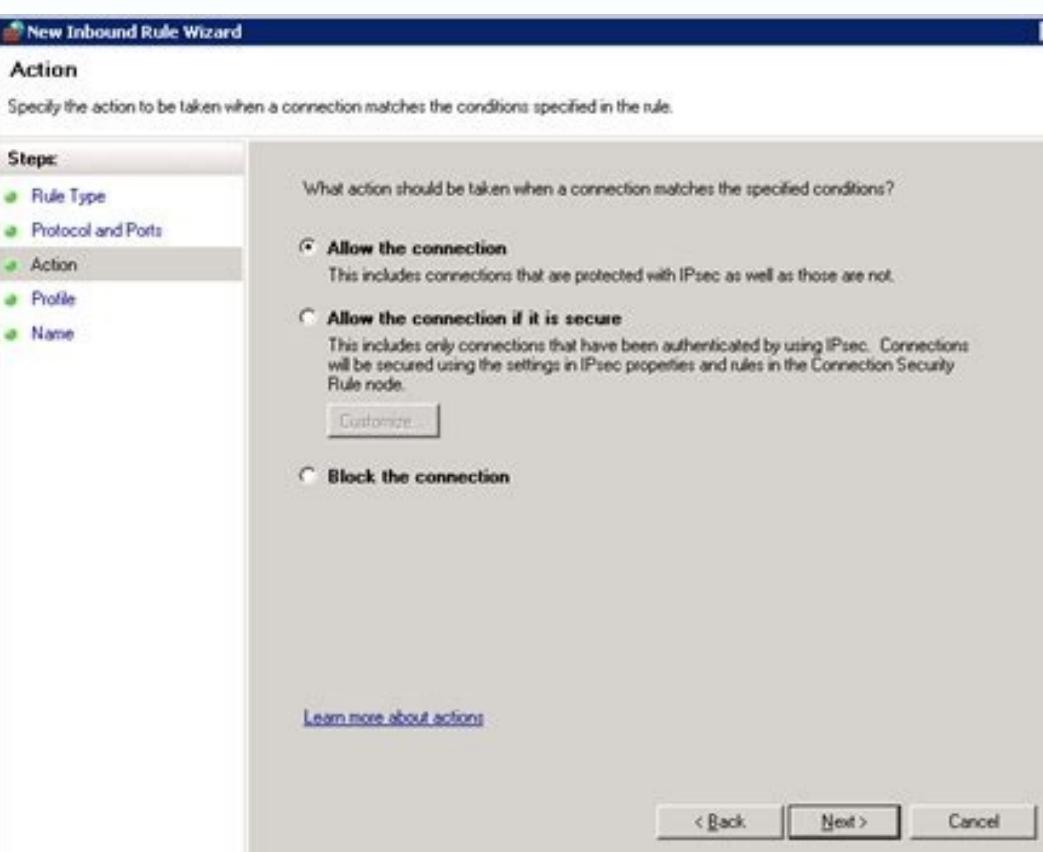
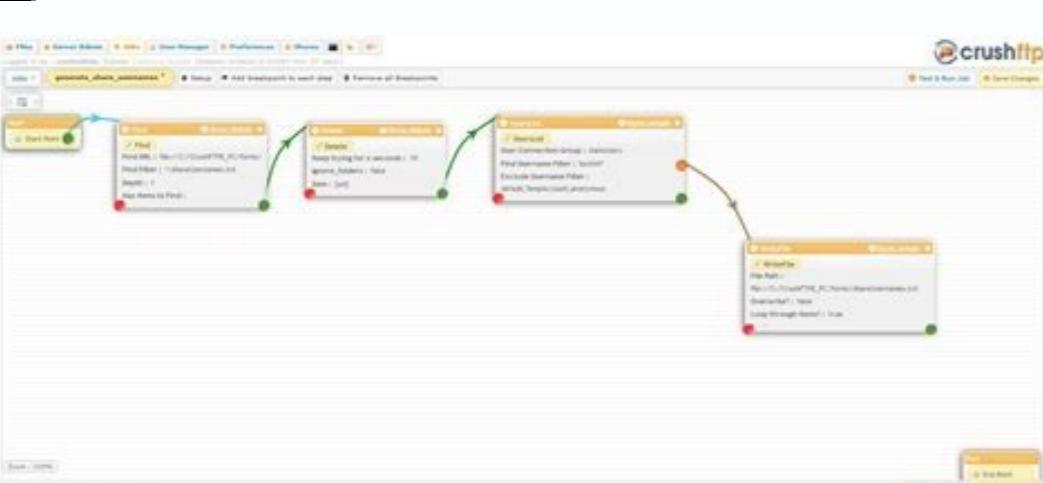
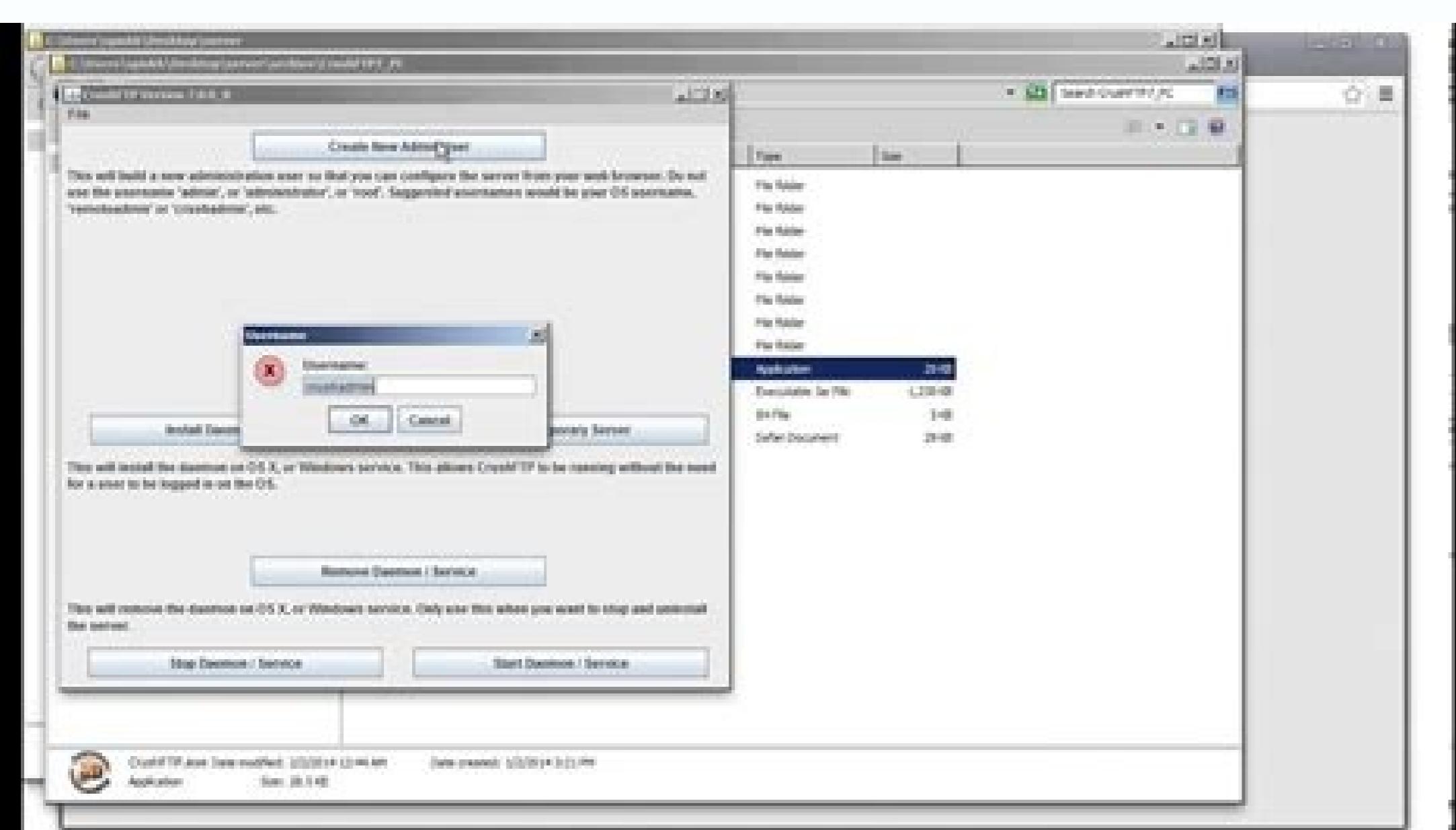
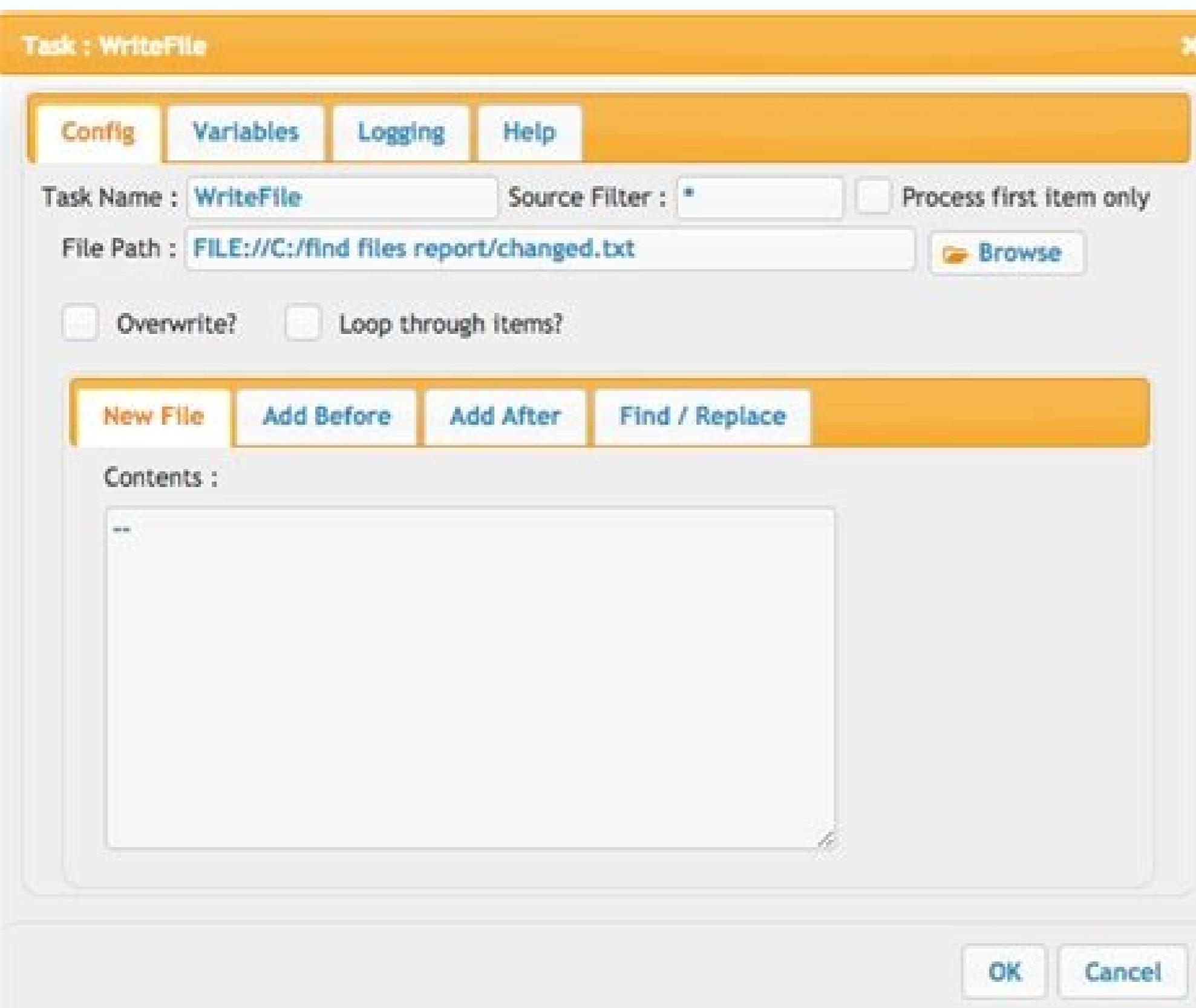
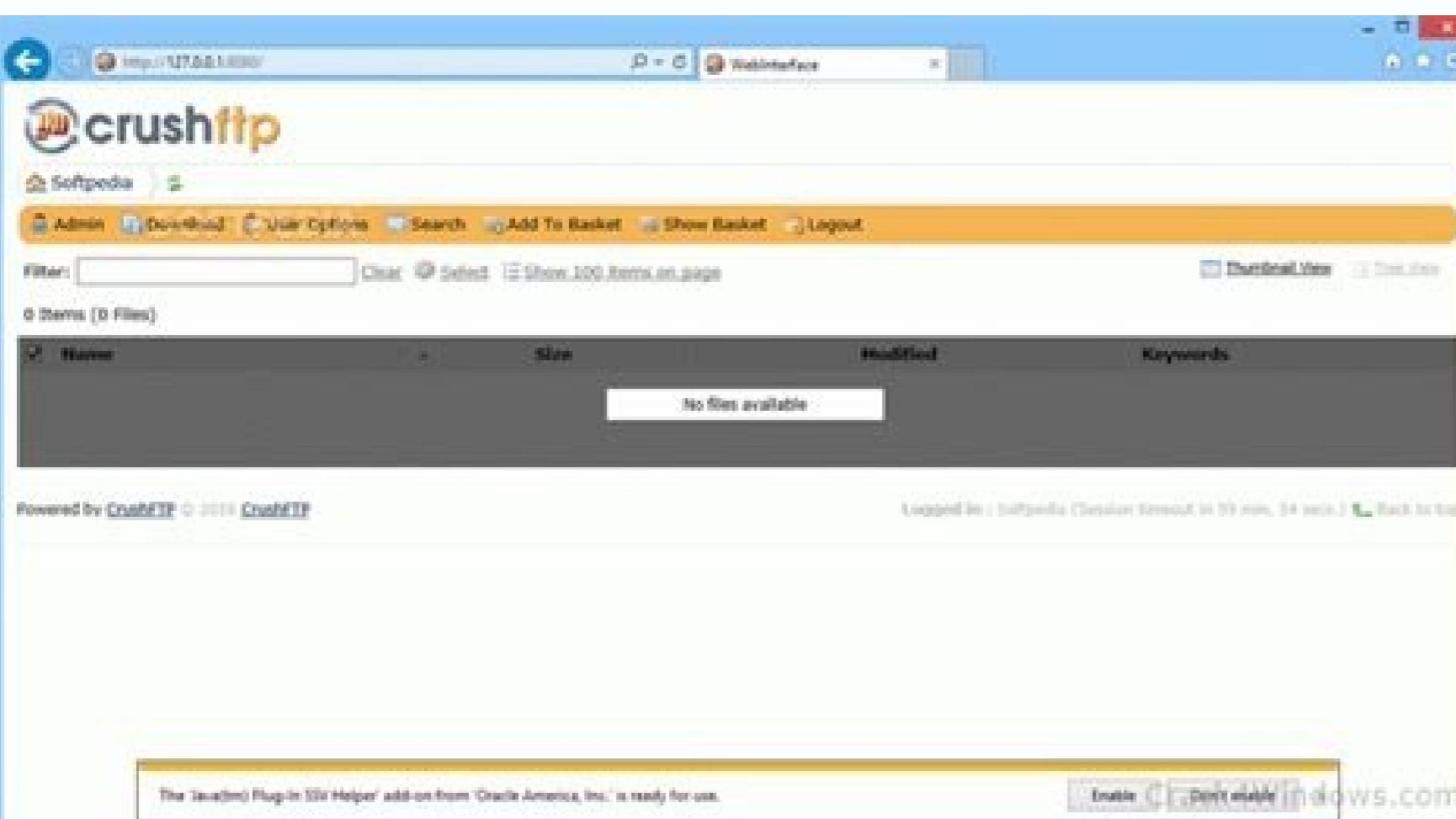


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dominant mutation of NF1 on chromosome 17, which is a tumor suppressor that inhibits p21 ras oncogene protein. It is similar to that for *Staphylococcus aureus*; see Table 5.1. Fever. If you have not completed all three USMLE steps within seven years, then this USMLE step, which has reached seven years, must be retaken and goes for one of the three stages until one is achieved to be certified. Surgeons must be wary! Male Reproductive Anatomy in Pathway of sperm: Remembered by the mnemonic SEVEN UP—Seminiferous tubules (sperm created) → Epididymis (sperm stored) → Vas deferens → Ejaculatory ducts → “Nothing” → Urethra → Penile urethra (Fig). Keloids are common in African American individuals. Albinism is a group of conditions in which there is a deficiency in melanin production caused by a defect in tyrosine metabolism, causing decreased pigmentation of eyes, hair, and skin. London: Churchill Livingstone; 2010.) CHAPTER 5 n Microbiology 123 Animal feed Domestic food¹ animals Human food Humans Wild animals Fig. With the increased diuresis, eventual dehydration is also a concern. Loop Diuretics Loop diuretics (e.g., furosemide, torsemide, bumetanide, ethacrynic acid) are potent, high-volume diuretics that block the NKCC2 cotransporter in the thick ascending limb of the loop of Henle, with far-reaching implications (see Fig). Patients with placenta previa are at higher risk for placenta accreta, in which the placenta attaches to the myometrium. This leads to a large twin (that got most of the blood) and a small twin (that got less of the blood). 17.13A). Philadelphia: Elsevier; 2008.) The umbilical cord consists of two umbilical arteries and one umbilical vein. On fundoscopic examination, the optic disc is usually pale. Instead of being control crystals, blemishes can be thought of as lacking control (many patients at the eye and testing these extracellular tissues (and drug abuse).¹ LIPID STRUCTURE AND METABOLISM Lipoproteins Fats acids are the building blocks of lipids (Fig). Diagnosis are reaction time to occur and may be negative, even in the setting of a UII, if the patient is urinating frequently has an infection by an organism that is not a nitrate reductase. This is why ACE inhibitors are nephroprotective in diabetics. CHAPTER 2 n Biochemistry 53 Therefore, of the four gametes, two would be normal. These are used in combination with NSAIDs to decrease acute muscle spasm. (Note that this is different from repression as a defense mechanism, in which a patient involuntarily pushes the memories out of awareness.) This often results spontaneously. In life- or limb-threatening emergencies, treatment should not be delayed despite parental objection. Diagnosis is based on physical examination, although lesions suspicious for SCC should be biopsied. The testes begin to produce testosterone, which influences the mesonephric duct (wolfian duct) form the epididymis, vas deferens, and seminal vesicles. The two general classes are esters (procaine, cocaine, tetracaine) and amides (have two salts in the name → lidocaine, bupivacaine, mepivacaine). St. Louis: Mosby; 1997.) Fig. These women do not have a stable self-image and do not make good decisions for themselves because of this. Fetal exposure to corticosteroids is important to induce surfactant production, and the stress of vaginal delivery on the fetus often increases fetal corticosteroid production. Bronchopneumonia begins initially as an acute bronchitis and extends into adjacent parenchyma. Fusiform bronchiectasis is associated with bronchiolitis. Other forms of bronchiectasis are due primarily to the normal GI flora (e.g., *Candida* and *Escherichia coli*). The mucous blood leaves through small fistulas in the peritoneal cavity, where the maternal body is no longer a host at this point. Exacerbations are associated with UTIs and sinusitis. These are susceptible to elevation of stomach contents (esophageal spasms, intubated patients, and debilitated hospitalized patients). 13-19). What studies will confirm the diagnosis, and which medication may prevent progression? Pitfall: Physicians may have less productivity in the Malpractice. A physician is at risk for a civil suit if the situation fits the 4 Ds: If the physician has a duty to the patient, is derelict in the patient's care, and directly causes damage to the patient. Immune deposits can also cause lupus glomerulonephritis and renal failure. Any increased sodium delivery to the principal cells (i.e., by a high-salt diet) causes this excess sodium to be absorbed from the lumen of the nephron into the principal cell through the epithelial Na⁺ channel (ENaC) because of an increased electrochemical gradient (increased difference in sodium concentration from tubular lumen to distal convoluted tubule cell). This constellation of symptoms is often termed salt-washable and weakly. The striatum includes the putamen and caudate nucleus. This is the Well-Fig section. “Rickettsiae Like Infections”. Shigella: Shigella species (of which there are four) cause dysentery released by the same mechanism as EIEC. Philadelphia: Elsevier; 2009.) 400 CHAPTER 13 n Neurology Posterior semicircular canal Anterior semicircular canal Cochlea Fig. Philadelphia: Elsevier; 2004; B from Goljan EF. Polycystic ovarian syndrome is a disorder in which there is increased LH and decreased FSH released from the pituitary. Nonobstipation can also occur during menses. 11. 13.10 The pupillary light reflex. 15.9). Thus they are exclusive to the conducting zone and are not found in the respiratory zone. There are no fusal points because it is a complete mole. Based on our experience with international medical graduates, it takes 6 to 12 months in step 1 exam preparation, 4 to 7 months in step 2 CK (clinical skills). These patients may already have depleted systemic stores of these electrolytes. 13.29 The visual pathway, from retina to primary visual cortex, the visual cortex. 3.4B). Common causes of obesity include obesity, hypothalamic-pituitary abnormalities, polycystic ovarian syndrome (PCOS), thyroid disorders, and Cushing syndrome. Fatty acids can also yield acetyl CoA by beta oxidation. Qualifications and benefits depend on the state. 2.24). From the contralateral posterior horn to the thalamus, pain and temperature and some touch information from the contralateral side of the body. Clinical Examination. Which statistical test should you use? This uncouples flow of electrons and ATP synthesis. Uveitis is the most common extraocular manifestation. 