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About the USMLE

# United States Medical License Examination (USMLE)

United States Medical License Examination (USMLE) is a three-step examination. It is mandatory for all medical graduates in order to get residency and to practice medicine in the United States of America (USA). You should pass USMLE Step 1, Step 2 CK and Step 2 CS to be qualified to apply for residency in the USA. Step 3 pass is mandatory to practice medicine without supervision.

## USMLE Step 1 Examination:

Step 1 assesses your understanding of basic sciences and application of this knowledge on clinical situations. Most of the questions are clinical scenarios followed by a question and 4 or more answers and you choose the correct one. It is one day examination. The test includes 280 questions divided into 7 blocks. Each block is 1 hour. There is also a presentation of 15 minutes before the test and 45 minutes of break time.

Subjects covered by USMLE Step 1 are:  anatomy, physiology, Biochemistry and cell biology, pathology, pharmacology, microbiology, behavioral sciences, epidemiology and statistics.

## USMLE Step 2 CK Examination:

Step 2 CK assesses your decisions on clinical situations regarding diagnosis and treatment and patient care. It is one day examination and it includes 318 questions divided into 8 blocks. Each block is one hour. There is also a presentation for 15 minutes and 45 minutes of break time. It has the same format of multiple-choice questions as Step 1 examination.

Subjects covered by USMLE Step 2 CK are:  general and systematic medicine, surgery, pediatrics, obstetrics and gynecology, psychiatry and forensic medicine.

USMLE Step 1 and Step 2 CK can be taken in different countries and not only in the USA.

## USMLE Step 2 CS Examination:

Step 2 CS assesses your interaction with the patients in terms of patient care, communication, history taking, physical examination and documentation. It uses standardized patients (actors not real patients). The test includes 12 cases. You have 15 minutes to stay inside the room with each standardized patient to take a history, perform exam and discuss the case with the patient. After you leave the room you will have 10 minutes to write patient notes. There is a lunch break of 30 minutes after 4 cases and another break of 15 minutes after 4 more cases. This test is only taken in the USA test centers.

## USMLE Step 3 Examination:

This is the final examination of the USMLE series and it assesses your ability to take decisions in clinical situations and follow up without supervision. It is a 2- day exam. The first day includes 256 multiple choice questions divided into 6 blocks. Each block is one hour. There are 5-minute tutorial and 45 minutes of break time. The second day includes 198 multiple choice questions divided into 6 blocks. Each block is 45 minutes. These blocks are followed by 13 case simulations (CCS).  These cases are advancing scenarios on the computer, not standardized patients as in Step 2 CS.  Each case takes 10-20 minutes and there is 45 minutes of break time. This test is also taken only in the USA test centers.

I wish you the best of luck in your examinations.

# Requirements for USMLE?

## The requirements for USMLE Step 1, Step 2 CK and Step 2 CS

1. Medical student or graduate of US or Canadian medical school that leads to MD degree and accredited by the LCME.
2. Medical student or graduate of US medical school that leads to DO degree and accredited by AOA.
3. Medical student or graduate of medical school outside USA or Canada and listed in the IMED and meets the criteria for ECFMG certification.

## The requirements for USMLE Step 3

1. Medical graduates who earned MD or DO of US or Canadian medical school accredited by the LCME or the AOA.
2. Graduates of medical schools outside US or Canada and listed in the IMED.
3. Passing USMLE Step 1, Step 2 CK and Step 2 CS
4. ECFMG certification or successful completion of Fifth Pathway program.

USMLE Frequently Asked Questions

Can I take the test during medical school?

Yes you may take USMLE Step 1 after the second year of medical school and USMLE Step 2 and USMLE Step 3 upon completion of medical school.

How do I apply to the USMLE?

You may apply at the USMLE official site (http://usmle.org/apply/index.html)

How much time does it take to prepare for the USMLE?

 There is no time limit to finish all USMLE steps. It depends on several factors such as your level of education and how self-motivated you are. It is recommended to take a practice test to evaluate your level of knowledge prior to studying for the USMLE.

What is the minimum passing USMLE score?

Step 1: 194

Step 2 CK: 209

Step 2 CS: (Pass/Fail)

Step 3: 196

How important is my USMLE scores?

As with all exams in general, the higher the score is the better. It is very important to get a high score to increase your chances of obtaining a residency position.

How many times can I re-take the USMLE?

You may take the same step of the USMLE up to three times within a 12-month period, but not more than a total of six times for each step. It is highly recommended to study hard and pass the exam with a high score the FIRST time in order to attain a residency position.

Where do I go to take the USMLE if I am a foreign medical graduate?

For foreign medical graduates that do not live in the United States of America, are able to take USMLE Step 1 & 2 CK in their own countries. However, USMLE Step 2 CS & Step 3 are strictly taken only in the United States of America.

QUESTIONS

# Question 1

A 54 year-old man presents to his physician for a routine checkup. He has type 2 diabetes for 6 years. He takes oral anti-glycemic medications and he had no complaint since his last visit 6 months ago. His physical examination is unremarkable. His lab tests are normal except for his lipid profile which shows the following results:

Triglycerides                     : 145 mg / dL

Total serum cholesterol: 180 mg / dL

LDL cholesterol                : 110 mg / dL

HDL cholesterol               ; 40 mg/ dL

Which of the following is the recommended therapy for this patient:

1. Diet and exercise and no further treatment
2. Statin
3. Bile acid resin
4. Niacin
5. Fibric acid

## Answer

**The correct answer is B:**

This patient has a history of diabetes mellitus which put him at a high risk for coronary artery disease and stroke. The goal of cholesterol for this patient is <70 mg/dL. High risk patients should start with life style changes as well as a lowering cholesterol medication. Statins are the drug of choice for lowering LDL cholesterol.

Diet and exercise are not enough for this patient as he is considered on the category of high risk patients (choice A).

Bile acid resin interferes with absorption of other oral drugs. It is not the best first choice for this patient (choice C).

Niacin is used to elevate HDL cholesterol. This patient’s HDL cholesterol is within the normal range (choice D).

Fibric acid derivatives are used in combination with statins in some cases but they are not enough to treat this patient high cholesterol (choice E).

# Question 2

A 23 year old man with a history of Marfan syndrome presents to the ER complaining of sharp pain on the upper back. He is admitted to surgery for the risk of aortic dissection.

Which of the following proteins are responsible for the probable development of abdominal aortic aneurysm (AAA) in this patient?

1. Myosin and actin
2. Fibrin and actin
3. Fibrillin and elastin
4. Myosin and fibrin

## Answer

**The correct answer is C:**

Marfan syndrome is a connective tissue disorder caused by FBNI gene mutation on chromosome 15 which results in defective fibrillin. It affects bones, heart, large vessels and eyes. Patients are tall with long extremities, hypermobile joints and long tapering fingers and toes. Aortic aneurysm develops due to cystic medial necrosis of the aorta.

Myosin and actin are not directly affected in Marfan syndrome. It affects fibrillin which forms a sheath around elastin. (Choices A, B and D)

# Question 3

A 23 year old woman presents to her physician for a routine physical examination. Her lab tests are normal except an elevated serum calcium level (13 mg/dL). She is healthy, exercises regularly, doesn't smoke or drink alcohol. She has no history of renal or digestive symptoms. Further evaluation shows decreased 24-hour calcium in urine (60 mg). Her mother was diagnosed with hyperparathyroidism and had a neck surgery. Her calcium serum level didn't improve and stayed high after surgery.

What is the most likely diagnosis?

1. Primary hyperparathyroidism
2. Secondary hyperparathyroidism
3. Familial benign hypocalciuric hypercalcemia (FHH)
4. Milk alkali syndrome
5. Medullary carcinoma of thyroid gland

## Answer

**The correct answer is C**

This is a typical presentation of familial benign hypocalciuric hypercalcemia (FHH). As the name implies, it is familial, her mother was diagnosed with it, hypocalciuric, decreased urinary calcium level and hypercalcemic, elevated serum calcium level. It is a very rare condition that could affect someone all their life without even noticing it.

It is different from primary and secondary hyperparathyroidism in urine calcium levels which is decreased in FHH but usually it is increased in cases of hyperparathyroidism and familial factor is an important clue in FHH. (Choice A and B).

Milk alkali syndrome is characterized by increase serum calcium level due to increase intake of calcium supplements, usually is cases of osteoporosis and as anti-acid. There is no history of calcium intake in this case. (Choice D).

# Question 4

A 46 year old man presents to his physician complaining of abdominal pain and increased abdominal size. He has a history of liver cirrhosis and ascites. The patient also complains of progressive shortness of breath. There is no fever, vomiting, diarrhea or constipation. His vital signs show temp. 99.7 F, pulse 106/min., blood pressure 110/78 mmHg. Abdominal examination shows diffuse tenderness on palpation and dull resonance on percussion. There is no rebound or guarding.

