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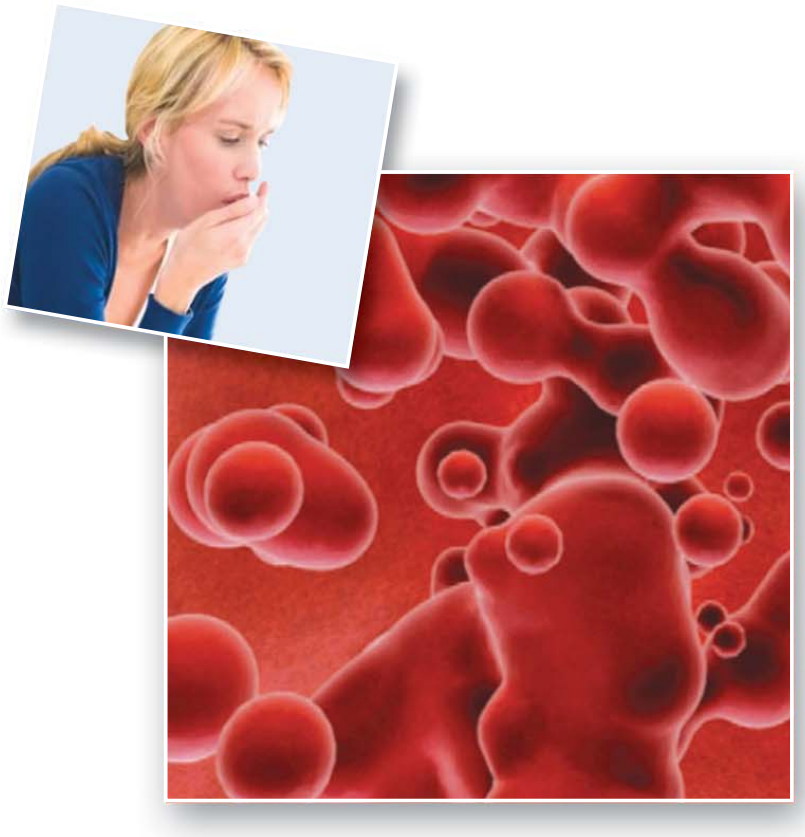
Assessment and management of acute hemoptysis



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EDITORIAL

Dear Doctor

Happy New Year!

In this issue we have focused on "Assessment and Management of Acute Hemoptysis" as the feature of Review Article. Expectoration of blood is distressing for patients and physicians alike. Most cases are self-limited and result from an infectious tracheobronchial etiology. However, hemoptysis occurs for numerous reasons, creating a challenge for the physician who must diagnose and manage this entity. This article provides a guide to examination and history-taking, intubation considerations, diagnostic testing, and treatment options in massive and nonmassive hemoptysis.

Besides, other regular sections are there as usual.

We welcome your suggestions and observations to help us improve our newsletter continously, at the same time we highly appreciate those who have shared there thoughts with us by writing.

Every endeavour has been made to make this issue interesting and we believe you will enjoy this issue as well!

On behalf of the "ACI family", we wish you and your family a very joyful, healthy and prosperous year 2012!

Thanks and best regards
ACI Pharmaceuticals

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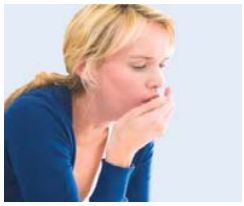
Assessment and management of acute hemoptysis



Expectoration of blood is distressing for patients and physicians alike. Most cases are self-limited and result from an infectious tracheobronchial etiology. However, hemoptysis occurs for numerous reasons, creating a challenge for the physician who must diagnose and manage this entity. This article provides a guide to examination and history-taking, intubation considerations, diagnostic testing, and treatment options in massive and nonmassive hemoptysis.

Introduction

The diagnosis, evaluation, and management of hemoptysis can pose many challenges to the physician. The word *hemoptysis* comes from the Greek words *haima* ("blood") and *ptysis* ("a spitting"). Simply stated, hemoptysis can be defined as the expectoration of blood. Clinically, however, the presentation of hemoptysis ranges from the commonly encountered blood-tinged sputum associated with an upper respiratory illness to frank blood coughed up by a patient in extremis who is having difficulty maintaining a patent airway. Along with its wide range of clinical presentations, hemoptysis has an even larger variety of etiologies, with little consensus on optimal evaluation and management. It should be noted that the phrase "coughing upblood," often used by patients to describe their symptoms, is not synonymous with hemoptysis. The assumption that all expectorated blood originates from the lower respiratory tract is not accurate and can lead to inappropriate evaluation and workup. Examples of pseudohemoptysis include expectorated blood that has its origins in the upper airway or gastrointestinal tract.

Massive hemoptysis

Hemoptysis can be categorized as *massive* or *nonmassive*, but there are no generally agreed upon parameters to distinguish between the two. Definitions based on the amount of blood expectorated have little clinical utility because quantifying the volume of blood is difficult at best. According to previous definitions, any amount from 100 to 1,000 mL of blood expectorated in 24 hours could be considered massive hemoptysis. A more practical definition of massive hemoptysis would include a volume and rate of expectorated blood sufficient to impair ventilation and gas exchange. Generally, less than 5% of all cases of hemoptysis are considered to be massive or life-threatening. It is this small percentage of cases that are often the most challenging to emergency physicians, requiring a great deal of critical thinking, aggressive management, and early consultation of various specialists.

Causes

Most cases of hemoptysis are caused by superficial mucosal erosions and edema of the tracheobronchial tree arising from an infectious etiology. Most commonly, these cases are self-limited and can be attributed to either acute or chronic bronchitis. Up to 30% of cases are cryptogenic, or have no identifiable cause. By far, the most common causes of hemoptysis are bronchitis, bronchogenic carcinoma, and bronchiectasis. Coincidentally, these are also among the most common causes of massive hemoptysis, along with tuberculosis, lung abscess, and pulmonary embolism.

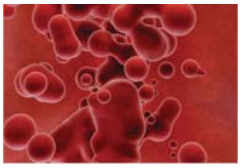
Pathophysiology

The site of bleeding in hemoptysis may be difficult to localize due to the lung's extensive blood supply, which derives from two different circulations. The pulmonary artery circulation starts with the pulmonary artery and bifurcates into the right and left main pulmonary arteries. Virtually the entire cardiac output flows through this system at low pressures, generally around 25/8 mm Hg. Because of these low pressures, the pulmonary artery circulation is an uncommon source of massive hemoptysis. However, in those with either acute pulmonary hypertension or a history of this condition, these pressures may rise significantly, playing a more significant role in massive hemoptysis. The bronchial artery circulation arises from the aorta and intercostal arteries and receives only a small portion of the cardiac output. However, it is a highpressure system, operating under systemic pressures. Because of this, bleeding from the bronchial circulation tends to be more notable and is responsible for approximately 80% of cases of massive hemoptysis.

Initial evaluation

History

Despite being generally unhelpful in identifying an exact source of bleeding, a detailed history and physical examination can be helpful in narrowing the differential diagnosis. The chronicity, characterization, and previous episodes of bleeding are important considerations. A patient with a 1-year history of worsening blood-streaked sputum would be more likely to have chronic bronchitis, bronchiectasis, or another indolent process. On the other hand, a vascular cause may be more likely in a patient experiencing the abrupt onset of cough productive of frank blood. Interestingly, occurrence



Low-risk patients with normal chest radiographs can be treated on an outpatient basis with close monitoring and appropriate oral antibiotics, if medication is clinically indicated.

of hemoptysis with the onset of the patient's menstrual cycle (catamenial hemoptysis) may point towards thoracic endometriosis. Symptoms of fever or chills, hematuria, or weight loss may indicate an infectious source, a pulmonary-renal syndrome, or neoplasm, respectively. Age is an important consideration in determining the cause of hemoptysis. The aspiration of foreign bodies is more commonly seen in children, while adults younger than 40 years are more likely to have bronchitis or bronchiectasis, and those older than 40 are at higher risk for neoplasm. A social history that documents tobacco use, environmental exposures, and recent travel should also be obtained. In addition, a patient's medical history may provide important clues to the etiology of hemoptysis. For example, bleeding disorders, renal disease, lupus, AIDS, congestive heart failure, mitral stenosis, and chronic lung disease can all present with hemoptysis. A thorough review of a patient's medication list, specifically for anticoagulant and antiplatelet medications and drugs commonly associated with thrombocytopenia, may provide essential information in the evaluation and management of hemoptysis.