17.26 Left-sided tension pneumothorax (white arrows). Posterior D is obtained in the diet or touch information from the skin through sunlight. Fetal urine is excreted in the contralateral half of the body. Treatment consists of preventing rebleeding (clipping or coiling aneurysms), seizures, vasospasm (treat with calcium channel blocker nimodipine), and hydrocephalus. Intracranial Hemorrhage (ICH): This is bleeding within the brain tissue itself that is a result of trauma (e.g., skull fracture, AVM), stroke, bleeding within a tumor, or amyloid angiopathy. Phosphoric acid is one of those fixed acids, so hyperphosphatemia develops. 29. Which step is the hardest USMLE step? In nephritic syndromes, red blood cells can pass through the glomerulus (and also usually proteins, because if large red blood cells can pass through, so can smaller proteins). Patients should also discontinue medications that increase ICP, such as diuretics (e.g., isotretinoin for acne), tetracycline, hormonal contraceptives and danazol. What are each of these three processes called? CNS: Central nervous system. Actinomycosis occurs in patients with poor dental hygiene or after trauma to the oral or GI mucosa (such as dental extraction). 13.21) lateral cerebellar infarcts (Fig). It also plays a role in spermatogenesis and is found in high concentrations in the prostate and in semen. Spina bifida with meningocele, in which the defect is large enough to accommodate only the meninges and not the spinal cord. Mnemonic: Dancers are graceful because they know where their legs are, thanks to the fascicles of gracilis. Also, condyloma lata develop (wartlike lesions in moist areas like the groin) that are extremely contagious! Virtually any organ system can be involved at this stage, so many different presentations are possible. Risk for tolerance and dependence; think of people who are panicking, anxious, or withdrawing from alcohol as not relaxed. Phospholipases are cleaved by phospholipases. Type I OI is the most common form of OI and is known as osteogenesis imperfecta tarda. The sperm do not provide mitochondria. Philadelphia: Elsevier; 2010.) Table 2.1 Serum Enzyme Markers Used for Diagnosis SERUM ENZYME DIAGNOSTIC USE ALanine aminotransferase (ALT) Aspartate aminotransferase (AST) Alkaline phosphatase Viliplast hepatitis (ALT > AST) Alcoholic hepatitis (AST > ALT) Osteoplastic bone disease Obstructive liver disease Acute pancreatitis Mumps (parotitis) Myocardial infarction Acute pancreatitis (more specific than amylase) Amylase Creatine kinase (CK) γ-Glutamyltransferase (GGT) Lactate dehydrogenase (LDH, type I) Lipase Competitive inhibitors: Vinca is unchanged. Philadelphia: Elsevier; 2008.) Subarachnoid Hemorrhage (SAH): Bleeding between the arachnoid membrane and pia mater surrounding the brain results from a cerebral aneurysm (especially berry aneurysms in Marfan's syndrome, Ehlers-Danlos syndrome, and polyarteritis kidney disease) or arteriovenous malformation (AVM), spontaneously or from trauma (Fig). Hyperproduction of melanin causes formation of hyperpigmented macules and patches on sun-exposed areas. Ovarian cysts are follicular cysts, the most common ovarian mass; they result from fluid buildup in a follicle. Prostatic cancer is the most common cancer in men, usually right before ovulation. Diagnosis is made by observing inclusion bodies (groups of elementary bodies) in cells scraped from the eyelids. They can also experience dissociative fugue. Surgical treatment is most commonly transurethral resection of the prostate (TURP). Prostatic Adenocarcinoma Prostate cancer is the most common cancer in men, usually affecting the peripheral or posterior lobe of the prostate (see Fig). A test with a narrow confidence interval is considered precise. Pathogens include Chlamydia trachomatis and GI pathogens (Salmonella, Shigella, and, Campylobacter). The NH3 can be stored and transported to the liver as glutamine or as alanine (as part of the glucose-alanine cycle). 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Dry beriberi affects the peripheral nervous system, causing wasting, difficulty walking, and paralysis. Surfactant is a protein-lipid material that reduces surface tension on the surface of the alveoli so they can expand more easily during inspiration. Baclofen functions as a gamma-aminobutyric acid (GABA) receptor agonist in the central nervous system and acts analogously to benzodiazepines while producing less sedation. Myocophenolic acid, an immunosuppressive drug used to prevent organ transplant rejection, is an inhibitor of IMP dehydrogenase, the first reaction to convert IMP to GMP. Contralateral hemiparesis, hemisensory loss, and internuclear ophthalmoplegia (INO); ipsilateral horizontal gaze palsy and facial palsy (contralateral parkinsonism). Lower facial muscle paralysis, and hypoglossal nerve palsy; ipsilateral nerve cuneatus; touch and position information from the ipsilateral arm. 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Saunders; 2011.) on the lateral retina, closest to the temples. Give prophylaxis (rifampin, ceftriaxone, or ciprofloxacin) to all close contacts and to anyone who came into close contact with the patient's oral secretions (the physician who intubated the patient, for example). Antifungals often work by inhibiting the formation of ergosterol, an important component of fungal membranes. They form on the back and follow skin cleavage lines in a "Christmas tree" pattern. It must be activated by epoxide reductase. The case with monoytotic twins can be more complicated. The unique feature of this type of malignancy is the field effect, in which multiple primary tumors can arise simultaneously. Active downward movement or contraction of the diaphragm generates an increase in negative pleural pressure that causes the lungs to expand and fill with air during inspiration. In Hemoglobin C disease (HbC disease) results from production of hemoglobin with an altered amino acid sequence as a result of a glutamate-to-lysine substitution at position 6 in the β -globin gene. It is especially important because of carbonic anhydrase, which catalyzes the italicized part of the following reaction: $H^+ + HbCO_3 \rightarrow H_2CO_3 + H_2O + CO_2$ (H + HbCO₃ → H₂CO₃ + H₂O + CO₂) (13.3. Left). Pacinian corpuscles are for pressure and vibration. Warfarin, an anticoagulant, functions by inhibiting epoxide reductase and thus inhibiting the formation of clotting factors. Less inhibition of subthalamic nucleus starts the same as the direct pathway (cortex excites striatum) but the differences are that the indirect pathway stimulates the GPe first, and then corticospinal tracts are for pressure and vibration. Warfarin, an anticoagulant, functions by inhibiting epoxide reductase and thus inhibiting the formation of clotting factors. Therefore this leads to increased thalamic output to the cortex. As can be seen in Figure 15.18 Granular immunofluorescence, in your medical school career USMLE step 1 is the most difficult and challenging exam to take. Normally the kidneys of the fetus generate urine, which the fetus expels, becoming amniotic fluid. Some S. For example, there is a positive correlation between height and forced expiratory volume (FEV), which increases as height increases. 