What is the management of this patient's condition?

1. No treatment necessary and re-check after 2 weeks
2. Abdominal paracentesis and empiric antibiotics and culture to specify antibiotics
3. Abdominal paracentesis and use antibiotics only if culture shows gram positive microorganisms
4. Abdominal paracentesis and use antibiotics only if the patient develops high fever

## Answer

**The correct answer is B**

This patient has a typical presentation of spontaneous bacterial peritonitis. It is caused by infection of the ascetic fluid, most probably caused by enteric bacteria. Abdominal paracentesis is recommended to confirm the diagnosis, culture of the fluid and to improve the patient’s shortness of breath.

It is considered an emergency in case of liver cirrhosis and needs immediate intervention. (Choice A)

Cefotaxime intravenously is the drug of choice in this case until the result of culture. (Choice C)

Absence of high fever in this patient doesn’t mean he has no infection. Treatment should be started immediately to avoid septicemia and shock. (Choice D)

# Question 5

A 5 year old boy presents to his physician with his mother. She noticed that her son is jerking his head multiple times each day and blinking his eyes too much. He also makes noises all of a sudden without any reason. The boy feels relieved after he does those movements and noises. She is worried about her son's condition especially after a co-worker told her that her boy might have seizures.

What is the most likely diagnosis?

1. Simple partial onset seizure
2. Complex partial onset seizure
3. Absence seizure
4. Tourette disorder
5. Malingering

## Answer

**The correct answer is D**

Tourette syndrome is characterized by vocal tics as in this patient. Vocal tics are sudden involuntary sounds caused by moving air through the nose or mouth. Tourette syndrome also causes jerking of the head and blinking of the eyes for several times a day.

Vocal tics are not found in any type of seizures. (Choice A, B and C)

Malingering is fabrication of symptoms of any mental or physical disorder for a secondary gain. This is not the case of this scenario. (Choice E)

# Question 6

Congenital heart diseases are defects of the heart and/or great arteries that are present at birth. They may be manifested at birth or hidden until later in life. Cyanosis is an important sign to diagnose and differentiate between types of congenital heart disease.

What is the most common congenital heart disease?

1. Atrial septal defect
2. Ventricular septal defect
3. Patent ductus arteriosus
4. Transposition of the great arteries
5. Tetralogy of Fallot

## Answer

**The correct answer is B**

Ventricular septal defect is the most common congenital heart disease. It is found in 30-60% of all congenital heart defects at birth. Most of cases close spontaneously shortly after birth. It is often associated with other congenital conditions such as Down syndrome. VSD can also occur in adults following myocardial infarction.

Due to the high pressure in the left ventricle, blood is rushed to the right ventricle resulting in increased pressure and volume which leads to pulmonary hypertension.

Atrial septal defect and patent ductus arteriosus are less common acyanotic congenital heart defects. (Choices A and C)

Transposition of the great arteries and Tetralogy of Fallot are less common cyanotic congenital heart diseases. (Choices D and E)

# Question 7

A 39 year-old man presents to the ER by his wife. They were watching TV when she noticed that her husband was confused and stumbling. He is not usually at home at this time but he didn't feel good all the day. He used to drink every night with his friends at the bar but he didn't go with them in the last two nights.  He assumed that he is tired because he drank too much last time two days ago. He denied chest pain, shortness of breath or any abdominal symptoms. His CT scan is negative for any mass or bleeding.

His lab tests show:

AST 64 U/L

ALT 24 U/L

Lactose dehydrogenase 267 U/L

What is the most likely diagnosis of this patient condition?

1. Alcohol withdrawal
2. Acute alcohol intoxication
3. Stroke
4. Heart attack

## Answer

**The correct answer is A**

This patient has a long history of alcoholism. If the scenario mentions that a chronic alcoholic didn't drink for more than 36 hours, it is most likely driving your attention to alcohol withdrawal. Now, you should start looking for signs and symptoms of withdrawal to confirm your guess. Confusion and stumbling are the two most common features of alcohol withdrawal in the first 48 hours.

Acute alcohol toxicity is incorrect answer as this patient didn’t drink alcohol for 2 days. Alcohol toxicity is characterized by nausea, repeated episodes of vomiting, cold clammy skin and unconsciousness or sub consciousness which is not manifested in this case. (Choice B)

CT scan is negative for stroke and the age of the patient make stroke less likely the case in this patient. (Choice C)

Heart attack is less likely the reason of this patient condition due to the absence of symptoms and signs of cardiac pathology. (Choice D)

# Question 8

Oxygen hemoglobin dissociation curve is managed to understand how the blood carries oxygen to the tissues and how to release it. It measures the affinity of hemoglobin for oxygen. Shift of the curve to the left means high affinity for oxygen while shift to the right means low affinity of hemoglobin to oxygen.

Of the factors listed below which one causes shift of oxygen hemoglobin dissociation curve to the right?

1. Decreased CO2
2. Decreased temperature
3. Decreased pH
4. Decreased 2-3 DPG

## Answer

**The correct answer is C**

Decreased pH or increased (H) ion concentration leads to shift of oxygen hemoglobin dissociation curve to the right.

Other factors causes shift of oxygen hemoglobin dissociation curve to the right are:

* Increased P (CO2). (Choice A)
* Increased temperature. (Choice B)
* Increased 2-3 DPG. (Choice D)

# Question 9

A 23 year old woman presents to the clinic complaining of fishy-smelling vaginal discharge. A smear of the discharge reveals stippled squamous epithelial cells with smudged borders.

What is the most likely diagnosis?

1. Trichomoniasis
2. Bacterial vaginosis
3. Chlamydial infection
4. Candidiasis
5. Genital herpes

## Answer

**The correct answer is B**

Bacterial vaginosis presents as a grey, fishy smell vaginal discharge. It is not sexually transmitted disease but it is associated with sexual activity. Gardnerella vaginalis is involved in this condition. They are pleomorphic, gram-variable rods. A smear of the vaginal discharge reveals stippled squamous epithelial cells with smuggled borders, also known as clue cells. A mnemonic for it is:

I don’t have a Clue why I smell Fish in the Vagina Garden.

Trichomoniasis is sexually transmitted disease characterized by frothy, greenish, foul-smell discharge. It is caused by trichomonas vaginalis which can be seen moving under microscope. (Choice A)

Chlamydial infection is caused by chlamydia trachomatis and characterized by urethritis, cervicitis, arthritis and conjunctivitis. It is a common cause of pelvic inflammatory disease (PID). It is the most common bacterial sexually transmitted disease in the USA. Vaginal discharge is purulent and cervical motion tenderness (Chandelier’s sign) is characteristic. (Choice C)

Candidiasis is characterized by its thick, white, “cottage cheese” vaginal discharge. It shows pseudo hyphae under microscope. (Choice D)

Genital herpes is mainly caused by HSV-2. It is characterized by painful vesicles and ulcers on the vulva and cervix. It also causes fever, headache and muscle pains. (Choice E)

# Question 10

A 26 year old man presents to the emergency room complaining of painful spasm of his neck. He feels like his neck is locked to the left. Last week he was diagnosed with schizophrenia and yesterday he started to take his medications. There is no history of trauma or previous similar attack.

What is the most likely diagnosis?

1. Dystonia
2. Akathisia
3. Parkinsonism
4. Tardive dyskinesia

## Answer

**The correct answer is A**

This is a typical presentation and time frame of dystonia. It occurs on the first 24 hours after ingesting typical antipsychotics such as haloperidol. Timing of side effects of antipsychotics follows the rule of 4.

Dystonia usually occurs after 4 hours.

Akathisia usually occurs after 4 days. (Choice B)

Parkinsonism-like symptoms usually happens after 4 weeks. (Choice C)

Tardive dyskinesia usually manifests after 4 months. (Choice D)

# Question 11

A 60 year-old woman visits her physician for her annual physical examination. She is concerned if she might have osteoporosis. Her older sister was diagnosed with osteoporosis when she was 60 years old. She smokes one pack of cigarettes every day for 35 years. She doesn’t take any medications or vitamins. She is thin and her BMI is 19.

What is the most appropriate test to show if this patient has osteoporosis?

1. Serum calcium level
2. Ultrasound of the head
3. X-ray of the spine
4. Dual energy x-ray absorptiometry of the hip
5. Bone biopsy of the iliac crest

## Answer

**The correct answer is D**

Osteoporosis is a disease characterized by decreased bone strength which leads to fractures following minor injuries. It occurs due to increased bone loss and decreased bone formation. It is common in old age, after menopause due to decreased estrogen, alcoholism, hyperthyroidism and kidney diseases.

