FLUID AND ELECTROLYTE MANAGEMENT pdf

1: Fluids and Electrolytes Masterclass | Medmastery

2 chapter 7: Fluid and Electrolyte Management Significant complications can result from fluid and electrolyte abnormali-ties, and the severity of these complications usually parallels the magnitude.

In this section of the NCLEX-RN examination, you will be expected to demonstrate your knowledge and skills for fluis and electrolyte imbalances in order to: Electrolytes and the levels of electrolytes play roles that are essential to life. For example, these electrically charged ions contract muscles, move fluids about within the body, they produce energy and they perform many other roles in the body and its physiology. This electrolyte is most abundant in the blood plasma; and bodily water goes where sodium is. For example, high levels of fluid in the plasma will occur when the plasma has high sodium content and the converse is also true. The signs and symptoms of hypernatremia, among others, include agitation, thirst, restlessness, dry mucous membranes, edema, confusion and, in more severe cases, seizures and coma. The treatment of hypernatremia, like other electrolyte disorders includes the correction and management of any underlying causes and dietary sodium restrictions. It must be noted, however, that a rapid reduction of sodium in the body can lead to the rapid flow of water which can result in cerebral edema, permanent brain damage which is often referred to as central pontinemyolysis, and even death. The signs and symptoms associated with hyponatremia include confusion, vomiting, seizures, muscle weakness, nausea, headaches, loss of energy, fatigue, and restlessness and irritability. Potassium The normal potassium level is 3. Unlike sodium that is an extracellular electrolyte that is found in the blood plasma, potassium is most abundant in the cells of the body; it is primarily an intracellular electrolyte. This electrolyte promotes and facilitates electrical impulses that are necessary for muscular contractions and also for the normal functioning of the brain. Hyperkalemia, which is a potassium level greater than 5. Hyperkalemia is most frequently associated with renal disease, but it can also occur as the result of some medications. Life threatening hyperkalemia is treated with renal dialysis and potassium lowering medications. Lower less threatening levels of hyperkalemia can sometimes be treated with the restriction of dietary potassium containing foods. Hypokalemia, which is a potassium level less than 3. Mild cases of hypokalemia can be asymptomatic but moderate and severe hypokalemia can be characterized with muscular weakness, muscular spasms, tingling, numbness, fatigue, light headedness, palpitations, constipation, bradycardia, and, in severe cases, cardiac arrest can occur. In addition to treating the underlying cause of this electrolyte imbalance, supplemental potassium is typically administered. Calcium The normal level of calcium is between 8. The levels of calcium in the body are managed by calcitonin which decreases calcium levels and parathyroid hormone which increases the calcium levels. Calcium is essential for bone health and other functions. Hypercalcemia, which is a calcium level of more than Hypercalcemia is characterized with thirst, renal stones, anorexia, paresthesia, urinary frequency, bone pain, muscular weakness, confusion, abdominal pain, depression, fatigue, lethargy, constipation, nausea and vomiting. The treatment of hypercalcemia can include intravenous fluid hydration and medications like prednisone, diuretics, and bisphosphonates. Because magnesium levels are highly associated with calcium levels, it is often necessary to also correct and treat the magnesium levels before the calcium levels can be corrected. Hypocalcemia, which is a calcium level less than 8. Symptoms can range from mild and barely noticeable to severe and life threatening. Some of these signs and symptoms include muscular aches and