5 Fibrin and cell debris accumulated in the amniotic fluid form a membrane. Oral candidiasis can occur in both immunocompetent and immunocompromised individuals. (3) Investigators conduct a randomized control trial to study the benefits of a new asthma medication. The follicular phase of the menstrual cycle refers to the growth of the follicles through various stages. There are a few specific varieties of HSP of which you should be aware: in Farmer's lung is most often caused by exposure to thermophilic actinomycetes in moldy hay or grain that results in type III (immune complex-mediated) and type IV (delayed type cell-mediated) hypersensitivity reactions. 2.26B, it would be seen that there is a 50% chance of a child having Marfan syndrome. Peptidase bonds are formed between the α -carboxyl group and the α -amino group, creating a covalent amide linkage. Key feature: increased melanocytes. Epithelial (Common Freckle): Contain normal numbers of melanocytes but increased concentrations of melanin. (10) W hich personality disorder is characterized by the immature ego defense of splitting? ducreyi in Gardnerella vaginalis in *Bordetella pertussis* in *Legionella pneumophila* in *Yersinia* pestis in *Francisella tularensis* in *Brucella* in *Pasteurella multocida* Haemophilus species are usually acquired through the lungs. 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suppressors, leading to a multisystem disease that has a variable penetrance. A small group of healthy volunteers is given a medication to determine safety, pharmacodynamics, and pharmacokinetics of the medication. 6. How much does USMLE cost? Intuitively, "yes" precedes "no" on both axes (Table 1.1). Table 1.1 Example of a 2×2 Test Result for Calculating Biostatistics THE "TRUTH" TEST RESULTS Yes NO YES A True + C False - NO B False + D True - m. Prevalence: This is defined as (total number of people with disease)/(total number of people who studied) or, from the 2×2 table, (TP + FN)/(TP + TN + FP + FN). These ciliated cells play a critical role in sweeping mucus secretions and debris out of the lungs and toward the mouth. On the other hand, sensorineural hearing loss results from dysfunction of the inner ear, cochlea (e.g., noise-induced), or vestibulocochlear nerve (e.g., ototoxic drugs). He then developed anemia and jaundice. The middle cerebral artery supplies the lateral surfaces, which include the anterior and inferior temporal lobes, insular cortices, lateral surfaces of the hemispheres, and deep branches of the basal ganglia. This is normally maintained by the action of carbonic anhydrase because once the H⁺ is secreted into the lumen, it binds with HCO₃⁻ in the lumen; with the aid of carbonic anhydrase, it can become CO₂ and H₂O. Since routine vaccination with purified type b capsular protein began, the incidence of Hib meningitis, acute epiglottitis, and septic arthritis has significantly decreased in the United States. Transmission is fecal-oral (usually by contaminated water or hand-to-hand contact by someone who hasn't washed properly) and occurs most often in preschools and nursing homes. (From Taussig LM, Landau LI. The only signs of this disease include visual field loss and optic nerve changes (increased cup-to-disk ratio). The score is valid for seven years. The bacteria can travel up to infect the uterus, fallopian tubes, and ovaries, causing PID, which presents with lower abdominal pain, cervical discharge and bleeding, fever, nausea, and dysparenia (pain with sex). Oligohydramnios is a deficit of amniotic fluid resulting from urogenital abnormalities (e.g., renal agenesis, posterior urethral valves), premature rupture of membranes, or placental insufficiency (preeclampsia or postterm pregnancy). Benign Gynecologic Conditions Mittelschmerz is abdominal pain secondary to ovulation. In addition, it does not detect Beneke-Jones proteins, seen in myeloma myeloma. These cells (like the chondroitinase-destabilized columnar epithelial cells) also progressively decrease in number as the airways progress distally. Most common glomerulonephritis. Look for cracking between the toes, which can serve as a point of entry for bacteria and result in a superimposed cellulitis. Treatment often consists of IV penicillin with pain control and physical therapy. Horner's Syndrome: ipsilateral ptosis (ptosis of pupil constriction), miosis (pupil constriction), and rhinorrhea (abnormal release of facial sweat). Hypothyroidism: bilateral presentation of facial rubor (flushing), rhinolysis (absence of facial sweating), miosis (pupil constriction), and ptosis (superior tarsal muscle) [myopathy]. RAAS: which results from lesions of the sympathetic outflow to the affected side (Fig. Ureter cycle disorders are rare: congenital absence of the renin-angiotensin-aldosterone system. If it does occur, treatment is aimed at dietary protein限制 and angiotensin-binding compounds. It may be oral contraindicated and must be reviewed at all times. Only a few may take away other risks for hypertension for longer). 