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Care and therapeutic tasks for patients with multi-organ trauma after traffic accidents

Zadania opiekuńcze i terapeutyczne wobec pacjentów z urazem wielonarządowym po wypadkach komunikacyjnych

Summary

Introduction. A multi-organ injury is an injury in which more than one organ has been damaged. A patient who has suffered a multi-organ injury requires complex care, the implementation many specialised procedures from a range of medical fields.

Objective. The aim is present the management of potencial patient with multiple organ trauma during admission to hospital and hospitalisation in a hospital ward and to identify the most common nursing problems.

Overview. Multi-organ trauma is an immediate life-threatening condition and requires the entire medical team to be committed, collaborative and act quickly to nullify the effects of the injury and prevent progression of the traumatic changes. The nurse has an overarching role in the care of the trauma patient. Treatment also includes educational and preventive measures. Nursing staff provide extensive education to the patient and the patient's family.

Conclusions. Multi-organ trauma is a clinical condition that requires immediate medical intervention on many levels. Such a patient is in a state of immediate threat to life, and the actions taken by medical staff have a significant impact on the patient's condition and his return to full health or convalescence.

Keywords: Multi-organ trauma, rib fracture, lung contusion, lung rupture, nursing process, individual case study.

Streszczenie

Wstęp. Uraz wielonarządowy to uraz, w którym więcej niż jeden narząd uległ uszkodzeniu. Pacjent, który doznał uraz wielonarządowego wymaga kompleksowej opieki, wdrożenia wielu specjalistycznych procedur z szeregu dziedzin medycyny.

Cel. Celem pracy jest przedstawienie postepowania z potencjalnym pacjentem z urazem wielonarządowym podczas przyjęcia go do szpitala oraz hospitalizacji w oddziale szpitalnym i wskazanie najczęstszych problemów pielęgnacyjnych.

Przegląd. Uraz wielonarządowy jest stanem bezpośredniego życia i wymaga od całego zespołu medycznego zaangażowania, współpracy oraz szybkiego działania w celu niwelowania skutków urazu oraz niedopuszczenia do progresji zmian urazowych. Pielęgniarka pełni nadrzędną role w sprawowaniu opieki nad pacjentem urazowym. Postepowanie lecznicze obejmuje także działania edukacyjne oraz profilaktyczne. Personel pielęgniarski prowadzi na szeroką skalę edukację chorego oraz jego rodziny.

Wnioski. Uraz wielonarządowy jest stanem klinicznym, który wymaga natychmiastowej interwencji medycznej na wielu płaszczyznach. Pacjent taki znajduje się w stanie bezpośredniego zagrożenia życia, podjęte działania przez personel medyczny mają znamienny wpływ na stan chorego i jego powrót do pełni zdrowia czy rekonwalescencje.

Słowa kluczowe: uraz wielonarządowy, złamanie żeber, stłuczenie płuc, rozerwanie płuca, proces pielęgnowania, studium indywidualnego przypadku.

Introduction

A multiple organ injury involves damage to more than one part of the body, with the injury being life-threatening. It usually requires multisystem surgical intervention; consequently, the patient is hospitalised in an intensive care unit. The treatment of the multiple organ injury patient is focused on managing haemorrhagic disorders, using broad-spectrum targeted antibiotic therapy, managing ionic and blood gas abnormalities, and introducing clinical nutrition or VTE prophylaxis. Both ward medical and nursing staff aim to avoid potential complications or progression of the injury [1].

Objective

This paper seeks to illustrate the management of a potential patient who has suffered multiple organ injury: abdominal and thoracic trauma with multiple rib fractures and lung contusion.

Overview

Approximately 75 million people are injured worldwide each year. Of this number, 80% are between the ages of 20 and 49. In the group of young people up to the age of

45, injuries and their sequelae, together with poisoning, are the leading cause of death. In Poland, 12.6% of all road accidents are fatal, while the European average is 4.5%. The road traffic fatality rate in Poland is seven deaths per 100 injured, while the European average is three deaths per 100 injured. Of all injuries, two dominate: craniocerebral trauma and abdominal trauma, where the mortality rate in craniocerebral trauma is 34.8–52% [2].

Bodily injuries can be classified in many ways: by location, multiplicity or type. The most common one differentiates between isolated injuries, multiple organ injuries and multiple site injuries. Other classifications divide injuries into multiple and single injuries, with none of these classifying the severity of the patient's condition. According to Polish statistics, as many as 300,000 people with injuries require hospital treatment of which 10–20% have suffered multiple injuries [2,3].

