

# The Risk of Hemorrhage and Nursing Care in Patients with Crimean-Congo Hemorrhagic Fever

## Kırım-Kongo Kanamalı Ateşi Tanılı Hastalarda Kanama Riski ve Hemşirelik Bakımı

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### Abstract

Thrombocytopenia is seen at a rate of 95-100% in patients diagnosed with Crimean-Congo Hemorrhagic Fever (CCHF). Activation of the coagulation cascade with the effect of endothelial damage leads to thrombocytopenia, hemorrhage, disseminated intravascular coagulation and multi-organ failure. The presence of poor prognosis factors causes the thrombocytopenia to rapidly deepen, and insufficient transfusion causes increased mortality rates. In patients with CCHF, independent nursing interventions include identification of hemorrhage/hemorrhage risk, determining the factors causing hemorrhage and solving the hemorrhage risk problem. Hence, the nurses who work in the unit where CCHF patients are treated should identify the hemorrhage risk in detail, specify individualized nursing interventions, follow evidence-based practice and be in collaboration with other health staff. This review presents information about nursing care aiming at hemorrhage/hemorrhage risk developing from thrombocytopenia in patients with CCHF.

**Keywords:** Crimean-Congo Hemorrhagic Fever; Hemorrhage; Nursing Care; Thrombocytopenia.

### Özet

Kırım-Kongo Kanamalı Ateşi (KKKA) tanılı hastalarda %95-100 oranında trombositopeni görülmektedir. Hastalarda gelişen endotel hasarının etkisiyle koagülasyon kaskadının aktifleşmesi, trombositopeniye, kanamaya, yaygın damar içi pıhtılaşmaya ve çoklu organ yetmezliği gelişmesine yol açmaktadır. Kötü prognostik faktörlerin olması, trombositopeninin hızlı bir şekilde derinleşmesi ve yeterli transfüzyonun yapılmaması, mortalite oranlarının artmasına neden olmaktadır. KKKA tanılı hastalarda kanama/kanama riskini tanılama, kanamaya neden olan faktörleri belirleme ve kanama riski sorununu çözme, bağımsız hemşirelik girişimlerini ifade eder. Bu nedenle KKKA tanısı ile tedavi gören hastaların olduğu üniteye çalışan hemşirelerin, her hastada kanama riskini ayrıntılı tanılamaları, bireye özgü hemşirelik girişimlerini belirlemeleri, bu konudaki kanıta dayalı uygulamaları takip etmeleri ve diğer sağlık ekibi üyeleri ile iş birliği içinde olmaları gerekir.

Bu derlemede, KKKA tanılı hastalarda trombositopeni sonucunda gelişen kanama/kanama riskini belirlemeye ve önlemeye yönelik planlanan hemşirelik bakımı yer almaktadır.

**Anahtar Kelimeler:** Kırım-Kongo Kanamalı Ateşi; Kanama; Hemşirelik Bakımı; Trombositopeni.

### INTRODUCTION

Crimean-Congo hemorrhagic fever (CCHF) is a zoonotic disease characterized by hemorrhage in the group of hemorrhagic fever (1). CCHF is one of the emergencies of infectious diseases. According to the

data of the World Health Organization (WHO), 3 billion individuals are under the risk of CCHF. Each year, 10.000-15.000 CCHF cases are reported and about 500 individuals die from the complications of CCHF (2).

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CCHF is endemic in Africa, Middle East, Asia and some regions of Southeast Europe. CCHF virus has been seen in more than 30 countries. Between 1998 and 2013, CCHF was most seen in Turkey, Russia, Iran, Pakistan, and Afghanistan (3,4). In the northern hemisphere, contamination with CCHF mostly occurs between May and September and the incidence is highest in June and July (5,6). CCHF spreads through direct contact with blood and other body fluids of tick, infected animals, through nosocomial spread and vertical spread. The tick can adhere to any part of the human body including the trunk, extremities and the head and neck (7,8).