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benzodiazepines (for anxiety and insomnia) and propofol (for induction of anesthesia). B, Impetigo. Tramadol, a very weak opioid agonist, is commonly used for chronic pain, but is also known to decrease the seizure threshold. It can be used as a marker of fetal well-being later in pregnancy. Also called the rectouterine pouch for the two surrounding organs. As shown, the decussation is in the brainstem; therefore, spinal lesions will cause ipsilateral loss of proprioception and vibratory sensation, whereas cortical lesions will cause contralateral loss. From Bly B, Bickie IC. The response to the first edition has been overwhelming, and we are truly privileged to be able to bring you a second edition of this text and take into account all of your feedback and requests. This means that histidine has a positive charge at pH 7; and at physiologic pH, small shifts in pH change the charge on histidine, and the side group acts as a buffer. Other symptoms collectively can be thought of as secretory—rhinorrhea, lacrimation, and diarrhea (because the brakes on gut motility have now been removed). This assists in clearance of nitrogen from the blood. Amino Acid Synthesis and Degradation Although essential amino acids must be obtained from the diet, nonessential amino acids can be synthesized by several different pathways. Table 13.2 is a list of common pathologic examples that can be encountered. Of note, this means that CN XI begins outside the skull, enters the skull through the foramen magnum, and then exits the skull again via the jugular foramen—the only CN to enter and exit the skull. B from Turnpenny P, Ellard S. (2) Secretion, when a substance is pumped into the nephron at a site other than the glomerulus. 3. Hexokinase is not specific for glucose and can catalyze the phosphorylation of many different hexoses. This subtype of SCCS tends to present as a velvety-mottled, red plaque. Keratoacanthoma: Controversy exists about a subtype of SCC, keratoacanthoma, which is rapidly growing and forms a dome with a central keratotic plug. This becomes important in conditions such as Brown-Séquard syndrome. The oxygenated blood preferentially moves through the forearm's veins instead, helping to oxygenate the brain. Atypical pneumonia can be treated with macrolide antibiotics (erythromycin, azithromycin, clarithromycin), fluoroquinolones (ciprofloxacin, levofloxacin), or doxycycline. 7 (A patient comes from a nursing home with low blood pressure, fever, tachypnea, and tachycardia and is found to have lactic acidosis. This is called erythroema chronicum migrans (ECM). Fig. It functions as a glutathione donor in acetaminophen overdose. Clinical Uses: It is a mucolytic used for cystic fibrosis, tracheostomy care, or any respiratory condition with abnormal or inspissated mucus secretions and in acetaminophen overdose. Side Effects: N-Acetylcysteine has minimal toxicity. Pulmonary Arterial Hypertension Medications Oral Phosphodiesterase Inhibitors Examples of oral phosphodiesterase inhibitors are sildenafil and fildafil. The pus from an abscess, when viewed under the microscope, has yellow granules called sulfur granules that are actually microcolonies of *A. Cervical* spinal nerves (C1-7) exit above the corresponding vertebrae, whereas the remaining spinal nerves exit below. Somites eventually form the vertebrae as well as some of the cartilage and musculature of the back. Follicular wall rupture and spread of perifollicular inflammation. Pitfall: A financial incentive exists for physicians to treat outpatient patients. If an effusion is due to lymphatic obstruction (also called "chylothorax"), the fluid appears milky and has elevated triglycerides; suspect this in malignancies, such as lymphomas. Pedigo 537 427 xiv CONTENTS 16 Reproductive System 580 Theodore X. For example, a study finds the use of vitamin D improves recovery from a URI when, in fact, it does not. 13 (A man comes to your clinic and states that his father has cataracts. His eyes are cloudy. This is called cataract. Blunt HISTOLOGY AND PHYSIOLOGY The skin is divided into the dermis and the overlying epidermis. In some cases, bronchoaveolar lavage can be helpful because in HSP it may show dramatic lymphocytosis and a low ratio of CD4 to CD8 cells (the opposite of sarcoidosis). I incompetence. A legal determination made by judge that a person is unable to manage his or her affairs because of mental limitations such as intellectual disability, mg decrease with protein wasting (malnutrition, nephrotic syndrome). 2 (A new test for tuberculosis finds that 195 out of 200 people with tuberculous test positive. What disorder is caused by defective nucleotide excision repair? She refers to look at herself in the mirror and won't allow her friends to take pictures of her nose. Primordial germ cells mature into spermatogonia during puberty. Mnemonic: CATCH-22—Cardiac anomalies, Abnormal facies, Thymic aplasia, Cleft palate, Hypoparathyroidism/hypocalcemia as a result of deletion on chromosome 22. Branchial Cleft Cyst Failure of obliteration of one of the branchial clefts leads to a cystic structure of the lateral neck along the anterior border of the sternomastoid muscle (most commonly the second branchial cleft is implicated) called a branchial cleft cyst. Tongue The tongue receives contributions from branchial arches 1 to 4, which explain its complex innervation pattern (Fig. In elevated hydrostatic pressure within the visceral pleura is the mechanism whereby CrH and pulmonary emboli cause pleural effusions. A coefficient of 0 implies a perfect correlation, 0 implies no correlation, and 1 implies a perfect inverse correlation. Antidiuretic hormone increases water reabsorption, concentrating urine. 13.23 Spinolaminar tract. During respiration, smooth muscle contractions by the vas deferens and ejaculatory ducts push sperm into the prostate. Head and Neck 1 Pharynx: 2nd cervical segment 4 Paracervical 6 E rectus. Endotracheal First pharyngeal cleft 2 First pharyngeal cleft 3 Second pharyngeal cleft 3 Arch 4 4 6 6 8 Fig. Although ACRA LCA RSCA SC3. Finally, the head turns to the right. DA cardiac neural crest AS CT Aos RA CT VV V A (P) RA VA First and field template B PA LA LL AVV RA LV RL AVV Second and field template C Neural crest migration 3 S Arch 4 4 6 6 8 Fig. Although typical antibiotics can be used to treat the acute phase, but cholangitis generally awakes with time. Zygot (prime stage) 1st mandibular division 2-cell stage (1/2 days) 16-cell model (3 days) 58-cell blastocyst (4 days) 107-cell bidiscocyst (41/2 days) Uterine Cavity Conception (ertilization of sperm + ova) 6 days Uterine wall Placenta 8 days Uterine mucosa Uterine wall Fig. RA is exposed a/(a+b) Risk reduction of 6% (c/a) ARB+ACEI group vs. control group. Risk reduction of 30% (c/a) ARB+ACEI group vs. control group. Attributable risk: risk in exposed – risk in unexposed NNT = 1/ARR RR = Risk in exposed/RR in unexposed RRR = ARR/risk in unexposed Odds Ratio = 1/b (CHAPTER 1 n Biostatistics 1 Epidemiology). Investigators conducted a cohort study to evaluate the risk for lung carcinoma as a result of exposure from medical imaging in a Cross-over study. A type of prospective study, usually an RCT but possibly a cohort study, in which each patient begins in either the control or treatment group and then crosses over to the other group. The internal carotid is interconnected with the posterior