Physical examination

First and foremost, a complete set of vital signs must be obtained in all patients presenting with hemoptysis. A hypotensive patient who is tachypneic and hypoxic will oftentimes need more urgent intervention before a complete history and physical examination can be obtained. Many elements of the physical examination can provide diagnostic clues. Aspects of the patient's general appearance, such as cachexia, may point to tuberculosis, immunocompromise, or malignancy. A careful examination of the nose and oropharynx is necessary to help exclude upper respiratory causes of pseudohemoptysis. Audible stridor may be noted in foreign body aspiration and upper airway malignancies (or a clot obstructing the airway). A heart murmur may suggest a cardiac etiology such as critical valvular disease (especially pulmonary stenosis). Examination of the extremities may reveal clubbing, a sign of chronic lung disease or neoplasm. Unilateral lower extremity swelling raises concern for deep vein thrombosis and possible concurrent pulmonary embolism. A detailed examination of the skin should also be performed. Rashes may suggest vasculitis, while petechiae or purpura may signal coagulopathy or thrombocytopenia.

Etiologies of hemoptysis

Pulmonary
- Sarcoidosis
- Cystic fibrosis
- Pneumonitis
- Bronchiectasis
- Broncholithiasis

Infectious
- Necrotizing bacterial pneumonia
- Fungal infections
- Septic emboli
- *Pneumocystis (carinii) jiroveci* pneumonia
- Tuberculosis
- Acute bronchitis

Cardiac
- Mitral stenosis
- Left ventricular failure
- Congestive heart failure
- Pulmonary hypertension
- Eisenmenger syndrome

Iatrogenic
- Medication induced
- Bronchoscopy
- Swan-Ganz Catheterization
- Transbronchial biopsy
- Transtracheal aspirate

Parasitic
- Hydatid cyst
- Paragonimiasis

Neoplastic
- Bronchogenic carcinoma
- Bronchial adenoma
- Kaposi sarcoma
- Pulmonary metastases
- Angiosarcoma

Vascular
- Pulmonary infarct
- Aortic or pulmonary artery embolism
- Bronchovascular fistula

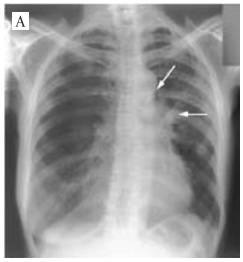
Hematologic
- Coagulopathy
- Thrombocytopenia
- Disseminated intravascular coagulation

Pulmonary-renal syndromes
- Goodpasture syndrome
- Wegener granulomatosis

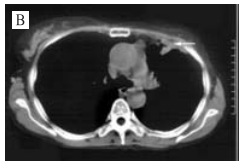
Vasculitis
- Pulmonary capillaritis
- Henoch-Schönlein purpura
- Behcet's disease
- Wegener's granulomatosis

Trauma
- Blunt/penetrating injury
- Suction ulcers
- Tracheoarterial fistula

Other
- Hemosiderosis
- Thoracic endometriosis
- Playing a wind instrument



Chest radiograph showing previous left mastectomy and left upper lobe and lingular infiltrates due to airway bleeding. A platinum embolisation coil is noted on this post-embolisation radiograph (arrow)



CT scan showing a mass lesion (arrow) involving the left anterior chest wall with associated left upper zone consolidation, consistent with recent haemoptysis and local tumour recurrence following the previous mastectomy

Diagnostic procedures

Sputum should be sent for microbiological investigation, including staining and culture for mycobacteria, and cytological examination if the patient is a smoker and over 40 years of age. Chest radiography may help to identify causative lesions or infiltrates resulting from pulmonary haemorrhage, but fails to localise the lesion in 20-46% of patients with haemoptysis. A CT scan may show small bronchial carcinomas or localised bronchiectasis. The use of contrast may help to identify vascular abnormalities such as arteriovenous malformations or aneurysms. Despite all investigative procedures, the aetiology of haemoptysis is unknown in up to 5-10% of patients.

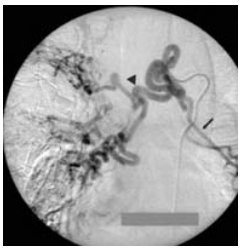
Laboratory investigation: Blood should be drawn and sent immediately for appropriate diagnostic studies, which might include CBC, prothrombin time, partial thromboplastin time, INR, comprehensive metabolic panel, typing and crossmatching, and arterial blood gas analysis. Urinalysis is also warranted in patients with so called pulmonaryrenal syndrome, ie, processes such as Goodpasture syndrome, Wegener granulomatosis, and polyangiitis, that cause both renal and pulmonary bleeding.

Chest radiography: A chest radiograph should be obtained in all patients presenting with new-onset hemoptysis. Findings on chest radiography may be normal or nonlocalizing in 20% to 46% of cases, but radiography may be useful in identifying the region of bleeding. Cavitary lesions, tumors, infiltrates, and atelectasis seen on chest radiography may help with localization.

CT and Bronchoscopy: In all patients with hemoptysis who are stable and able to tolerate recumbency, CT should be performed before any invasive procedures are initiated. CT will identify lesions or pathology not visible on chest radiography. The role of CT in imaging the mediastinum and central airways, along with its ability to detect blood clots, bronchiectasis, broncholithiasis, and endobronchial neoplasms, is well established. The type of CT scan (high-resolution, conventional, or CT angiography) should be selected based on history, physical examination findings, and clinical suspicion of underlying pathology. CT angiography is preferred if either pulmonary embolism or pulmonaryvascular fistula is suspected. High-resolution CT, utilizing thinner slices, is designed to evaluate abnormalities that involve the subtle architecture of the lung and often provides incomplete coverage of the lung. It is useful in suspected interstitial disease. For other cases, conventional contrast-enhanced CT of the chest may be utilized. CT has the advantage of being noninvasive, and it can also be an effective modality for localizing bleeding sites and exploring the cause of bleeding. In general, CT can identify various abnormalities, including bronchiectasis, lung abscesses, mass lesions, aneurysms, or pulmonary embolism. If a peripheral lesion or mass is identified, the most appropriate next course of action may be percutaneous biopsy. However, if CT fails to localize the bleeding or provide a diagnosis, bronchoscopy is generally indicated. In all unstable patients, bronchoscopy should be performed before CT. Rigid bronchoscopy utilizes a larger lumen and allows for greater suctioning ability. It also provides excellent visualization of the central airways, but relatively poor visualization of the lobar and segmental bronchi. Moreover, rigid bronchoscopy is usually performed in the operating room under general anesthesia but can be performed under local anesthesia or conscious sedation in the hands of experienced personnel. Alternatively, fiberoptic bronchoscopy requires only moderate sedation and can often be performed rapidly at the patient's bedside. It allows for excellent visualization of the lobar and segmental bronchi, which cannot be visualized by rigid bronchoscopy. With rapid bleeding, however, visualization with a fiberoptic bronchoscope can be difficult. The fiberoptic bronchoscope can be passed through the lumen of the rigid bronchoscope, allowing for better visualization of the distal airways by combining the two methods.

Emergency management and stabilization

As always, the evaluation should begin with the ABCs. The most common cause of death with massive hemoptysis is asphyxiation, not exsanguination; therefore, ensuring adequate ventilation with protection of the airway is of utmost importance. The three main goals of management are to prevent aspiration, stop or control the bleeding, and treat the cause. With significant bleeding, two large-bore IV catheters should be placed for volume resuscitation. If the site of bleeding is known, the bleeding lung should be placed in a dependent position to protect the opposite lung. The use of cough-suppressing drugs is controversial and must



Vascular abnormalities seen on pre-embolization bronchial arteriogram of a 25-year-old man with hemoptysis due to tuberculous bronchiectasis. Selective arteriogram shows a common bronchial artery trunk giving rise to a hypertrophied right (arrowhead) and a normal left bronchial artery (arrow)

be undertaken with great caution. Small doses of codeine or morphine may provide some benefit, but these medications may lead to major alveolar accumulation of blood and inadvertent worsening of symptoms. All coagulopathies should be quickly corrected with transfusion of fresh frozen plasma and/or platelets. If an infectious etiology is suspected, sputum should be sent for bacterial, fungal, and mycobacterial cultures. Serologic studies for more specific diagnoses may also be obtained, such as ANCA antibodies for Wegener granulomatosis or anti-GBM antibodies for Goodpasture syndrome, but results likely will not be available immediately and are unlikely to affect initial management decisions. It is also advisable to consider early consultation of interventional radiologists as well as those credentialed to perform emergent bronchoscopy. Both may offer definitive care in identifying and ligating the source of bleeding.