As it turns out, a patient with multiple injuries can be quite a problem when it comes to prioritising management. Sometimes, the number of injuries and their location, or at least the patient's condition, require the assistance of multiple specialists or immediate neurosurgery and surgery. Also of great importance is the history taken by the emergency medical team and their handling of the patient during wound management at the scene of the accident or during transport to a hospital. Whenever possible, the paramedic can provide valuable information through the history taken, such as the time of the last meal, allergies, medications, chronic diseases and blood group. Such information can significantly speed up the diagnosis of the casualty and the implementation of appropriate treatment in the hospital emergency department. It is very good practice to take and secure blood samples, which significantly speeds up, for example, the determination of the blood group and its cross-matching for potential surgical intervention. Of course, imaging studies such as radiographs, CT scans or plain ultrasound scans are indispensable for diagnosis; the latter can be performed by paramedics using the eFAST protocol while managing the patient's wounds in the ambulance. Imaging studies show medical staff the exact location of the injury, its extent or the need for surgical treatment. The most common organ injuries are:

- head injuries: intracranial haemorrhage, concussion, cerebral contusion
- chest injuries: tension pneumothorax, rib fracture, lung contusion, haemothorax, cardiac tamponade, cardiac contusion, rupture of the diaphragm, rupture of the aorta.
- abdominal cavity injuries: rupture or tearing of the spleen, liver and kidneys, large vessels, rupture of the intestine, and rupture of the urinary bladder.
- musculoskeletal system injuries: fractures of long bones, rib fracture, clavicle fracture, joint sprain/dislocation, vertebral fractures

A potential patient suffered a multiple organ injury as a result of a road traffic collision between two cars. On admission, the patient's condition is most often described as serious. Parameters: HR and RR are elevated, while NIBP and SO2 are usually lowered. The patient usually presents with tachypnoea, a tender and painful abdomen, elevated

inflammatory parameters (CRP, PCT), and deteriorated ventilation. The doctor usually orders oxygen therapy at 3 L/min and basic blood tests, including blood typing. A CT scan often reveals multiple rib fractures, lung contusion, pneumothorax, ruptured spleen and cardiac contusion. Following emergency surgery, pleural drainage is often performed to decompress the pneumothorax, and a central venous catheter is inserted. Due to the risk of progression of traumatic injuries, analgosedation and mechanical ventilation are undertaken in the patient, and parenteral nutrition is introduced. Empirical broad-spectrum antibiotic therapy and a follow-up chest and abdominal CT scan are included. When the patient's condition improves, inflammatory markers decrease, the oxygen concentration in the breathing gas mixture is reduced, the ventilation mode is changed to CPAP, and analgosedation is reduced. In favourable conditions, the patient is extubated, and high-flow oxygen therapy is undertaken, followed by passive oxygen therapy via nasal cannula. On subsequent days, when the patient's condition stabilises, a transfer to the general surgery ward is made for further treatment.

Example of a proposed nursing diagnosis for a potential patient

A patient admitted to hospital with a multiple organ injury as a result of a traffic accident requires total support from medical staff in the first few days of hospitalisation in self-care. A bedridden patient requires preventive care for pressure ulcers. The patient experiences pain due to the injury type and its extent. In addition, the patient is deeply concerned about their condition and prognosis.

Proposed models of care

Dorothea Orem

A theoretical model that has been applied in practice, known as the self-care deficit theory. This model includes three systems of care:

- total compensation,
- partial compensation,
- educative/supportive.

In the care of the multiple organ injury patient, a total compensation system was used, targeting the total care of the patient in the Intensive Care Unit and an educative/supportive system aimed at the patient's family, which requires education in the care of the patient after hospital discharge.

Virginia Henderson

A nursing model of care oriented towards human need theory, in the case of the multiple organ injury patient, requires the nurse to focus on evaluating the patient's needs as their condition improves, where the expected end-stage of the patient's stay in the

intensive care unit is the complete recovery of biopsychosocial function. The nurse's role is to plan care and deliver and evaluate the intervention undertaken.

Callista Roy

The adaptation model aims to help the patient and family adapt to the new situation. The role of the nurse is to motivate and present solutions to shape a new reality after a new life situation, such as a multiple organ injury [4].