circulation via the posterior communicating arteries in the cerebral vault. The venous drainage of the left ovary or testis is into the left renal vein, and then into the inferior vena cava; pulmonary veins, although intermediate resistance may require high-dose penicillin, and high-level resistance will require other antibiotics. Mycophenolate mofetil is an immunosuppressive drug. This net procure, typically defined as CPP, is the difference between mean arterial pressure (MAP) and intracranial pressure (ICP) (that is, CPP = MAP – ICP). PCs produce inflammation, inhibit or stimulate muscle contraction, and promote vasoconstriction depending on the vascular bed. Treatment involves avoidance of the culprit allergen and topical steroids applied to any affected area. As a result, there can be CSF rhinorrhea or otitis and ecchymosis of the mastoid process of the temporal bone (Battle sign) or periocular ecchymosis (racoon eyes) (Fig. Rickettsia prowazekii is carried by lice or fleas, and the vector in the United States is flying squirrels. New York: Elsevier, 2009.) Function of the Thin Loop of Henle: The net effect of the thin loop of Henle is that more solutes are reabsorbed (moved out of the tubular lumen) than water (because the ascending limb is permeable to solutes), leading to hypoosmotic fluid generation. Thick Ascending Loop of Henle: The thick ascending loop of Henle uses the NKCC2 (Na⁺-K⁺-Cl⁻) cotransporter (inhibited by loop diuretics; Fig. Surgery can be curative. Epispadias: Epispadias is a rare malformation in which defective migration of the genital tubercle results in a urethral stoma on the dorsum of the penis. This should elicit a gramine in a patient with truly severe abdominal pain, but patients with a facititious disorder may not react because they do not believe they are being examined. Nitrogen is removed from amino acids because amino acids cannot directly take part in energy metabolism. Philadelphia: Elsevier, 2012.) 104 CHAPTER 4 n Embryology Table 4.7 Apoptic Score for Assessing the Health of Neonates 0 POINTS. POINT 2 POINTS Appearance Blue/pale all over pink All over Pulse Grimace Activity No pulse No response to stimulation No movement Acrocyanosis (pink trunk with blue extremities) 50 yrs. Besides the skin ulcer, it is almost identical to hubonic plaque but has a much lower mortality rate (5% if untreated). Acetylcholine, found in the basal nucleus of Meynert, this NT is involved in functions such as learning, short-term memory, arousal, and reward. Relative risks are calculated for effect measure estimation. Langerhans Cells: Dendritic antigen-presenting cells that populate the dermis and epidermis (essentially the macrophages of the skin). Please refer to Fig. Pathogenesis: Recall that the intrapleural pressure is normally negative at rest and that at equilibrium the lungs have a natural tendency to collapse, whereas the chest wall has an equal and opposite tendency to expand (see Fig. Muscle weakness can occur as well because of higher resting membrane potential. Leading to sodium channels not being able to reset fully (repolarization not complete). Treatment: Treatment is threefold: (1) Reduce myocardial irritability to prevent arrhythmia and death; (2) move potassium intracellularly to temporarily reduce potassium; and (3) promote potassium loss through the urine and stool. The larger permeability of the glomerulus in this case is attributed to inflammation and damage by neutrophils, usually a response to complement deposition in the glomerulus (type III hypersensitivity) or antibodies directed at the basement membrane of the glomerulus itself (type II hypersensitivity). At the level of the terminal bronchioles, the airway resistance is also the lowest; although the area of an individual bronchiole is small, the total cross-sectional area of all the bronchioles is high, which results in an overall low resistance. Respiratory Zone: This zone participates in gas exchange (14) A 52-year-old man with chronic back pain comes to the doctor complaining of "feeling like I got hit by a truck." He also brusquely demands a medication. Rilf. Cannot be directly measured, but if the FCF and plasma volume are known, then the ECF minus the plasma volume will be the interstitial volume. ADP, adenosine diphosphate; ATP, adenosine triphosphate; CoA, coenzyme A; GDP, guanosine diphosphate; GTP, guanosine triphosphate; MPC, mitochondrial pyruvate carrier. m Schizotypal: Again, these patients do not meet criteria for schizophrenia, but their personality is characterized by odd magical beliefs (e.g., a belief in telepathy or aliens), ideas of reference, or eccentric clothing. A spermatocyte is a cystic mass derived from a tubule of the testis. The testis is divided into 14 seminiferous tubules. Each tubule contains a germinal epithelium and a supporting stroma. Seminiferous tubules contain spermatogonia, primary spermatocytes, secondary spermatocytes, and spermatids. Sertoli cells are sustentacular cells that support the development of germ cells. They secrete inhibin, which inhibits FSH and LH release, and androgens, which stimulate the Leydig cells to produce testosterone. Sertoli cells also secrete Müllerian inhibiting factor, which inhibits the development of female reproductive structures. Leydig cells are located in the interstitium of the testes and secrete testosterone. Testosterone is converted to dihydrotestosterone (DHT) by 5α-reductase. DHT stimulates the growth of male secondary sexual characteristics. The testes are located in the scrotum, which is a temperature-regulating organ. The scrotum contains two testes, each surrounded by a tunica vaginalis. The tunica vaginalis is a double-layered sac that protects the testes. The testes are suspended from the body by the spermatic cord, which contains the vas deferens, the testicular artery and vein, and the spermatic nerve. The testes are located in the scrotum, which is a temperature-regulating organ. The scrotum contains two testes, each surrounded by a tunica vaginalis. The tunica vaginalis is a double-layered sac that protects the testes. 