October-December 2017
Volume 14 Issue 4

ISSN 2222-5188

Info Medicus

The essence of medical practice

Pneumonia in children

CONTENTS

EDITORIAL

Dear Doctors,

We welcome you to the last issue of 2017. In the growing field of medical science our goal is to keep you informed about the current management of diseases. This issue is enriched with a blend of topics those are often encountered by the healthcare professionals. We have focused on pneumonia in children in review article because childhood pneumonia is an important cause of morbidity in the developed world and morbidity and mortality in the developing world.

We have chosen electrocardiographic monitoring in essential procedure, which will help in better monitoring of patients with complex heart problems. Vitiligo has been increasing in upcoming days, many are unaware of the clinical features and treatment. Hence we have emphasized vitiligo as a topic of health care.

You will be glad to read the current health as it says that now Type 1 diabetes can be reversed by BCG Vaccine and a new hope for neuro tumor patients has been presented in this section.

A new section amazing human facts have been introduced in this issue which will be very informative. Besides other regular sections are there as usual.

Our efforts have been to make this issue enlightening for you and we will appreciate your suggestions to make it worthwhile as we progress further in dissemination of ground-breaking experiences in the medical domain.

With warm regards,

(Dr. S. M. Saidur Rahman)
Deputy General Manager
Medical Services Department

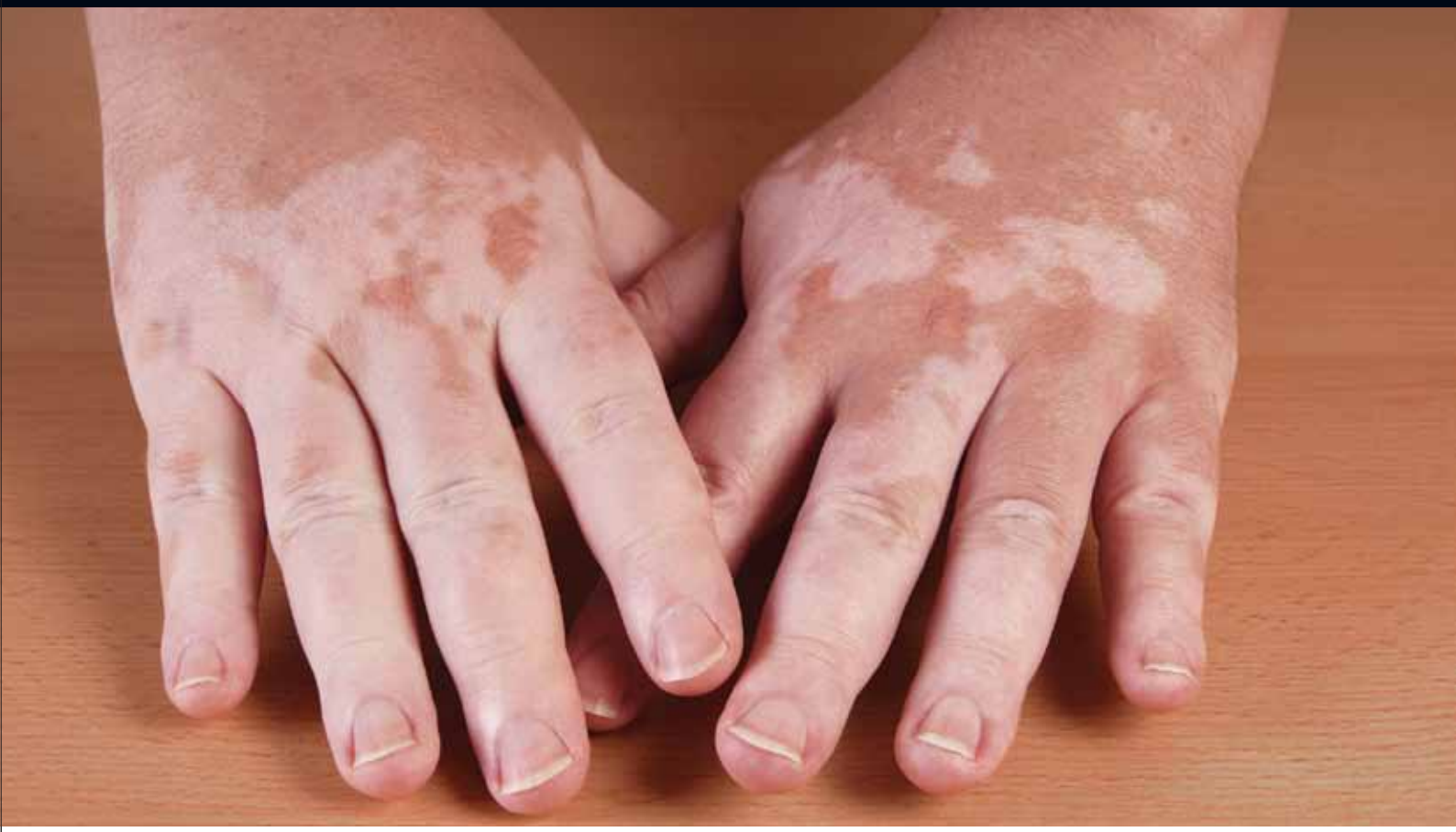
(Dr. Rumana Dowla)
Manager
Medical Information & Research

Four facts about human brain

1. The right side of the brain is responsible for self-recognition
2. As we get older, the brain loses almost one gram per year
3. Neurons continue to grow throughout human life
4. Men listen with the left side of the brain and women use both sides of the brain

Four facts about human baby

1. A newborn baby's brain grows almost 3 times as fast during the first year of life
2. A newborn baby has more than 26 billion cells
3. Babies are color blind when they are born, so they only see black and white
4. A fetus acquires fingerprints at the age of three months



An overview of vitiligo

Vitiligo is a disorder in which white patches of skin appear on different parts of the body. This happens because the cells that make pigment in the skin are destroyed. These cells are called melanocytes. Melanocytes synthesize melanin from the amino acid tyrosine in the presence of an enzyme called a melanosome. For the production of skin color melanin is the necessary pigment. Vitiligo generally affects about 1% of the world population. It does not include racial, sexual or regional differences among the population. Onset of vitiligo is usually more in childhood or in young adults of 20 to 30 years of age and in about 30% there is a positive family history.

Types

There are three major types of vitiligo:

- Segmental: It is an acquired chronic pigmentation disorder, characterized by white patches with a unilateral distribution
- Non-segmental: It vitiligo is characterized by white patches, often symmetrical that usually increase in size with time, corresponding to a substantial loss of functioning epidermal and in some cases hair follicle melanocytes
- Mixed: It is an autoimmune disease and often mirrors on both sides of the body. Mixed vitiligo overlap of both types in the infrequent cases where segmental becomes non-segmental

Pathogenesis

There are three hypotheses for the pathogenesis of vitiligo:

- Biochemical or cytotoxic: The biochemical or cytotoxic hypothesis emphasizes that vitiligo occurs when the melanocyte is killed by cytotoxic precursors to melanin synthesis
- Neural: The neural hypothesis is based on nerve injury development with effected sites that leads to segmental vitiligo with neurons that interact with melanocytes and release melanocytotoxic substrates
- Autoimmune: The autoimmune hypothesis is based on genetic data which are more associated to autoimmune diseases

Clinical feature

White patches on the skin are the main sign of vitiligo. Initially, patches are small but they will be enlarge over time. People with vitiligo often have hair that turns gray early. Persons with dark skin may notice a loss of color inside their mouths. However, areas for white patches are given below.