Nursing problems

Diagnosis 1

Pain [10013950]

Interventions

- Monitoring pain [10038929];
- Assessing pain [10026119];
- Administering pain medication [10023084];
- Nurse-controlled pain management [10039798];
- Identifying attitude toward pain [10009654];
- Managing pain [10011660];
- Collaboration in the implementation of nurse-controlled pain management
- [10039812].

Outcome

Reduced pain [10027917].

Diagnosis 2

Impaired respiratory system function [10023362]

Interventions

- Maintaining ventilation with a mechanical ventilator [10046258];
- Monitoring respiratory therapy [10037092];
- Monitoring respiratory status [10012196];
- Monitoring laboratory result [10032099];
- Managing symptom [10031965];
- Monitoring blood oxygen saturation using pulse oximeter [10032047];
- Drainage tube care [10046113].

Outcome

Effective respiratory system function [10028160]

Diagnosis 3

Altered blood pressure [10022954]

Interventions:

- Monitoring blood pressure [10032052];
- Measuring blood pressure [10031996];
- Administering medication [10025444];
- Monitoring response to treatment [10032109];
- Measuring blood pressure [10031996];
- Ensuring continuity of care [10006966].

Outcome

Blood pressure within normal limits [10027647].

Diagnosis 4

Effective continuity of care [10035507]

Interventions:

- Ensuring continuity of care [10006966];
- Continuous surveillance [10005093];
- Monitoring pain [10038929];
- Monitoring blood pressure [10032052];
- Monitoring response to treatment [10032109];
- Monitoring blood oxygen saturation using pulse oximeter [10032047];
- Monitoring tissue perfusion [10035335];
- Monitoring cardiac status [10034285].

Outcome

Effective continuity of care [10035507].

Diagnosis 5

Risk for impaired nervous system function [10037333]

Interventions

- Monitoring neurological status [10035326];
- Assessing neurological status [10036772];
- Monitoring intracranial pressure [10046355];
- Monitoring vital signs [10032113];
- Monitoring pain [10038929];
- Monitoring confusion [10045424];
- Monitoring response to treatment [10032109].

Outcome

Effective nervous system function [10027675].

Diagnosis 6

Risk for impaired nutritional status [10037224]

Interventions

- Assessing nutritional status [10030660];
- Managing nutritional status [10036013];
- Assessing risk for impaired nutritional status [10040921];
- Monitoring nutrition [10036032];
- Monitoring bowel motility [10037211];
- Monitoring blood glucose [10032034];
- Monitoring bilirubin level [10036992];
- Monitoring fluid balance [10040852].

Outcome

Positive nutritional status [10025002].

Diagnosis 7

Risk for pressure ulcer [10027337]

Interventions

- Providing pressure relieving mattress [10050281];
- Assessing risk for pressure ulcer [10030710];
- Skin care [10032757];
- Fracture care [10043464];
- Skin assessment [10041126];
- Applying ointment [10050350].

Outcome

No pressure ulcer [10029065].

Diagnosis 8

Risk for impaired urinary system function [10045453]

Interventions

- Assessing urine [10050164];
- Catheterising urinary bladder [10030884];
- Urinary catheter care [10033277];

- Managing urinary catheter [10031977];
- Monitoring fluid balance [10040852];
- Monitoring fluid output [10035319].

Outcome

Effective urinary system function [10028615].

Diagnosis 9

Risk for infection [10015133]

Interventions

- Monitoring signs and symptoms of infection [10012203];
- Assessing signs and symptoms of infection [10044182];
- Preventing infection [10036916];
- Use aseptic technique [10041784];
- Assessing exposure to contagion [10044013].

Outcome

No infection [10028945].

Diagnosis 10

Risk for hypovolaemia [10042049]

Interventions

- Monitoring fluid intake [10035303];
- Monitoring fluid balance [10040852];
- Monitoring fluid output [10035319];
- Measuring fluid output [10039250];
- Managing fluid therapy [10042096];
- Collaborating in fluid therapy [10030948];
- Assessing fluid intake [10044176].

Outcome

Adequate hydration [10042065].

Diagnosis 11

Risk for impaired cardiac function [10037314]

Interventions

- Monitoring blood pressure [10032052];
- Monitoring tissue perfusion [10035335];

- Monitoring laboratory result [10032099];
- Monitoring cardiac status [10034285];
- Assessing cardiac status [10036738];
- Assessing cardiac status using monitoring device [10002706].

Outcome

Effective cardiac function [10035077].