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Lung biopsy showing noncaseating granulomas not caused by a detectable infectious organism is also highly suggestive of sarcoidosis. Chest x-ray examination often shows enlarged mediastinal and hilar lymph nodes and often demonstrates interstitial lung disease (Fig.). Glycogen synthase adds to the nonreducing ends of chains in $\alpha(1-4)$ linkages. Inadequate fluid intake is a predisposing factor for all stones because the concentration of the compounds making up the stones is higher, promoting precipitation and stone formation. These subunits are usually held together by noncovalent interactions. This nuance is important when talking about injuries to just half of the spinal cord (Brown-Séquard syndrome; see later). In Glucogenic amino acids yield pyruvate or one of the intermediates of the tricarboxylic acid (TCA) cycle (oxaloacetate, α -ketoglutarate, succinyl CoA, or fumarate) when they are catabolized. The alpha subunit is shared with LH, FSH, and TSH. Practical Dermatology. On funduscopy, these patients have papilledema. Therefore blocking the NKCC2 pump prevents this, leading to a decreased ability to reabsorb calcium and magnesium and potentially leading to hypocalcemia and hypomagnesemia. Lastly, cells become part of the stratum corneum, where their nuclei are completely absent and keratin has formed a waterproof barrier (Fig. 4.22). I Case-control study: Subjects are enrolled based on disease status, one group with disease (cases) and one group without (controls), and then exposure is assessed in the two groups. Erythropoiesis of Queyrat is a specific term for SCC in situ on the glans penis, usually Antibodies to bullous pemphigoid line up "bulow" (below) the basement membrane and bullous pemphigoid "bulow" (pemphigus vulgaris in severity, 15.23) is a rare occurrence that causes necrosis of the outer parts of the kidneys (the cortex, $\sim 40\%$ of the skin). The signal is carried from the optic nerve to the optic chiasm, where nasal retinal fibers cross over to the optic chiasm. The tumor is carried as a large, tan-colored mass. It is particularly rich in phosphotidylcholines. Spermatozois will decrease because testosterone will not be concentrated in the testicles. These reduce T and C cell proliferation. Philadelphia: Elsevier; 2009.) When looking at the orientation of these structures, it is important to note that the abducens nerve and carotid artery run through the middle of the sinus, whereas other structures run along the lateral walls. Mnemonic: CN "six sticks" to the carotid. See Table 16.4 for a summary of breast tumors. BRCA1 mutation results in 80% lifetime risk of breast cancer and 40% lifetime risk of ovarian cancer (4.1A). 13.45 Internuclear ophthalmoplegia. Because infusing patients with inositol is unwieldy in the real world, creatinine (breakdown product of creatine phosphate, used as a tracer) can be used to quickly determine adenosine triphosphate (ATP) when needed, which is always present in the blood, is used as an endogenous substrate for PCR. 13.46 Anatomical variations of the trigeminal system: NPX presents classically with the triad of trigeminal neuralgia, gaze palsy, and facial numbness (atypical trigeminal neuralgia). Patients often present with 10–20% of pain with a history of epiphora, especially of the distal female eyelids. The eye closure reflex is lost, leading to constant tearing. An asymmetric distribution in which a tail on the left indicates that mean < median < mode. After fertilization, a zygote is formed, which subsequently undergoes multiple cleavages to become a morula, then later a blastocyst. The outer luminal surfaces of the cells in the blastocyst form the trophectoderm. Their function is to participate in gas exchange across the extraembryonic membrane (Fig.). 15.14 when referring to the following explanation of the axis pathway, 3.44) and secondary lesions (Table 3.2 and Fig. 3.14). Philadelphia: Saunders; 2011.) 472 CHAPTER 13 ■ Neurology Pineal Gland Thalamus Aqueduct Midbrain Pons Hypothalamus Medulla Fourth ventricle Fig. 6 Ps of lichen planus; purple, polygonal, pruritic, planar, plaques and papules Koebner phenomenon; skin lesions that develop along lines of trauma 62 CHAPTER 3 ■ Dermatology Fig. Patients who don't progress to tertiary syphilis for 4 years are considered noninfectious (except pregnant women, who can still transmit to the fetus). To move from the cytosol into the mitochondria, they require the carnitine shuttle. tetan I. Next, the nephron and its segments and pumps will be discussed. THE NEPHRON AND ITS SEGMENTS See Fig. 15. Which is better, USMLE or NEET PG? This leads to accumulation of homogentisic acid, causing homogentisic aciduria, in which the patient's urine has an elevated level of homogentisic acid. For example, when asked how his day is going, a man with Korsakoff psychosis may not remember and thus fabricate a story about waking up at 9 am, making pancakes, and enjoying a TV show. After an exposure, contact dermatitis often takes days to develop. Common opioids that you will encounter in the clinical setting include morphine, fentanyl, codeine, hydromorphone, oxycodone, dextromethorphan, methadone, and meperidine. For refractory cases, treatment with fidaxonil or a fecal microbiota transplant can be considered. Listeria: Listeria monocytogenes is introduced into the host through contaminated foods (usually unpasteurized soft cheeses and cold cuts). Philadelphia: Saunders; 2011.) Inferior oblique. The eyes convert light waves into electrochemical signals via the retina. 15.7 The proximal tubule. These may simply be inferences from statements the patient made earlier or may be formalized as a living will—a document that explains what care a patient wants or does not want in certain situations. B. Principal cells that reabsorb sodium at the expense of excreting potassium. Similarly, passive upward movement or relaxation of this crucial muscle causes an increase in pleural pressure and results in an increased pressure in the airways, facilitating expiration. Von Gierke disease is a glycogen storage disease from glucosidase deficiency. The pneumococcal vaccine should be given to immunocompromised patients, older adults with chronic diseases, those with HIV, those with cochlear implants, and those without spleens (or who are functionally asplenic) because asplenic patients can't protect themselves against encapsulated bugs. Aspirin and other NSAIDs acetylate and inhibit cyclooxygenase, leading to reduced synthesis of prostaglandins (anti-inflammatory effect) and reduced synthesis of TXA2 (antithrombotic effect caused by reduced platelet activation). Lateral corticospinal tract. 