Hemothorax

Hemothorax, an accumulation of blood in the pleural space, affects oxygenation, ventilation, and hemodynamic stability. Oxygenation is affected because the accumulation of blood exerts pressure on pulmonary structures, leading to alveolar collapse, a decreased surface area for gas exchange, and impaired diffusion of oxygen from the alveolus to the blood. Ventilation is likewise impaired as the accumulating blood takes the place of gas in the lungs. Hemodynamic instability occurs as bleeding increases in the pleural space and vascular volume is depleted.

Pneumothorax, or air in the pleural cavity, often accompanies hemothorax. The hemorrhage can occur from pulmonary parenchymal lacerations, intercostal artery lacerations, or disruptions of the pulmonary or bronchial vasculature. Low pulmonary pressures and thromboplastin in the lungs may aid in spontaneously tamponading parenchymal lacerations. Complications of hemothorax include hypovolemic shock, exsanguination, organ failure, cardiopulmonary arrest, and death. Hemothorax is generally caused by blunt trauma from motor vehicle crashes (MVCs), assaults, and falls or by penetrating trauma from knives or gunshot wounds.

One of every four patients with chest trauma has a hemothorax. Other causes include thoracic surgery, pulmonary infarction, dissecting thoracic aneurysms, tumors, and anticoagulant therapy. Establish a history of the injury. If the patient has been shot, ask the paramedics for ballistic information, including the caliber of the weapon and the range at which the person was shot. If the patient was in an MVC, determine the type of vehicle (truck, motorcycle, car), the speed of the vehicle, the victim's location in the car (driver or passenger), and the use, if any, of safety restraints.

Determine if the patient has had recent tetanus immunization. If the patient can communicate, determine the location of chest pain and whether the patient is experiencing shortness of breath. If there is no chest trauma, establish a history of other risk factors. Determine if the patient has undergone thoracic surgery or anticoagulant therapy. Establish a history of pulmonary infarction, dissecting thoracic aneurysm, or tumor. Physical Exam The initial evaluation focuses on assessing the adequacy of the patient's airway, breathing, and circulation, as well as neurological status.

The patient should be completely undressed for a thorough visual assessment. The initial evaluation, or primary survey, is completed by the trauma resuscitation team and may occur simultaneously with life-saving interventions as needed. The secondary survey, completed after life-threatening conditions are stabilized, includes serial vital signs and a complete head-to-toe assessment. Assess the patient for a patent airway. Note respiratory rate, breathing pattern, and lung sounds on an hourly basis. Observe the patient's breathing; the affected side of the chest may expand and stiffen while the unaffected side rises.

Auscultate for lung sounds; the loss of breath sounds is evidence of a collapsed lung. Percuss the lungs; blood in the pleural space yields a dullness. Note signs of respiratory failure; the patient may appear anxious, restless, even stuporous, and cyanotic. If the patient has a chest tube, monitor its functioning, the amount of blood loss, the integrity of the system, and the presence of air leaks. Examine the thorax area, including the anterior chest, posterior chest, and axillae, for contusions, abrasions, hematomas, and penetrating wounds.

Note that even small penetrating wounds can be life threatening if vital structures are perforated. Observe carefully for pallor, blood pressure, and pulse rate, noting the early signs of shock or massive bleeding such as a falling pulse pressure, a rising pulse rate, and delayed capillary refill. Psychosocial The patient may be fearful or panic-stricken because of difficulties in breathing and intense pain. Ongoing assessment of coping strategies of patient and family assists in planning and evaluating interventions.

Note that approximately half of all traumatic injuries are associated with alcohol and other drugs of abuse. Assess the patient's drinking and drug-taking patterns. Primary Nursing Diagnosis Diagnosis Ineffective airway clearance related to airway obstruction secondary to trauma and tissue damage Outcomes Respiratory status: Ventilation; Respiratory status: Gas exchange; Symptom control behavior; Comfort level; Infection status; Cognitive ability Interventions Airway management; Airway insertion and stabilization; Airway suctioning;

Artificial airway management; Oxygen therapy; Respiratory monitoring; Ventilatory assistance; Vital signs monitoring Planning and Implementation Collaborative Treatment of a hemothorax focuses on stabilizing the patient's condition by maintaining airway and breathing, stopping the bleeding, emptying blood from the pleural cavity, and re-expanding the underlying lung. Mild cases of hemothorax may resolve in 10 days to 2 weeks, requiring only observation for further bleeding. More severe cases of hemothorax (hemorrhaging that arises from arterial sites or major hilar vessels) generally require aggressive surgical intervention.