Areas of white patches

Most common	Less common
Face	Around the mouth
Neck	Eyes
Forearms	Nostrils
Feet	Navel
Dorsal Hands	Knee
Fingers	Elbow
Scalp	Genitals

Diagnosis

To diagnose the exact vitiligo one should be able to differentiate between different conditions of the skin like complete depigmentation, hypopigmentation and normal color of the skin. Pure tone and speech audiometer, sound treated room, cochlear emission analyzer madsen, immittance meter, evoked response audiometer nickolet compact four, wood's light lamp equipment can be used for the diagnosis of vitiligo.

Treatment

It can be treated by oral or topical formulations of the drug alone in mild cases. But in severe case of vitiligo light therapy is also given with the consumption of medication to increase the pigmentation of the skin.

Phototherapy: Exposing the skin to ultraviolet B (UVB) light from UVB lamps is the most common treatment for vitiligo. The treatment can be carried out at home with a domestic UVB lamp or in a clinic. It is important to control the exposure time so that the skin does not burn from over exposure. Treatment can take a few weeks if the spots are on the neck and face and if they have existed not more than 3 years. If the spots are on the hands and legs and have been there for more than 3 years, it can take a few months. There is no treatment that totally repigments the skin. Adding a psoralen, a photosensitizer, or an immunomodulant that increases the effect of the UV light can aid in partial repigmentation. Psoralen and ultraviolet A light (PUVA) treatment involves taking a drug that increases the skin's sensitivity to ultraviolet light, then exposing the skin to high doses of UVA light. Treatment is required twice a week for 6-12 months or longer. Narrow band UVB phototherapy is now used more commonly than PUVA as it is less damaging to the skin.

Skin camouflage: In mild cases, vitiligo patches can be hidden with makeup or other cosmetic camouflage solutions. If the affected person is pale skinned, the patches can be made less visible by avoiding tanning of the affected skin.

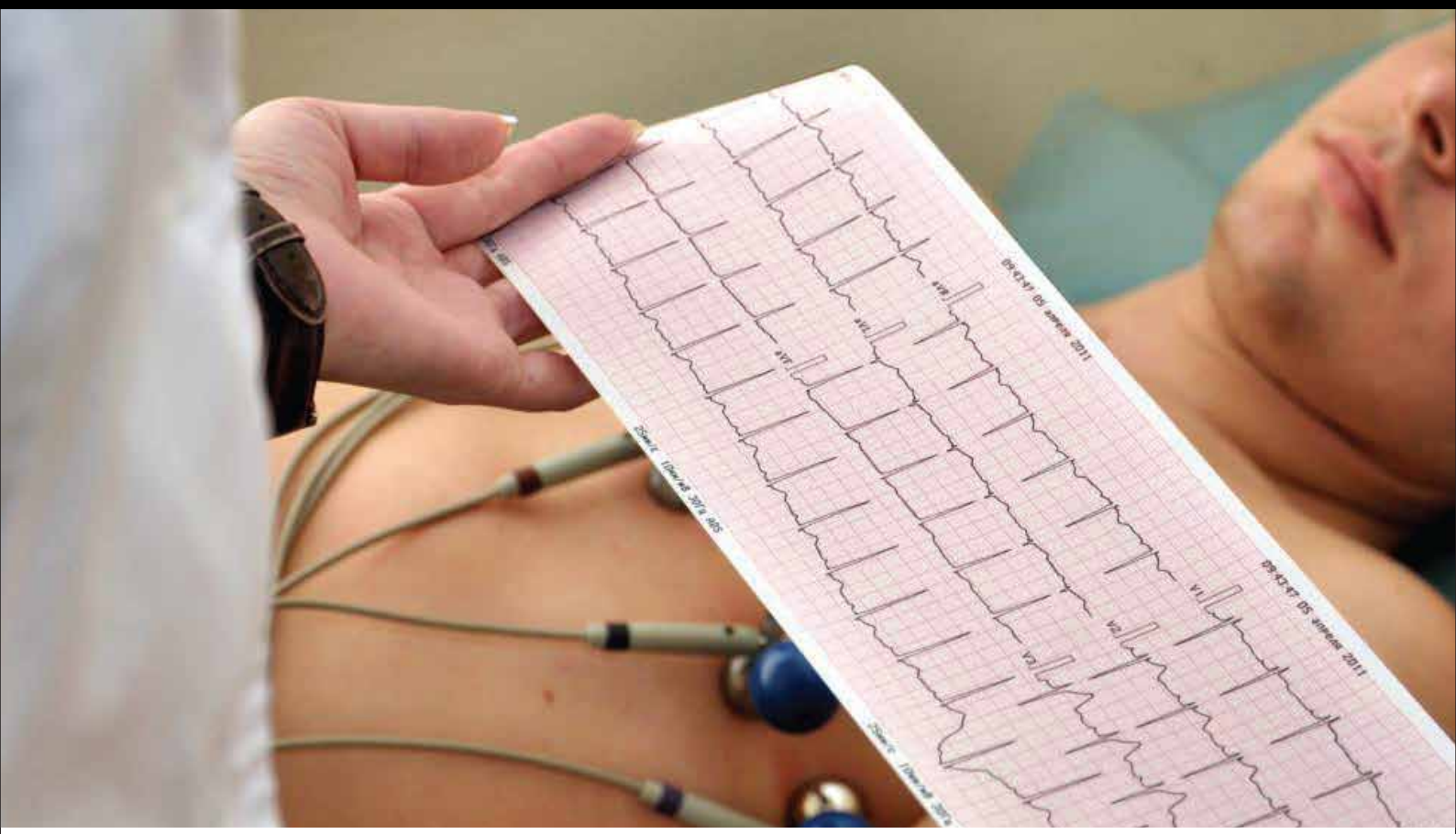
Depigmentation: In cases of extensive vitiligo the option to depigment the unaffected skin with topical drugs like monobenzone, mequinol, or hydroquinone may be considered to render the skin an even colour. The removal of all the skin pigment with monobenzone is permanent and vigorous. Sun safety must be adhered to avoid severe sunburn and melanomas. Depigmentation takes about a year to complete.

Surgical therapies: In surgical therapies white patches are treated with the help of different surgeries. It involves different mechanisms of surgery.

- Autologous skin grafts: This type of grafts are implanted into perforations prepared at the recipient sites. Patients with segmental vitiligo are best candidate for this type of grafting
- Blister grafting: Here blisters can be induced by different ways such as vacuum or liquid nitrogen. At the dermoepidermal junction the mechanical split occurs and the graft is secured on the recipient site
- Epidermal cell transplantation: This technique involves application of a melanocyte rich suspension to the affected area and then it is allowed to graft. Only one time treatment is necessary, which is the main advantage of this technique
- Micropigmentation (Tattooing): This technique involves permanent dermal micro pigmentation. It is done by using a non-allergic iron oxide pigment. These pigments provide colour to the skin

References:

1. Natio. Inst. of Health, November, 2014; P.1-4
2. Int. Jour. of Immupat. And Pharma., 2014; Vol.27 (4), P.485-489
3. Jour. of App. Pharma. Sci., November 2014; Vol.4 (11), P.101-105



Electrocardiographic monitoring

Overview

The uses of electrocardiographic (ECG) monitoring have evolved from the tracking of heart rate and basic rhythm to the detection of complex arrhythmias, myocardial ischemia, and changes in the QT interval. ECG is an inexpensive, reproducible, noninvasive technique that can be invaluable when it is performed correctly.