Thrombocytopenia is seen in almost all patients with the diagnosis of CCHF and signs of the hemorrhagic stage manifest as subcutaneous hemorrhage, namely petechia, purpura, and ecchymosis, gingival, nasal, vaginal, gastro-intestinal, urinary, lung and cerebral hemorrhage in the advanced stages of the disease (9-11). Thrombocytopenia-related hemorrhage renders patients to experience severe problems. Thrombocytopenia is defined as a platelet count of below  $150.000/\text{mm}^3$  (12).

Although a specific treatment is not available for CCHF, the mortality rates are low with proper supportive treatment. In patients with hemorrhage, transfusion should be carried out to keep the platelet count above  $20.000/\text{mm}^3$  (12-14).

Patients hospitalized with the diagnosis of CCHF should be isolated from other patients and contact and respiratory isolation measures should be applied. The health professionals who provide care interventions should use personal protective equipment including gloves, eyeglasses, masks and coveralls. Individuals who may encounter blood or body fluids of patients should be evaluated for development of fever, fatigue, widespread body pain for 14 days and laboratory tests should be performed for leukopenia, thrombocytopenia, and elevated transaminases (11,15-17). In addition, ribavirin prophylaxis is recommended for these individuals (18).

### **Nursing Care for Individuals Who Have the Risk Factors for Hemorrhage or Who Experience Hemorrhage**

The primary goal of care for a patient with CCHF includes prevention of injury risk, fall risk, and complications, early care and treatment of hematological impairment and complications, and thereby enabling recovery in the shortest possible time. In treatment of CCHF-related thrombocytopenia, nursing care toward controlling hemorrhage is quite important in cases when platelet infusion should be undertaken by applying interventional procedures. Therefore, nurses have an important role for determining the factors that increase hemorrhage and planning proper nursing interventions (19,20). Planning and applying patient-specific nursing care are among the independent roles of nurses. Furthermore, nurses aim at solving the hemorrhage/hemorrhage risk-related problems through collaboration with other health team members (21,22).

Care should be provided in accordance with the nursing process, which is the scientific problem-solving method composed of the steps of determining the needs of the patients hospitalized for CCHF who have the risk factors of hemorrhage or who had hemorrhage, planning, implementation and evaluating nursing interventions toward these needs. The nursing process consists of the diagnosis, identification of nursing assessment, planning, implementation, and the evaluation steps (23,24). All members of the healthcare team should be in cooperation for assessment of thrombocytopenia-related hemorrhage risk/hemorrhage and early initiation of preventive/therapeutic interventions. During this process, nurses who are the crucial members of the healthcare team recognize the changes early by constantly observing the patients. Providing care for the patients in accordance with the nursing process would enable the patient to recover in the shortest period through preventing complications such as the CCHF-related hemorrhage/hemorrhage risk and infection risk (19,21,25).

## 1. Assessment

This is the first stage of the nursing process: the pre-assessment of the condition for the detection of care needs of the individual or family. It is the stage when the information is collected and verified. The data should be correct and complete as it is the main stage of the process (26). In the assessment stage of the nursing process, the obtained data are arranged, compared, and classified after comprehensive evaluation of the individual. Hence, the health problems of the individual can be identified, and the causes can be discriminated (23,27).

In CCHF, individuals who work in endemic regions, who are occupied with agriculture or breeding, who travel to rural areas and members of the healthcare team who play a role in care and treatment of the patients comprise the risk group. Environmental factors such as temperature and humidity are important risk factors for the spread of the disease (28).

Diagnosis of the patients with CCHF includes data collection, interpretation and re-arrangement of data, organization of data and evaluation activities (29,30). The diagnosis of the patient followed-up with CCHF is important. The nursing process should be used together with this model for scientific and systematic conduction of nursing practices (31,32). In the assessment step of the nursing process, the use of a proper model enables correct and complete data collection, helps nurses make a decision, and facilitates data analysis (31,33,34). In this context, the forms prepared under the guidance of a nursing model adopted by the institution make data collection systematic at patient admission. Nursing model may be used at every stage of the nursing process (35). The care given in that way would be sufficient for meeting the needs of the individual. Diagnosis of hemorrhage/hemorrhage risk consists of taking the medical and nursing history of the patient and assessment of the vital signs, auxiliary radiological and laboratory tests. For the management of hemorrhage in patients with CCHF, genetic disorders that could cause hemorrhage should be identified, laboratory results should be evaluated, the amount of the fluid taken and excreted