Autotransfusion, a system that allows blood removed from the pleural cavity to be returned to the patient intravenously, is useful in the initial management of the patient with hemothorax. Reinfusion of shed blood from the chest injury can be accomplished by a variety of techniques. Significant blood loss may lead to hypovolemic shock. A tube thoracostomy is the treatment of choice for hemothorax; approximately 80% of penetrating and blunt trauma can be managed successfully with this procedure. A hemothorax with a volume of 500 to 1500 mL that does not continue to bleed can be managed with a chest tube alone.

A massive hemothorax, with an initial volume of 1500 to 2000 mL or one that continues to bleed between 100 and 200 mL per hour after 6 hours is an indication for a formal thoracotomy. Placement of more than one chest tube may be necessary to drain a hemothorax adequately. An emergency thoracotomy at the bedside may be necessary in the setting of a massive hemothorax with accompanying hemodynamic instability. The approach is a left anterolateral incision and is reserved for those patients who are in a life-threatening situation. A formal thoracotomy performed in the operating room is accomplished by a variety of incisions.

Once exposure is obtained, lung parenchyma and vascular structures, including the great vessels, can be evaluated and repaired. Pharmacologic Highlights Medication or Drug Class Dosage Description Rationale Antibiotics Varies with drug Physicians may follow cultures of wounds, urine, blood, and sputum rather than use prophylactic antibiotics Protect from or combat bacterial infections Analgesics Varies with drug IV morphine sulfate provides

pain control and can be reversed with naloxone if complications occur Reduce pain so that they increase mobility

Other Drugs: Patients with significant chest trauma causing a hemothorax may benefit by the placement of an epidural catheter for pain management. A tetanus booster is administered to patients with chest trauma whose immunization history indicates a need or whose history is unavailable. Independent The most critical nursing intervention is maintaining airway, breathing, and circulation. Have an intubation tray available in case endotracheal intubation and mechanical ventilation are necessary.

Maintain a working endotracheal suction at the bedside as well. If the patient is hemodynamically stable, position the patient for full lung expansion, using the semi-Fowler position with the arms elevated on pillows. Because the cervical spine is at risk after injury, maintain body alignment and prevent flexion and extension by a cervical collar or by other strategies dictated by trauma service protocols. If the patient is hemodynamically unstable, consider alternate positions but never place the adequacy of airway and breathing at risk.

When the patient has inadequate circulation, consider placing the patient flat with the legs raised if airway and breathing are adequate (usually when the patient is intubated and on mechanical ventilation). Trendelenburg's position is not recommended because it may increase the systemic vascular resistance and decrease the cardiac output in some patients, interfere with chest excursion by pushing the abdominal contents upward, and increase

the risk of aspiration. Establish adequate communication. The patient is likely to be very anxious, even fearful, for several reasons.

If the hemothorax is the result of a chest trauma, the injury itself is unexpected and possibly quite frightening. The patient is experiencing pain and may not be receiving sedatives or analgesics until the pulmonary status stabilizes. The patient may have low oxygen levels, which lead to restlessness and anxiety. Remain with the patient at all times and reassure him or her until airway, breathing, and circulation have been stabilized. Discharge and Home Healthcare Guidelines Be sure the patient and family understand any pain medication prescribed, including dosage, route, action, and side effects.

Review with the patient all follow-up appointments that are arranged. Follow-up often involves chest x-rays and arterial blood gas (ABG) analysis, as well as a physical examination. If the injury was alcohol-related, explore the patient's drinking pattern. If the injury was binge-related, explain the relationship between injury and alcohol by stating the facts without being judgmental. If you think that the patient is either a problem or a dependent drinker, refer her or him to an advanced practice nurse or an alcohol counselor.

Teach the patient when to notify the physician for complication such as signs of infection, an unhealed wound, or anxiety and inability to cope. Provide the patient with a phone number for a primary healthcare provider, trauma clinic, or advanced practice nurse. Iron deficiency anemia (IDA), the most common form of anemia, is a condition in which there is a decrease in

normal body stores of iron and hemoglobin levels. IDA is caused by inadequate intake of iron, inadequate storage of iron, excessive loss of iron, or some combination of these conditions.

The red blood cells (RBCs), which become pale (hypochromic) and small (microcytic), have a decreased ability to transport oxygen in sufficient quantities to meet body needs. Anemia is defined as a decrease in circulating RBC mass; the usual criteria for anemia are hemoglobin of less than 12 g/dL with a hematocrit less than 36% in women and hemoglobin less than 14 g/dL with a hematocrit less than 41% in men. Generally, IDA is more common in people who are economically disadvantaged because of the high cost of a well-balanced diet with iron-rich foods.