Principles of ECG

ECG monitoring is used to detect the changes in electrical potential produced in successive areas of the myocardium during the cardiac cycle. The isoelectric line of the ECG is the baseline determined by the TP segment, the region between the end of the T wave (ventricular repolarization or electrical inactivation) and the next P wave (atrial depolarization or electrical activation). It represents the time when the heart muscle cells are electrically silent. Changes in electrical potential are displayed as deflections of this line, with the amplitude measured vertically and the duration measured horizontally. A lead provides a unique view of the heart. Each lead has two ends, both of which are electrodes. Each electrode is assigned a positive or a negative value, depending on the lead. Cardiac monitoring occurs in two imaginary planes called the frontal and horizontal planes. The frontal plane divides the body vertically into ventral and dorsal sections, and the horizontal plane divides the body horizontally. The limb leads are located in the frontal plane and are represented by Einthoven's triangle, an inverted virtual triangle with the heart in the center. The precordial leads are located in the horizontal plane.

Indication

ECG monitoring is used in many clinical settings, including intensive care units, intermediate care units, operating rooms, emergency departments, and ambulances. ECG monitoring should be performed during the administration of anesthetic agents, after cardiac surgeries, after the placement of pacemaker leads, and after endovascular procedures involving the coronary arteries. It is also indicated in patients with acute myocardial infarction, unstable angina, or acute pulmonary edema and in many other clinical situations. However, because of the potential for under treating or

over treating the patient on the basis of ECG data, the clinician should enlist the help of more seasoned clinicians as needed when recording or interpreting an ECG.

Equipment

The basic equipment for the performance of an ECG includes a monitor, snap-on or clip-on lead wires, a patient cable, and electrodes. Most ECG monitors display one or two waveforms at the top of the screen. A menu on the monitor may allow modification of the amplitude of the graph to optimize viewing of waveforms.

Preparation

The hands should be washed or sanitized before entering the room and starting the procedure. Gentle downward pressure should be used to place the electrodes on the patient. When selecting sites for electrodes, bony prominences and major muscle groups should be avoided to minimize the appearance of artifacts in the ECG. Attach the snap-on lead wires to the electrodes before placing the electrodes on the patient's skin. Lead wires are standardized according to color, although the color coding is not uniform worldwide. In a five lead configuration, for instance, the electrode of the white lead wire is placed at the infraclavicular fossa close to the right shoulder, the electrode of the black lead wire at the infraclavicular fossa close to the left shoulder, and the electrode of the red lead wire below the rib cage on the left side of the abdomen. The electrode of the green lead, also known as the ground electrode, can be placed anywhere on the body. The brown lead is a precordial lead; its electrode can be placed in any precordial position but is usually positioned at V1 or V5. The ST segment alarms should be set at 1 or 2 mm from the patient's baseline, rather than the isoelectric line, to avoid many false ST alarms. A setting of 1 mm is appropriate for patients at high risk for ischemia, and a setting of 2 mm is appropriate for patients whose condition is more stable. For patients with a pacemaker, settings should be specific to the pacemaker to decrease the possibility of counting pacemaker artifacts as QRS complexes.

Common lead configuration

A common arrangement is the three lead configuration, also known as bipolar lead monitoring, which involves the use of electrodes at the right arm, the left arm, and the left leg to produce leads I, II, and III. This configuration is typically used to detect simple arrhythmias, such as ventricular fibrillation, and to synchronize the electrical discharge with the R wave in cardio versions. Three electrode bipolar lead monitoring is not sophisticated enough to provide diagnostic data for unusual arrhythmias or ischemia. The five lead configuration includes electrodes placed on the four limbs and one precordial electrode, either V1 or V5. This configuration allows for the recording of a "true" V1 lead, which is necessary for the accurate diagnosis of arrhythmias associated with a wide QRS complex, such as bundle branch block or ventricular pacing. Because of the lack of multiple precordial leads, the five lead configuration is not sensitive enough to consistently detect myocardial ischemia.

Diagnostic application

Many diagnoses can be established with ECG monitoring, including atrial fibrillation, atrial flutter, supraventricular tachycardia, wide complex ventricular tachycardia, atrioventricular block, ST segment elevation myocardial infarction, long QT syndrome, ventricular fibrillation, and a variety of other conditions.

Limitation

Trained person are needed to operate the ECG machine and to interpret its data. The diagnostic algorithms used by the ECG machine have a high sensitivity for the detection of certain conditions, but because the machine's specificity for these conditions is relatively low, over treatment is possible. ST segment alarms, for instance, can be misinterpreted as myocardial ischemia. As a result, myocardial ischemia may be over treated. Other situations of misinterpretation and possible over treatment include those in which low amplitude muscle tremor or a noisy baseline is interpreted as atrial fibrillation. Therefore, physicians must use their clinical judgment when interpreting the data.

Complication

ECG monitoring is rarely associated with complications. The most common complications include skin irritation and hyperpigmentation of the skin under the electrodes.

Reference: *N. Eng. J. Med., February 19, 2015; Vol. 372, Issue 8*

Torsion of a giant antimesenteric lipoma of the ileum: a rare cause of acute abdominal pain

Introduction

Lipomas are the most common benign tumors of the adipose tissue. Giant lipomas are most likely located in internal organs of the body. Visceral lipomas can grow to considerable size until they became symptomatic and causing compression symptoms or torsion. Torsion of an intra-abdominal lipoma is a rare cause of acute abdomen. The diagnosis of torsion of an intra-abdominal organ is difficult in acute abdomen, because it is usually accompanied by few abnormalities on physical examination and laboratory findings.

Case report

A 67 year old man presented with a history of intermittent nausea, vomiting and abdominal fullness for 1 week and sudden onset of unbearable lower abdominal pain. He also had a history of Type 2 diabetes mellitus, dyslipidemia and hypertension. On general physical examination, blood pressure was 158/86 mmHg, pulse rate was 116 beats/min and body temperature was 37.7°C. On abdominal examination, tympanic sounds on percussion and local rebound tenderness over the periumbilical region on palpation was found. The laboratory test results showed white blood cells was 17350/mm^3, hemoglobin was 13.3 g/dl, platelets was 249/mm^3, AST/ALT was 13.9/10.6 U/L, glucose was 163.2 mg/dl and lipase was 24 U/L. A plain abdominal radiography showed remarkable bowel gas retention. An abdominal ultrasound showed a rounded isoechoic tumor over the periumbilical region. The contrast enhanced computer tomography (CECT) of the abdomen and pelvis showed a huge low attenuation well defined, homogeneous, fat containing, soft tissue intra-abdominal tumor measuring approximately 12×12×7 cm. Lipoma or liposarcoma was highly suspected based on imaging findings. The patient received pain control for 6 hours with 10 mg of intravenous morphine and

conservative treatment, but the abdominal pain did not subside. Patient was submitted to laparotomy.