Endotracheal intubation: If oxygenation and ventilation are compromised, or if bleeding continues at either a large volume or a rapid pace, the patient should be intubated. It is paramount to anticipate a difficult airway and to be prepared to take appropriate measures. Early intubation is generally preferred in all situations where an adequate airway cannot be ensured. Orotracheal intubation is preferred over nasotracheal intubation because a larger tube can be used and the excess length is available for selective mainstem intubation. An 8-mm or larger endotracheal tube should be used, if possible, to allow for subsequent bronchoscopy. A larger tube will also assist in both ventilation and airway suctioning.

Treatment

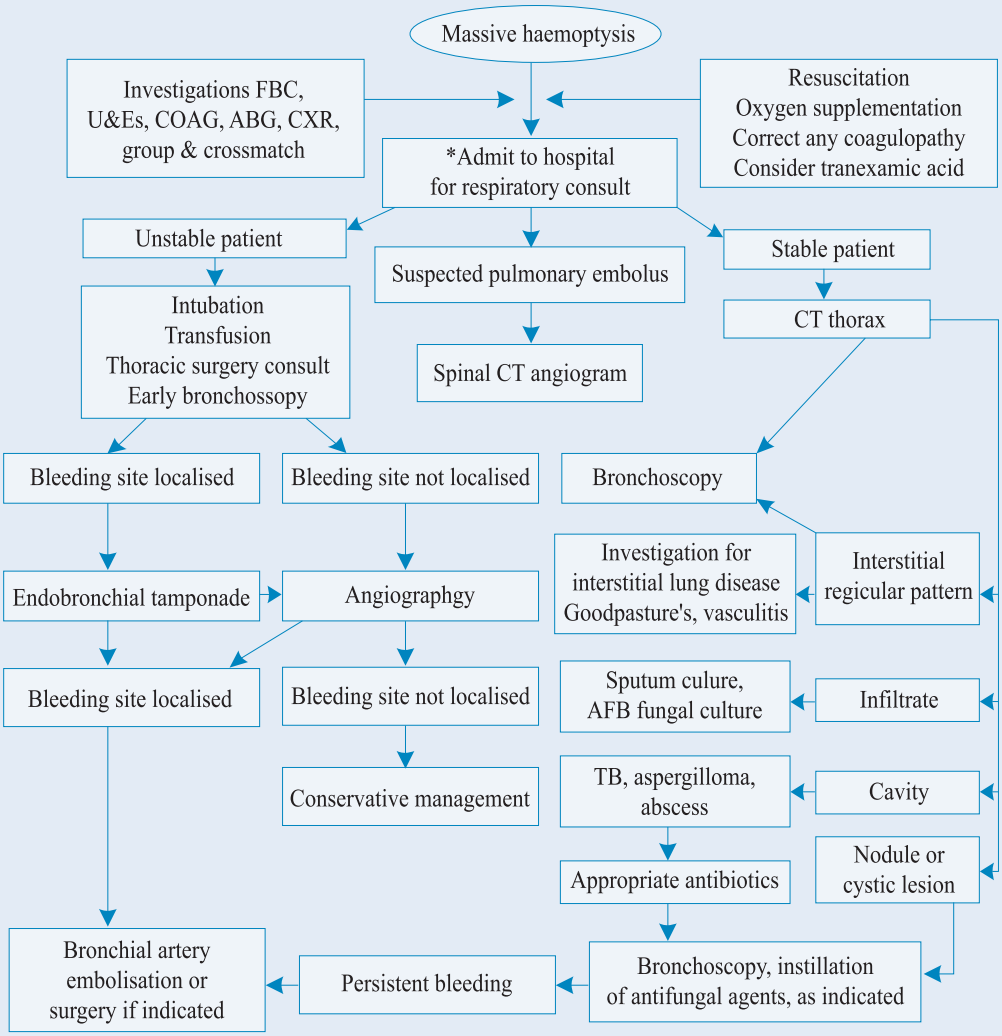
Endobronchial tamponade: Endobronchial tamponade is one technique that may be used as a temporizing measure to help control active hemorrhage. A Fogarty catheter (size 4 to 7 French) can be passed through the working port of the bronchoscope, advanced into the bleeding segment, and inflated. This will prevent aspiration of blood into the nonbleeding lung, while the endotracheal tube remains in the trachea, allowing for adequate ventilation. More recently, a double-lumen balloon catheter was designed that allows for the passage of vasoactive drugs through the second lumen. Topically applied bronchoscopic therapies that may be attempted to slow or stop bleeding include epinephrine, vasopressin, thrombin, or a fibrinogen-thrombin combination. Unfortunately, these methods have not been well studied in randomized controlled trials.

Laser therapy: There has been some success in the management of massive hemoptysis using laser photocoagulation with an Nd:YAG or argon laser to cauterize directly visualized endobronchial lesions-mostly in cases of airway carcinoma with recurrent bleeding. Targeting the lesions with the laser beam can be extremely difficult, however, if bleeding is persistent.

Bronchial artery embolization: Another approach often used to control active bleeding is arteriographic embolization. Bronchial artery embolization (BAE) was first performed in 1973 and is currently considered the treatment of choice for most patients with massive hemoptysis. Once the bleeding vessel is identified, a number of techniques may be attempted to control bleeding. Some examples include the injection of gelatin sponge particles or polyvinyl alcohol foam and placement of metal coils. Immediate success rates may range from 64% to 100%, but this can be viewed only as a "semi-definitive" treatment since rebleeding occurs in 10% to 20% of individuals during a 6 to12 month period. A devastating complication associated with BAE is accidental embolization of the anterior spinal artery. Interestingly, the anterior spinal artery may arise from a bronchial artery in approximately 5% of the population; if the artery is embolized proximally, paraplegia may result. Moreover, not all cases of massive hemoptysis involve bleeding from the bronchial arteries, and BAE may fail in cases where bleeding arises from the non-bronchial artery collaterals off the systemic vessels or, as is seen less often, from the pulmonary artery circulation.

Surgery: A last option for patients with localized disease is surgery. Surgery is generally indicated only in patients in whom rebleeding has occurred post-BAE, those with anatomic variations that preclude BAE, and those demonstrating multiple bleeding vessels on angiography. Contraindications to surgery include diffuse disease (cystic fibrosis, extensive pulmonary tuberculosis), inadequate pulmonary reserve, and inoperable lung cancer. Surgery, however, remains the treatment of choice in those with aortic aneurysms, arteriovenous malformations, bronchial adenomas, and iatrogenic pulmonary rupture (eg, pulmonary artery rupture from a Swan Ganz cathter).

Assessment and management of massive haemoptysis



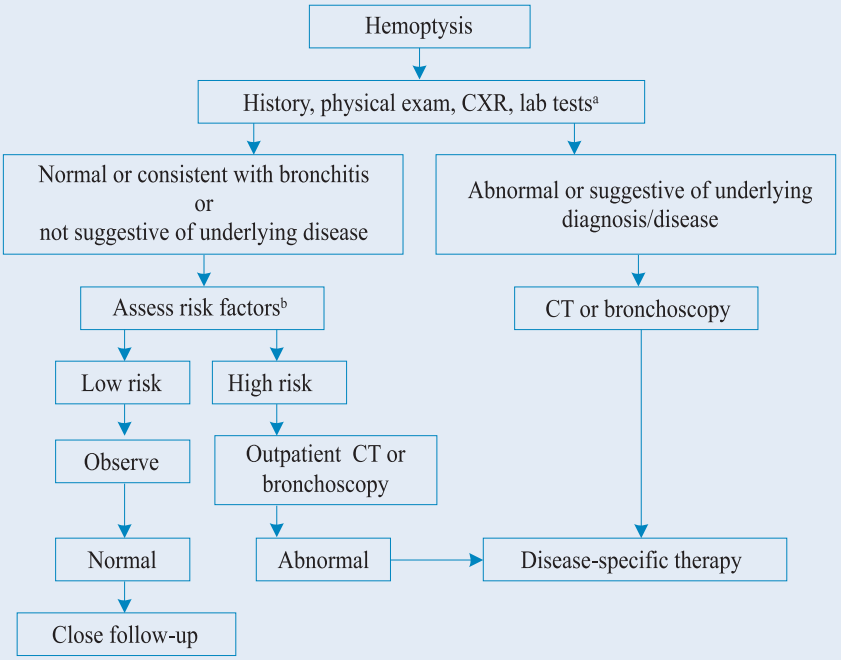
FBC=Full blood count, U & Es = Urea and electrolytes, COAG= Coagglutination test for identification of Salmonela colonies on agar plates, ABG= Arterial blood gas, CXR= Chest X-ray, CT =Computed tomography

*Palliative measures may be appropriate in the setting of advanced

Nonmassive hemoptysis

All patients presenting to the physician with hemoptysis require a baseline evaluation consisting of a detailed history, physical examination, and chest radiograph. In a stable patient, infection is the most common cause of hemoptysis; infectious etiologies account for approximately two-thirds of cases. Along with chest radiography, a CBC, an electrolyte panel, renal function tests, coagulation studies, and/or urinalysis should be obtained at the physician's discretion according to history and findings on physical examination. Moreover, if risk factors for tuberculosis exist, a PPD (purified protein derivative) skin test should be performed. If initial workup, including chest radiography, is normal, the patient's risk factors for malignancy should be assessed. These include age older than 40 years, male sex, greater than 40-pack-year smoking history, and hemoptysis lasting more than 1 week. Patients considered to be at low risk may be observed for recurrence. However, those at moderate to high risk should undergo outpatient CT or bronchoscopy, often with referral to a pulmonologist. If findings on initial evaluation and/or chest radiography are abnormal, CT and/or bronchoscopy should be performed and disease-specific therapy undertaken. Even with mild bleeding, patients with significant underlying disease should be admitted due to their high risk for deterioration.

