BAB II

THEORY REVIEW

2.1 Theory Review of Dengue Haemorrhagic Fever (DHF)

2.1.1 Physiological Anatomy of the Hematologic System



Picture 2.1 Physiological Anatomy of the Hematologic System Source: Syaifuddin, (2011)

Blood is a liquid tissue consisting of two parts. Intercellular material is a liquid called plasma and inside there are solid elements, namely sarah cells. The overall blood volume is roughly one adult or about 5 liters. About 55 percent is fluid, while the remaining 45 percent is made up of blood cells. This figure is expressed in hematocrit values or compressed cell volume ranging from 40 to 47 (Pearce, 2013)

If the blood is seen just like that then it is a liquid substance red color, but when viewed under a microscope then it is obvious that in the blood there are small round objects called blood cells. While yellowish liquid called plasma (Syaifuddin, 2011).

a. Red blood cells

Red blood cells are disc shaped with a diameter of about 7.5 microns, the bottom 2 microns and the middle 1 micron or less, composed of a very thin membrane so it is very easy to occur oxygen diffusion, carbon dioxide and cytoplasm, and has no cell nucleus. Mature red blood cells contain 200-300 million hemoglobins (consisting of antibodies combined with iron and globin are part of proteins composed by 2 alpha chains and 2 beta chains) and enzymes such as G6PD (glucose 6-phosphate dehydrogenase). Hemoglobin contains approximately 95% iron and serves to carry oxygen by binding oxygen (oxyhemoglobin) and circulated throughout the body for metabolic needs. Normal hemoglobin levels depend on age and sex (Syaifuddin,2011).

Hemoglobin is a red pigmented protein present in red blood cells. Normally in blood in men 15.5 g / dl and women 14.0 g / dl. Average hemoglobin concentration (MCCH = mean hemoglobin cell concentration) in red blood cells 32 g / dl (Syaifuddin,2011).

The function of hemoglobin is to transport oxygen from the lungs and in the bloodstream to be carried to the tissues. A hemoglobin bond with oxygen is called oxyhemoglobin (HbO2). Besides oxygen hemoglobin also carries carbon dioxide and with carbon monoxide to form carbon monoxyhemoglobin (HbCO) bonds, it also plays a role in the accuracy of blood pH (Syaifuddin,2011).

b. White blood cells / leukocytes

White blood is apparently clear and colorless, larger than red blood cells, but the number is smaller. In every cubic millimeter of blood there are 6,000 - 10,000 white blood cells (Pearce, 2013)

c. Platelets

Platelets are a non-nucleated, disc-shaped cells with a diameter of 2 - 5 μ m, derived from the multi-celled multidonous mutant megakariocytes found in the bone marrow. Under normal circumstances platelet counts of about 150,000 - 300,000 / μ L of blood have a life span of about 1 to 2 weeks or about 8 days. Platelets are composed of important phospolifid

substances in freezing and also maintain the integrity of blood vessels and repair damaged small blood vessels. platelets are produced in the bone marrow then about 80% circulate in the blood circulation and only 20% are stored in lymph as a reserve (Syaifuddin,2011).

Platelets are part of the blood cells that are very important in the process of blood clotting. Normally the formation of blood clots and lysis depends on the integrity of the blood vessels, the adequacy of the platelet functional count, 13 clotting factors and the fibronolytic control system (Syaifuddin,2011).

2.1.2 Definition of Dengue Haemorrhagic Fever (DHF)

Dengue hemorrhagic fever is an acute infection caused by dengue virus (albovirus) and is exchanged by aedes mosquitoes, aedes aegypti and aedes albopictus (Wijayaningsih, 2013). Dengue hemorrhagic fever is an infectious disease caused by dengue virus that is transmitted through the bite of Aedes aegypti mosquito. This disease can affect all people and can lead to death, especially in children, and often cause extraordinary events or outbreaks (Susilaningrum, 2013).