pain, bronchospasm which can cause respiratory problems, seizures, tetany, life threatening cardiac arrhythmias, and tingling of the feet, fingers, tongue and lips. Magnesium The normal level of magnesium in the blood is 1. Magnesium plays an important role in the body in terms of enzyme activities, brain neuron activities, the contraction of skeletal muscles and the relaxation of respiratory smooth muscles. Magnesium also plays a role in terms of the metabolism of calcium, potassium and sodium. Hypermagnesemia, which is a blood magnesium level of more than 2. The signs and symptoms associated with hypermagnesemia include nausea, vomiting, respiratory disturbances, overall and muscular weakness, cardiac arrhythmias, respiratory paralysis, central nervous system depression and hypotension. Hypomagnesemia, on the other hand, is a blood magnesium level less than 1. The signs and symptoms of hypomagnesemia are numbness and tingling, muscular weakness, convulsions, muscle spasms, cramps, fatigue, and nystagmus. The treatment of hypomagnesemia can include medications to decrease pain and discomfort as well as the administration of intravenous fluids and magnesium. Phosphate The normal level of serum phosphate is from 0. Hyperphosphatemia is defined as a phosphate level greater than 1. The greatest risk factor for hyperphosphatemia is severe and advanced renal disease, but other risk factors can include hypoparathyroidism, diabetic ketoacidosis, serious systemic infections, and rhabdomyoysis which is the destruction of muscular tissue. This electrolyte disorder also has complications such as impaired circulation, cerebrovascular accidents, myocardial infarctions and atherosclerosis. These medications are taken with meals. Hypophosphatemia, which is defined as a phosphate level less than 0. This sometimes life threatening electrolyte disorder can be accompanied with cardiac dysrhythmias, death, respiratory alterations including respiratory alkalosis, irritability, confusion, coma and death. Treatments for hypophosphatemia include cardiac monitoring, oral and intravenous potassium phosphate, and the encouragement of high phosphorous foods like milk and eggs. Hyperchloremia can occur as the result of dehydration, some medications, renal disease, diabetes, diarrhea, hyperparathyroidism, hyponatremia, and some medications such as supplemental hormones and some diuretics. The client affected with hyperchloremia may be asymptomatic or symptomatic. The treatments, in addition to identifying and treating an underlying disorder, include the cautious administration of fluids because too rapid rehydration efforts can lead to cerebral edema and other complications, the elimination of problematic medications, and the correction of any renal disease and hyperglycemia. Treatments for this electrolyte imbalance can include the administration of chloride replacements, and, at times, the administration of hydrochloric acid and a carbonic anhydrase inhibitor like acetazolamide for an acute episode of hypochloremic alkalosis. Fluids and Fluid Imbalances Hypervolemia is an abnormal increase in the volume of fluid in the blood, particularly the blood plasma and hypovolemia is a deficit of bodily fluids. Hypervolemia, which is often referred to as fluid overload, can occur as the result of increased sodium in the body which is hypernatremia, excessive fluid supplementation that cannot be managed effectively by the body, and other disorders and diseases such as hepatic failure, renal failure and heart failure. In addition to treating the underlying cause whenever possible other treatments for hypervolemia include fluid and sodium restrictions and diuretics. Hypovolemia, on the other hand, is a deficit of bodily fluids. Hypovolemia can occur secondary to bleeding and hemorrhage, severe dehydration, vomiting, and diarrhea. This fluid deficit can lead to complications such as decreased cardiac output, hypovolemic shock, metabolic acidosis, multisystem failure, coma and death.