Approach to evaluation of nonmassive hemoptysis



CXR = chest radiograph; CT = computed tomography

[a] Complete blood count, prothrombin time, partial thromboplastin time, international normalized ratio, electrolytes, renal function, urinalysis

[b] Age >40 years, male sex, >40-pack-year smoking history, hemoptysis lasting >1 week

Management

The overall goals of management of the patient with hemoptysis are threefold: bleeding cessation, aspiration prevention, and treatment of the underlying cause. As with any potentially serious condition, evaluation of the "ABCs" (i.e., airway, breathing, and circulation) is the initial step.

The most common presentation is acute, mild hemoptysis caused by bronchitis. Low-risk patients with normal chest radiographs can be treated on an outpatient basis with close monitoring and appropriate oral antibiotics, if clinically indicated. If hemoptysis persists or remains unexplained, an outpatient evaluation by a pulmonologist should be considered. An abnormal mass on a chest radiograph warrants an outpatient bronchoscopic examination. For patients with a normal chest radiograph and risk factors for lung cancer or recurrent hemoptysis, outpatient fiberoptic bronchoscopy also is indicated to rule out neoplasm. High-resolution CT is indicated when clinical suspicion for malignancy exists and sputum and bronchoscopy do not yield any pathology. High-resolution CT also is indicated when chest radiography reveals peripheral or other parenchymal disease.

Conclusion

Hemoptysis can present clinically in many ways, and its etiologies are numerous. Clearly, this creates both diagnostic and management challenges to the physician. Although the large majority of cases are self-limited and require little workup, it is crucial to identify those cases that warrant more extensive evaluation and follow-up. Likewise, those cases of lifethreatening massive hemoptysis, while rare, often require urgent stabilization and airway control. Unstable patients must be treated aggressively and efficiently, and specialist consultation should not be delayed. Established guidelines do not exist in the management of hemoptysis; thus, each case should be managed with careful assessment of the history, physical examination findings, and risk factors and timely use of diagnostic testing. Maintaining a high index of suspicion in hemoptysis may prevent undesired outcomes in this somewhat unpredictable condition.

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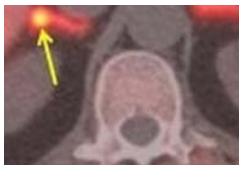
Protein insight into spread of variant Creutzfeldt - Jakob Disease (vCJD) to brain

Scientists have discovered that blocking the production of proteins in the immune system could prevent the spread of a disease that destroys nerve cells. Researchers at Edinburgh University's Roslin Institute said vCJD occurs when proteins known as prions accumulate in the spleen, lymph nodes and tonsils. They then spread to the brain, causing a disease that can destroy nerve cells. The study could lead to treatments to stop vCJD spreading to the brain. The researchers said a study showed that blocking the production of a protein, PrPC, in one type of immune cell could stop the spread of prions. Stopping these cells from expressing this protein did not affect the regular function of the immune system. The researchers found that when the follicular dendritic cells expressed PrPC, prions were able to replicate on the surface of these cells and spread throughout the body. However, when the cells were prevented from producing PrPC, the prions were not able to multiply and were destroyed by other cells in the immune system. Scientists said that any treatments would only be viable if the condition was diagnosed in its early stages.

Scientists question if Wi-Fi laptops can damage sperm

Scientists are questioning if using Wi-Fi on a laptop to roam the internet could harm a man's fertility, after lab work suggested ejaculated sperm were significantly damaged after only four hours of exposure. The bench side tests showed sperm were less able to swim and had changes in the genetic code that they carry. Expert's stress this does not mean the same would occur in a real-life setting and say men should not worry unduly. But they are recommending more studies. The preliminary research, published in the journal Fertility and Sterility, looked at semen samples from 29 healthy donors. Each donor sample was separated out into two pots. One of these pots was then stored for four hours next to a laptop that was wirelessly connected to the internet. The other was stored under identical conditions, minus the laptop. The scientists, from Argentina and the US, suspect that the effect seen is unrelated to the heat kicked out by a laptop, although heat can damage sperm. The UK's Health Protection Agency (HPA) has been closely monitoring the safety of Wi-Fi. It says people using Wi-Fi, or those in the proximity of Wi-Fi equipment, are exposed to the radio signals it emits and some of the transmitted energy in the signals is absorbed in their bodies. However, the signals are very low power. The HPA says there is no consistent evidence to date that exposure to radio signals from Wi-Fi adversely affects the health of the general population. Although men should still be cautious about balancing a laptop on their thighs for hours on end.

Scan can spot 'curable cause of high blood pressure'



Doctors say they have found a medical test that can diagnose the most common curable cause of high blood pressure. Conn's syndrome - a disease of the adrenal glands is thought to be the cause behind one in 20 cases of hypertension. But until now it has been difficult to detect, requiring a complex series of tests on blood taken from a vein supplying the adrenal gland. Experts at the University of Cambridge say a simple scan can spot the problem. The hi-tech PET-CT scan looks for small growths in the adrenal glands that are about the size of a five pence piece. These benign growths or tumours called adenomas - pump out too much of a hormone called aldosterone, which in turn raises blood pressure. The researchers developed a special radioactive tracer called 11C-metomidate, which lights up adenomas in the scan. After initial success in 44 patients, the researchers team is now using the scan on any patients they suspect to have Conn's syndrome. Once the problem is identified the condition can be treated either by surgically removing the affected gland or by using a drug to block the effects of aldosterone. This is important because high blood pressure greatly increases the risk of heart attack and stroke. In the future PET-CT could be a quick way to reassure a lot of patients without the need for detailed investigations.

Reference: bbc.co.uk

Emergent management of lightning injuries

Lightning strike is commonly associated with burns, but serious burn injuries are rare, while cardiopulmonary arrest is the most likely cause of death after such an event. It can be difficult to diagnose a lightning-injured patient if there were no witnesses to the event or the patient is unaccompanied to the Physicians. Telltale diagnostic signs are discussed herein, along with mechanisms, types, and management of lightning-associated injuries. Also included is a comparison of the effects of highvoltage electrical injuries versus lightning injuries.

Introduction

Lightning injuries is commonly associated with burns, but serious burn injuries are rare, while cardiopulmonary arrest is the most likely cause of death after such an event. Injuries and deaths due to lightning are believed to be underreported. This may be due to several factors, including a lack of witnesses to the event and attributing a patient's symptoms to another etiology. Lightning can occur in different forms, with streak lightning being the most common. Most frequently, lightning is negatively charged; positively charged lightning is more powerful because of its stronger electrical field, and it may be associated with a different injury profile. This may be due in part to the fact that it lasts 10 times longer and can originate several miles away from a storm. Burns and blunt trauma secondary to a splash mechanism may be more likely in victims of positively charged lightning, since this form of lightning can originate "out of the blue." Lightning generates intense heat around it, rapidly heating the air to 20,000°C, which is three times the temperature of the surface of the sun. This rapid heating generates a supersonic shock wave that decays to an acoustic wave heard as thunder.

