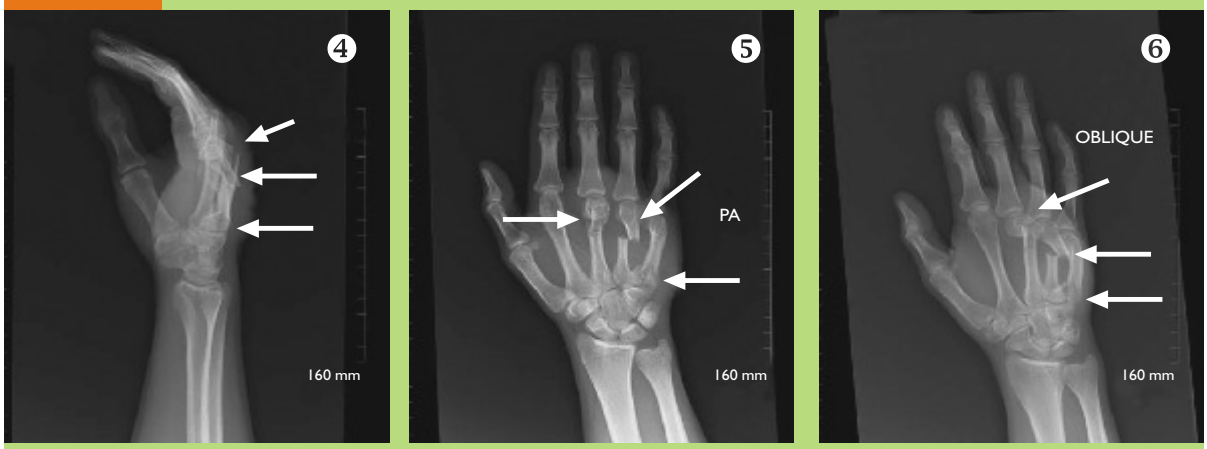
Case 2



A 45 years old man with multiple medical problems, including diabetes and peripheral neuropathy, presents to the ED with pain in his right foot after a twisting injury incurred while he was stepping out of his automobile. He is able to ambulate on presentation. Radiographs of the foot are obtained (Figures 1-3).

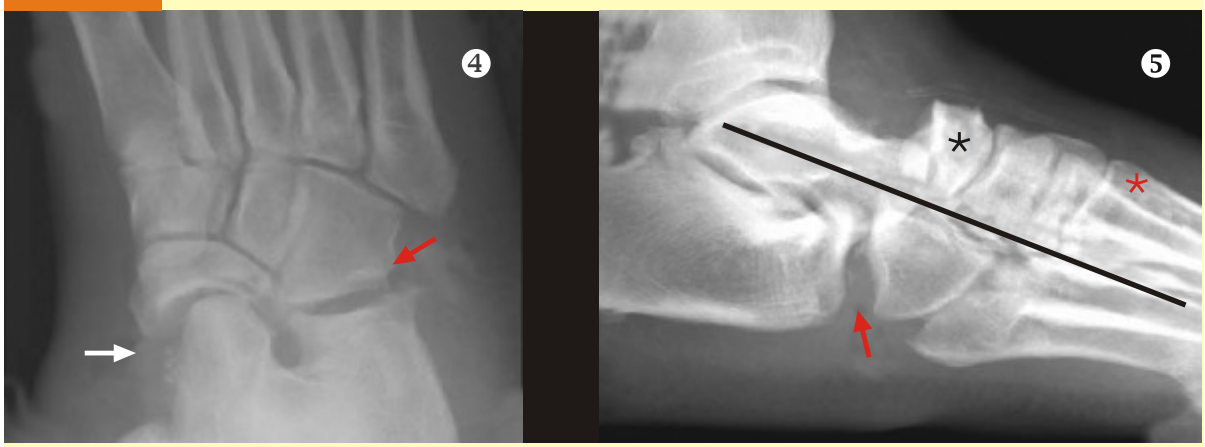
What is the diagnosis?

Answer 1



The images reveal fractures of the third, fourth, and fifth metacarpals with 45 degrees of volar angulation (apex dorsal) of the third metacarpal head, a midshaft fracture with ulnar displacement and 40 degrees of volar angulation of the distal fragment of the fourth metacarpal, and a minimally displaced fracture of the base of the fifth metacarpal. Minimally displaced isolated fractures of the third or fourth metacarpal can usually be managed conservatively with a short arm cast and dynamic splinting of the affected digit with the adjacent digit. The interosseous muscles between the metacarpals in the middle of the hand will continue to apply equal tension on the fragments, maintaining their alignment. However, when multiple metacarpals are fractured at the same time, the splinting effect of the intact adjacent etacarpals is forfeited.