Osteoporosis is defined as bone density of 2.5 standard deviation below the bone density of a young adult. Bone density is measured by dual energy x-ray absorptiometry of the hip.

Serum calcium level is not affected in osteoporosis. (Choice A)

Imaging studies and bone biopsy are useful tests but not as specific as dual energy absorptiometry. (Choices B, C and E)

# Question 12

A 33 year-old woman presents to her physician complaining of fatigue, general muscle aches, weight gain, irregular menstrual cycles and milky discharge from both breasts for 3 months. Her vital signs are pulse 64/min, blood pressure 123/88 and temp 96.3. Her physical examination reveals galactorrhea of both breasts and dry skin.

Her laboratory results are as follows:

Thyroid stimulation hormone (TSH): 23 uU/ml

Prolactin level: 55ng/ml

What is the best first step in management of this patient?

1. Repeat laboratory tests
2. Start levothyroxine therapy
3. Start estrogen therapy
4. Start anti-dopamine therapy
5. MRI of the pituitary gland

## Answer

**The correct answer is B**

This is a typical presentation of hypothyroidism. Long history of fatigue, muscle pain, gaining weight, disturbance in menstrual cycles, galactorrhea and dry skin are common features of hypothyroidism. Decreased pulse and low body temperature are also features of this condition. Elevated thyroid stimulating hormone (TSH) is diagnostic.

Decreased serum thyroid hormone leads to increased thyrotropin-releasing hormone (TRH) through feedback mechanism. TRH stimulates anterior pituitary gland to secrete TSH and prolactin which in turn causes disturbances in menstrual cycle and galactorrhea.

Thyroid hormone replacement is the treatment of choice for hypothyroidism. This patient should start on levothyroxine therapy to relieve his symptoms and to improve his basal metabolic rate. Levothyroxine will also decrease the secretion of TRH through negative feedback and eventually decrease the levels of TSH and prolactin.

Laboratory tests are matching the clinical picture of hypothyroidism. So, no need to repeat those tests. (Choice A)

There is no role of estrogen or anti- dopamine therapy in this scenario. (Choice C and D)

There is no need for MRI in this case. There is no evidence of any gross lesion of the pituitary. (Choice E)

# Question 13

A 21 year-old pregnant woman in her first trimester visits her physician complaining of progressive dyspnea. After physical examination, ECG and echocardiography, she is diagnosed with severe pulmonary hypertension. Her family history supports this diagnosis.

Which of the following choices is associated with the best outcome for the mother’s life?

1. Termination of pregnancy
2. Administration of anti-coagulants
3. Administration of prostacyclin
4. Administration of ACE inhibitors
5. Observation and treatment after delivery

## Answer

**The correct answer is A**

Pulmonary hypertension is considered severe if pulmonary artery pressure is >70% of systemic blood pressure. Severe pulmonary artery pressure carries up to 50% of risk of maternal death. All patients with pulmonary hypertension should be counseled for termination of pregnancy. It is considered the best outcome of the mother’s life.

Other options (B, C, D and E) are considered with meticulous medical monitoring if the patient refuses to terminate her pregnancy and after signing a consent including her acknowledge of risk of death if she continues her pregnancy.

# Question 14

A 67 year old man visits his primary care physician for evaluation. Yesterday he had a seizure for the first time in his life. His co-workers told him that he lost consciousness all of sudden and started shaking his hands and legs for about two minutes. They called the ambulance but he was completely normal when paramedics arrived. He refused to go to the ER and told them that he will visit his regular doctor next day. His doctor orders some tests to exclude a brain tumor.

What is the most accurate test to confirm a diagnosis of brain tumor?

1. MRI of the brain
2. CT scan of the head
3. Hormonal assay
4. Brain biopsy

## Answer

**The correct answer is D**

This is one of the Trickiest questions on USMLE. The last line is the most important segment of the scenario. If you jump to the choices without paying close attention to the main question, you will definitely choose the most common wrong answer which is MRI. Most of the students jump to answer options after they read the last statement in the scenario (His doctor orders some tests to exclude a brain tumor) without reading the main question.

The question would be straightforward and not tricky if it asks What is the next step in diagnosis?. The answer would be MRI. (Choice A)

But it asks: What is the most accurate test to confirm the diagnosis of brain tumor? The only correct answer should be brain biopsy.

Other imaging studies and hormonal assays could be performed in some cases of brain tumors to reveal the nature of the tumor and to choose the appropriate chemotherapy. (Choices B and C)

Brain biopsy is performed in some situations as post-operative tissue biopsy to confirm the pathological type of the brain tumor and also in post-mortem cases for research.

# Question 15

A 65 year-old man complains of progressive shortness of breath for 6 months. He smokes a pack of cigarette daily for 50 years. He drinks 3-4 beers daily for 40 years. Otherwise, he has a healthy life style. On examination, the point of maximum impulse is displaced and rales are heard on both lung bases. He also has hepatosplenomegaly. His echo show both right and left ventricular dilation and low ejection fraction.

His lab tests are as follows:

AST: 240 U/L

ALT: 130 U/L

Alkaline phosphatase 230 U/L

What is the most likely cause of his cardiac findings?

1. Smoking
2. Chronic alcohol intake
3. Rheumatic heart disease
4. Chronic hypertension

## Answer

**The correct answer is B**

This is a typical presentation of alcoholic cardiomyopathy. Hepatosplenomegaly is most likely due to chronic alcohol intake. AST is higher than ALT in alcoholics.

Alcoholic cardiomyopathy is a dilated cardiomyopathy characterized by enlargement of both ventricles accompanied by impaired function i.e. low ejection fraction.

Smoking is less likely the reason of cardiomyopathy by itself. Meanwhile, its consequences which include hypertension and coronary heart disease may result in cardiomyopathies. (Choice A)

History, clinical presentation and laboratory investigations support the etiology of this patient’s condition as alcohol intake more than as rheumatic heart disease or chronic hypertension. (Choices C and D)

# Question 16

A 28 year old woman visits her physician for evaluation of bilateral proximal muscle weakness and muscle pain. Her symptoms started last week and her pain is getting worse. Her records indicate alcohol abuse and cocaine addiction. She is HIV positive and she takes zidovudine. She also takes simvastatin for hypercholesterolemia. A muscle biopsy shows significant changes in mitochondrial histology.

What is the most likely etiology of this patient's condition?

1. Alcohol abuse
2. Cocaine addiction
3. Zidovudine
4. Simvastatin
5. HIV infection

## Answer

**The correct answer is C**

Zidovudine causes significant changes in mitochondrial histology with depletion of mitochondrial DNA.

All choices cause myositis but only zidovudine results in mitochondrial changes.

Zidovudine is the only choice associated with mitochondrial changes. All of other choices cause myositis and muscle pain but the only one which causes mitochondrial changes is zidovudine.

(Choices A, B, D and E)

# Question 17

A 33 year-old woman visits her physician for evaluation of progressive fatigue and muscle aches. She lives in Texas after she emigrated from South Korea last year. She has lost 25 Lbs. and has arthralgia and low grade fever over the last six months. Last week, she noted back pain in the area between her shoulder blades. She works at a convenient store and she thought that all her symptoms are due to lifting heavy boxes. She looks tired, her pulse is 105/min and her blood pressure is 70/40 mmHg. She has normochromic, normocytic anemia and her platelet count is 750,000/uL. Her leukocyte count is normal and her erythrocyte sedimentation rate is 130/h.

What is the most likely diagnosis?

1. Hemolytic anemia
2. Iron deficiency anemia
3. Takayasu’s arteritis
4. Idiopathic thrombocytopenic purpura

## Answer

**The correct answer is C**

This is a classic presentation of Takayasu’s arteritis. She is a young Asian and her symptoms and blood picture are typical for the inflammatory phase of the disease. Her aches are due to narrowing of the main arteries and her back pain is mainly caused by inflammation of the thoracic aorta. Loss of weight is common in Takayasu’s arteritis. Subclavian arteries are the most affected vessels but it can affect any of the large arteries including the aorta and its branches. MRI is useful to confirm the diagnosis. It shows thickening and edema of the walls of large vessels.

Other options may share some of the symptoms and blood features but not as typical as Takayasu’s arteritis. (Choices A, B and D)

# Question 18

A 23 year-old woman was involved in a motor car accident three days ago. She was hypotensive and diagnosed with internal bleeding. She received several units of blood. Today her urine output is very low for the last six hours. Her urinalysis showed hematuria, proteinuria, muddy brown epithelial cells and granular casts. Her lab tests also show BUN: 26 mg/dL and serum creatinine: 2.6 mg/dL.