Mechanisms of injury

Lightning produces injury and death by multiple mechanisms. These include its electrical effect, the effect of the heat produced by the lightning, and the physical force of the lightning striking the ground or the individual. A direct strike injury is damage caused when the lightning bolt directly hits a victim. A splash mechanism indirectly injures a victim when the lightning hits another object, such as a tree, and splashes onto the victim. Contact injury occurs when a victim is directly in contact with an object that has been struck by lightning. The concussive force of the lightning strike can lead to significant blunt trauma and specific lightning-related injuries, including tympanic membrane rupture. The victim can be thrown a great distance as well, which itself can cause significant trauma. Lightning should be considered in terms of its current, not its voltage. By its very nature, lightning is unidirectional and flows for a short time only, which is in contrast to alternating and direct current. Because of this, lightning typically causes asystole rather than ventricular fibrillation. However, due to the intrinsic automaticity of the heart, the victim of a lightning strike is unlikely to die since cardiac activity will resume spontaneously. Furthermore, when first examined, the patient may be in cardiac arrest with ventricular fibrillation. Survival depends entirely on the length of time from the initial injury, as successful resuscitation may not be achieved if the victim has had prolonged myocardial ischemia. Even if a cardiac rhythm is reestablished from intrinsic cardiac automaticity, the concurrent "short-circuiting" of the respiratory electrical center can cause respiratory arrest, exacerbating the situation. Due to the short duration of exposure, lightning strikes (unlike highvoltage electricity) do not cause significant burns or muscle breakdown leading to rhabdomyolysis and subsequent renal failure.

Injury classification

Injuries from lightning strikes can be arbitrarily classified as minor, moderate, or severe. Minor injuries include headache, transient amnesia, transient neurologic dysfunction, and tympanic membrane rupture. Permanent injuries may also be sequelae of the strike. Moderately injured patients can present in lethargic, stuporous, and comatosestates. They frequently have neurologic manifestations, including extremity paralysis and seizures, and may also have cardiovascular manifestations of the strike, including sympathetic instability and asystole with spontaneous return of a perfusing rhythm. Almost all patients with moderate injuries have tympanic membrane rupture. They must also be evaluated for signs of blunt trauma due to possible concussive damage from the lightning strike. Most patients with moderate injuries recover within hours. However, some patients demonstrate long-term sequelae, including neuropathies and sympathetic nervous system disorders. In addition, most victims of lightning strikes have evidence of first or second degree burns. Patients with severe injuries are usually in extremis due to cardiorespiratory arrest, which can lead to anoxic brain injury. Prognosis is poor.

Effects on organs and systems

Nervous system: Injury to the central nervous system is caused by electrical current passing through the brain. This can cause significant damage to neuronal structures, leading to necrosis of brain tissue and formation of hematomas. Trauma resulting from the lightning strike's concussive force can cause multiple other injuries, including skull fractures, scalp

Patterns in high-voltage electrical injury vs lightning injury

	High-voltage electrical injury	Lightning injury
Mechanism of injury	Direct contact	Multiple mechanisms
Voltage	Hundreds to thousands	Millions
Contact time	Can be prolonged	Immediate, brief
Cardiopulmonary effects	Ventricular fibrillation, asystole	Respiratory, cardiac arrest
Nervous system injuries	Paresthesias	CNS, PNS injuries; autonomic dysfunction
Entrance, exit wounds	Common	Rare
Secondary trauma	Less common	Common
Eye injuries	Less common	Common
Tympanic membrane rupture	Unusual	Common
Myoglobinuria/hemoglobinuria	Very Common	Rare
Skin	Fasciotomy commonly required	Fasciotomy rarely required

CNS = central nervous system; PNS = peripheral nervous system

hematomas, and tears within the dura. Respiratory arrest and subsequent cardiac arrest can result from neuronal injury within the brain stem. Seizures are also seen in lightning strike victims, as are signs of "short-circuiting" of neurons, e.g., paresis, hemiplegia, ataxia, and cranial nerve palsies. Anterograde amnesia and confusion occur in nearly all victims of lightning strikes, with variable symptom duration (sometimes lasting for days). Furthermore, victims often report severe, unremitting headaches that can last for months after the event. These patients may present with findings similar to those of a postconcussive syndrome, including nausea, dizziness or frank vertigo, and tinnitus along with the headache. These symptoms can be mistaken for a migraine type headache, with the exception that the headache induced by lightning strike typically is generalized in nature. The peripheral nervous system can also be severely affected in victims of a lightning strike, with pain and paresthesias as the most pronounced features. These symptoms typically are most noticeable in the extremities through which the current passed and do not necessarily manifest immediately after the injury. Among patients who have been severely injured by lightning, approximately two-thirds demonstrate lower extremity paralysis and one-third have upper extremity paralysis. Due to sympathetic instability and vascular spasm, the skin of the affected extremities appears mottled, and these extremities also lack sensation and evidence of a pulse. These signs and symptoms usually resolve within several hours. However, some patients have long-term autonomic dystrophy and even develop reflex sympathetic dystrophy subsequent to a lightning strike.

Eyes: Eye injuries occur in more than 50% of individuals struck by lightning. There are many mechanisms for eye injury, including direct electrical damage, light damage, and blunt trauma. If cataracts develop, this usually occurs within days following the strike. Autonomic disturbances (eg, Horner syndrome) affecting the eye are also possible and can be temporary or permanent. Fixed and dilated pupils cannot be used in this context as indicators of serious brain injury.

Ears: Due to the significant noise and the shock wave inherent in lightning strikes, transient hearing loss is prevalent. As mentioned, a common finding is tympanic membrane rupture, which is seen in 50% of patients. Any evidence of fluid or blood drainage from the ear canal warrants CT of the head to look for injury to the skull or brain.

Cardiopulmonary: Cardiopulmonary arrest is the most common cause of death following a lightning strike; however, the victim is not likely to die unless the arrest is a direct result of the strike.

Anterograde amnesia and confusion occur in nearly all victims of lightning strikes, with variable symptom duration.

Secondary cardiac arrest has been reported and is caused by paralysis of the brain stem respiratory center, resulting in hypoxia which itself leads to cardiac arrest. This can occur even if the heart has regained sinus function and a perfusing rhythm. Other arrhythmias are also common, and these run the gamut from atrial to ventricular dysrhythmias. ECG is not useful as a screening tool, as changes indicative of ischemia may be delayed for as long as 1 week. Most of these changes resolve relatively quickly, but some, especially prolongation of the QT interval, may require several days to subside. Direct injury to the lungs with pulmonary contusion and hemorrhage can occur as well.

Skin: Due to the nature of lightning, visible entry and exit wounds are not common in lightning injury. Burns, however, are very common. Burns to the skin can be loosely categorized into five groups. The first category is linear burns (including flash burns); these are firstand second-degree burns caused by steam on the victim's skin. Linear burns are typically 1 to 4 cm wide and follow areas of moisture accumulation such as the axillae and the area beneath the breast. Punctate burns, the second category, are discrete circular burns that are typically closely spaced and vary in size from a few millimeters to a centimeter in diameter. The sine qua non of lightning injury is Lichtenberg figures (also known as lightning flowers), a ferning pattern of burns to the skin. These are not true burns, as evidenced by the fact that microscopic evaluation of biopsy samples reveals no damage to the skin. The fourth type of burn is thermal, which is caused by the intense heat of the lightning, which can burn clothing and jewelry, causing second and third degree burns. Included in this category are contact burns, a subgroup of burns that occur when metal such as jewelry is heated by the lightning, causing burns to adjacent skin. There is also a fifth group that encompasses a combination of these injury patterns.

Kidneys: Due to the short duration of lightning strikes, myoglobinuric renal failure is not common since significant muscle breakdown does not typically occur. This is in direct contrast to high-voltage electrical injury, in which it commonly occurs.

Other injuries

Concussive force injuries: Since victims of lightning strike can be thrown several yards from the site of the strike, evaluation for blunt trauma is mandatory. Evaluation for bony injuries should be performed with appropriate radiologic studies, including CT if indicated.

Diagnosis

It is important to recognize that the diagnosis of a lightning injured patient may be difficult, especially if the patient is unaccompanied. Historical features, including witnesses to the event, a storm in the area, and physical findings, are immensely helpful in establishing the clinical picture. The differential diagnosis is broad and includes cerebrovascular etiologies such as stroke, hemorrhage, and seizures, as well as cardiovascular causes such as arrhythmias and myocardial infarction. Telltale signs of lightning injury include an arborealtype burn (ie, Lichtenberg figures), tympanic membrane rupture, and disheveled appearance of the patient (including clothing that is blasted apart). The patient is also likely to be confused or amnestic to prior events.

Laboratory and radiologic testing: Recommended laboratory tests include electrolyte measurement, assessment of renal function, complete blood count, and cardiac enzyme studies, including creatine kinase and troponin assays. ECG is mandatory, as is cardiac monitoring. The decision to order radiologic evaluation depends on the patient's presentation and the physician's assessment. CT of the head may be warranted in patients with altered mental status. Further CT scans may be indicated in patients with evidence of significant blunt trauma.