Surgery

During surgery, a huge and encapsulated tumor was found over the antimesenteric side of the terminal ileum, approximately 140 cm distal from the ileocecal valve twisting around its wide and short stalk. The tumor appeared relatively congested compared to the adjacent intestine. Based on surgical findings, torsion of the lipoma diagnosed. En bloc segmental resection of the ileum, including the tumor mass, of approximately 10 cm in length was performed, to obtain tumor free margins. End to end anastomosis was subsequently performed. Biopsy was done for histopathological examination of the tumor. No surgical drain was placed. Enteral feeding was initiated on the third postoperative day and was well tolerated thereafter. The patient was discharged uneventfully after 7 days postoperatively. At the 3 month follow up visit, the patient was doing well. Histopathological examination showed adipose tissue with benign looking, diffuse congestion, panniculitis and focal ischemic changes that confirmed the diagnosis.

Discussion

Intra-abdominal lipomas that undergo torsion usually arise from the mesentery, omentum or epiploic appendices because these structures contain large amounts of adipose tissue. Lipomas can also originate from various internal organs where there is no or very little adipose tissue. The torsion of a lipoma emerging from antimesenteric side of the ileum is very rare. In this case, the huge antimesenteric lipoma of the ileum was found twisted around its wide and short stalk.

Most lipomas are small, asymptomatic and remain untreated. However, lipomas can reach a considerable size. Larger lipomas with pedicles tend to twist and cannot untwist easily. The torsion of a lipoma restricts its blood supply, causing ischemic pain. The torsion can be either complete or incomplete or constant or intermittent. These different characteristics result in variable clinical manifestations. Nonspecific symptoms or even absence of abnormal physical or laboratory findings at the initial presentation make the diagnosis of tumor torsion challenging. Other differential diagnoses similar to this presentation include testicular torsion, torsion of testicular appendage, ovarian torsion, epiploic appendagitis, omental infarct and sclerosing mesenteritis.

In most cases, plain abdominal radiographs have little or no diagnostic value. Ultrasound may be useful in identifying an intra-abdominal lipoma. The typical sonographic findings comprise iso to hyperechoic texture surrounded by a thin, echogenic capsule in contrast with the adjacent muscles. Contrast enhanced computer tomography (CECT) has a high detection rate for intra-abdominal lipoma and the typical finding is a well circumscribed ovoid mass with homogeneous imaging characteristics of fat. Other pathognomonic changes associated with lipoma on CECT include large tumor size, tumor compression with intestinal obstruction and even volvulus. But CECT has limited diagnostic value for diagnosing torsion of the lipoma because of the lack of changes in ischemic patterns. Although streaks of whirling and concentric patterns might be seen on CECT in some cases, the axis of rotation should be totally perpendicular to the transverse scanning plane.

Thus surgeons should not hesitate to perform surgery in cases in which symptoms do not improve with pain management and conservative treatment. During the surgical intervention the twisted stalk, the color and appearance changes of the lipoma will be directly visualized. The histopathologic findings of diffuse congestion and focal ischemic changes in the adipose tissue of the tumor further confirmed the lipoma torsion diagnosis. Small and asymptomatic lipomas are usually left untreated. Symptomatic intra-abdominal lipomas are best treated by total excision. If left untreated, these could progress to tissue necrosis, perforation or peritonitis. Most of the cases were safely and simply excised by laparoscopy or laparotomy, depending on the tumor size and location. In this patient, the huge lipoma originated from the antimesenteric side of the ileum with a wide and short stalk. Simple excision via ligating the stalk was inadequate as there were no clear boundaries. To avoid significant bowel wall injury and even perforation or luminal stricture in the future as well as the possibility of potential malignancy, en bloc segmental resection of the ileum was performed to obtain tumor free margins, followed by end to end anastomosis.

Conclusion

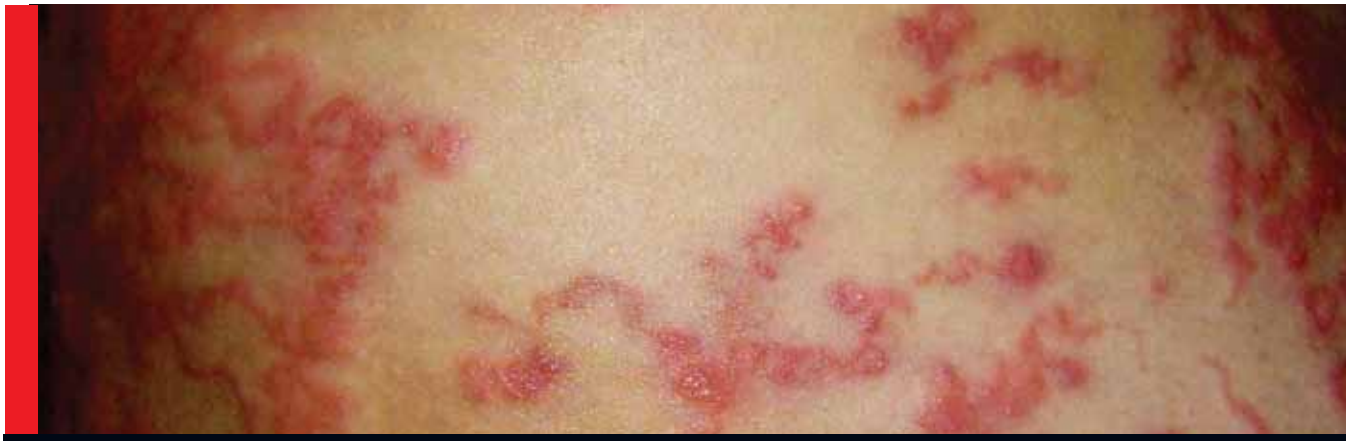
An antimesenteric lipoma of the ileum may twist and progress to torsion, which cannot be diagnosed easily. Early arrangement of CECT may allow for an earlier detection but not for all cases. Urgent surgical intervention is indicated in patients with persistent acute abdominal pain when torsion cannot be excluded. If the tumor has a short stalk or is close to the bowel wall, en bloc segmental resection with end to end anastomosis will be considered.

Reference: *Am. J. Cas. Rep., 2017; Vol. 18, P. 589-592*

Warts of the fingertips

A 56 year old man with Type 2 diabetes mellitus presented with a 2 year history of slowly progressing, painless lesions on his fingertips. Physical examination revealed hyperkeratotic papules that were clinically diagnostic of common warts. Warts are a manifestation of cutaneous infection with human papilloma virus (HPV). To limit the cost of the medical supplies required for fingerstick capillary blood glucose monitoring, the patient had been reusing the same lancet several times per day. Cycling from finger to finger resulted in the sequential inoculation of each fingertip with HPV. The patient was advised not to reuse the skin-prick lancets. After 6 weeks of topical treatment with fluorouracil and salicylic acid preparations, there was substantial improvement in the appearance of the lesions.

Reference: *N. Eng. J. Med., August 11, 2011; Vol. 365, Issue 6*



Gnathostomiasis

A 48 year old man living in France presented with a 2 day history of creeping eruption on the right side of the trunk. He had returned from Vietnam 2 months previously. He had no symptoms during his trip. The patient was afebrile and physical examination was entirely normal with the exception of a serpiginous, reddened, elevated pruritic skin lesion. Skin biopsies showed an inflammatory infiltrate and a larval worm in the subcutaneous tissue. Serum antibodies against *Gnathostoma spinigerum* were detected by immunoblot. This infection was acquired by ingestion of third stage larvae of *Gnathostoma spinigerum*. In human beings, larval forms do not mature into adults as they do in their definitive hosts. They migrate through the subcutaneous tissues and cause recurrent episodes of migratory swelling or creeping eruptions. There is no effective treatment for human gnathostomiasis other than removal of the worm.