What is the most likely diagnosis of her renal pathology?

1. Acute glomerulonephritis
2. Interstitial nephritis
3. Acute tubular necrosis
4. Traumatic avulsion of the ureter

## Answer

**The correct answer is C**

Acute tubular necrosis (ATN) is the most likely pathology in this case. It is caused by decrease in blood volume which leads to prerenal azotemia. The most common cause of renal failure associated with prerenal azotemia is acute tubular necrosis. It is characterized by rapid decline of renal function and acute elevation of blood urea and serum creatinine. The BUN/creatinine ratio is usually normal as in this case. The muddy brown epithelial cells and granular casts are also typical in ATN.

Acute glomerulonephritis is characterized by the humpy lumpy appearance under light microscope and sub epithelial humps under electron microscope. It is type III hypersensitivity forming immune complexes (antigen-antibody complexes) which deposit below the podocyte foot processes of the basement membrane of the glomeruli. It occurs mainly after streptococcal infection. (Choice A)

Interstitial nephritis is inflammation of the kidney tissue that surrounds the tubules. It is caused mainly as a side effect of some drugs or post-infection. It is characterized by eosinophilia and eosinophiluria. (Choice B)

Traumatic avulsion of the ureter is mainly occurs as a complication of ureteroscopy. There is no mention to any surgery or trauma of any kind in this patient’s history. (Choice D)

# Question 19

A 68 year-old man visits his physician for new symptoms arises recently. He has a long history of aortic valve stenosis which is treated with atenolol and he often forgets to take it. Now he complains of frequent chest pains with less exertion. The patient is wondering if he should be considered for an aortic valve replacement. He has a friend who told him that he had the surgery six years ago and he is feeling much better since then. Echocardiogram shows decrease of aortic cusp separation (6 mm).

Which of the following is the strongest indication for aortic valve replacement in this patient?

1. The patient age (68 years old)
2. The patient gender (male)
3. Long duration of aortic stenosis (more than 10 years)
4. Non-compliance with medical treatment
5. Echocardiographic findings

## Answer

**The correct answer is E**

Indications of aortic replacement surgery in aortic stenosis patients are:

1. Maximum aortic valve separation of less than 8 mm.
2. Symptomatic aortic stenosis i.e. chest pain with exertion
3. Patients undergoing coronary artery bypass graft surgery

This patient has severe aortic valve stenosis confirmed by echocardiography. Aortic valve separation of 6 mm is considered severe stenosis.

Age, gender, long duration of aortic stenosis and non-compliance with the medical treatment are not considered indications for surgery unless accompanied by symptoms for severe aortic stenosis. (Choices A, B, C and D)

# Question 20

A 36 year-old man presents to his physician complaining of fever, generalized muscle aches and mild cough since yesterday. His temperature is 102.5 F. His physical examination is otherwise normal. He had not received influenza vaccine this year. His physician received a note form Public Health Office informing him that influenza A is documented in his county.

What is the most appropriate management of this patient?

1. Assurance and rest in bed with no treatment
2. Nasopharyngeal culture of influenza and treatment if it is positive
3. Wide spectrum antibiotic
4. Anti-influenza drugs such as amantadine or zanamivir
5. Hospitalization and isolation

## Answer

**The correct answer is D**

His patient has a typical presentation of influenza A supported by the Public Health documentation in his county. The use of anti-influenza drugs as amantadine and zanamivir is valuable on the first 24-48 hours to provide quick recovery and to avoid complications.

Rest in bed is also important but it should be accompanied with treatment. (Choice A)

There is no need for culture as it is a straight forward case. The causative organism is already recognized by the Public Health officials as influenza A. (Choice B)

Wide spectrum antibiotics can be used if secondary bacterial infection occurs. There is no evidence of any bacterial infection in this scenario. (Choice C)

There is no need for hospitalization or isolation. (Choice E)

# Question 21

A 55 year old athletic man visits his doctor for consultation. Recently he checked his blood pressure to be approved physically for a marathon. His blood pressure was 170/98. He proudly tells his physician that he has never had any health problem and didn’t see any doctor for years. His family history is significant for his father died of a stroke at 62 years of age and his brother was diagnosed of hypertension when he was 39 and received antihypertensive treatment. On physical examination, his BMI is 23, his pulse is 97/min and his blood pressure is 180/96 mmHg. His fundus examination shows grade II retinopathy. ECG demonstrates left ventricular hypertrophy with normal sinus rhythm. All his laboratory tests are normal.

What is the first line of treatment for this patient?

1. No treatment necessary and follow up in 3 months
2. Start doxazosin
3. Start hydralazine
4. Start Lisinopril

## Answer

**The correct answer is D**

This patient has high blood pressure measured at 2 occasions and family history of hypertension that confirm the diagnosis of essential hypertension. Left ventricular hypertrophy with normal sinus rhythm and retinal changes are complications of hypertension.

This patient needs to start antihypertensive drug immediately. An ACE inhibitor is recommended to avoid or delay renal changes related to hypertension. Lisinopril is an ACE inhibitor. Its mechanism of action is to inhibit the transformation of angiotensin1 into angiotensin II and to decrease the degradation of bradykinin. These two mechanisms lead to decreased peripheral resistance without reflex tachycardia. ACE inhibitors are also protective to the kidneys through inhibition of renin-angiotensin-aldosterone system.

This patient needs immediate medical treatment for his complicated hypertension. (Choice A)

Doxazosin is an alpha 1 selective anti adrenergic drug. It is used in hypertension patients who also have benign prostatic hyperplasia. It reduces urinary retention through its relaxing effect on smooth muscles. It is not recommended as the drug of choice in cases of essential hypertension. (Choice B)

Hydralazine is a smooth muscle relaxant acting directly as vasodilator of arteries and arterioles. It is not commonly used for hypertension treatment because of its reflex action on the heart and large vessels through feedback sympathetic stimulation. (Choice C)

# Question 22

A 51 year-old man visits his physician for a routine physical examination. He has no health complaints. He smokes 1 pack of cigarettes and drinks a cup of wine daily for 30 years. He has no significant past history and takes no medications. He has no significant family history and both his parents are healthy. Physical examination and blood tests are normal.

What is the test recommended to be done next?

1. Chest x-ray
2. Liver function tests
3. Kidney function tests
4. Colonoscopy
5. Prostate-specific antigen (PSA) test

## Answer

**The correct answer is D**

This person is completely normal. When you find this type of scenario, you should think about screening tests. There is no reason to perform any diagnostic test for a normal person.

Colonoscopy is recommended for all people after the age of 50 as a screening test for colorectal cancer. If the initial colonoscopy is normal i.e. no polyps, the test can be repeated after 10 years. If there is a family history of colorectal cancer, screening test should be started earlier and calculated by 10 years younger than the age of the family member when first diagnosed with colon cancer. In cases of abnormal colonoscopy, polyps should be removed and the test should be repeated 3-5 years after the initial one.

Chest x-ray, liver function tests and kidney function tests are diagnostic tests and not approved as screening tests. (Choices A, B and C)

PSA is recommended only if there is a strong family history of cancer prostate and after the age of 60. (Choice E)

# Question 23

You receive a phone call from the nurse of a nursing home telling you that your patient refused to take her medications for the third day. She is 75 years old, competent and has disability of both lower limbs.

What is your best response to the nurse’s concern?

1. Ask the patient for the reason of refusal and don’t force her to take her medications
2. Get help of the staff in the nursing home to force the patient to take her medications as you are responsible for any complications that could happen to her if she doesn’t take her medications.
3. Call her family and address this issue with them to find the best way to solve this problem to avoid any blame if something happens to her
4. Tell the patient that if she doesn’t take her medications then, there is no need to take any future appointments

## Answer

**The correct answer is A**

This patient is competent, which means she is capable of making her decisions about her life. She has the right to refuse to take her medications. Her physician as a care provider has an obligation to know and discuss with the patient the reason of her refusal.

Forcing a competent patient to take her medications is absolute no. It is considered abuse and my leads to illegal consequences. (Choice B)

Addressing this issue with her family is considered a breach of confidentiality. Unless having the patient’s consent, health care providers should not discuss any issues with any third party including family or friends. (Choice C)

This patient has the right to make her own decisions concerning her appointments and medications. Refusal to take her medications should not have any consequences on her future care. (Choice D)

# Question 24

A 26 year-old woman complains of left flank pain and fever for 2 days. She has a history of two episodes of urinary tract infections in the past three years treated with trimethoprim-sulfamethoxazole. She is married, sexually active and takes contraceptive pills. Her last menstrual period was 5 days ago. On physical examination, her pulse is 100/min., blood pressure is 120/80 and her temperature is 103 F. She has left costovertebral angle tenderness on palpation.