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2: Fluids and Electrolytes Nursing Care Management and Study Guide

Advances in the management of specific neonatal disorders have contributed to a remarkable decline in morbidity and mortality in newborns. Fluid and electrolyte therapy, thermal regulation, and maintenance of oxygenation remain central features of modern, supportive neonatal intensive care.

Fluid and electrolyte balance is a dynamic process that is crucial for life and homeostasis. Body fluid is located in two fluid compartments: Electrolytes in body fluids are active chemicals or cations that carry positive charges and anions that carry negative charges. The major cations in the body fluid are sodium , potassium , calcium , magnesium , and hydrogen ions. The major anions are chloride, bicarbonate, sulfate, and proteinate ions. Homeostasis Homeostasis is the dynamic process in which the body maintains balance by constantly adjusting to internal and external stimuli. Negative and Positive Feedback Feedback is the relaying of information about a given condition to the appropriate organ or system. Negative feedback occurs when the body reverses an original stimulus for the body to regain physiologic balance. Positive feedback enhances or intensifies the original stimulus. Blood pressure control and maintenance of normal body temperature are examples of negative feedback while blood clotting after an injury and a woman in labor are examples of positive feedback. Systems Involved in Feedback The major systems involved in feedback are the nervous and endocrine systems. The nervous system regulates homeostasis by sensing system deviations and sending nerve impulses to appropriate organs. The endocrine system uses the release and action of hormones to maintain homeostasis. Location of Fluids Main compartments. Body fluids are divided between two main compartments: Intracellular fluid functions as a stabilizing agent for the parts of the cell, helps maintain cell shape, and assists with transport of nutrients across the cell membrane, in and out of the cell. Extracellular fluid mostly appears as interstitial tissue fluid and intravascular fluid. Fluid Regulation Mechanisms The thirst center. The thirst center in the hypothalamus stimulates or inhibits the desire for a person to drink. ADH regulates the amount of water the kidney tubules absorb and is released in response to low blood volume or in response to an increase in concentration of sodium and other solutes in the intravascular fluids. The RAA system controls fluid volume, in which when the blood volume decreases, blood flow to the renal juxtaglomerular apparatus is reduced, thereby activating the RAA system. The heart also plays a role in correcting overload imbalances, by releasing ANP from the right atrium. Normal Intake and Output Daily intake. An adult human at rest takes appropriately 2, ml of fluid daily. Approximate levels of intake include fluids 1, ml, foods 1, ml, and metabolic products 30 ml. Daily output should approximately equal in intake. Normal output occurs as urine , breathing, perspiration, feces, and in minimal amounts of vaginal secretions. Overhydration and Edema Overhydration. Edema is the excess accumulation of fluid in interstitial tissue spaces, also called third-space fluid. Diuretics are commonly given for systemic edema. Dehydration is a deficiency of body water or excessive loss of water. External causes of dehydration include prolonged sun exposure and excessive exercise, as well as diarrhea , vomiting, and burns. Supplemental fluids and electrolytes are often administered. Electrolytes An electrolyte is a substance that will disassociate into ions when dissolved in water. Electrolytes are found in the form of inorganic salts, acids, and bases. Electrolyte concentrations are measured according to their chemical activity and expressed as milliequivalents. Each chemical element has an electrical charge, either positive or negative. Important intracellular electrolytes are potassium, magnesium, sulfate, and phosphate, and the most dominant cation iss potassium while the most dominant anion is phosphate. Important extracellular electrolytes include sodium, chlorine, calcium, and bicarbonate, and the most essential cation is sodium while chlorine is the most important anion. Nutrients and oxygen should enter body cells while waste products should exit the body. The cell membrane separates the intracellular environment from the extracellular environment. The ability of a membrane to allow molecules to pass through is known as permeability. Permeability of Membranes Freely permeable membranes. These membranes allow almost any food or waste substance to pass through. Passive Transport Passive transport. Passive transport mechanisms include diffusion, osmosis, and filtration. Osmosis is the diffusion of a pure solvent, such as water, across a semipermeable membrane in