by the patient should be monitored. At the same time the patient should be constantly monitored, anticoagulants and other medications of the patient should be determined, medications should be arranged through cooperation with the physician and hemorrhage should be controlled. The nurses should investigate the factors that cause hemorrhage, factors that increase hemorrhage and their reasons while they try to identify hemorrhage/hemorrhage risk and solve the identified problems (19-21,25,36).

## 2. Nursing Diagnosis

In the nursing diagnosis stage as the second stage of the nursing process, the health problems of the individual and the factors that lead to these problems can be determined. This process is the data analysis process in which the nurse uses critical thinking skills. It results in identification of one or more nursing diagnoses in individual-specific care delivery (23,27,37,38).

The data of the patient with CCHF are collected, grouped, interpreted and the nursing diagnosis of "hemorrhagic risk" is made by using the NANDA-I (North American Nursing Diagnosis Association-International) classification. For making the diagnosis of hemorrhage risk in patients with CCHF, the tendency to decrease in blood volume that may damage health conditions should include the definition of the hemorrhage risk. Lack of knowledge about the hemorrhage measures that allow identification of the problem should take into account the risk factor (39). In addition to the nursing diagnosis of the hemorrhage risk in patients with the diagnosis of CCHF, many common NANDA-I nursing diagnoses can be made. These can be include:

- Pain
- Hyperthermia
- Fluid volume imbalance
- Impaired skin integrity
- Ineffective peripheral tissue perfusion
- Anxiety
- Fear
- Infection risk, etc. (40).

### 3. Planning

In the planning stage, the decision is made regarding how individualized, targeted, and organized nursing care will be provided. The nurse defines the individualized expected outcomes and develops a care plan that includes the interventions for achieving the expected outcomes. Care priorities are determined with the patient and the short- and long-term expected outcomes of the goals of the care are determined, nursing interventions are decided, and the care plan is prepared (27,41).

#### Identification of Outcomes

When performing the care and treatment of the patients with the diagnosis of CCHF, planning should be made towards elimination of nursing problems related to life activities (27,37,42,43).

**NOC (Nursing Outcomes Classification):** The nursing diagnosis of "hemorrhagic risk" is made by using the NANDA-I (North American Nursing Diagnosis Association-International) classification and the relevant NOC is decided.

The severity of blood loss: The severity of internal and external bleeding/hemorrhage is determined.

The individuals are classified into 1-severe, 2-significant, 3-moderate, 4-mild, 5-none groups according to the following signs and symptoms:

- Visible blood loss
- Reduced systolic and diastolic blood pressure
- Increased apical heartbeat rate
- Pale skin and mucous membranes
- Reduced hemoglobin (Hb) levels
- Reduced hematocrit (Hct) levels (44).

#### Expected outcomes;

- To eliminate the hemorrhage risk factors, signs and symptoms
- To reduce invasive interventions
- To provide sufficient fluid intake
- To eliminate constipation and its symptoms

- To help patients to be able to independently perform the life activities that they can tolerate
- To enable maintenance of life activities within normal ranges (23,32,45).

#### Nursing Interventions

At the planning stage, the decision is made for interventions toward the hemorrhage risk nursing diagnosis. The proper nursing interventions for the patient should be determined in accordance with the etiology of the problem and expected outcomes. Nursing interventions are planned for maintenance of the care and management of the planned activities for the patients diagnosed with CCHF (30,46).

**NIC (Nursing Interventions Classification):** After the "hemorrhagic risk" nursing diagnosis is determined and the NOC is decided, the NIC related to the "hemorrhagic risk" nursing diagnosis is determined.

#### The Interventions for Problem Solving

- Supervision

#### Preventions for Hemorrhage

- To reduce bleeding
- Risk identification
- Management of the environment: Safety
- Prevention of falls (47).