What is the best next step in management?

1. Admission to the intensive care unit (ICU)
2. Collection of urine and blood cultures
3. CT scan of abdomen and pelvis
4. MRI of the kidney
5. Administration of wide spectrum antibiotics

## Answer

**The correct answer is B**

This patient history and examination are consistent with acute pyelonephritis. In this case we should collect urine and blood samples for culture before we start empiric antibiotic treatment. Culture is important for prescribing the most effective antibiotic and for the follow up.

The patient is stable and so there is no need for the ICU. (Choice A)

Diagnosis of acute pyelonephritis can be reached by history and physical examination only. Imaging studies are not necessary in this case as it is straight forward. In case failure of medical treatment, imaging studies should be considered for further knowledge. (Choices C and D)

Collection of urine and blood samples for culture should be done before administration of any antibiotics to achieve accurate results. (Choice E)

# Question 25

A 23 year old man visits his physician for routine examination. He has a history of HIV infection for 3 months and he is compliant with his medications. He is concerned about developing AIDS.

Which of the following is the most useful test to address his concern?

1. HIV antibody test
2. HIV RT PCR
3. HIV p24 antigen
4. CD4 lymphocyte count

## Answer

**The correct answer is B**

The most recent and accurate test to determine the progress of HIV patient to develop AIDS is HIV RT PCR. Viral load of 750,000 increase significantly the chance to develop AIDS.

HIV antibody test and HIV p24 antigen are important tests to diagnose HIV infection but they have no major rule in prognosis. (Choices A and C)

CD4 lymphocyte count is the most common WRONG answer. It is used to check if the patient already developed AIDS and to evaluate the most possible complications. CD4 lymphocyte count is also important to determine prophylactic treatment for susceptible opportunistic infections. (Choice D)

# Question 26

A 34 year old man was brought to the ER by his wife. He is disheveled and dirty and yelling his friend’s name. His wife tells the ER physician that her husband was in a car accident three weeks ago and lost his best friend. Upon interviewing him, he is detached with a flat affect and is responding to internal stimuli.

What is the most likely diagnosis?

1. Brief psychotic attack
2. Acute stress disorder
3. Post-traumatic stress disorder
4. Schizophreniform disorder
5. Schizophrenia

## Answer

**The correct answer is A**

Brief psychotic disorder is a short duration psychosis occurs after exposure to a strong stress situation. It usually lasts for a day or more up to a month. This patient has psychotic symptoms in the form of hallucinations, delusions and disorganized behavior short after the loss of his friend in an accident, a stressor. It can also occurs without a stressor or postpartum.

Acute stress disorder has the same duration and following a stressor as in brief psychotic disorder but it usually doesn’t show any psychotic symptoms instead it shows mainly signs of depression. (Choice B)

Post-traumatic stress disorder (PTSD) is diagnosed when acute stress disorder continues for more than one month. It is characterized by recurrent disturbing flashbacks and avoidance of memories of the stressing events. Stressors that commonly lead to PTSD are assault based traumas. Non-assault based trauma as loss of a friend is less likely leading to PTSD. (Choice C)

Schizophreniform disorder is characterized by the presence of signs and symptoms of schizophrenia for more than one month and less than 6 months. (Choice D)

Schizophrenia is a mental disorder characterized by abnormal disorganized behavior, false belief, confused thinking, hallucinations, social withdrawal and lack of motivation. Symptoms and signs should last for 6 months or more to consider the diagnosis of schizophrenia. (Choice E)

# Question 27

A 9 year-old boy is brought to his physician by his mother for evaluation of bloody urine. His urine analysis shows Hg and RBC casts. His maternal grandfather suffered deafness and died of renal failure. Physical examination is normal except for cataract on his right eye.

What is the most likely diagnosis?

1. Polycystic kidney disease
2. Wilms tumor
3. Alport syndrome
4. Fragile X syndrome

## Answer

**The correct answer is C**

Alport syndrome is a congenital disorder mostly x-linked caused by mutation in collagen type IV which leads to thinning and splitting of glomerular basement membrane. It is characterized by the triad of glomerulonephritis; eye problems and sensorineural deafness (Can’t see, can’t pee and can’t hear a buzzing bee). It causes hematuria, deafness, retinopathy and lens dislocation.

Polycystic kidney disease is a genetic disorder characterized by the presence of cysts in one or both kidneys. It can be manifested at any stage of life by high blood pressure, hematuria, abdominal pain and polyuria. In some cases, it is accompanied by cysts in lungs, liver or ovaries. It doesn’t cause any vision or hearing problems as seen in this patient. (Choice A)

Wilms tumor affects children at age 2-4 mainly due to mutation on chromosome 11. It presents as a unilateral large palpable flank mass with or without hematuria. Eye problems may manifest due to aniridia if Wilms tumor occurs as a part of WAGR complex which is a combination of Wilms tumor, Aniridia, Genitourinary symptoms and Retardation. (Choice B)

Fragile X syndrome is a genetic disorder characterized by expansion of CGG trinucleotide repeat on X chromosome. It causes mental retardation and prominent characteristics in the form of elongated face, protruding ears, hyper extensible finger joints and hypotonia. There is no mention of these characteristics in the above scenario. (Choice D)

# Question 28

A 4 year-old boy visits you in the clinic with his mother for evaluation of an increasing size of his genitalia. She tells you that her boy had aggressive behavior for the last six months. Besides progressive increase of the length of his penis, he has excessive pubic hair. On examination, his pulse is 80/min. and blood pressure is 140/92 mmHg. Other than genital findings, the rest of examination is normal. You send blood and urine samples for lab testing.

What is the most likely initial diagnosis of this boy’s condition?

1. Conn syndrome
2. C-21 hydroxylase deficiency
3. C-11 hydroxylase deficiency
4. C-17 hydroxylase deficiency

## Answer

**The correct answer is C**

This patient has a typical presentation of C-11 hydroxylase deficiency. It is manifested as hypertension, precocious puberty and abnormal behavior. This enzyme contributes to the transformation of 11-deoxycorticosterone into corticosterone which in turn forms aldosterone and also assists in the transformation of 11-deoxycortisol into cortisol. So, deficiency of this enzyme leads to lack of cortisone and aldosterone. 11-deoxycoticosterone has the same action as aldosterone on the kidneys leading to Na and water retention which results in high blood pressure. Deficiency of cortisol leads to adrenal hyperplasia due to feedback stimulation of ACTH. Increased secretion of sex hormones leads to precocious puberty.

Conn syndrome is familial hyperaldosteronism characterized by hypertension, hypokalemia and metabolic alkalosis. Sex hormones are not affected in this disorder. (Choice A)

C 21-hydroxylase deficiency results also in low cortisol and aldosterone and high secretion of sex hormones. It leads to hypotension and precocious puberty due to accumulation of progesterone and its transformation into testosterone by zona reticularis. (Choice B)

C 17-hydroxylase enzyme stimulates the transformation of pregnenolone and progesterone into sex hormones secreted by zona reticularis. Deficiency of this enzyme leads to hypertension and delayed puberty. (Choice D)

# Question 29



What is the most common cardiac condition associated with this syndrome?

1. Transposition of great vessels
2. Tetralogy of Fallot
3. Persistent truncus arteriosus
4. Coarctation of the aorta
5. AV septal defect

## Answer

**The correct answer is E**

The most common cardiac congenital anomaly associated with Down syndrome is endocardial cushion defect. Endocardial cushion defect leads to AV septal defects, atrial septal defect or ventricular septal defect.

Transposition of great vessels is found mainly in infants of diabetic mothers. (Choice A)

Tetralogy of Fallot and persistent truncus arteriosus are associated with 22q11 syndromes which include DiGeorge syndrome. (Choices B and C)

Coarctation of the aorta and bicuspid aortic valve are seen in Turner syndrome. (Choice D)

# Question 30



This patient complains of brittle toe nails. He mentions that his toe nails were discolored yellow before they started to break off into pieces. KOH preparation shows hyphae under microscope.

What is the most likely diagnosis?

1. Nail psoriasis
2. Onychomycosis
3. Lichen planus
4. Bacterial paronychia
5. Periodic nail shedding

## Answer

**The correct answer is B**

This is a case of fungal infection confirmed by the presence of hyphae under microscope. Infection starts by discoloration of toe nails and then they brittle and break off into pieces. Onychomycosis is the only fungal infection out of the choices listed above. It is the most common disease of the nails caused by dermatophytes, candida and some other molds.