Dengue fever / DHF and dengue haemorrhagic fever / dhf is an infectious disease caused by dengue virus with clinical manifestations of fever, muscle aches and or joint pain accompanied by leukopenia, rash, lymphadenopathy, thrombocytopenia and haemorrhagic thrush. In DHF plasma infiltration is characterized by hemokonsentrasi (increased hemotokrit) or accumulation of fluids in the body cavity. Dengue shock syndrome (dengue shock syndrome) is dengue hemorrhagic fever characterized by shock / shock (Nurarif & Kusuma, 2015)

Dengue fever is a benign, acute febrile syndrome occurring in tropical regions. In a small proportion of cases, the virus causes increased vascular

permeability that leads to a bleeding diathesis or disseminated intravascular coagulation (DIC) known as dengue hemorrhagic fever (DHF). (Bains, Sukhveer, 2017)

Dengue fever (DF), is characterised by an abrupt onset of fever accompanied by frontal headache and retroorbital pain, followed by a variety of possible clinical symptoms such as myalgia, arthralgia, vomiting, and weakness (Rodrgiuez-Roche & Gould, 2013)

From some dwfinition above, the author can conclude that dengue haemorragic Fever is a disease caused by degu virus spread by the bite of aedes aegypti mosquitoes with symptoms of high fever, joint pain, and decreased platelets.

2.1.3 Etiology

Dengue virus including Flavivirus serologically there are 4 types of type1, type 2, type 3, type 4. Known 3 kinds arbovirus Chikungunyam Onyongnyong from genus Togavirus and West Nile Fever from genus Flavivirus, which resulted in symptoms of fever and rashes (Widagdo, 2012)

The dengue viruses are positive stranded RNA viruses in the genus Flavivirus, family Flaviviridae. There are four distinct dengue virus (DENV) serotypes that share antigenic relationships (DENV-1, DENV-2, DENV-3, and DENV-4), and although infection with one serotype confers lifelong protection against that serotype, it does not necessarily protect against a secondary infection with a heterologous serotype. Indeed, nonprotective but cross-reactive antibodies may enhance disease severity (Rodrgiuez-Roche & Gould, 2013).

2.1.4 Pathophysiology

The dengue virus enters the body and then reacts with the antibody and forms the antibody virus complex, in which the circulation activates the complement system, due to activation of C3 and C5 releases C3a and C5a, two peptides which are powerless to release histamine and are strong mediators as a factor of increased stability wall of blood vessels. Increased permeability of capillary walls results in reduced plasma volume, resulting in hypotension, hemoconcentration, and hypoproteinemia and effusion and shock (shock) (Suriadi, 2010).

2.1.5 Pathway



Picture 2.2 Scheme of Pathofisiology Source: Nanda NIC-NOC (2015) 2.1.6 Clinical Manifestations

Signs and symptoms are fever or history of acute fever between 2-7 days, usually biphasic. manifestations of usual bleeding, positive tourniquet test, presence of petechiae, thrombocytopenia <100.00 / ul, and plasma leakage with marked: Increased hematocrit values> 20% of age and sex score and hematocrit> 20% decrease after adequate fluid administration. (WHO, 1997 in Nurarif & Kusuma, 2015).

Based on the details of the symptoms, dengue fever can be divided into four degrees, ie:

- 2.1.6.1 In Degrees 1, fever is accompanied by unspecific symptoms and the only manifestation of bleeding is a positive tornoquine test.
- 2.1.6.2 In Degrees two, symptoms in Degrees 1 are accompanied by spontaneous bleeding in skin or other bleeding.
- 2.1.6.3 In Degrees 3, the symptoms of Degrees 1 and 2 are accompanied by the presence of signs of circulatory failure, ie rapid and gentle pulse, decreased pulse pressure (<20 mmhg) or hypotension with cold, moist, and restless skin.
- 2.1.6.4 In Degrees 4, Signs of Degrees 1, 2, and 3 have severe shock, pulse is not palpable and blood pressure can not be measured (Nurarif & Kusuma, 2015).

2.1.7 Complication

According Widagdo (2012) DHF complications are as follows:

- 2.1.7.1 Kidney failure.
- 2.1.7.2 Pleural effusion.
- 2.1.7.3 Hepatomegaly.
- 2.1.7.4 Heart failure

2.1.8 Support Examination

According to Susilaningrum (2013) on DHF patient's blood test

will be found as follows :

- 2.1.8.1 Hb and PCV increased (> 20%).
- 2.1.8.2 Thrombicitopenia (<100,000 / ml)
- 2.1.8.3 Leukopenia (probably normal or leukocytosis)
- 2.1.8.4 Ig.D dengue positive
- 2.1.8.5 Blood chemistry results show hypoproteinemia, hypochloremia, hyponatremia.
- 2.1.8.6 Urine and blood pH may increase.
- 2.1.8.7 Metabolic acidosis: pCO2 <35-40 mmHg, HCO3 is low.
- 2.1.8.8 SGOT / SGPT may increase.