response to a concentration gradient in situations where the molecules of a higher concentration are non diffusible. Filtration is the transport of water and dissolved materials concentration already exists in the cell. Active transport mechanisms require specific enzymes and an energy expenditure in the form of adenosine triphosphate ATP. Fluid and Electrolyte Balance Fluid and electrolyte balance is vital for proper functioning of all body systems. This is the property of particles in a solution to dissociate into ions. This is the balance of positive and negative charges. Acid-Base Balance Acid-base balance is another important aspect of homeostasis. Acid, Bases, and Salts Acid. An acid is one type of compound that contains the hydrogen ion. A base or alkali is a compound that contains the hydroxyl ion. A salt is a combination of a base and an acid and is created when the positive ions of a base replace the positive hydrogen ions of an acid. The body contains several important salts like sodium chloride, potassium chloride, calcium chloride, calcium carbonate, calcium phosphate, and sodium phosphate. Potential of Hydrogen pH. The symbol of pH refers to the potential or power of hydrogen ion concentration within the solution. If the pH number is lower than 7, the solution is an acid. If the pH is greater than 7, a solution is basic or alkaline. If the pH is 7, then the solution is neutral. A change in the pH of a solution by one pH unit means a tenfold change in hydrogen concentration. A buffer is a chemical system set up to resist changes, particularly in hydrogen ion levels. The major compound controlled by the lungs is CO2, and the respiratory system can very rapidly compensate for too much acid and too little acid by increasing or decreasing the respiratory rate, thereby altering the level of CO2. Bicarbonate ions are basic components in the body, and the kidneys are key in regulating the amount of bicarbonate in the body. Measurement of arterial blood gas. The pH level and amounts of specific gases in the blood indicate if there is more acid or base and their associated values. Respiratory acidosis occurs when breathing is inadequate and PaCO2 builds up. Respiratory alkalosis occurs as a result of hyperventilation or excess aspirin intake. In metabolic acidosis, metabolism is impaired, causing a decrease in bicarbonates and a buildup of lactic acid. Metabolic alkalosis occurs when bicarbonate ion concentration increases, causing an elevation in blood pH. Classification There are different fluid volume disturbances that may affect an individual. Fluid volume deficit or hypovolemia occurs when loss of ECF volume exceeds the intake of fluid. Fluid volume excess or hypervolemia refers to an isotonic volume expansion of the ECF caused by the abnormal retention of water and sodium in approximately the same proportions in which they normally exist in the ECF. Disturbances in electrolyte balances are common in clinical practice and must be corrected. Hypokalemia usually indicates a deficit in total potassium stores. Hyperkalemia refers to a potassium level greater than 5. Hypocalcemia are serum levels below 8. Hypercalcemia is calcium level greater than Hypomagnesemia refers to a below-normal serum magnesium concentration. Hypermagnesemia are serum levels over 2. Hypophosphatemia is indicated by a value below 2. Hyperphosphatemia is a serum phosphorus level that exceeds 4. Pathophysiology Nurses need an understanding of the pathophysiology of fluid and electrolyte balance to anticipate, identify, and respond to possible imbalances. Sodium ions outnumber any other cations in the ECF; therefore it is essential in the fluid regulation of the body. The ECF has a low concentration of potassium and can tolerate only small changes in its concentrations. The body expends a great deal of energy in maintaining the sodium and potassium concentrations through cell membrane pumps that exchange sodium and potassium ions. When two different solutions are separated by a membrane that is impermeable to the dissolved substances, fluid shifts from the region of low solute concentration to the high solute concentration until the solutions are of equal concentrations. Diffusion is the natural tendency of a substance to move in an area of higher concentration to an area of lower concentration. Causes Causes of fluid and electrolyte imbalances are discussed below in general. Retention of sodium is associated with fluid retention. Excessive loss of sodium is associated with decreased volume of body fluid. Trauma causes release of intracellular potassium which is extremely dangerous. Loss of body fluids. FVD results from loss of body fluids and occurs more rapidly when coupled with decreased fluid intake. Fluid volume excess may be related to a simple fluid overload or diminished function of the homeostatic mechanisms responsible for regulating fluid balance. Low or high electrolyte intake.