Diagnosis 12

Acid-base imbalance [10033539]

Interventions

- Administering medication and solution [10001804];
- Administering intravenous medication [10045836];
- Managing medication [10011641];
- Monitoring laboratory result [10032099];
- Monitoring fluid balance [10040852];
- Monitoring response to treatment [10032109].

Outcome

Improved acid-base balance [10033502].

Nursing guidance for the patient and family

Multiple organ injury is an immediate life-threatening condition. The multiplicity of injuries, their extent, and the treatment management have a significant impact on the patient's comfort and quality of life going forward. Above all, the patient must follow medical and nursing advice after such an injury. The patient should remain under specialist care for an extended period of time, so regular visits to the outpatient clinics and primary care are necessary. Moderate physical activity is advisable: daily walking and exercise will greatly impact a rapid recovery [5].

Another critical point is that prescribed medications are taken regularly. Consistent and systematic intake of medication will guarantee a rapid recovery. In addition, the patient should ensure a balanced diet during recovery: one that is rich in protein, fruit and vegetables, minerals, and vitamins while avoiding highly processed products [6].

The patient's family should show great empathy towards the patient. The support of loved ones is an invaluable aid to recovery and a boost of positive energy. The patient's loved ones should also ensure that all recommendations from medical staff are followed [6].

Care and therapeutic tasks

A patient hospitalised for a multiple organ injury requires specialist care from the whole treatment team. The overarching task of the nursing team is to identify the patient's care problems, clarify the goal of care, isolate appropriate nursing actions and evaluate the outcome [7].

Qualified medical staff, including paramedics, laboratory diagnosticians, electroradiologists, nurses, and doctors of various specialities, participate in the care and diagnosis of multiple organ injury patients. Properly coordinated management by medical personnel has a direct impact on the rapid diagnosis of the patient and the introduction of appropriate and effective treatment as soon as possible. The mentioned measures should ideally involve the patient's family, who should support the patient and provide the medical staff with important information about the patient's condition before the injury [8].

The nursing staff caring for a patient with multiple organ injury has a therapeutic, diagnostic, and surgical function, but it also assumes a preventive or educational function later in the treatment process [9].

The nurse's diagnostic function is performed during the first meeting between the nurse and the patient. The patient's condition can be quickly assessed by measuring basic vital signs such as blood pressure, temperature, or heart rate. Carrying out a thorough physical examination and taking a history deepen the information already collected and promote the formulation of a correct diagnosis. The culmination of diagnosis is the review and analysis of the patient's laboratory tests – the correct interpretation of the results can significantly influence further management and the patient's prognosis [10].

The abundance of medication administered to trauma patients forces the nurse to have a sound and broad knowledge of pharmacology and pharmacokinetics. The nurse must know the action, effect or interaction of drugs. The speed of the nurse's action when administering pharmacotherapy has a significant impact on the patient's subsequent prognosis, especially when the patient is still in shock. The nurse must be able to calculate the dose of medication ordered by the doctor and know its effect. During the emergency procedure, it is the nurse's responsibility to ensure the success of the actions taken; speed and insight will reflect the success in improving the patient's condition [11].

After intensive treatment and stabilisation of the patient's condition, it is time to round off the therapeutic measures; it is time to educate the patient and follow up after discharge. The nurse's educational and preventive functions significantly impact the patient's and their family's management at home. It is up to the nurse to instruct on how

to change dressings correctly, interpret blood pressure or blood glucose measurements correctly, and manage abnormal results. Through a preventive function, the nurse can prevent the patient from another hospitalisation, worsening the condition, or exacerbating the disease [12].

Conclusions

1. Multiple organ injury is an immediate life-threatening condition and requires the entire medical team to be committed and collaborative and act quickly to mitigate the effects of the injury and prevent the progression of traumatic damage.
2. The nurse has an overarching role in the care of the trauma patient. The nurse measures vital signs and is responsible for interpreting, analysing, and acting on pathological results. The nurse is responsible for carrying out medical orders, preparing medicines and administering them, and caring for vascular catheters, wounds, and drains. The nurse is an indispensable part of therapy. She is always at the patient's side, quickly identifies nursing problems, and selects appropriate interventions.
3. Treatment also includes educational and preventive measures. Nursing staff extensively educate patients and their families so that they can competently care for the patient after hospital discharge. Patients sometimes only make a full recovery at home, and loved ones have to assume a nursing role during this time.

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