2.1.9 Management

Management for DHF cases are:

- 2.1.9.1 Bed rest: to rest
- 2.1.9.2 Soft foods: to meet the nutrients
- 2.1.9.3 Drink 1.5 2 liters / 24 hours: to meet the lost fluids
- 2.1.9.4 Symptomatic administration of medicament.
- 2.1.9.5 Antibiotics are given when there is a risk of secondary infection.
- 2.1.9.6 Intravenous fluids (Wijayaningsih, 2013)

2.2 Theoretical Review of Nursing of Dengue Haemorrhagic fever (DHF)

- 2.2.1 Assesment
 - 2.2.1.1 Assess the history of nursing

Assess for an increase in body temperature, signs of bleeding, nausea, vomiting, no appetite, heartburn, muscle and joint pain, signs of rapid and weak pulse, hypotension, cold and moist skin especially in extremities, cyanosis, loss of consciousness (Suriadi,2010).

2.2.1.2 Focus Assessment

- a. Health history includes: current illness, prior illness, family illness.
- b. Place of residence: signifies whether or not a residence is feasible.
- c. Environmental conditions: indicates whether or not an environment is clean.
- d. Is there a traveling history from the city (endemic region)
- e. employment history.
- f. The trigger factor and duration of complaint.
- g. Vital signs: signify the general state.
- h. Nutrition pattern: indicates whether or not the nutrition is consumed
- i. Activity pattern: indicates the range of motion of the activity
- 2.2.2 Nursing Diagnosis (Nanda NIC-NOC, 2015)
 - 2.2.2.1 Ineffective peripheral tissue perfusion is related to leakage of blood plasma.
 - 2.2.2.2 Hyperthermia related to dengue virus infection process.
 - 2.2.2.3 Acute Pain.
 - 2.2.2.4 Lack of fluid volume related to intravascular fluid migration to the extravascular
 - 2.2.2.5 Risk for shock (hypovolaemic) related to excessive bleeding, intravascular fluid transfer to extravascular.
 - 2.2.2.6 Imbalance nutrition is less than body needs related to inadequate nutrition intake due to decreased nausea and appetite.
 - 2.2.2.7 Risk for bleeding related to decreased blood clotting factors (thrombocytopenia).
 - 2.2.2.8 Ineffectiveness of breathing patterns related to airway is disrupted by spasms of respiratory muscles, pain, hivopentilation. (Nurarif & Kusuma, 2015).

- 2.2.3 Nursing Intervention
 - 2.2.3.1 According to Nurarif and Kusuma (2015), Ineffective peripheral tissue perfusion is related to leakage of blood plasma.

Intervention

- Monitor the presence of certain areas that are only sensitive to heat / cold / sharp / dull
- b. Monitor ability to defecate.
- c. Limit the movement of the head, neck and back
- d. Discuss the changing sensation

Rational:

- a. Know the signs of bleeding.
- b. Know the ability to push to minimize the bleeding.
- c. Minimize the risk of bleeding.
- d. Know the general state of the client
- 2.2.3.2 According to Wijayaningsih (2013), Hyperthermia related to dengue virus infection process.

Intervention:

- a. Assess at the onset of fever.
- b. Observe vital signs (temperature, pulse, tension, breathing) every 3 hours.
- c. Encourage clients to drink a lot (2.5 liters / 24 hours).
- d. Give warm compresses.
- e. Encourage wearing clothes that can absorb sweat.
- f. Collaboration for administration of antipyretic drugs.

- a. can Identify client fever patterns for subsequent interventions
- b. Vital signs are a reference to know the general state of the client.
- c. Increased body temperature leads to increased body evaporation so it needs to be balanced with a high fluid intake.

- d. Inhibits the center of simplisis in the hypothalamus resulting in vasodilation of the skin by stimulating the sweat glands to reduce body heat through evaporation.
- e. Moist skin conditions trigger the growth of fungus and prevent the onset of skin rash and help the evaporation process.
- f. Reduces fever with central action in the hypothalamus.

2.2.3.3 According to Wijayangningsih (2013), Acute Pain.

- Intervention:
- a. Assess pain levels with a range of pain ranges from 1-10.
- b. Give a comfortable position and atmosphere.
- c. Assess with clients experienced pain.
- d. Teach clients the method of distraction during pain.
- e. Collaborative administration of analgesic drugs.