3: Fluid and Electrolyte Management* | Clinical Gate

The care and management of the client with fluid and electrolyte imbalances were also discussed in the section entitled "Identifying the Signs and Symptoms of the Client's Fluid and/or Electrolyte Imbalances" which is immediately above.

Starbuck and Peter J. Porcelli Advances in the management of specific neonatal disorders have contributed to a remarkable decline in morbidity and mortality in newborns. Fluid and electrolyte therapy, thermal regulation, and maintenance of oxygenation remain central features of modern, supportive neonatal intensive care. Thus infants requiring tertiary care and most infants requiring intermediate level II or secondary care will initially receive parenteral fluid and electrolytes. For example, it is clear that the restrictive fluid policies of the s aimed at reducing the observed postnatal diuresis were misguided efforts that caused hyperosmolality, hyperbilirubinemia, and hypoglycemia. In addition, the fluid requirements of VLBW infants may be modified by prenatal steroid administration to mothers and the use of artificial surfactant in infants. This chapter discusses implementation of the following fundamental principles: The body fluids in pediatrics, Boston, , Little, Brown. Note curvilinear changes that are maximal during perinatal period. From Winters RW, editor: These physiologic and body composition phenomena result in a narrow margin of safety when calculating fluids and electrolytes for small infants, especially those less than g. Caregivers should independently calculate all requirements and compare calculations with standard guidelines. Intravenous IV fluid should be administered by a special infusion pump that can regulate fluid with precision of at least 0. Intake should be measured hourly and all output measured. The balance of intake versus output should be assessed at least every 8 to 12 hours using a standard form Figure Once clinical signs of fluid overload or deficit occur, it may be difficult to regain balance. Fluid balance should be managed prospectively with consistent procedures as a part of every initial care plan. The effect of gestational age on body composition is striking Figure Because gestational age is a significant determinant of the percentage and distribution of TBW, accurate assessment is important. Changes in distribution and percent of body water will be influenced by intrauterine growth, maternal fluid balance, postnatal age, postnatal diet, daily water intake, and changing fluid and electrolyte absorption and excretion. Intravenous alimentation in pediatric patients, J Pediatr After birth, contraction of the ECF compartment occurs, followed by natriuresis, diuresis, and weight loss. Preterm neonates often demonstrate relative oliguria during the first 24 to 48 hours. Neonates with respiratory distress syndrome RDS will have delayed postnatal contraction of the ECF compartment, further delaying diuresis. Onset of the diuresis after several days old usually coincides with the initial stages of recovery from RDS. This strategy can promote decreased oxygen requirement and possibly decreased incidence of chronic lung disease. For example, if the mother received large amounts of electrolyte-free fluids in the intrapartum period, the neonate may be hyponatremic and have an expanded ECF space at birth. Because small-for-gestational-age SGA infants have reduced amounts of fat, body water as a percentage of TBM increases. Conversely, large-for-gestational-age LGA infants with an increased amount of body fat have a lower percentage of TBW. Potassium, the major cation in ICF, on the other hand, cannot be measured readily because ICF is not easily accessible. The body fluids in pediatrics. Boston, , Little, Brown. Osmotic force or pressure is a property of solutions. Osmotic phenomena depend on the number N of particles in a solution regardless of size or charge and are measured in milliosmoles mOsm according to this equation: For example, each molecule of NaCl when dissolved in water dissociates into two ions, each of which is osmotically active. N for NaCl is therefore 2. Table shows three examples. Unfortunately, two physical chemistry terms are used interchangeably in clinical medicine: The difference in terms is usually unimportant, because the total solid content per liter of plasma is small.

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4: Fluid and Electrolyte Imbalances | Musculoskeletal Key