Management

The highest priority is to assess and stabilize the patient's airway, breathing, and circulation. Cardiopulmonary resuscitation should be instituted immediately if the victim is in cardiac arrest. Due to the risk for secondary cardiac arrest, this should be continued not only until spontaneous circulation occurs but until spontaneous respirations occur as well (or until the airway is secured). Following resuscitation and the primary survey, another careful survey should be performed with the patient completely undressed; if possible, history from witnesses and emergency medical services personnel should be obtained. The patient's eyes should be examined for reactivity, acuity, and presence of cataracts; the ears should be evaluated for hearing, tympanic membrane rupture, and telltale signs of basilar skull fracture, including hemotympanum.

Cardiovascular assessment should include documentation of pulses in all extremities, and the patient should be continually monitored for evidence of arrhythmia. The abdomen should be assessed for evidence of acute traumatic injury. Evaluation for focal neurologic abnormalities, including sympathetic dysfunction of an affected extremity, should also be performed. The extremities will be cold and clammy and have decreased sensation and pulses. Finally, with the patient completely undressed, the skin and extremities should be examined for any evidence of burn injury. IV access should be obtained and crystalloid started. In addition to continuous cardiac monitoring, further invasive monitoring may be warranted depending on the patient's vital signs and overall clinical status. Unless the patient is truly hypotensive, fluid administration should not be aggressive, due to the risk for cerebral edema, and once the patient has been stabilized, fluids should be restricted because of this risk. Since lightning strike alone rarely causes hypotension, significant hypotension mandates evaluation for other etiologies of shock, especially abdominal or chest hemorrhage and long bone fractures.

Disposition

The disposition of lightning-injured patients depends on the clinical scenario. Patients with minor injuries can be observed for several hours, while those with severe symptoms should be admitted for further management. Follow-up should be arranged as required for those who are discharged.

Conclusion

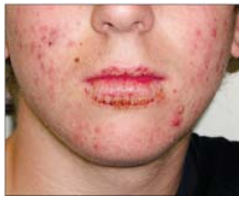
Lightning strike is one of the most common environmental causes of death. It is important to understand that the mechanism of injury, the resulting injury pattern, and the potential complications associated with lightning strike are all quite different from those seen with high-voltage electrical injury. Classic injuries associated with lightning strikes include tympanic membrane rupture and arboreal burns. Lightning strikes can result in some delayed effects, including cognitive and behavioral issues, cataracts, and peripheral nervous system dysfunction. The patient should be informed of the potential for these effects and educated appropriately.

Reference: Emergency Medicine, October 2011:7-13

DERM DILEMMA

What is your diagnosis?

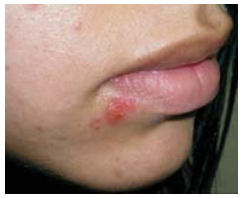
CASE 1



A 16 year old boy presents with a 5 day history of weeping, honey-colored crusts below his lower lip. He recently was at summer camp, where he swam in ponds and was exposed to weeds. He has a history of chronic acne. The rash is nonpruritic, but there is some burning. Several other campers have a similar rash. Bacterial culture and sensitivity are obtained.

What is your diagnosis?

CASE 2



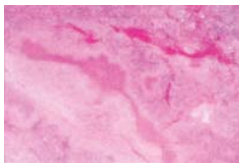
A 22 year old woman has painful blisters of her right outer lip and swollen lymph nodes below her right jaw. She also reports malaise, fever, and anorexia. Prior to the onset of the blisters, she had localized pain and burning of the area. The patient recently vacationed in Cancun, Mexico, and had significant sun exposure. On physical examination, she demonstrates painful grouped vesicles on an erythematous base.

What is your diagnosis?

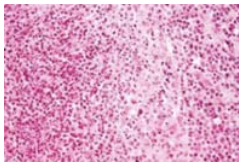
Reference: Emergency Medicine May 2011:19-20

Answers 17

Cat-scratch disease



Micrograph of a lymph node affected by cat scratch disease. H & E stain



High magnification micrograph of cat scratch disease showing a granuloma (plae cells-right of center on image) and a microabscess with nentrophils (left of image) H & E stain

A 9 years old boy, master Alif from Gajipur got admitted in the department of surgery of Uttara Adhunik Medical College Hospital, Dhaka, with painful unilateral inguinal lymphadenopathy for 14 days with fever, anorexia, nausea and generalized weakness. He has no complaints of cough, micturation problem, any history of wound or ulceration in his lower limbs. He has no other swellings in any other part of his body. He received symptomatic treatment in last 14 days, but as his pain and fever didn't reduce he came here for better treatment. On general examination he was ill-looking with average built, his temperature was 101^0 F, he wasn't aneaemic, non icteric, pulse rate 90/min, had no leg oedema, both lung fields were clear. On local examination, there was lobulated swelling in the right inguinal region; 4x3 cm sized area was swelled with overlying red skin. Local temperature was raied, the site was tender and of variegate consistency. Overlying skin wasn't free but the area was well demarcated. All other systemic examination was normal. His hematological and biochemical tests were within normal limit except ESR, which was 50 mm in 1st hour. They clinically diagnosed a case of inguinal abscess with lymphadenopathy, and they prepared the patient for incision and drainage followed by inguinal node biopsy under general anesthesia. Per operatively following inguinal skin crease incision scanty pus drained out, enlarged matted capsulated lymph nodes were found, centre filled with caseous necrotic material. They excised 4 to 5 lymph nodes for histopathological examination and kept the wound open. Postoperatively he was on antibiotics (Cephalosporin), analgesics, antiemetics and antiulcerants. Daily dressing of the wound was performed for 7 days. The wound became healthy and it healed up very nicely. So secondary closure wasn't needed. But he developed mild fever on 5th post operative day which subsided on Paracetamol. But there were still enlarged inguinal lymph nodes at the site which were painless. Other symptoms disappeared. On 7th postoperative period histopathology report of inginal lymph nodes revealed granuloma with presence of abscess in the centre resmbling stellate abscess which is the features suggestive of Cat-scratch disease. On repeated enquiry about a small scar mark of healed ulcer on his foot, the child mentioned about scratch by a kitten at the site. After this the patient was managed with Doxycyclin for 2 weeks. Now except few enlarged inguinal lymph nodes other sign symptoms subsided.

Discussions

This patient presented with lympandenopathy and fever, initially he didn't mention about contact with a cat or kitten, but after diagnosis he recalled about 1 and half month before and there was a small scar mark of healed ulcer. Most cases of cat scratch disease are diagnosed by the history and physical examination. *Bartonella henseale* infections can be confirmed by culture of the organism, PCR or serology. The organism takes 9 to 45 days to grow. Serologic assays include an indirect immunofluroescenceassay and enzyme-linked immunosorbent assy (ELISA). A rise in titer or the presence of IgM suggests a recent infection. Skin test, blood test, and cultures are done to rule out other causes of swollen lymph nodes. Histopathology of the lymph nodes, and sometimes liver or spleen, is suggestive but not diagnosis. Cat-scratch fever is characterized by stellate abscesses. Initially the patient was diagnosed as a case of lymphadenopathy due to bacterial infection with suppuration and the differential diagnosis was tuberculous lymphadenitis as the patient could not recall his history of scratch by kitten. On 7th postoperative period histopathology report of inguinal lymph nodes reveals granuloma with presence of abscesses in the centre resembling stellate abscess. Treatment is usually supportive and symptomatic. Severely affected lymph nodes are occasionally excised. Antibiotics are not consistently effective for cat scratch disease. They may be recommended by some authorities, particularly if the lymph nodes are severely affected, the course of disease is prolonged, or organs other than the lymph nodes have become involved. Several investigators have claimed that cat-scratch lymphadenopathy resolves more quickly with certain antibiotic regimens (Chloramphenicol, Erythromycin, Doxycycline, Gentamicin, Trimethoprim-sulfamethoxazole, Azithromycin, Tetracyclines and Ofloxacin). This patient was managed with cephalosporins and after receiving histopathology report doxycycline was given for 2 weeks.

In summery, the diagnosis of cat-scratch disease in this case was made only after the failure of initial management the patient received before.

Reference: J. Uttara Adhunik Med. Coll. 2011; 1(1):34-36

Fiberoptic intubation

Introduction

Fiberoptic intubation is an integral part of caring for patients for whom airway access is expected to be difficult, but it is also used to secure the airway when unexpected difficulties arise. The techniques vary, depending on whether the nasal or oral approach is used and on whether the patient is awake or anesthetized.