Rational:

- a. Knowing the level of pain experienced by clients in accordance with the individual response to pain.
- b. A comfortable environment will help the relaxation process.
- c. Help clients in choosing a convenient way to reduce pain.
- d. Relaxation will distract during pain.
- e. Reduces pain optimally.
- 2.2.3.4 According to Nurarif and Kusuma (2015), Lack of fluid volume related to intravascular fluid migration to the extravascular Intervention :
 - a. Monitor general conditions / vital signs.
 - b. Assess for signs of shock.
 - c. Encourage clients to drink a lot.
 - d. Observation of intake and output.
 - e. Collaboration of intravenous fluids.

- a. Hypovolaemia can be manifested by hypotension and tachycardia.
- b. Acetone-breathing related to aceto-acetic acid breakdown and should decrease when ketosis must be corrected, fever with redness, dryness indicates dehydration.
- c. Liquid intake is necessary to increase the volume of body fluids.
- d. Know the fluid balance.
- e. Accelerate the healing process to meet fluid requirements.
- f. Gives estimates of replacement fluids, kidney function, and treatment programs.
- 2.2.3.5 According to Wijayaningsih (2013), Risk for shock (hypovolaemic) related to excessive bleeding, intravascular fluid transfer to extravascular

Intervention :

- a. Monitor the general state of the client.
- b. Obsevation of vital signs every 2-3 hours.
- c. Explain to clients and family about signs of bleeding that occur.
- d. Check hb, HT, AT every 6 hours.
- e. Collaborative administration of blood transfusion
- f. Collaboration of hemostatikum administration.

- a. know the progress of the client's condition during the treatment period.
- b. Mengantisivasi the existence of shock.
- c. Rapid bleeding is known to be treated immediately and prevented.
- By explaining to clients / family is expected signs of shock or bleeding can be immediately known.
- e. Know the level of leakage of blood vessels.
- f. Replace blood (blood volume) as well as missing blood components.

- g. Helps stop bleeding.
- 2.2.3.6 According to Wijayaningsih (2013), Imbalance nutrition is less than body needs related to inadequate nutrition intake due to decreased nausea and appetite.

Intervention:

- a. Assess client's dietary habits.
- b. Weigh the weight every day or as indicated.
- c. Give the food easy to digest.
- d. Serve meals slightly but often.
- e. Teach clients and Engage client families on meal planning as indicated.
- f. Collaboration with doctors for anti-nausea treatment.

Rasional:

- a. Know the needs required by the client.
- b. If food is preferably kien can be included in the digestion of eating, this cooperation can be pursued after returning home.
- c. Reduce fatigue while eating.
- d. The presence of hepatomegaly can suppress the gastrointestinal tract.
- e. Increase the sense of involvement provides information to the family to understand the client's nutrients.
- f. Provision of anti-nausea drugs can reduce the nausea so that the nutritional needs of clients are fulfilled.
- 2.2.3.7 According to Nurarif and Kusuma (2015), Risk for bleeding related to decreased blood clotting factors (thrombocytopenia).Intervention:
 - a. Monitor signs of platelet loss accompanied by clinical symptoms.
 - b. Encourage clients to get plenty of rest.
 - c. Give explanation to report immediately if there is any sign of further bleeding.
 - d. Describe the medicine and its benefits.

Rational:

- a. Platelet decline is a sign of leakage of blood vessels.
- b. Uncontrolled client activity can cause bleeding.
- c. Helping clients get as much handling as possible.
- d. Motivate clients to take medication according to the given dosage.
- 2.2.3.8 According to Nurarif and Kusuma (2015), Ineffectiveness of breathing patterns related to airway is disrupted by spasms of respiratory muscles, pain, hivopentilation.

Intervention:

- a. Position the client as comfortable as possible.
- b. Monitor respiration and O2 status.
- c. Monitor vital sign.
- d. Clean the mouth, nose and secret trachea.
- e. Keep the airway patent.
- f. Inform clients and family about relaxation techniques to improve their breathing patterns.

- a. Provide comfort to clients.
- b. Know the changes significantly.
- c. Recognize the general state of the client.
- d. Facilitate the airway of the client.
- e. Prevents risk of apnue
- f. In order for regular breathing.