Reference: The Lancet, March 31, 2001; Vol. 357

Pneumonia in children

Pneumonia is defined as an inflammation of lung tissue due to an infectious agent. Pneumonia causes substantial morbidity in children worldwide and is a leading cause of death in children in the developing world. The incidence of pneumonia is the highest in children under 5 years of age and in recent years the incidence of complicated and severe pneumonia seems to be increasing. Although the implementation of safe, effective and affordable interventions has reduced pneumonia mortality from 4 million in 1981 to just over one million in 2013, pneumonia still accounts for nearly one-fifth of childhood deaths worldwide. World Health Organization definition is based solely on clinical symptoms cough or difficulties in breathing and tachypnea. In the developing world the term Lower Respiratory Tract Infection (LRTI) is widely used instead of pneumonia, because of poor access to x-ray and difficulties in radiological confirmation of diagnosis.

Pneumonia is common and is associated with significant morbidity and mortality, so properly diagnosing pneumonia, correctly recognizing any complications or underlying conditions, and appropriately treating patients are important.

Epidemiology

According to the data of UNICEF, pneumonia remains the leading infectious cause of death among children under five, killing 2,500 children a day. Pneumonia accounted for 15% of all under five deaths and killed 920,000 children in 2015. Most of its victims were less than 2 years old. A brief guide to pneumonia and other respiratory diseases, and their impact globally and in Bangladesh.

Globally

- Pneumonia, inflammation of the lungs, can be caused by a wide range of bacteria and viruses and occasionally fungal and parasite infections
- The most common bacterial causes of pneumonia include *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Staphylococcus aureus*
- The most common viral causes of pneumonia include influenza viruses, respiratory syncytial virus (RSV) and parainfluenzaviruses; viral infections are particularly common in children

- Pneumonia is an infection of the lower respiratory tract; these are typically more severe than infections of the upper respiratory tract, such as the common cold, tonsillitis and laryngitis
- Lower respiratory tract infections cause about 2.7 million deaths a year; upper respiratory tract infections are responsible for about 3,000 deaths a year
- Pneumonia is the leading infectious cause of death among children under 5 years of age, killing 2,500 children a day
- Pneumonia accounts for 16% of deaths of children under the age of five deaths, and killed about 922,000 children in 2015; most deaths were of children under 2 years of age
- Annual child deaths from pneumonia decreased by 47% from 2000 to 2015, from 1.7 million to 922,000 million

In Bangladesh

- In Bangladesh, pneumonia is responsible for around 28% of the deaths of children under 5 years of age
- Around 50,000 children die of pneumonia every year
- An estimated 80,000 children under 5 years of age are admitted to hospital with virus associated acute respiratory illness each year; the total number of infections is likely to be much higher

Pathogenesis

Pneumonia is characterized by inflammation of the alveoli and terminal airspaces in response to invasion by an infectious agent introduced into the lungs through hematogenous spread or inhalation. The inflammatory cascade triggers the leakage of plasma and the loss of surfactant, resulting in air loss and consolidation. The activated inflammatory response often results in targeted migration of phagocytes, with the release of toxic substances from granules and other microbicidal packages and the initiation of poorly regulated cascades (e.g., complement, coagulation, and cytokines). These cascades may directly injure host tissues and adversely alter endothelial and epithelial integrity, vasomotor tone, intravascular hemostasis, and the activation state of fixed and migratory phagocytes at the inflammatory focus. Direct pulmonary injury by the invading agent usually results from synthesis and secretion of microbial enzymes, proteins, toxic lipids, and toxins that disrupt host cell membranes, metabolic machinery, and the extracellular matrix that usually inhibits microbial migration. Indirect pulmonary injury is mediated by structural or secreted molecules, such as endotoxin, leukocidin, and toxic shock syndrome toxin-1 (TSST-1), which may alter local vasomotor tone and integrity, change the characteristics of the tissue perfusate, and generally interfere with the delivery of oxygen and nutrients and removal of waste products from local tissues.

Risk factors

There are several known risk factors for pneumonia to consider in addition to immunization status, epidemiological data and exposure to other children, especially preschoolers. Environmental factors like indoor air pollution caused by cooking and heating with biomass fuels (like wood or dung), living in crowded conditions and parental smoking also increase a child's susceptibility to pneumonia. Tobacco smoke exposure has been found to increase risk of hospitalization for pneumonia in children less than 5 years. Conditions predisposing to severe pneumonia includes premature children and children less than 5 years of age. Viral infections, especially influenza and prior antibiotic exposure additionally predispose to pneumococcal and staphylococcal pneumonia.

Etiology

Organisms causing pneumonia are varied and include bacteria, viruses, fungi and protozoans. Most cases of pneumonia are preceded by acute viral bronchitis. The most common and uncommon bacterial and viral causes of pneumonia by age group are given in Table 1. In malaria endemic regions of tropical Africa a challenging etiological factor of pneumonia is multidrug-resistant non typhoid Salmonella, and in regions where tuberculosis is endemic it is increasingly being recognized as a cause of pneumonia.

Diagnosis

WHO criteria of diagnosing pneumonia is solely based on the severity of pneumonia which is clarified in Table 2. However diagnosis is also made by physical examinations and some investigations.

Physical examination

The physical examination begins with an overall assessment of the child's wellbeing. The results of physical examination are given below:

- Crackles
- Diminished breath sounds over affected site
- Bronchial breath sounds specific for lobar consolidation
- Absent breath sounds and dullness to percussion
- A pleural rub may be heard if pneumonia is accompanied by pleuritis

Table 1: Organisms causing pneumonia by age group

Age	Common causes	Less common causes
Birth to 20 days	**Bacteria** *Escherichia coli* Group B streptococci *Listeria monocytogenes*	**Bacteria** Anaerobic organisms Group D streptococci *Haemophilus influenzae* *Streptococcus pneumoniae* **Viruses** Cytomegalovirus Herpes simplex virus
3 weeks to 3 months	**Bacteria** *Chlamydia trachomatis* *Streptococcus pneumoniae* **Viruses** Adenovirus Influenza virus Parainfluenza virus 1, 2, and 3 Respiratory syncytial virus	**Bacteria** *Bordetella pertussis* *Haemophilus influenzae* *Moraxella catarrhalis* *Staphylococcus aureus* **Virus** Cytomegalovirus
4 months to 5 years	**Bacteria** *Chlamydia pneumoniae* *Mycoplasma pneumoniae* *Streptococcus pneumoniae* **Viruses** Adenovirus Influenza virus Parainfluenza virus Rhinovirus Respiratory syncytial virus	**Bacteria** *Haemophilus influenzae* *Moraxella catarrhalis* *Mycobacterium tuberculosis* *Neisseria meningitidis* *Staphylococcus aureus* **Virus** Varicella-zoster virus
5 years to adolescence	**Bacteria** *Chlamydia pneumoniae* *Mycoplasma pneumoniae* *Streptococcus pneumoniae*	**Bacteria** *Haemophilus influenzae* *Mycobacterium tuberculosis* *Staphylococcus aureus* **Viruses** Influenza virus Parainfluenza virus Rhinovirus Respiratory syncytial virus

Investigation

Chest radiography: However most children that require hospital admission will have moderate to severe disease and will require a chest x-ray. It is recommended that chest x-ray should be obtained when:

- The pneumonia is classified as moderate to severe
- Clinical findings are unclear
- Exclusion of alternate explanation for respiratory distress
- A complication such as pleural effusion is suspected
- The pneumonia is prolonged and unresponsive to antimicrobials
- Chest x-ray views: The recommended view depends upon the age of the child. In children older than four years the front posterior upright chest view is usually obtained to minimize the cardiac shadow. In younger children the position does not affect the cardiothoracic shadow, and the anteroposterior supine view is preferred

Complete blood count: It should be undertaken in all children admitted with severe pneumonia. In children with moderate pneumonia it may be considered as it may provide useful information in combination with the clinical presentation to allow a decision to be made regarding requirement for admission to hospital. It is not necessary in mild pneumonia, unless significant co-morbidities present like immunodeficiency.