Nail psoriasis looks the same as the picture but its KOH preparation doesn’t show hyphae under microscope unless there is fungal infection on the top of psoriasis. (Choice A)

Lichen planus causes longitudinal ridges and grooves on the nail plate. It also causes thinning and atrophy of the nail bed, subungual keratosis and hyperpigmentation. (Choice C)

Bacterial paronychia is bacterial infection of the nails. It is mainly caused by staph aureus but some other bacteria could be involved too. (Choice D)

Periodic nail shedding is a normal process mostly occurs between seasons. It doesn’t show any signs of inflammation or infection. (Choice E)

# Question 31

A 2 year-old boy is brought to the clinic with his mother for frequent upper respiratory infections for the last 3 months. General examination shows large head with prominent forehead and enlarged abdomen. On abdominal examination there is hepatosplenomegaly. The rest of examination is normal. After lab tests, the boy is diagnosed with Hunter syndrome.

What is the mode of inheritance of this syndrome?

1. Autosomal dominant
2. Autosomal recessive
3. X-linked recessive
4. X-linked dominant
5. Mitochondrial

## Answer

**The correct answer is C**

Lysosomal storage diseases are group of genetic disorders caused by different gene mutations that translate deficiency in enzyme activity. All lysosomal storage diseases are the results of accumulation of different substances inside the lysosomes.

Hunter syndrome is caused by deficiency of the enzyme, iduronate-2-sulfatase which leads to accumulation of heparan sulfate and dermatan sulfate. It usually manifests after the first year of life as abdominal hernias, ear infections and recurrent colds. Characteristics of Hunter syndrome start to be prominent after accumulation of large amounts of glycosaminoglycan throughout the cells of the body.

Most of lysosomal storage diseases are autosomal recessive except Hunter syndrome which is X-linked recessive. (Choices A, B, D and E)

# Question 32

A 68 year old postmenopausal woman visits her physician for evaluation after she was diagnosed with stage 1 vaginal squamous cell carcinoma last week. The abnormal cells are limited only to the lower part of vagina. Today she comes to discuss her treatment options with her physician.

What is the most appropriate treatment at this stage and at this location?

1. Lower vaginectomy with vaginal reconstruction
2. Topical and systemic hormonal treatment
3. Topical and systemic chemotherapy
4. Topical radiation therapy

## Answer

**The correct answer is D**

Primary vaginal cancer is a rare cancer and usually squamous cell carcinoma occurs mostly in women over the age of 50. It is treatable if diagnosed early. Stage 1 is considered if the tumor is localized to the vagina and there are no lymph nodes involved. Topical radiation therapy is the treatment of choice for the 1st stage of primary vaginal cancer.

Invasive vaginal cancer and late stages should be treated with radiation therapy and surgery. Chemotherapy is used after surgery. (Choices A, C)

There is no rule of hormonal treatment in vaginal cancer. (Choice B)

# Question 33

An alcoholic 44 year-old man is brought to the emergency room because of severe abdominal pain and vomiting large amount of blood. The patient was throwing up frequently since yesterday but he didn’t notice any blood until two hours ago. The last time he had alcohol was yesterday afternoon during a banquet. The patient had never complained of any related symptoms before. He doesn’t smoke or take any recreational drugs.

What is the most likely diagnosis of this patient’s condition?

1. Esophageal varices
2. Mallory-Weiss Syndrome
3. Cancer esophagus
4. Acute gastritis

## Answer

**The correct answer is B**

This patient has typical presentation of Mallory-Weiss syndrome. It is caused by a tear of the esophagus mucosa due to forceful vomiting. It is very common in alcoholics and patients with eating disorders.

Esophageal varices are usually preceded with hepatic and gastric symptoms for months or years before the first episode of hematemesis. Also bleeding of esophageal varices is not usually accompanied with vomiting or abdominal pain. (Choice A)

Cancer esophagus usually causes obstruction and dysphagia before hematemesis. (Choice C)

Acute gastritis is rarely leads to hematemesis unless there is another reason on top of it as ulcer or gastric cancer. (Choice D)
Question 34

A 16 month-old boy is brought to his physician by his mother complaining of severe itching all over his face. Her child couldn’t sleep last night and he kept rubbing his face against bedding. He had the several episodes on the last six months and he relieved without any treatment but this time is more severe and shows skin changes on his face. The previous episodes were not related to any season or any specific food. When the physician asks his mother if she used any new lotion or shampoo for the boy, she answered ‘no’. The boy is rubbing his face against his mother’s clothes throughout the visit. Examination of his face shows dry and scaly patches over his cheeks.

What is the most likely diagnosis of this boy’s condition?

1. Allergic contact dermatitis
2. Atopic dermatitis
3. Seborrheic dermatitis
4. Scabies

## Answer

**The correct answer is B**

This is a typical presentation of atopic dermatitis or eczema. The most common age of onset is 1-2 years. It is characterized by intermittent episodes of severe itching and scaly dry skin. The cause is unknown but believed to be genetic disorder involving the immune system. Diagnosis is confirmed by atopy patch test which includes the application of patches of allergens for 24-72 hours and the evaluation of the skin lesions. This test is also useful for the recognition of the specific allergen that causes the symptoms.

Allergic contact dermatitis is dermatitis caused by contact with a substance. It manifests first by the appearance of rash at the site of exposure. Later, depending on the type of allergen, it changes into erythema, papules, blisters or vesicles. It is considered type IV hypersensitivity. Don’t be confused with the word “allergic” which is usually type I hypersensitivity. The word “contact” makes the difference. (Choice A)

Seborrheic dermatitis is a chronic, relapsing dermatitis affecting the scalp, face and trunk. It affects mainly immunocompromised patients. It manifests as scaly, itchy and erythematous skin. Scales are similar to dandruff and seen on the scalp. Its cause is unknown. The history and clinical picture of this patient is not the same as seborrheic dermatitis. (Choice C)

Scabies is a contagious disease caused by Sarcoptes scabiei and manifests as severe itching and vesicles. It affects certain parts of the body but in children it affects any part including the head. Itching is worse at night. It is different from atopic dermatitis in its mode of transmission and presentation. (Choice D)

# Question 35

A 32 year-old man presents to his physician complaining of lower back pain for 3 months. He describes his pain as dull pain involving his lower back and upper gluteal region. He also complains of stiffness of his lower back in the morning that improves with physical activity. The patient also suffers pain in his left eye with redness. His vision is fine but light bothers him and he has to put sunglasses to tolerate it. Physical examination shows inflammation of his left eye and positive Schober's test of the lower back. His x-ray shows changes in the sacro-iliac joint.

What is the most likely diagnosis?

1. Lumbar disc prolapse
2. Kyphosis
3. Ankylosing spondylitis
4. Osteoarthritis
5. E--Rheumatoid arthritis

## Answer

**The correct answer is C**

This patient has a typical presentation of ankylosing spondylitis. The most common complain of AS is dull pain and stiffness of the lower back and upper gluteal region that improves with physical activity. Also 40% of patients have uveitis presented with redness and pain of the eye accompanied with floaters and over-sensitivity to light. Aortic regurgitation is seen in some cases of ankylosing spondylitis. It can be manifested by itself or in conjugation with other diseases such as ulcerative colitis. HLA-B27 is associated with ankylosing spondylitis.

Lumber disc prolapse is an incorrect answer simply because of the injury on the X-ray is located at the sacroiliac joint and not at the lumber region. Also lumber disc prolapse causes continuous pain which is exaggerated by physical activity not improved by it as the case in this patient. (Choice A)

Kyphosis is an excessive convex curvature of the spine in the thoracic and sacral regions. It manifests itself on X-ray in mild cases and on physical examination in severe cases. Fatigue is the main symptom of kyphosis due to strain on muscles trying to adapt with straight posture. (Choice B)

Osteoarthritis is a generative joint disease usually occurs over the age of 45. It causes pain and stiffness of affected joints. Pain usually relieves with gentle pain and worsens with excessive use. Age of onset and character of pain doesn’t match this patient condition. (Choice D)

Rheumatoid arthritis is an autoimmune disease of the joints. It is manifested as warm, swollen and painful joints most commonly at the wrist and hand bilaterally. As opposed to the above scenario, RA shows signs of local inflammation and extra joint manifestations mainly in heart and lungs. (Choice E)

# Question 36

A study is conducted to evaluate the action of a new oral antidiabetic drug in patients with a new onset type 2 diabetes. All patients involved in the study are informed that they would be treated with a new oral antidiabetic drug. They are divided into three groups and each group would be treated with a different dose. Drug assessment is determined based on testing serum glucose and HgA1C regularly throughout the study.

Which of the following best describes this type of study?