Indications

Nasal Approach: Nasal fiberoptic intubation is indicated for patients in whom oral intubation is known to be or is expected to be difficult - for example, in a patient with a limited mouth opening or a supraglottic tumor. It is also indicated when the use of mask ventilation is expected to be difficult, such as in patients with morbid obesity, a beard, abnormal neck anatomy, or an airway that allows only limited visualization. The presence of two or more such risk factors increases the likelihood that mask ventilation will be difficult.

Lack of patient cooperation precludes the use of fiberoptic intubation while the patient is awake even in situations in which airway management is expected to be difficult. In such patients, general anesthesia should be induced only by very experienced anesthesiologists.

Oral Approach: Oral fiberoptic intubation can be used when laryngoscopy is unexpectedly difficult in the already-anesthetized patient, provided that mask ventilation and therefore oxygenation are administered by means of a face mask until fiberoptic intubation can be performed.

Indications

Known or anticipated condition that will render Intubation difficult:

- Supraglottic tumor
- Abscess in the neck region

Patients with limited mouth opening:

- Rheumatoid arthritis
- Cervical spine problems
- Poor dentition

Mask ventilation difficult:

- Body mass index > 30 or higher
- Beard
- Abnormal neck anatomy
- Airway that allows only limited visualization

Equipment

For both the nasal and the oral approaches, you will need nonsterile gloves; a watersoluble lubricant; a flexible, armored, silicone endotracheal tube with an internal diameter of 6 mm; a 10 ml syringe; an antifogging agent; and tape and ribbon to secure placement of the endotracheal tube. The diameter of the flexible fiberscope should be between 3.7 mm and 4.1 mm. For the nasal approach only, need a topical anesthetic with an atomizer; 0.5 ml of 10% cocaine nasal drops for vasoconstriction and local anesthesia of the lower nasal cavity; and a 2 ml syringe with a local anesthetic, such as 2% lidocaine, for local anesthesia of the larynx and the proximal trachea. For the oral approach only, you will need a slit oral airway.

Equipment and medications for fiberoptic intubation

Equipment

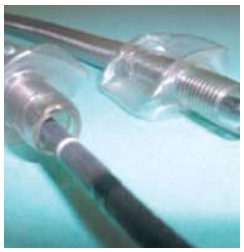
- Nonsterile gloves
- Topical anesthetic with atomizer
- Syringes, 2 ml (N) and 10 ml
- Water-soluble lubricant
- Flexible endotracheal tube, internal diameter 6 mm
- Antifogging agent
- Tape and ribbon
- Flexible fiberscope, diameter 3.7-4.1 mm
- Slit oral airway (O)

Medications

- Clonidine, 0.15 mg orally
- Fentanyl, 2 µg intravenously per kilogram of body weight
- 10% Cocaine nasal drops, 0.5 ml 2% Lidocaine
- Etomidate, 0.2-0.3 mg intravenously per kilogram of body weight

Preparing the patient

Explain the procedure to the patient and obtain informed consent. Give the patient a slightly sedating medication that does not induce salivation (e.g., 0.15 mg of oral clonidine or intravenous glycopyrrolate). Place a face mask on the patient during monitoring to provide 100% oxygen, administer 2 µg of intravenous fentanyl per kilogram of body weight, and anesthetize the posterior pharyngeal wall with a topical anesthetic spray (this is particularly important for physicians who are fairly new to performing the procedure). Prepare the inferior nasal cavity by applying 0.25 ml of cocaine inside each nostril and close the patient's nose by pressing on both sides with your thumb and forefinger. Alternatively, ask the patient to do this.



The recommended size of the gap between the tube and the fiberscope

Preparing the equipment

While you are preparing the equipment, be sure the patient is being adequately oxygenated by means of a firmly applied mask. Lubricate the endotracheal tube and then thread it over the fiberscope. Fix the endotracheal tube with tape or with an adapter for the fiberscope. Check to ensure that the fiberscope is flexible and provides a focused view, apply an antifogging agent to the tip of the scope, and then connect the oxygen source to the fiberscope.

Nasal approach

Stand above the patient's head and explain each step as you proceed. Hold the fiberscope near its tip to get the best feel for the instrument as it proceeds through the lower nasal canal. When it reaches the posterior nasopharynx, ask the conscious patient to stick out his or her tongue, which will make it easier to advance the instrument toward the epiglottis. Simultaneously, lift the tip of the fiberscope, making a slight downward movement with the thumb of the hand that is holding the instrument.

If the patient is heavily sedated, it can be helpful to use a tongue-traction maneuver. Working in the supraglottic region, administer 1 to 2 ml of local anesthetic through the working channel of the fiberscope, simultaneously administering oxygen to propel the anesthetic into the area. Advance the fiberscope posterior to the epiglottis and through the vocal cords, taking care to avoid any direct contact with the pharyngeal and laryngeal structures, and facilitate the advancement through the glottis by making a slight downward movement with the tip of the scope. It is important to distinguish the trachea, with its rings and posterior tracheal membrane, from the esophagus, because the scope can be unintentionally advanced into the esophagus. Inject an additional 1 to 2 ml of local anesthetic through the channel of the fiberscope. This stimulus induces a cough reflex that disperses the local anesthetic in the trachea. Make sure the fiberscope remains in the proximal part of the trachea, since this is the only area that has been anesthetized. Alternatively, inject the anesthesia directly by puncturing the cricothyroid membrane. To induce general anesthesia in patients who are not in critical condition, It is recommend for the administration of 0.2 to 0.3 mg of intravenous etomidate per kilogram of body weight. Etomidate is not the drug of choice in critically ill patients because it may induce adrenal insufficiency ; agents such as intravenous midazolam or propofol should be used in these patients. In a patient whose airway is not severely compromised, administering a hypnotic agent before advancing the tube can increase comfort and may also decrease the reluctance of an anesthesiologist to perform fiberoptic intubation in a patient who is awake. After the patient loses consciousness, advance the instrument toward the carina. No sedating medication should be given to patients with a severely compromised airway, not even during insertion of the fiberscope. Place lubricant at the orifice of the nose and on the cuff of the endotracheal tube. Use rotating movements to advance the tube, a slight resistance at the beginning of the nasal passage. Watch for the appearance of the endotracheal tube on the screen of the fiberoptic unit, and place the tip of the tube 3 to 4 cm above the carina. Remove the fiberscope and attach the endotracheal tube to the ventilation system of the anesthesia machine.

Oral approach

If difficult to visualize the larynx of a patient who is already anesthetized, and conventional intubation without success, use bag and mask ventilation to maintain oxygenation. Then place a slit oral airway in a midline position. Ask an assistant to perform a chin lift and jaw thrust maneuver. Insert the fiberscope at the midline and follow the posterior wall of the oropharyngeal airway. The end of the epiglottis can be easily recognized. Advance the fiberscope through the glottis, just above the carina. When the insertion of the fiberscope has been completed, remove the slit oral airway and use rotating movements to advance the flexible endotracheal tube, maintaining the position of the chin-lift and jaw-thrust maneuver.

Confirming tube placement

Confirm that the endotracheal tube is in the correct position by viewing it directly through the fiberscope. It is also important to check the carbon dioxide signal on the anesthesia monitor, since the endotracheal tube may have become displaced during the removal of the fiberscope. Auscultation over the stomach and both lungs in the midaxillary line should confirm correct placement.

Securing the tube

Using adhesive tape, fix the endotracheal tube onto the bridge of the nose; in oral intubation, affix the tube to the maxilla. Then secure the tape with a ribbon or other approved device to keep the tube

from being displaced. Stabilize a flexible orotracheal tube with the previously used slit oral airway.

Troubleshooting

The most common source of problems that may occur during fiberoptic intubation is deviation from the standardized procedure. With this technique, the incidence of difficulty increases if use a assistance, polyvinyl chloride tube instead of a flexible silicone tube. The flexible tube follows the curve of the fiberscope more easily. The procedure will also be more difficult if you use an endotracheal tube with a sharp bevel rather than a tube with a soft end and no bevel. It is very important to preserve a very small gap between the endotracheal tube and the fiberscope, since a small gap results in less frequent contact between the tip of the tube and the posterior arytenoid region. When using oral fiberoptic intubation, be sure to perform an adequate chin-lift and jaw-thrust maneuver, and be certain that the slit oral airway is the correct size. In general, a number 4 slit oral airway is the appropriate size for adults. If the slit oral airway is too large, it will obstruct your view through the fiberscope as you advance it toward the glottis.