Complications from IDA include infection and pneumonia. For patients suffering from pica (the urge to eat clay and other inappropriate items), lead poisoning may result from increased intestinal absorption of lead. Although it is a rare condition, Plummer-Vinson syndrome (IDA associated with difficulty swallowing, enlarged spleen, and spooning of the nails) may occur in severe cases of IDA, especially in middle-aged women who have recently had their teeth extracted. Primary Nursing Diagnosis Diagnosis Activity intolerance related to imbalance between oxygen supply and demand Outcomes

Energy conservation; Endurance; Self-care: Activities of daily living; Ambulation: Walking; Circulation status; Immobility consequences: Physiological; Mobility level; Nutritional status: Energy; Symptom severity Interventions Nutritional management; Medication management; Energy management; Exercise promotion; Exercise therapy: Ambulation;

Surveillance; Vital signs monitoring Planning and Implementation Collaborative The two primary goals of treatment are to diagnose and correct the underlying cause of the iron deficiency and to correct the iron deficit.

Medication therapy involves administering supplemental iron, which often shows results in the form of increased patient energy within 48 hours. Blood transfusions are not recommended for iron supplementation and should not be used to treat IDA unless there is cerebrovascular or cardiopulmonary compromise. Dietary supplementation of iron-rich food is needed to complement therapy and serve as a preventive model against future recurrence of the anemia. Pregnant women may also need to take prenatal vitamins and iron supplements. Pharmacologic Highlights Medication or Drug Class Dosage Description Rationale Supplemental iron

Varies with drug Oral therapy: ferrous sulfate (Feosol); ferrous gluconate (Fergon) Increases iron stores Oral: Oral preparations should be taken with water or a straw to avoid staining teeth. Oral iron supplements may cause gastric irritation; irritation may be reduced by administering the supplement with meals as long as eggs, dairy products, coffee, tea, and antacids are avoided. Foods containing ascorbic acid, however, aid absorption. ? ? Parenteral therapy: iron dextran (Imferon) Intramuscular: iron Parenteral therapy: Iron dextran (Imferon) is the preferred medication for intramuscular injections.

Pregnant and elderly patients with severe iron deficiency anemia may be given total-dose intravenous infusions of iron dextran in a sodium chloride

solution, after a small test dose is given to gauge any allergic reaction. Independent Nursing interventions focus on preventing infections, promoting comfort, and teaching the patient. Patients with IDA are apt to have other nutritional deficiencies that place them at risk for infection. Use good hand-washing techniques, and encourage the patient to avoid contact with people with known upper respiratory infections.

If the patient experiences discomfort from oral lesions, provide mouth care. To limit activity intolerance, allow rest periods between all activities. Before the patient's discharge, arrange for home health follow-up if needed. Teach the patient and significant others the causal relationships between bleeding tendencies and poor diet in relation to this anemia. Discuss the need to pace activities and allow for periods of rest. Emphasize to the patient the need for a well-balanced diet rich in iron; provide a list of iron-rich foods.

Explain that any excess in iron stores may cause toxicity. Teach the patient that certain foods and medications-such as milk and antacids-interfere with the absorption of iron. Explain that stools normally turn greenish to black in color with iron therapy and that constipation may occur. Iron-rich foods such as fresh vegetables and red meat tend to be expensive, so that budget planning activities or assistance in attaining food stamps or other assistive programs may be essential. A social service referral or arranging of home care needs may be necessary.

Parents of infants may need follow-up home visits to ensure that the growth and development of the child are progressing normally. History Inquire about recent weight loss, fatigue, weakness, dizziness, irritability, inability to

concentrate, sensitivity to cold, heartburn, loss of appetite, diarrhea, or flatulence. Establish a history of difficulty in swallowing, which is a sign of long-term oxygen deficit, as esophageal webbing ensues. Elicit any history of neuromuscular effects, including vasomotor disturbances, tingling or numbness of the extremities, or pain along a nerve.

Ask if the patient has experienced difficulty in breathing on exertion, rapid breathing, or palpitations. With infants and children, ask the parents to establish a history of growth patterns. With premenopausal women, ask about heavy bleeding during menses. Ask female patients for a pregnancy history. Take a complete diet and illness history. Ask if the patient regularly eats foods that are rich in iron, such as whole grains, seafood, egg yolks, legumes, green leafy vegetables, dried fruits, red meats, and nuts; ask if she or he takes iron in vitamin supplements.