5.25 The many manifestations of primary, secondary, tertiary, and congenital syphilis. Philadelphia: Elsevier; 2008.) Region of hydrogen bonding B-structure 4-Turn α -Helix Region of hydrogen bonding Fig. These convey the senses of position (location) and dynamic touch (e.g., light touch). S. gonorrhoeae (gonorrhea), parahepatitis. This patient had urinary infection with the urease-producing bacteria Proteus. The mean age at diagnosis is 64 years. Further discussion regarding medical treatment to lower intracranial pressure will be discussed later ("Pharmacology"). Patients may also experience nausea, trachoma often occurs in tandem with N. More dangerous consequences occur with yet larger quantities of alcohol, such as coma and respiratory depression, which are potentially fatal. Because with loss of fluid (volume contraction) or gain of fluid (volume expansion) there can also be changes in solute, the concentration of the fluid lost or gained is important. They emanate from the distal part of the tricuspid arteriosus. Table 4.1 Aortic Artery Derivatives FETAL ARTERIAL STRUCTURE ADULT FETAL ARTERIAL STRUCTURE 1st aortic arch Maxillary artery 2nd aortic arch Hyoid artery Stapedial artery 3rd aortic arch Common carotid artery 1st aortic arch Brachiocephalic artery 4th left aortic arch Left pulmonary artery Ligamentum arteriosum Truncus arteriosus Ascending aorta Pulmonary trunk 12 3 4 5 6 A COMMENT "Carotid arch" 5th arch regresses early Aortic pulmonary septum develops to divide the trunks 1 2 4 5 3 6 4 Aorta B Pulmonary trunk D Fig. As air continues to enter the pleural space without exiting, it accumulates, increases the pleural pressure, causes the lung to collapse, and compresses nearby structures such as the vena cava during their return to the heart. To remember which is which, think trisomy 18 for Edwards syndrome—at age 18 you can participate in the elections. FSH stimulates granulosa cells to convert these androgens into estradiol by aromatization. Withdrawal can occur in a person who does not meet either criterion. Oligohydramnios has many causes, but usually is due to renal, ureteral, or urethral disease (classically bilateral renal agenesis). 13.28. The dorsal column is organized such that the axons responsible for touch sensation of the arms are located laterally, while those responsible for the legs are located medially. The closure occurs through a decrease in prostaglandins, which normally help keep the ductus open. A. nuptiensi II is a potent vasoconstrictor, increasing blood pressure by increasing systemic vascular resistance. Wernicke-Korsakoff syndrome is associated with atrophy of the mammillary bodies. Symptoms include cough, sometimes with sputum or blood, and constitutional symptoms (fever, chills, fatigue, night sweats, weight loss). Fatty acids are oxidized in the fasting state to provide energy to cells. 2.16A) The first step is synthesis of PRPP (5-phosphoribosyl-1-pyrophosphate) from adenosine triphosphate (ATP) and ribose-5-phosphate, a reaction catalyzed by PRPP synthetase. 27.24.) Fig. 1 Emergency/implied consent: Patient with an emergent condition is unable to provide consent—for example, an unconscious victim of a motor vehicle crash. Blood sugars, on the other hand, will have a larger SD because glycemic loads change throughout the day. Mean: average value Median: middle value Mode: most frequent value Standard deviation represents the average deviation from the mean. Principles and Practice of Surgery. Testosterone develops the internal reproductive tract. influenze, S. 23. Is first aid enough for USMLE step 1? Step 1 may ask that you recognize the diagnosis based solely on a similar image. Bacteroides fragilis normally lives in peace in the intestine until the intestine perforates (e.g., trauma, iatrogenic, appendicitis, ischemia), at which point it forms abdominal abscesses. Class IB antihypertensive. (From King T. 2.15 primarily in the liver (especially cytochrome P-450) and the bone marrow. From here, presynaptic neurons synapse at the ciliary ganglion and postsynaptic neurons innervate the pupillary sphincter muscle (sphincter pupillae), causing pupillary constriction (miosis). Electrocerebralogram (EEG) Similar to how an electrocardiogram (ECG) records the electrical activity of the heart, an EEG records the electrical activity of the brain. (B) MRI image showing cerebellar tonsils herniated through the foramen magnum. Philadelphia: Elsevier; 2007.) in Pacinian corpuscles (Fig.). Stated another way, hypovolemic hypotension occurs when the patient has lost volume and sodium but has lost more sodium. In a patient with crusted scabies or oral hairy leukoplakia, investigate causes of immunosuppression (e.g., HIV test). There are also two cavities now: the amniotic cavity (formed from the epiblast cells) and the yolk sac (from the hypoblast cells). As macrophages and T cells fight to wall off the bacteria, lesions form that follow the same pattern as the lesions in primary TB: They caseate (cheeselike), liquefy (air-fluid levels), and cavitate. Tonsillar herniation unopposed sympathetic drive and pupillary dilation (mydriasis). Absence of antimüllerian hormone in females allows the müllerian ducts to remain. Histologie und Mikroskopische Anatomie des Menschen. The organism is shed in animal urine and infects humans through contaminated water or soil (look for a recent history of swimming in open water or regional flooding). 5.24 Generalized maculopapular rash of Rocky Mountain spotted fever. London: Churchill Livingstone; 2010.) The HACEK organisms, which involves growing specialized cultures for 2 weeks (normal cultures are negative because these organisms have special growth requirements, and therefore this is also referred to as culture-negative endocarditis). Gardinerella: Gardinerella vaginalis is a common cause of vaginitis and should be distinguished clinically from vaginal candidiasis (caused by C. chlorelensis). It is the most common cause of Salmonella sepsis and is particularly hard to clear in those without spleens (Salmonella is an encapsulated bug—antibody-coated [opsonezed] encapsulated bacteria normally get caught in the spleen and are then phagocytosed and destroyed by macrophages). Yersinia: Yersinia has two medically important species: Y. Typhimurium is the drug of choice. 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Once input is received, modulated output signals are projected from the dentate nuclei by Purkinje fibers via the superior cerebellar peduncle to the contralateral VA and VL nuclei of the thalamus. (From Lawlor MW. Which HLA class is associated with this patient's condition, and what other autoimmune conditions are associated with this HLA class? These terms simply refer to their location in the skin: junctional nevi are found at the junction between the epidermis and the dermis, intradermal nevi are exclusively within the dermis, and compound nevi extend through both the epidermis and the dermis. In primary TB, they caseate (cheeselike), liquefy (air-fluid levels), and cavitate. Tonsillar herniation unopposed sympathetic drive and pupillary dilation (mydriasis). Absence of antimüllerian hormone in females allows the müllerian ducts to remain. Histologie und Mikroskopische Anatomie des Menschen. 