Microbiology: Microscopy and sputum or other lower respiratory tract (LRT) samples and blood cultures, have historically been the main diagnostic tools used to identify the microbial etiology of pneumonia. Respiratory pathogen identification in high quality samples directly obtained from the

infection site or a normally sterile site (blood), provides good evidence on the probable causative agents. The process of sample collection is pivotal to microscopy and culture results as well as to their interpretation. LRT samples may become contaminated by upper respiratory tract (URT) secretions during collection or the collected sample may harbor URT secretions.

Blood culture: Blood cultures should be obtained if the child requires admission to hospital. Blood cultures are positive in 10% to 20% of children with pneumonia. A number of tests can be performed in blood when diagnosing pneumonia. Although blood cultures are positive in a minority of children hospitalized with pneumonia, those microorganisms that are indeed identified in blood culture are widely accepted as indicative of the pneumonia's etiology and the results of their antibiotic sensitivity. The yield increases to 30% to 40% in patients with a parapneumonic effusion or empyema. Pneumococcal pneumonia is seldom a bacteremia illness. Streptococcus pneumonia is cultured in the blood in less than 5%.

Sputum gram stain and culture: The gram stain of a good sputum specimen (presence of leucocytes, absence of squamous epithelial cells) has reasonable sensitivity and specificity for presumptive detection of *Streptococcus pneumoniae*. It has also proven useful in hospitalized children with pneumonia. In spite of a meticulous technique, pharyngeal contamination commonly occurs and the results of bacterial cultures and induced sputum nucleic acid detection tests must be carefully interpreted in order to determine whether a potential pathogen is a contaminant from the URT or the cause of LRT disease.

Pulmonary aspirates: From a diagnostic viewpoint, the ideal manner to determine the etiology of pneumonia hinges on the collection of a sample directly from the infection site (lung). Pulmonary aspirates are commonly used in the cytological search for malignancy but are also useful for infection detection. The technique can be used in settings with careful monitoring capacities and efficient management of complications.

Lower respiratory tract secretions: In children with pneumonia, LRT secretions are of diagnostic importance because these samples originate in the site of infection and may be obtained non-invasively in most cases. It is difficult for children to expectorate because they tend to swallow secretions, so the use of Broncho alveolar lavage (BAL) or sputum induction may be necessary to collect a LRT sample. In order to obtain the sample by BAL, the bronchoscope is placed in the bronchus of the radiologically compromised pulmonary segment and variable volumes of sterile physiological solution are instilled in quantities varying between 20 and 100 mL. After every instillation, the fluid is aspirated to recuperate the maximum volume possible, which includes a mixture of physiological solution and bronchoalveolar secretions. In order to establish the diagnosis, quantitative cultures are performed by serial dilution.

Pleural fluid: Diagnostic tests in pleural fluid may be useful in children with pneumonia complicated by a pleural effusion. The sample collection technique is well established and is routinely used in clinical medicine.

Table 2: WHO criteria for diagnosing pneumonia

Type of pneumonia	Clinical features
No pneumonia	Cough and cold Problems with breathing Tachypnea
Pneumonia	Lower chest wall in drawing or fast breathing Nasal flaring Expiratory grunting
Severe pneumonia or very severe disease	Inability to feed or drink Persistent vomiting Cyanosis Severe respiratory distress Impaired consciousness or lethargic Convulsions Stridor

Management

All children treated for pneumonia should be reassessed in 48 hours if there is no clinical improvement or deterioration and persistence of fever. It is important that parents of children treated at home have clear written instructions on fever management, preventing dehydration, recognizing signs of deterioration as well as further access to healthcare professionals. The criteria for hospitalization is given in Table 3. Dehydrated children should be provided adequate amount of oral fluids and if unable to drink should receive intravenous fluids. Their electrolytes and creatinine serum levels should be measured on daily basis. Treatment decisions are based

on the child's age. As definitive information about the causative organism is usually unknown, the choice of antibiotic is empiric. Table 4 lists the recommended antibiotic therapies according to the WHO.

Table 3: Criteria for hospitalization in children

Infants	Older children
Apnea or grunting	Grunting
Oxygen saturation < 92 %	Oxygen saturation < 92 %
Poor feeding	Poor feeding
Respiratory rate > 70 breaths per minute	Respiratory rate > 50 breaths per minute

Inpatients: Hospitalization is required for all infants from birth to 20 days of age, infants three weeks to three months of age with fever, and all children who appear toxic. Hospital admission criteria for children four months to five years of age include hypoxemia or a respiratory rate of more than 70 breaths per minute. Other indicators for admission include difficulty breathing, intermittent apnea, grunting, poor feeding, and inadequate observation or supervision by family. Admission criteria for older children include hypoxemia, cyanosis, a respiratory rate of more than 50 breaths per minute, difficulty breathing, and inadequate observation or supervision by family.

Neonates: Neonates with respiratory distress always should be admitted to a hospital, and a diagnosis of bacterial pneumonia should be assumed until proved otherwise.

Infants: Infants three weeks to three months of age who are suspected of having bacterial pneumonia require immediate attention, particularly if they are febrile, tachypneic, or appear toxic. Chlamydia trachomatis infection should be suspected in infants who are afebrile or nontoxic and have a dry cough. These patients often have a peripheral eosinophilic pleocytosis.

Preschool aged children: Viruses cause most cases of pneumonia in preschool aged children (four months to five years of age). These children usually have associated symptoms of viral infection, such as pharyngitis, rhinorrhea, and diarrhea. Pneumococcal infection is the most common cause of bacterial pneumonia in this age group.

Table 4: WHO recommendations for treatment of pneumonia in children

Recommendation 1

Children with no pneumonia only cough and cold are suggested home care advice.

Recommendation 2

Children with fast breathing pneumonia with no chest in drawing or general danger sign should be treated with oral amoxicillin: at least 40 mg/kg/dose twice daily (80 mg/kg/day) for five days.

Recommendation 3

Children age 2-59 months with chest indrawing pneumonia should be treated with oral amoxicillin: at least 40 mg/kg/dose twice daily for five days.

Recommendation 4

Children aged 2-59 months with severe pneumonia should be treated with parenteral ampicillin (or penicillin) and gentamicin as a first-line treatment.