Contraindications

Nasal fiberoptic intubation should be avoided in patients with severe maxillofacial trauma, since the fiberscope or the endotracheal tube could inadvertently enter the brain. Massive airway bleeding is a relative contraindication to nasal and oral fiberoptic intubation, which should be performed only by very experienced anesthesiologists.

Complications

Minor complications include epistaxis and transient minor laryngeal injury, such as erythema and hematoma of the vocal cords; hoarseness may also result. If adhere to a predefined standard procedure, severe complications, such as damage to the arytenoid, extensive hematoma of the pharyngeal wall, or aspiration, are unlikely to occur.

Summary

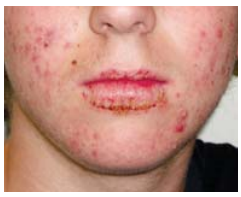
Fiberoptic intubation is a standard technique used to manage the care of patients in whom airway access is known to be or is expected to be difficult. Most complications can be avoided if the physician strictly adheres to the protocol for the procedure. Fiberoptic intubation is best accomplished by those who perform it as part of their daily practice.

Reference: N. Engl. J. Med. 19 May 2011, 364; 20: e42

DERM DILEMMA

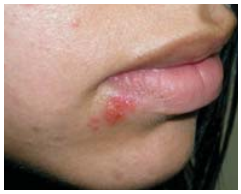
Answers

CASE 1



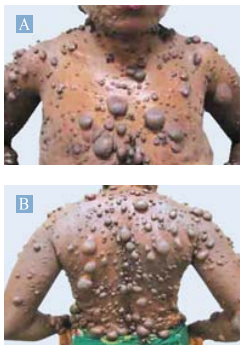
The patient has impetigo. Nonbullous impetigo is usually caused by *Staphylococcus aureus* and sometimes *Streptococcus pyogenes*. Infection often occurs at minor sites of trauma. Bullous impetigo is caused by *Staphylococcus aureus*, and blister formation is mediated by an exfoliative toxin produced by the Staphylococcus strain. Local wound care, including cleaning and removing crusts, is important. Localized impetigo in a healthy patient can be treated with mupirocin ointment 2% three times a day. β-Lactamase-resistant penicillins and firstor second-generation cephalosporins should be used in more advanced cases. Some organisms are sensitive to macrolides. The possibility of MRSA should be considered in resistant cases.

CASE 2



The patient is diagnosed with herpes labialis due to herpes simplex virus. A primary infection is possible, as suggested by the lymphadenopathy and systemic symptoms. Multiple grouped vesicles on an erythematous base are the classic manifestation. Initial primary herpes labialis can be treated orally with acyclovir 400 mg three times a day for 10 days, famciclovir 250 mg three times a day for 10 days, or valacyclovir 1 g twice a day for 10 days. Recurrent orolabial herpes can be treated with penciclovir 1% cream applied every 2 hours for 4 days, famciclovir 1.5 g (one dose) orally, or valacyclovir 2 g orally twice a day for 1 day.

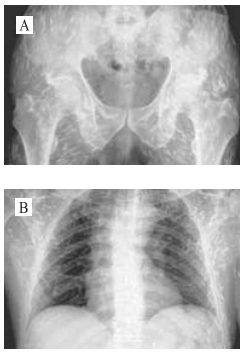
Neurofibromatosis



A 26 year old woman presented with painless nodular skin lesions that first developed 7 years earlier. Skin nodules initially appeared on the anterior chest wall and progressed to involve the whole body. Her medical history and that of her family were unremarkable. Cutaneous and subcutaneous nodules were more extensive on the upper limbs and the anterior and posterior trunk (Figure A and B). The size of the nodules ranged from 5 to 40 mm in diameter. She had plexiform neurofibromatosis on the scalp and three café au lait spots in the right inguinal region. The results of histologic examination of biopsy specimens from the lesion on her scalp and from an excised nodule on her chest were consistent with neurofibromatosis. The patient received a diagnosis of neurofibromatosis type 1, a syndrome caused by neurogenic tumors arising from neural sheath cells located along peripheral and cranial nerves. Inheritance is autosomal dominant, although half of cases are caused by a spontaneous mutation. Clinical findings can include Lisch nodules of the iris, schwannomas, café au lait macules, axillary freckling, optic-nerve gliomas, astrocytomas, multiple neurofibromas, and plexiform neurofibromas; plexiform neurofibromas are associated with an 8 to 12% risk of malignant degeneration. Surgical excision can be undertaken for cosmetic purposes, but lesions may recur. The patient was offered genetic counseling and is scheduled for clinical review every 6 months for surveillance of the nodules and any conditions that may be associated with neurofibromatosis.

Reference: N. Engl. J. Med. 24November 2011, 365; 21: 2020

Cysticercosis



A 67 year old man was referred to the hematology department for evaluation of monoclonal gammopathy. As part of his workup, a skeletal survey was performed. The study did not show any lytic bone lesions, but numerous "rice grain" calcifications were seen throughout the body (with the exception of the hands and feet), with their long axes oriented in the plane of the muscle fibers (Fingers A and B). This appearance is highly suggestive of cysticercosis. The patient was asymptomatic at the time of presentation but reported that as an adolescent he had muscle pain for which he had never been treated. The patient grew up without indoor plumbing, in a region where the domestic breeding of pigs was a frequent practice and the likely cause of his infection. The patient reported no past or present neurologic symptoms. Cysticercosis is caused by the hematogenous dissemination of larvae from the pork tapeworm, *Taenia solium*. The eggs are typically ingested through contaminated food or water. Common sites of involvement include the central nervous system, which can lead to neurologic symptoms, and the muscles, which can lead to muscle pain. No therapy for cysticercosis was given.

Reference: N. Engl. J. Med. 24November 2011, 365; 21: e41

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 30 March 2012
- We look forward to receiving your winning entry

Info Quiz Answers
October-December 2011

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

Jog your memory

Please select the correct answer by (√) against a, b, c, d & e of each questions in the Business Reply Card and send it through our colleagues or mail within 30 March 2012; this will ensure eligibility for the Raffle Draw and the lucky winners will get attractive prizes!

1. Alpha one antitrypsin deficiency is likely to demonstrate the following skin pathology

a. Dermatomyositis
b. Cutaneous polyarteritis nodosa
c. Maculopapular rash
d. Panniculitis
e. Erythema nodosum

2. An elderly patient with essential thrombocytosis has a platelet count of over 1 million and is suffering from recurrent thromboembolic episodes despite treatment with aspirin.

a. Radiation of the medullary cavity
b. Plasmapheresis
c. Hydroxyurea
d. Alpha-interferon
e. Anagrelide

3. A comparison of norepinephrine and phenylephrine shows that, when given at therapeutic doses both can

a. Decrease skin blood flow
b. Stimulate liver gluconeogenesis
c. Cause reflex tachycardia
d. Relax pregnant uterus
e. Increase A-V conduction

4. Hospitalized immunocompromised patients are at risk for pneumonias. Which of the following would represent such a nosocomial pneumonia.

a. *P. carinii*
b. Nocardia spp
c. Mavium-intracellulare
d. *Pseudomonas aeruginosa*
e. *Staphylococcus aureus*

5. A 42-year-old man with acute renal failure is confused. His serum potassium is 8.1 mEq/L . The most likely abnormal ECG finding is

a. T wave inversion
b. PR interval of 300ms
c. QT interval of 0.4s
d. U wave
e. Tall tented T waves test

6. The most common etiologic factor in the induction of neurofibromatosis

a. Mutation NF2 gene
b. Mutation of DPC4 gene
c. Mutation of p21 gene
d. Mutation of Rb gene
e. Mutation of p53 gene

7. Septic pulmonary embolism in an intravenous drug abuser is likely to be secondary to

a. *P. carinii*
b. Nocardia spp
c. Mavium-intracellulare
d. klebsiella
e. Candida

8. A child who has had abnormal development of the membranous bones has a broad skull with associated facial and dental anomalies. Which other bones are most likely to also be affected?

a. Clavicles
b. Femurs
c. Metatarsals
d. Phalanges
e. Tibias

9. Vascular abnormalities are a known side effect of several cytotoxic drugs. Which of the following cytotoxic drugs is most likely to lead to thrombosis and thromboembolism?

a. Methotrexate
b. 5-fluorouracil
c. Taxoids
d. Cyclopentenyl cytosine
e. Trastuzumab

10. In a patient with Wolff Parkinson White syndrome, the most characteristic finding on an ECG is

a. ST segment elevation
b. Inversion of lead I
c. Q wave measuring 50% of QRS height
d. Delta waves
e. ST segment depression

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