#### Nursing activities toward the specified nursing interventions

- The risk factors for hemorrhage are evaluated.
- The risk factors for thrombocytopenia are determined.
- The patients are monitored for signs and symptoms of hemorrhage (petechia, ecchymosis, hematuria, hemoptysis, epistaxis, gingival bleeding, etc.).
- Complete blood count, in particular the platelet level is checked.
- Safety measures are taken for protection from traumas and injuries (use of non-slip shoes, removal of bedsides, etc.).
- Vital signs are monitored.
- Level of conscious is monitored.

- Bed clothing-related skin traumas are reduced.
- Dangerous and sharp objects are removed.
- Help is provided for the patient for daily living activities like getting off the bed, walking, going to the toilet.
- Fine needles are used for injections.
- Pressure is applied to vascular access point for 5 minutes or until the bleeding stops.
- The sites of invasive applications are monitored for bleeding.
- Fluid intake is increased according to body mass index (BMI) in cooperation with the physician.
- The potential side effects of the medications are evaluated regarding the hemorrhage risk.
- Information is provided to the patient family or caregiver for prevention of hemorrhage.
- Intra-muscular injection is not carried out when the platelet count is low.
- Constipation is prevented by helping the patient consume fiber food for prevention of intestinal hemorrhage.
- Oral laxatives and feces softeners are used for prevention of constipation.
- Platelet suspension transfusion is carried out with the order of the physician.
- Measuring rectal temperature, applying vaginal and rectal suppositories are avoided.
- Soft toothbrushes are used for oral care.
- Care should be paid for nose care and hard applications should be avoided.
- If there is gingival bleeding, only toothpaste is used for oral care.
- Lips should be moistened once every 2 hours.
- The procedures that should be performed in case of hemorrhage (like applying pressure) are taught to the subjects/families and they are educated for the importance of early intervention.
- Rest cure is maintained during active hemorrhage (19,21,25,36,48,49).

#### 4. Implementing

This is the stage in which the planned nursing care is implemented. The nurse initiates nursing

interventions that enable the individual to reach optimal health through the care plan developed toward nursing diagnoses (23,24,42).

During the implementation, the patient is informed about the interventions planned. The consent of the patient or family should be obtained, privacy and confidentiality should be provided, goals, planned interventions, and the methods to be implemented should be reviewed (23,30).

#### 5. Evaluating

The evaluation stage is defined as “making a decision for the effectiveness of nursing interventions applied toward meeting the needs of the individual” (24). Although the evaluation seems to be the last stage of the nursing process, it takes place at every stage. The evaluation made at the previous stage usually requires re-diagnosis, creating a nursing diagnosis and planning. The changed and newly developing needs are determined through focused diagnosis (23,24). In patients with CCHF, the evaluation should be made frequently as massive hemorrhage is life threatening and even causes death (8,13).

In the evaluation, whether the expected outcomes are realized or not, the determined problems and the potential risks, and whether the targeted goals could be achieved or not, should be evaluated. If the problem continues, all stages of the process are reviewed, and the required changes are made in the care plan in accordance with the determined needs (24,26).

#### CONCLUSION

The main factors that influence the emergence of CCHF include climatic and environmental factors. For protection from CCHF and prevention of its spread, contact with ticks and the virus should be hindered and individuals or families or the community should be instructed about the ways of contamination and protection and ticks (50).

When proper care is not provided when the thrombocytopenic patient has bleeding or the risk factors for bleeding; the quality of life of the patient

is impaired as the duration of the disease prolongs, and bleeding and multi-organ failure lead to an increase in the mortality rate (50). In this context, environmental risk factors and individual risk factors should be determined. Individualized nursing care should be planned, implemented, and the outcomes of hemorrhage risk, a complication of CCHF, should be evaluated during care, treatment, and the discharge processes. As the hemorrhage risk is commonly and potentially life-threatening problem

in patients with CCHF, the patients should be evaluated at certain intervals beginning from admission to the unit.

Nurses who provide care for thrombocytopenic patients should have sufficient knowledge about the hemorrhage risk and update their knowledge in accordance with the related evidence-based interventions (51).

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