1. Case-control study
2. Randomized controlled trial
3. Single blind clinical trial
4. Double blind clinical trial
5. E - Cross sectional study

## Answer

**The correct answer is B**

This study is randomized controlled trial in which the researcher elects a certain group of patients (new onset type 2 diabetes) and informed them about the new drug. They are divided into 3 groups randomly and each group of patients receives a certain dose.

Case-control study is a retrospective observational study in which 2 groups, one group already had a certain disease or symptom and the other group is normal (control group). The above study is prospective and dealing with a group of people has the same condition without a control group. (Choice A)

Single blind clinical trial is different from the above trial in which the groups of patients are not informed about the drug or the doses used. (Choice C)

Double blind clinical trial is different in which both the patients and the researchers don’t know which group takes certain drug or dose. (Choice D)

Cross sectional study is an observational study in which analysis of data collected from a population at a defined time. (Choice E)

# Question 37

A 52 year old alcoholic man complains of painful lesions on his tongue and inside his mouth. He also has hyperpigmented scales on his face and both hands. He is weak, forgetful and suffers of burning sensation in several parts of his body. He mentions that he has diarrhea for the last two months.

Deficiency of which of these vitamins is responsible for this patient’s condition?

1. Vitamin A
2. Vitamin B3 (niacin)
3. Vitamin C
4. Vitamin D
5. Folic acid

## Answer

**The correct answer is B**

This is a typical presentation of pellagra, niacin deficiency. The three Ds, Dermatitis, Dementia and Diarrhea are characteristic of this condition.

Vitamin A deficiency is manifested by night blindness. (Choice A)

Vitamin C deficiency or scurvy affects collagen synthesis through defective hydroxylation of proline and lysine amino acids. Defective collagen is responsible for delayed wound healing and abnormal bleeding. Scurvy lacks the 3 Ds which define pellagra. (Choice C)

Vitamin D deficiency occurs in children as rickets and in adults as osteomalacia. It affects bone development and growth. (Choice D)

Folic acid deficiency causes fatigue, loss of appetite, weight loss, headache and anemia. Deficiency of folic acid in pregnant women leads to neural tube defects in the fetus. Routine folic acid administration is recommended for all pregnant women. It doesn’t have the 3 Ds of niacin deficiency. (Choice E)

# Question 38

A 35 year old man is always frustrated when he comes home after work. If supper is not ready yet, he would yell at his wife. Upon interviewing him, he submitted that he is not happy at his work. His supervisor always yells at him and he is afraid to argue back and lose his job.

What is the defense mechanism involved in this condition?

1. Projection
2. Transference
3. Displacement
4. Sublimation
5. Reaction formation

## Answer

**The correct answer is C**

This defense mechanism displaces this person's anger at his supervisor into anger at his wife. Displacement is placing your reaction to an action into another direction. Instead of yelling back at the supervisor, he yells at his wife.

Projection is a defense mechanism in which the person attributes unacceptable internal impulse to an external one. An example of projection is a husband wants to cheat on his wife accused her of cheating on him. It is different from displacement in which the person blames someone else for self-mistakes. (Choice A)

Transference is projection of an important person in their life onto another person. An example of it is seen when the patient projects his feeling about his father onto his physician. (Choice B)

Sublimation is replacing of unacceptable wish with another valuable course of action. Replacement of a wife’s anger at her husband with volunteering at a public service is an example. (Choice D)

Reaction formation is a defense mechanism in which a person replaces his warded-off feeling with an opposite action. An example is when a person with libidinous thoughts enters the monastery. (Choice E)

# Question 39

A 27 year old woman presents to her physician complaining of abnormal vaginal bleeding. She gave birth to her second child 8 weeks ago through uncomplicated vaginal delivery. On examination, the uterus is enlarged. Her lab tests show marked increased HCG. Her chest x-ray shows multiple nodules on both lungs. Her physician performs endometrial curettage.

What does the endometrial biopsy most likely show in this case?

1. Endometrial hyperplasia
2. Endometrial adenocarcinoma
3. Proliferation of cytotrophoblasts and syncytiotrophoblasts
4. Bundles of elongated spindle-shaped cells with prominent nuclei

## Answer

**The correct answer is C**

This is a typical presentation of choriocarcinoma. It is malignant cancer of the placenta. Choriocarcinoma is characterized by marked increase in HCG and early metastases to the lung. Histopathology includes marked proliferation of cytotrophoblasts and syncytiotrophoblasts, the main cells of the placenta.

Endometrial hyperplasia is characterized by excessive proliferation of cells of the endometrium. It occurs in cases of estrogen excess either intake as in estrogen replacement therapy or pathological as in polycystic ovarian syndrome. Excessive proliferation of placental cells is more relevant to choriocarcinoma. (Choice A)

Endometrial adenocarcinoma is the most common uterine cancer and usually occurs in old age. The patient doesn’t have any criteria that suggest endometrial cancer. Her clinical picture and pathological findings suggest choriocarcinoma. (Choice B)

Bundles of elongated spindle-shaped cells with prominent nuclei are seen in fibroids. There is no mention in this scenario that suggests the presence of fibroids in this patient. (Choice D)

# Question 40

A 68 year old man presents to his physician complaining of progressive shortness of breath for the last three months. Last week, he started feeling shortness of breath during sleep. He had to wake up at least twice every night and open the window to be able to catch his breath. The patient has a long history of hypercholesterolemia and recurrent angina. On examination, there is pitting edema on both legs.

What of the following expected to be increased in this patient?

1. Cardiac output
2. Peripheral resistance
3. Renal perfusion
4. Lung compliance

## Answer

**The correct answer is B**

This is a typical presentation of advanced heart failure with pulmonary congestion. Peripheral resistance increases to allow blood volume to compensate for the low cardiac output.

Cardiac output decreases due to decreased contractility of the heart in advanced heart failure. (Choice A)

Renal perfusion is decreased due to low cardiac output. (Choice C)

Lung compliance is decreased due to pulmonary edema. (Choice D)

# Question 41

A female in her child-bearing age complains of irregular vaginal bleeding and severe cramping pain for the last few hours. She is stable and her vital signs are within normal limits. She had amenorrhea for 3 months.

What is your next step of action?

1. Pregnancy test
2. Ultrasonography of abdomen
3. CT scan of abdomen and pelvis
4. CT scan of pituitary gland
5. Call the gynecologist

## Answer

**The correct answer is A**

The presentation and history of this case leans towards miscarriage or ectopic pregnancy. To confirm or exclude pregnancy, the next step of action should be pregnancy test. All the options should be done after that and more if needed.

Be aware of the difference between next step and other steps i.e. diagnostic or confirmatory test. Next step or first step doesn’t mean the most important step to reach a diagnosis. It is just the next step that followed by other important steps such as ultrasonography, CT scan or any other diagnostic procedures.

# Question 42

A 44 year old man presents to the emergency room with severe lower abdominal pain for three hours. He also complains of nausea and vomiting. He had similar episodes in the past but not as severe as this time and they resolved spontaneously. On examination, he is in pain and his vital signs are within normal limits. His left scrotum is swollen, tender, warm and erythematous. A color Doppler sonography is performed. It reveals absence of blood flow to the left testis.

What is the best treatment for this patient?

1. Analgesics and wide spectrum antibiotics
2. Immediate surgical detorsion of the left testis
3. Admission to the hospital and observation until resolved spontaneously
4. Further investigations and reference to urology department

## Answer

**The correct answer is B**

This presentation represents torsion of the testis. It is an emergency. Surgical detorsion of the affected testis needs to be done immediately. Absence of blood flow approved by Doppler sonography is confirmatory.

Analgesics and wide spectrum antibiotics are the treatment of orchitis. This case is torsion of the testis and it is an emergency. (Choice A)

Admission to the hospital and observation is not a correct answer. There is a great risk of necrosis and gangrene if it is left unresolved. (Choice C)

There is no need for further investigations and reference to urology department. The case is straight forward and needs urgent intervention. (Choice D)

# Question 43

A 62 year old woman presents to her primary care provider with a long history of constipation. Along the last two years, she has tried all kinds of laxatives, high fiber diet and drinking large amounts of water with little or no improvement. She has to strain excessively to defecate and when she defecates, she feels not satisfied and needs to go further but she can’t. Her last menstrual period was 7 years ago and she doesn’t take any pills. Her past, surgical and family history are unremarkable. On examination, there is no distress, her vital signs are within normal limits and her abdominal examination is normal. Digital rectal examination shows no fissures, scars or masses. It reveals tonic contraction of her anal sphincter with hard stools in ampulla. Her lab tests reveal normal thyroid function and normal metabolic profile.