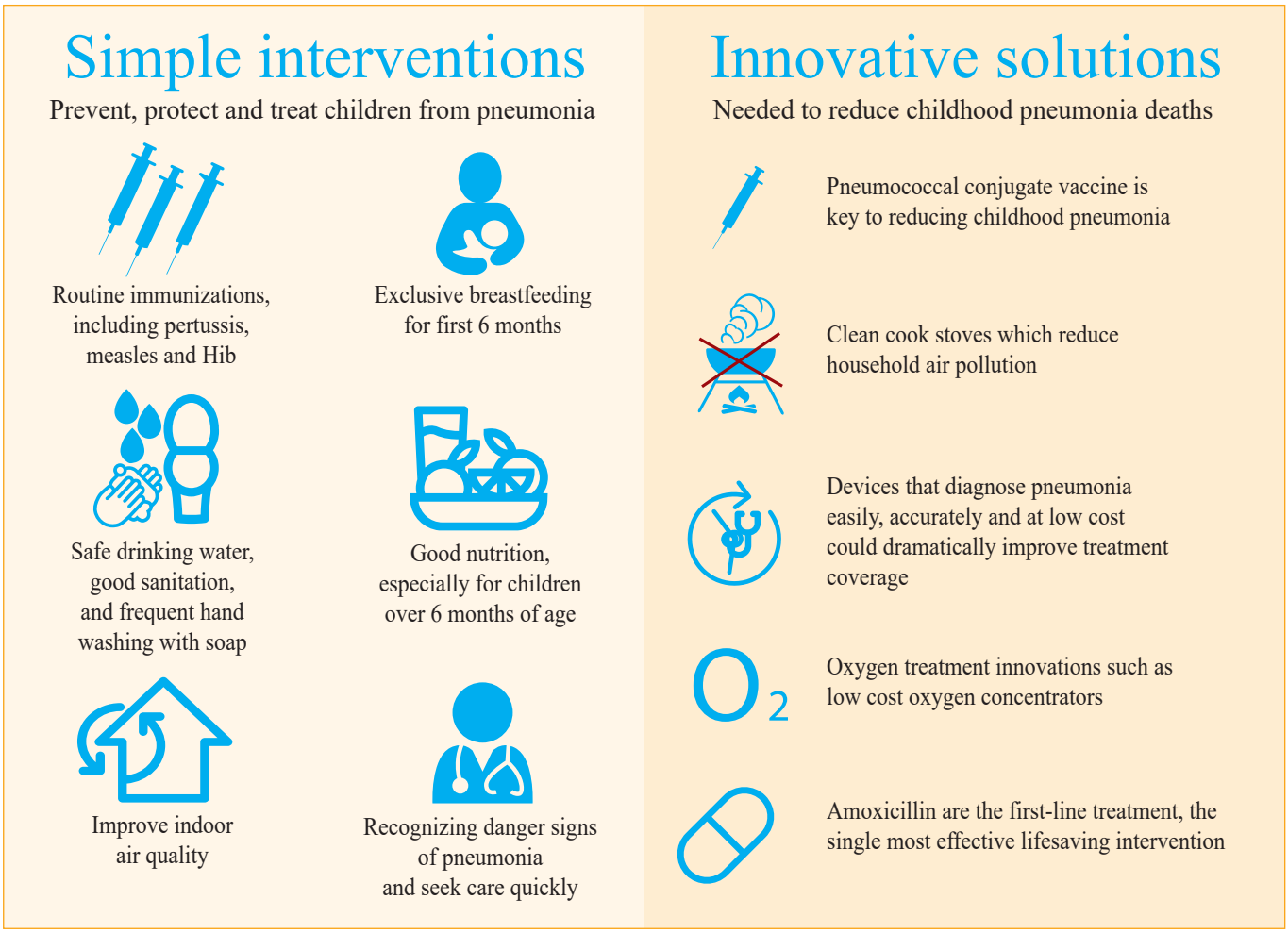
Ampicillin: 50 mg/kg, or benzyl penicillin: 50 000 units per kg IM/IV every 6 hours for at least five days.

Gentamicin: 7.5 mg/kg IM/IV once a day for at least five days.

Ceftriaxone should be used as a second-line treatment in children with severe pneumonia having failed on the first-line treatment.

Recommendation 5

Ampicillin plus gentamicin or ceftriaxone are recommended as a first-line antibiotic regimen for HIV-infected infants and for children under 5 years of age with chest indrawing pneumonia or severe pneumonia.



Older children: *Streptococcus pneumoniae* is a significant pathogen in school aged children and adolescents (5 to 18 years of age) with pneumonia. In school aged children, pneumococcal pneumonia usually begins with a high fever and sputum producing cough. Mycoplasma pneumoniae infection often begins with headache or gastrointestinal symptoms. Other symptoms, such as fever, arthralgia, and cough, in a school aged child suggest Mycoplasma infection.

Complication

Empyema and parapneumonic effusion: Parapneumonic effusion is defined as pleural fluid collection in association with underlying pneumonia and empyema is defined as the accumulation of purulent fluid in the pleural cavity. Fluid collection is usually unilateral. Empyema is present in every child with fever, tachypnea, pain and pleuritic chest pain.

Lung abscess: Lung abscess is a thick walled, cavity containing necrotic tissue 2 cm or greater in diameter caused by an infection. It may be either primary occurring in healthy children without lung abnormalities or secondary occurring in children with underlying condition predisposing to lung disease.

Necrotizing pneumonia: Necrotizing pneumonia, defined as multiple cavity lesions in consolidated areas, is a rare, though increasingly detected complication in children. It is characterized by liquefaction and cavitation of pulmonary tissue. The most frequently associated pathogen is Streptococcus pneumoniae. Necrotizing pneumonia should be suspected in patients with complicated pneumonia who do not improve despite optimal medical treatment.

References:

1. *Revised WHO classification and treatment of childhood pneumonia at health facilities, 2014; P.1-26*
2. *Intech open science, Pneumonia in children, 2013; P.137-163*
3. *Am. Fam. Phy., September 1, 2004; Vol. 70, (05), P. 189-908*
4. *Am. Fam. Phy., October 1, 2012; Vol. 86, (07) P. 661-667*
5. *Pediatric infectious diseases: Open access, 2015; Vol. 01,(1):(3), P. 1-06*
6. *NSW Health: Infants and children: Acute management of community acquired pneumonia, March 2015; P. 01-32*
7. *Medscape.com*
8. *Data.unicef.org/child-health/pneumonia*
9. *www.who.int/maternal_child_adolescent/epidemiology/profiles/neonatal_child*

HISTORY OF WORLD AIDS DAY

World AIDS Day was first visualized by Thomas Netter and James W. Bunn (Public information officers for the AIDS Global Programme at the World Health Organization) in the month of August in 1987. They shared their idea to Dr. Jonathan Mann (Director of the AIDS Global Programme), who had approved the idea and recommended the World AIDS Day observance on 1st of December in the year 1988. World AIDS Day, designated on 1 December every year since 1988, is dedicated to raising awareness of the AIDs pandemic caused by the spread of HIV infection, and mourning those who have died of the disease. Government and health officials, non-governmental organizations and individuals around the world observe the day, often with education on AIDS prevention and control.