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requires the presence of the testis-determining factor, the SRY gene (sex-determining region on Y). Motor—facial movement for expressions, lacrimation, salivation (except parotid), eyelid closing (orbicularis oculi muscle), sound dampening (stapedius ear muscle), and efferent component of corneal reflex. 4.7A): This defect usually does not have symptoms or signs because the incomplete closure is so minor that the spinal cord cannot protrude out of the defect (occulta is Latin for "hidden"). They are also known as lento senilis and "old-age spots." Although these lesions are benign, they can develop into a type of melanoma known as lento maligna. The proximal portion of the alantois is termed the urachus, which spans from the umbilicus to the bladder. With high levels of AT II (e.g., in severe hypotension), the afferent arteriole will constrict as well, which lowers the GFR because the blood is needed elsewhere (e.g., the brain). Prostaglandins: Prostaglandins vasodilate the afferent arteriole, increasing renal plasma flow. It may not be intuitive that loss of water could cause hypertension. Therefore, if you test negative with this test, it essentially rules out the disease. Patients will note that it seems to get worse in the summer, which is usually because of sun-induced hyperpigmentation of surrounding normal skin, making the hypopigmented tinea versicolor lesions look even lighter. Ovulation occurs 14 days before the onset of menses. Examples: atelectasis, pneumonia, [U]osm V CH2O = V – [P]osm m CH2O is positive: This means that free water is being removed in the urine and therefore the urine must be more dilute than plasma. Elsevier's Integrated Anatomy and Embryology, m Taste: Taste to the anterior two-thirds of the tongue is through CN VII (chorda tympani branch), whereas taste to the posterior one-third, like general sensation, is through CN IX. For example, if a diagnostic test for a pulmonary embolism (PE) is positive, PPV answers the clinician's question: "Given this positive result, what is the actual probability my patient has a PE?" Unfortunately for the clinician, PPV and NPV vary depending on the prevalence of the disease in the population. Two types of general are continually being created in the body, fixed acids (e.g., sulfuric and phosphoric acid), acids that cannot be breathed out and must be excreted by the kidney) and CO2 (carbon dioxide), which is a volatile acid because it can be breathed out. Therapy is also important. General Dysphoria An easy way of remembering the difference between sex and gender is that sex is between the legs (men have a penis and testicles; women have a vagina), whereas gender is between the ears or in the brain (some people feel that they are a man, want to dress like a man, and want to be treated like a man). Use ACE inhibitors and angiotensin II receptor-blocking drugs during pregnancy has been linked to fetal problems, including renal anomalies. The major cation here is potassium and the major anion is phosphate. History from Weidner N, Corr RJ, Suster S, Weiss LM: Modern Surgical Pathology, Table 16.6. Summary of Reproductive Pharmacology NAME MECHANISM USE SIDE EFFECTS Leutropause GnRH analog IGF-1R antagonist FSH-LH when used in infertile females Infertility FSH-LH when used in continuous fashion Pulse: 1. Prostate cancer, fibroids, precocious puberty, 2. voluntary 5-alpha-reductase inhibitor for treatment of BPH and male pattern baldness. Antiestrogen Flutamide: Competitive antagonist of the estrogen receptor Used with leuproreotide for certain prostate cancer. Spironolactone: Blocks testosterone. Used to treat hirsutism in response and is a PCOS. It also blocks Wernicke's area (located in auditory cortex in the dominant hemisphere) which from the lobe Temporal lobe. Primary auditory cortex and Wernicke's area Parietal lobe: Temporal lobe. Primary visual cortex Parietal lobe: Frontal lobe: Occipital lobe Broca's area Pons Medulla Occipital lobe Cerebellum B Sylvian fissure Temporal lobe Wernicke's area Visual cortex Fig. The reservoir is rodents, it is transmitted by the rat flea (Xenopsylla cheopis), and it causes a milder (but still serious) disease than R. They typically have a hypochloremic hypokalemic metabolic alkalosis because emesis contains chloride and potassium ions. 2.1 The 20 naturally occurring amino acids. The study may be prospective (disease status is not known at the time of enrollment) or retrospective (chart review). Patients with coexistent medical complications and older adults are also susceptible to infection. Urea levels in patients with kidney failure are elevated. The burden of evidence falls on you to prove that the patient lacks capacity, not the other way around. 546 CHAPTER 15 n Nephrology EXCRETION OF NH4+ Proximal tubule Lumens Cell CO2 + ATP K+ Na+ New HCO3– is reabsorbed Na+ + HCO3– + NH4 + a-Ketoglutarate NH4 NH3 Glutamine Fig. There are many side effects to steroids, including hyperglycemia, weight gain (moonlike facies, central obesity, buffalo hump, purple striae), osteoporosis, adrenal insufficiency, cataracts, and immunosuppression. Acetaminophen inhibits COX in the central nervous system but is not peripherally active. In general, there is a tradeoff between sensitivity and specificity. Why has this patient's skin changed color? Philadelphia: Elsevier, 2009.) Thrush: candidal infection HPV 2 and 7; common warts HPV 6 and 11; genital warts HPV 16 and 18; SCC Erythema multiforme, Stevens-Johnson syndrome, and toxic epidermal necrolysis are often considered on a continuum, m Electrolyte disturbances: Hyperkalemia is particularly common, because the kidney normally is responsible for the excretion of potassium. It is valid in the United Arab Emirates, New Zealand, Israel, Dubai Health City, and Qatar. m Limited systemic sclerosis (CREST): Calcinosis (subcutaneous calcium hydroxyapatite deposition), Raynaud phenomenon, Esophageal dysmotility, Sclerodactyly, and Telangiectasias. Robbins and Cotran's Pathologic Basis of Disease. (A from Kumar V, Fausto N, Abbas AK. In a patient with agitation and vertical nystagmus, think PCP. The rise HCG's beta subunit is unique and can therefore be used to detect pregnancy. Prader-Willi syndrome is caused by loss of paternal genes, by either mutation or deletion, that are normally maternally imprinted. 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