What is the next appropriate action to determine the etiology of this constipation?

1. Anorectal manometry
2. Colonoscopy
3. Barium enema
4. MRI of colon and rectum

## Answer

**The correct answer is A**

This is a typical presentation of functional constipation. Tonic contraction of anal sphincter and hard stool in the ampulla are the clues for this diagnosis. There is no evidence of colon involvement such as blood in stools or malignancy. Anorectal manometry with balloon expulsion test is the next appropriate action to confirm the diagnosis and to determine the etiology of this condition.

Colonoscopy is recommended as a screening test for this patient but the question asks about specific action to determine the etiology for this condition. There is no rush for colonoscopy as it is less likely to be useful in this case. (Choice B)

Barium enema and MRI of colon and rectum are not recommended in this patient at this time. (Choices C and D)

# Question 44

A 19 year old man presents to the emergency room with persistent right upper abdominal pain, nausea and vomiting for the last 6 hours. He had toothache in the last three days and he ingested large amounts of Tylenol. His vital signs reveal tachycardia and hypotension.

Which of the following is the drug of choice to treat this condition?

1. N-Acetylcysteine
2. Physostigmine
3. Calcium gluconate
4. Fomepizole
5. Pyridoxine

## Answer

**The correct answer is A**

This patient ingested large amounts of Tylenol. Tylenol is the trade name for acetaminophen. Large amounts of acetaminophen may result in hepatotoxicity. This patient presents with the early signs of hepatic toxicity. The drug of choice in this case is N-acetyl cysteine.

Physostigmine is the drug of choice for anticholinergic poisoning. (Choice B)

Calcium gluconate is the drug of choice for hydrofluoric acid toxicity. (Choice C)

Fomepizole is the drug of choice for suspected methanol or ethylene glycol poisoning. (Choice D)

Pyridoxine is the drug of choice for isoniazid poisoning. (Choice E)

# Question 45

A 78 year old man presents with episodes of lightheadedness and dizziness for the last two weeks. Duplex ultrasound reveals stenosis of the carotid artery and carotid endarterectomy is performed. During the surgery, the left hypoglossal nerve is injured.

Which of these conditions is the most likely result of this injury?

1. Loss of sensation of the anterior two-thirds of the tongue
2. Loss of sensation of the posterior third of the tongue
3. Deviation of the tongue to the left on protrusion
4. Deviation of the tongue to the right on protrusion

## Answer

**The correct answer is C**

Hypoglossal nerve is a motor nerve. It has no sensory fibers. So, injury of the nerve shouldn’t affect sensation anywhere. This injury is considered lower motor neuron lesion and so it affects the same side of the lesion. It causes deviation of the tongue to the same side of injury. Fasciculation or atrophy of the tongue is characteristic of lower motor neuron lesion.

Sensory innervation of the anterior two thirds of the tongue is supplied by the mandibular branch of trigeminal nerve. (Choice A)

Sensory innervation of the posterior third of the tongue is supplied by the glossopharyngeal nerve. (Choice B)

Deviation of the tongue to the opposite side of the lesion is caused by upper motor neuron lesions such as cortical lesions. The injury in this case in considered lower motor neuron lesion. (Choice D)

# Question 46

A 28 year old woman presents to her physician with pain, redness and progressive swelling of her right breast since last week. She breast feeds her 6 months old boy consistently since his birth. She has no history of trauma to her breast. She is taking antibiotics for five days with no improvement. Her past, surgical and family histories are unremarkable. She doesn’t smoke nor drink any alcohol. On examination, she is afebrile and her vital signs are within normal limits. Her right breast is enlarged, warm and erythematous. Overlying skin is thick and tender. The nipple and surrounded area are normal. There are palpable small, firm, non-tender lymph nodes felt on the right axilla.

What is the next step to determine the possible diagnosis of this condition?

1. Breast tissue biopsy
2. Lymph node biopsy
3. Ultrasound of the right breast
4. Mammogram of the right breast

## Answer

**The correct answer is C**

The differential diagnosis of this breast condition varies from simple abscess to inflammatory cancer. Ultrasound of the affected breast is the most important next step in diagnosis. It is preferred than mammogram in young age especially lactating women. (Choice D)

Biopsies are performed if there is suspicion of malignancy revealed by ultrasound. (Choices A and B)

Again and again: Read the question carefully before you jump to the choices. Next step is different from diagnostic test. Also possible diagnosis is not final diagnosis. Diagnostic test in this case is biopsy. It is not the correct answer for this question.

# Question 47

A 68 year old man is brought to the clinic by his son complaining of abnormal behavior for one month. Along the last 6 months, he had worsening forgetfulness. He lost his way several times and his neighbor brought him home after finding him wondering around his home. His medical, surgical and family histories are unremarkable. He doesn’t smoke, drink or use any recreational drugs. He eats healthy food and takes daily vitamin and mineral supplements. He is happily married for 39 years. His last regular checkup was 6 months ago and was completely normal.

What is the appropriate next step in management?

1. Mini mental state examination
2. MRI of the brain
3. CSF analysis
4. Electroconvulsive therapy

## Answer

**The correct answer is A**

Mini mental state examination is an important test for evaluation of patients with suspected dementia. It is performed at the clinic and it is a part of neurologic examination. Because the question asks about the next step, we should choose the option that considered on the examination before we jump to the laboratory and imaging studies.

MRI of the brain, CSF analysis and electroconvulsive therapy may be performed later depending on further diagnosis but they are not the next step in management for this patient. (Choices B, C and D)

# Question 48

A 12 year old girl visits her physician for evaluation of a brain injury caused by a motor car accident 6 months ago. She lost her consciousness after the accident for 2 weeks. She retained all functions except the ability to read.

What is this condition called?

1. Agnosia
2. Aphasia
3. Apraxia
4. Alexia

## Answer

**The correct answer is D**

Alexia is the loss of ability to read properly. It is mainly occurs as a result of left posterior cerebral artery occlusion.

Agnosia is inability to recognize common things. It occurs as a result of brain damage or injury affecting occipitotemporal border. (Choice A)

Aphasia is impairment of speech affecting either production of speech or comprehension or both. It is due a stroke or brain injury to the frontal or temporal lobes. Aphasia is classified into Broca’s aphasia, Wernicke’s aphasia and global aphasia according to the affected site in the brain. (Choice B)

Apraxia is the loss of ability to perform activities. It occurs as a result of damage to the brain in the posterior parietal cortex. (Choice C)

# Question 49

A four day old boy is brought to the clinic by his mother for yellow coloration of his skin and eyes. On examination, the boy is normally developed and his sclera is icteric. Blood test indicates high serum unconjugated bilirubin.

What is the main reason of jaundice in this boy?

1. Hemolysis of red blood cells
2. Decreased excretion of bilirubin
3. Abnormal dilation of common bile duct
4. Low levels of glucuronyl transferase

## Answer

**The correct answer is D**

This is a case of physiologic jaundice. It occurred at 3-7 days of age and characterized by yellow coloration of skin and sclera. The cause of this jaundice is under-development of endoplasmic reticulum which is responsible for the secretion of glucuronyl transferase. It is self-controlled but might need intervention in severe cases which is characterized by high levels of bilirubin.

Hemolytic disease of the newborn occurs in cases of Rh incompatibility (Rh negative mothers of Rh positive fetuses). It happens right after birth and it is an emergency. (Choice A)

There is no mention to any problem with kidneys or any reason for decreased excretion of bilirubin in this case. This boy’s condition is most likely due to physiologic jaundice. (Choice B)

There are no signs or laboratory results suggesting dilation of common bile duct in this case. This is a case of physiologic jaundice in which endoplasmic reticulum is not fully developed resulting in low levels of glucuronyl transferase. (Choice C)

# Question 50

A 72 year old woman presents to her physician complaining of abdominal pain, frequent and burning micturition. After physical examination and laboratory tests, she is diagnosed with urinary tract infection. She is prescribed gentamicin. What is the most likely complication attributed to this antibiotic?

1. Hepatic toxicity
2. Hearing loss
3. Thrombocytopenia
4. Agranulocytosis

## Answer

**The correct answer is B**

Gentamicin is one of the aminoglycosides. It is used against a lot of organisms mainly gram negative bacteria such as Pseudomonas, Proteus and gram positive Staphylococci. It is not used in Neisseria or legionella infections due to the risk of shock as a result of the release of Lipid A endotoxin found in these organisms. Side effects of aminoglycosides are No Need Of Toxins…..Nephrotoxic, Neuromuscular blockade, Ototoxic and Teratogen.

Aminoglycosides don’t cause hepatic toxicity or any blood abnormality. (Choices A, C and D)