Answer 2



The patient has fractures and subluxations at the midtarsal joint. This joint, which includes both the talonavicular and calcaneocuboid articulations, is known as Chopart's joint. Fractures and dislocations occurring at the midtarsal joint are termed Chopart injuries. These injuries typically occur from high-energy trauma and are less common than injuries to the adjacent tarsometatarsal (Lisfranc) and subtalar joints. It can be difficult to detect Chopart injuries on radiographs. As Figure 4 demonstrates, radiographic findings include widening of the tibiotalar joint (white arrow) and the calcaneocuboid joint (red arrow). On the lateral view (Figure 5), the subluxation may be detected; a line drawn through the talus does not intersect the navicular (black asterisk) or the first metatarsal (red asterisk). This view also shows widening of the calcaneocuboid joint as well as small osseous fragments within the joint (arrow). Prompt detection of Chopart injuries is important; midfoot instability and progressive deformity will result from failure to treat these injuries in a timely manner.

Reference:
Emergency Medicine ; Vol: 42; No: 08

Infant fever

Fever in a baby less than six months old is rare but a temperature higher than 38°C in a baby of less than three months old and a temperature of more than 39°C in a baby older than three months needs further medical advice.

Symptoms

Symptoms of a fever vary but the baby or child can look flushed and feel hot. They will often be lethargic and off their food. Crying may be persistent. Their breathing rate may be faster than normal or there may be difficulty breathing. An older child may have wheezing or coughing symptoms. If there is any rash, or neck stiffness, need urgent medical advice, to rule out meningitis.

Causes and risk factors

In most cases a fever is the body's reaction to an acute viral or bacterial infection. Raising the temperature helps create an inhospitable environment for viral or bacterial invaders, it also stimulates the production of disease-fighting white blood cells. The body's temperature control system is not well developed in babies. Over wrapping and keeping the house too warm is the most common reason for babies to become overheated, other than infection.

Treatment and prevention

Dehydration is a risk for infants, and a feverish baby should always be given lots of fluids. A child with a temperature of less than 38.8°C does not always require immediate medical attention. The child should be observed, and help sought if the symptoms appear to get worse, or the fever does not subside within 24 hours.

A child with a temperature of 38.8°C or higher should be given paracetamol, or ibuprofen. Both these medications have a pain relieving and anti-fever action. Children should not be given aspirin.

Polio

Poliomyelitis is highly infectious and affects the nervous system, sometimes resulting in paralysis. It's transmitted through contaminated food, drinking water, faeces and swimming pool water.

Symptoms

In most cases (90%), polio may cause no symptoms and no sequalae. 5% of cases are termed 'abortive polio' three to 21 days after infection a slight fever and sore throat may develop. There may be vomiting, headache and abdominal pain, illness only last 2-3 days. In about 1% of cases, the signs of abortive polio are present but the headache, nausea and vomiting are much worse. There may also be stiffness of the neck, trunk and limb muscles. This is called nonparalytic polio.

Paralytic polio occurs in about 0.1% of cases. Paralytic polio is very variable. It commonly affects just one limb, a leg or an arm. However, it may affect groups of muscles and may affect breathing, eating, bladder and bowel function. Paralysis may improve over six months but some people are left with long term disabilities. The more severe the disease (for example with breathing difficulties) the more likely someone is to die from it.

Causes and risk factors

Polio mainly affects people who haven't been immunised. Most parts of the world are now polio-free following successful immunisation programmes.

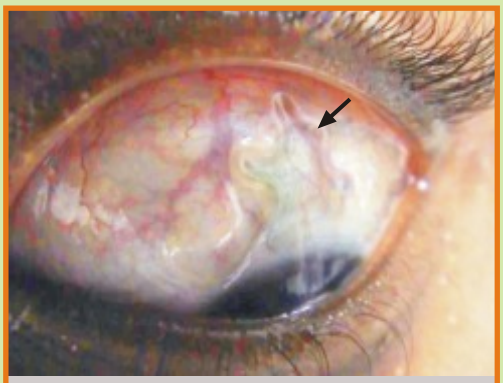
Treatment and prevention

There's no specific treatment for polio infection. Symptomatic therapy with painkillers, for example, is usually all that's necessary when infection is mild.

If the infection is severe then admission to hospital may be needed, particularly if respiration is affected. Those with paralysis can be helped to regain function in the affected limb or limbs with physiotherapy. Vaccination is the only effective method of preventing polio. Travellers to countries that still have a risk of polio may need additional boosters.

Reference:
www.bbc.co.uk/health

Ocular loiasis



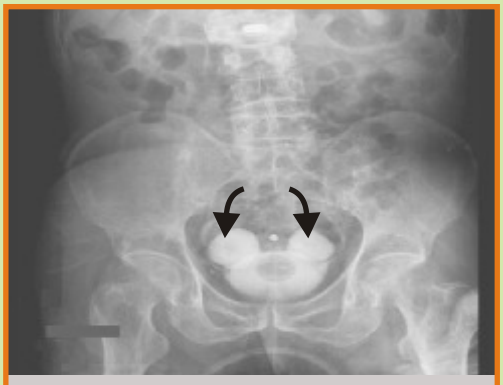
Arrow shows *Loa loa*

A 21 years old woman presented with the sensation of something moving in her eye. She reported having no systemic or visual symptoms. Her medical history was notable only for a trip abroad to Nigeria 6 years earlier.