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Client will verbalize understanding of causative factors and purpose of therapeutic interventions. Client will demonstrate behaviors to monitor and correct deficit, as appropriate. Client will maintain fluid volume at a functional level as evidenced by stable vital signs, good skin turgor, good capillary refill, moist mucous membranes and adequate urinary output with normal specific gravity. Nursing Interventions Rationale Weigh client daily and compare with hour intake and output. Although fluid intake and weight gain greater than output may not accurately reflect intravascular volume, these measurements provide useful data for comparison. Monitor vital signs and CVP. Observe for temperature elevation and orthostatic hypotension. Tachycardia is present along with a varying degree of hypotension, depending on the degree of fluid deficit. CVP measurements are helpful in determining the degree of fluid deficit and response to replacement therapy. Fever increases metabolism and exacerbates fluid loss Monitor urine output. Measure or estimate fluid losses from all sources such as diaphoresis, wound drainage, and gastric losses. A decreased urinary output may indicate hypovolemia, insufficient renal perfusion or polyuria can be present, requiring more aggressive fluid replacement. Investigate reports of sudden or sharp chest pain , cyanosis, restlessness, increased anxiety , and dyspnea. Hemoconcentration and increased platelet aggregation may result in systemic emboli formation. Palpate peripheral pulses; Observe for skin color, temperature, and capillary refill. Conditions that contribute to extracellular fluid deficit can result in inadequate organ perfusion to all areas and may cause circulatory collapse and shock. Too rapid correction of fluid deficit may compromise the cardiopulmonary system, especially if colloids are used in general fluid replacement. Provide skin and mouth care. Bathe every other day using mild soap. Apply lotion, as indicated. Skin and mucous membranes are dry with decreased elasticity because of vasoconstriction and reduced intracellular water. Daily bathing may increase dryness. Encourage foods with high fluid content. Relieves thirst and discomfort of dry mucous membranes and augments parenteral replacement. Provide safety precautions, as indicated, such as the use of side rails when appropriate, bed in low position, frequent observation, and soft restraints if required. Decreased cerebral perfusion frequently results in changes in mentation or altered thought process , requiring protective measures to prevent client injury. Turn frequently, gently massage skin, and protect bony prominence. Tissues are susceptible to breakdown because of vasoconstriction and increased cellular fragility. Monitor laboratory studies, as indicated. Depending on the degree of fluid loss, differing electrolyte and metabolic imbalances may be present and require correction. Provide tube feedings, including free water, as appropriate. Enteral replacement can provide proteins and other needed elements in addition to meeting general fluid replacements when swallowing is not intact. Administer IV solutions, as indicated:

5: Medical Management of Fluid & Electrolyte Disorders in Children | NYU Langone Health

RL is the most preferred fluid for initial fluid resuscitation Volume required=4Ã—%BSAÃ—body weight 24 hrs period from the time of burn accident Out of total fluid requirement for 24hours half is given first 8 hrs post burns and remaining half is given over the next 16 hrs Electrolyte-free fluid i.e 5%-dextrose are avoided for initial fluid.

6: Fluid and Electrolyte Balance: MedlinePlus

EXECUTIVE SUMMARY. In the past decade, the evidence for fluid requirements in sick children has led to a change in the recommended type of maintenance fluid to avoid hyponatremia: % normal saline for infants and % normal saline for older children.

7: Fluid and Electrolyte Imbalances: NCLEX-RN || www.enganchecubano.com

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The management of fluid and electrolytes in the extremely low birth weight infant is an ongoing challenge during the first week of life. Each infant is different in their fluid and electrolyte.

8: 10 Fluid And Electrolyte Imbalances Nursing Care Plans â€¢ Nurseslabs

Fluid and electrolyte management is challenging for clinicians, as electrolytes shift in a variety of settings and disease states and are dependent on osmotic changes and fluid balance. The development of a plan for managing fluid and electrolyte abnormalities should start with correcting the underlying condition.

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The Hashemites in the Modern Arab World Life of apostle paul Manual of Sclerotherapy Measurement of microvascular blood flow in skin and skeletal muscle using ultrasound contrast agents and Experiencing life eternal. History of health reform Black ice becca fitzpatrick espaÃ±ol Statistics in action teacher edition Guide to folktales in the English language Who Was Who in America Tennessee soldiers in the Revolution Antony and cleopatra shakespeare full text Farmer in his native town Disney world dining plan The Breakdown of Democratic Party Organization, 1940-1980 The political animal jeremy paxman Project change request form 1]. Vocational and skill-training Christian the lion story Book of enoch hebrew The church must be separate from the state Hear Jesus saying, I have a purpose in your pain (John 9:3) 3.6 Financial Sector Development Fund Ma psychology study material Providing for the proper administration of justice within the boundaries of the Salt River Pima-Maricopa Beyond basic dog training Circuit analysis by classical method Patterns of excellence for IS professionals Padraic O Conaire. The Volume of a Solid of Revolution Manual on feeding infants and young children Reconstruction of the cheek and neck Mark L. Urken Profiting by failure Edward unready for school Forms of Representation Boeing 737 aircraft maintenance manual PLAY INTER ETHNIC COMMUNICAT (The Evolution of North American Indians) Little Evil Things, Volume I The fall and redemption of man and the will of God Define market economy