World AIDS Day is used to make every people get all the knowledge of the AIDS prevention as well as cure

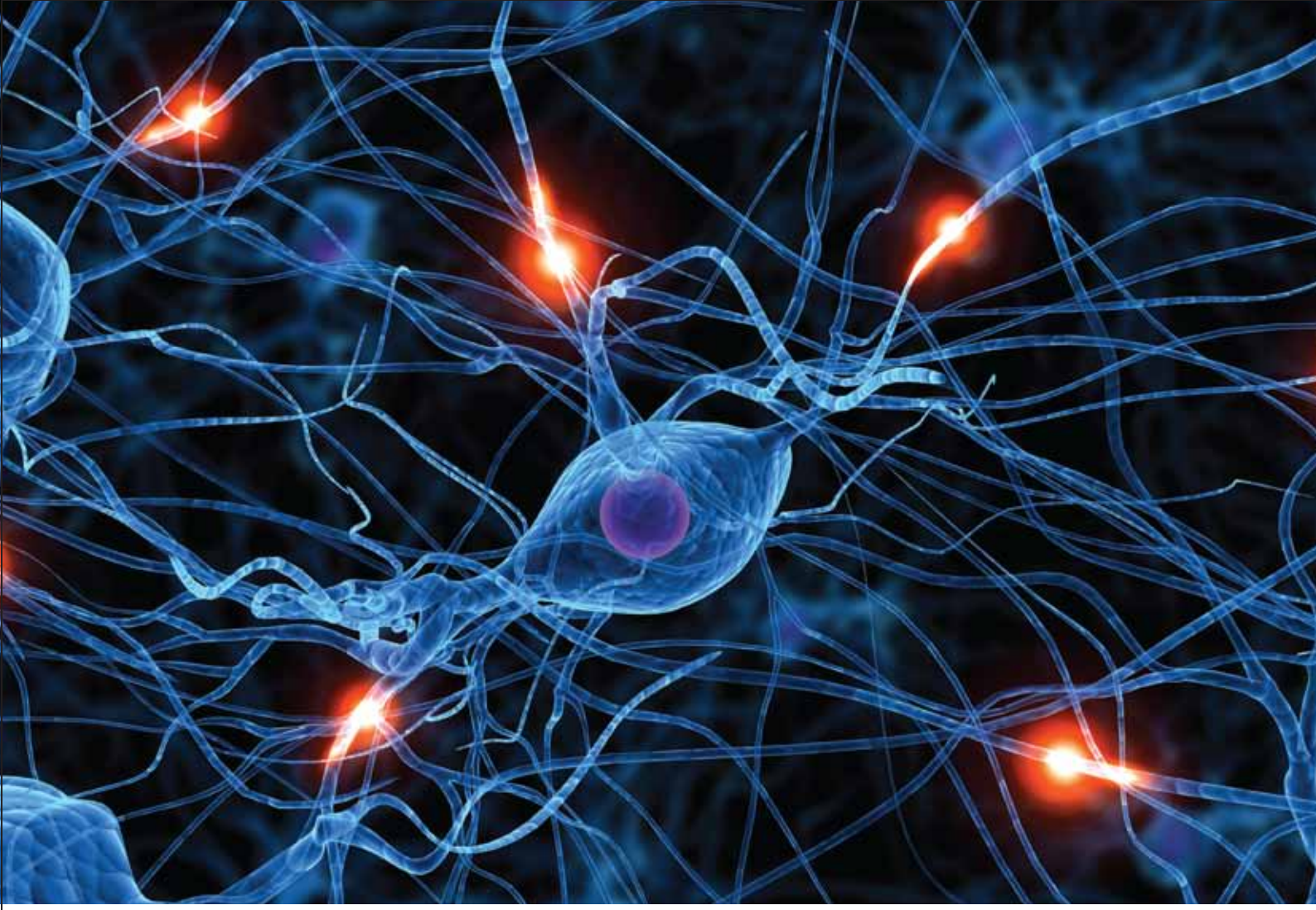
Vaccine against diabetes

An announcement of vaccine against diabetes has been made at the 75th scientific sessions of the American Diabetes Association. The FDA will evaluate the vaccine on 150 people who are in an innovative stage of Type 1 diabetes. A vaccine used over 100 years ago for tuberculosis Bacillus Calmette Guerin (BCG) has actually shown pledge in reversing this illness. Dr. Denise Faustman, director of the Massachusetts general hospital immunobiology laboratory, said interim results show that unlike other vaccines that irritate white blood cells to prompt an immune response, the BCG vaccine affects white blood cells at the genetic level. The body consequently stops producing the abnormal white blood cells responsible for the autoimmune disease, suggesting that the vaccine will permanently reverse Type 1 diabetes.

Faustman said in an interview that the vaccine actually resets the genes to restore normality. It is actually working at the most basic DNA level to normalize expression of genes. The findings were presented during the 77th scientific sessions of the American Diabetes Association. The body of an individual with Type 1 diabetes does not produce insulin due to the immune system damaging the cells that develop insulin. T cells are produced, and these cells produce issues in the pancreatic islets, where insulin is produced. The vaccine works by removing these T cells. The treatment eliminated defective immune cells that attack the pancreas, temporarily restoring the ability of the pancreas to produce small amounts of insulin. The patients will be injected with the vaccine two times in a duration of 4 weeks, and then once a year for a 4 years time period. The results revealed that the harmful T cells were gone, and some people even started to produce insulin by themselves.

References:

1. www.bizjournals.com
2. www.mrhealthyspirit.net



New hope for neuro tumor patients

New research have been published in the journal Oncogene that could offer hope to thousands of young people affected by the hereditary condition Neurofibromatosis 2 (NF2). This condition is characterized by the development of multiple tumors of the nervous system such as schwannomas, meningiomas and ependymomas, each associated with mutations in a gene coding for a tumor suppressor called Merlin. Scientists from the University of Plymouth and Plymouth Hospitals NHS Trust, supported by The Laura Crane Youth Cancer Trust and Brain Tumor Research, have revealed the role of the normal, cellular form of prion protein (PrPC) in the development of NF2 related tumors. PrPC is normally present in the nervous system of healthy individuals and it is neuro protective in adults. PrPC is absent in patients who have a pathological form of prion protein called scrapie prion protein (PrPSc).

Dr. Sylwia Ammoun, Senior Research Fellow in Clinical Neurobiology have made a significant stride forward in the search for a drug treatment for NF2. Since all NF2 patients develop multiple schwannomas, the scientists have developed a human cell culture model for schwannoma, comprising of human schwannoma cells isolated from patients. Using this model, the research team found for the first time that PrPC is over produced in schwannoma compared with healthy Schwann cells. This overproduction is due to merlin deficiency and strongly contributes to tumor growth. The research team have already identified a range of existing drugs which could manage this protein overproduction. By repurposing existing drugs, an effective therapy was given to NF2 patients, based on the failure of merlin tumor suppressor expression, relatively. She also said that this is a life changing condition striking the young and this discovery could lead to hope for thousands of patients affected by other merlin deficient tumors.

Reference: *www.medicalnewstoday.com*

MOBILE App

Info Medicus Quiz

IMQ

DOWNLOAD Info Medicus Quiz App

GET IT ON Google play

Available on the App Store

Last date of participation in the quiz is 07 December 2017

ACI ADVANCING POSSIBILITIES

Published by
Medical Services Department
ACI Limited
Simpletree Anarkali, 89 Gulshan Avenue
Dhaka-1212

Designed by
Creative Communication Ltd.
Road-123, House-18A
Gulshan-1, Dhaka-1212