On examination, a live worm, 2 cm in length, was seen in the superior subconjunctival space of the left eye. It was removed and identified as a male *Loa loa worm*. Blood testing revealed microfilaremia and antifilarial antibodies. The patient received systemic therapy with corticosteroids and diethylcarbamazine. *Loa loa* is a nematode whose larvae are introduced into humans who have been bitten by infected chrysops flies in areas of western equatorial Africa. Over a period of 3 to 4 years, the larvae mature into adult worms, which can then live for up to 17 years in a human host, moving at speeds of up to 1 cm per minute as they roam through the patient's subcutaneous tissues. Although localized inflammation (Calabar swellings) may occur, major tissue damage is rare.

Reference:
N. Engl. J. Med. Vol.363,No.11:e16

Bladder diverticula



Arrow shows Bladder diverticula

A 73 years old man presented with intermittent fevers for 2 weeks. He had a history of recurrent urinary tract infections, parkinsonism, and a compression fracture at the L_2 vertebra that was the result of a fall 2 years before presentation. In addition, he had paraparesis and a neurogenic bladder, also subsequent to the fall. The results of physical and laboratory evaluation were notable for the identification of *Pseudomonas aeruginosa* in a blood culture and for a urinalysis showing more than 100 white cells per high-power field. He was treated with empirical antibiotics. Intravenous urography showed no obstructive uropathy, but symmetric diverticula could be seen near both ureteral orifices (arrows). These lesions, known as Hutch diverticula, are usually congenital rather than occurring as a result of a neurogenic bladder or an infection or obstruction. They represented a new finding in this patient. Hutch diverticula are more commonly seen in men and boys and are usually unilateral and asymptomatic. After treatment with antibiotics, the patient's fever and pyuria subsided. He declined any further evaluation or intervention. During the year after diagnosis, two more urinary tract infections developed.

Reference:
N. Engl. J. Med. Vol.363,No.8:e13

Jog your memory

Please select the correct answer by tick (✓) against a, b, c, d of each questions in the Business Reply Post card and send it through our colleagues or mail within 31 December 2010; this will ensure eligibility for the Raffle Draw and the lucky winners will get attractive prizes!

1. Which is not true regarding physiology of portal hypertension?

a. Both the portal blood flow as well as portal resistance increases
b. There is extensive hyperdynamic circulation
c. Blood flow towards the portal vein increases because the systemic venous pressure increases
d. Splanchnic vasodilatation is caused by relaxation of splanchnic arterioles and splanchnic hyperemia

2. Which of the following is not a congenital abnormality associated with juvenile polyps?

a. Malrotation
b. Meckel's diverticulum
c. Macrocephaly
d. Mesenteric lymphangioma

3. In Lynch syndrome which malignancy does not occur?

a. Bronchus
b. Ovary
c. Endometrium
d. Sebaceous carcinoma

4. What is not included in the triad of Zollinger Ellison Syndrome (ZES)?

a. Hyperacidity
b. Intractable duodenal ulcer disease
c. Liver secondaries
d. Non beta islet cell tumor of pancreas

5. Which is not a paraneoplastic syndrome for Hepatocellular Carcinoma?

a. Hypercalcemia
b. Hypoglycemia
c. Erythrocytosis
d. Hyperglycemia

6. Which is the most common cause of Hemobilia?

a. Blunt trauma abdomen
b. Iatrogenic injury
c. Cholelithiasis
d. Hepatic artery aneyrysm

7. What is the most common complication after esophagectomy?

a. Arrythmia
b. Pulmonary collapse and consolidation
c. Recurrent laryngeal nerve injury
d. Massive bleeding

8. Which of the following is not true regarding blood supply of pancreas?

a. It receives blood supply from coeliac trunk and superior mesenteric artery
b. Body & tail of pancreas is supplied by splenic artery
c. Postero superior pancreatic duodenal artery is a branch of Superior mesenteric artery
d. All major pancreatic arteries lie posterior to pancreatic ducts

9. Which of the following are not true pancreatic cysts?

a. Associated with Von Hippel-Lindau Disease in 50%
b. It is associated with cysts of liver and kidney
c. Most go on to be associated with chronic pancreatitis
d. Pancreatic cysts are very rare

10. Which is not an indication of spleenectomy in idiopathic thrombocytopenia (ITP)?

a. Asymptomatic patients with platelet count between 30000-50000 mm^3
b. Refractory thrombocytopenia
c. Relapse after glucocorticoid therapy
d. Platelet count of 10000 despite management for 6 weeks but no bleeding

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The essence of medical practice

October-December 2010
Volume 7 Issue 4

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Paricel	
Tenocab	
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Xcel	
Xeldrin	
Zepam	
Zitum	

Doctor's Query

Please write any query/information/comments regarding products and medical information

Info Quiz

Tick (✓) the correct answer(s) for

Raffle Draw

(last date of entry 31 December 2010)

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