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Mini Review

Initial assessment of the trauma patient: a nursing approach

Panagiota Katsaphourou

University Orthopedics Clinic, General Hospital of Attica "KAT", Athens, Greece

Abstract

This article presents a mini review of a nursing approach to the trauma patient. Trauma injury is one of the leading causes of death and is considered a modern era disease that poses an immense financial, social and even political burden, forcing the topic of death toll due to unsafe state infrastructures into the political agenda. Reviewing articles from various sources and databases written in English and in Greek, we look into the role of the trauma nurse, focusing on the steps that need to be followed during the initial assessment and the primary evaluation of the trauma patient in an attempt to point to the fact that knowledge of protocols, speed and close collaboration can be factors that literally make a difference between life and death on the trauma patient's life.

Keywords: Trauma nurse, Trauma patient, Initial assessment and primary evaluation

Introduction

Traumatic injuries or trauma refers to physical injury that occurs suddenly and is potentially severe in form, requiring immediate medical assistance such as resuscitation or other actions to prevent permanent damage or death. Major trauma is usually caused by external forces such as falls, road accidents, assaults, crush injuries, burns etc. Severe traumatic injury requires admission to a hospital for assessment, treatment and rehabilitation, and the full extent of the injuries calls for thorough diagnostic and therapeutic procedures. Moreover, the patient who experiences physical trauma will more often than not face longterm psychological difficulties due to the shock of the unanticipated injury[1].

According to the World Health Organization, traumatic injury accounts for 9% of global mortality[2]. Only in the USA, traumatic injury is the first cause of death in ages 1-46, with a staggering 47%[3]. The leading cause of traumatic injury are road traffic injuries, with more than 1.25 million people worldwide losing their life each year as a result of traffic crashes[4]. Since the human population increases along with the number of vehicles worldwide, traffic accidents alone slowly develop into a modern pandemic that acquires the epidemiology trend of a disease[5,25], burdening the health systems with requirements for short or long-term hospitalizations, emergency department visits and thousands of doctor hours[2]. In Greece, a country with a population of 10.77 million people, the Hellenic Statistical Authority reports that in the period 2000-2015 approximately 250,000 road accidents occurred resulting in 22,500 deaths and 32,500 people with severe injuries and disabilities[6].

50% of all trauma deaths usually occur within the first hours of injury[7]. They are usually related to brain injury, cardiovascular collapse or hemorrhage and can be prevented if properly treated. It therefore becomes evident that the survival of patients and the prevention of disabilities rely on securing that the right patient receives the most appropriate treatment in the shortest time possible[8]. In the effort to save the patient's life, a multidisciplinary team of health professionals has to collaborate closely. These professionals must work together to assess and manage the trauma patient. They come from the areas of emergency medicine, nursing, surgery, intensive care and support, and are all coordinated by a team leader. Their aim is to quickly resuscitate and stabilize the trauma patient, determine the nature, extent

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Corresponding author: *Panagiota Katsaphourou, 55 Dimitriou Damaskou Str., 13674 Acharnes, Menidi, Athens, Greece*

E-mail: *pkatsaphourou@gmail.com*

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and severity of the injuries, prioritize management and transport or prepare the patient for definitive care[8].

The role of the nurse is of the outmost importance since they are either dispatched -in some countries, such as the US or the UK- at the site of the injury during the prehospital phase or are present upon arrival at the hospital. They are usually the emergency care and critical care professionals[9,10] who are involved in the initial assessment, help initialize the trauma patient care procedure by triaging the patient, participate in the primary evaluation, prepare patients for operations, assist surgeons during operations and monitor the patient. These are evidently highly demanding tasks that require knowledge, stamina, dedication and effectiveness.

Method

For the purposes of this article, a review of the existing literature on the topic of nursing approach in trauma care was conducted in online databases (PubMed/Medline), medical and nursing journals and websites with the use of the key words: trauma nurse, trauma patient, initial assessment and primary evaluation. From the 75 online sources retrieved, 25 met the inclusion criteria which were the role of the nurse during the care of the trauma patient in the stages of Preparation, Triage and Primary Survey. The data selected came from sources published between 1995 and 2018. Exclusion criteria were all other stages of the assessment of the trauma patient, specific traumatic injury types and sites in the human body, particular trauma patient groups and articles published prior to 1995.

Results

Initial assessment

The majority of trauma deaths occur within the first hours after injury. The causes usually are extensive nervous and/or cardiovascular system damage[11]. The mechanism of the injuries leading to death usually follows predictable patterns and is closely related to individual patient characteristics, as well as environmental conditions. The identification of these patterns can make the difference between life and death for the patient. The study of these patterns led to the development of the Advanced Trauma Life Support (ATLS), the protocol nowadays used as standard of care for trauma patients[12].

Advanced Trauma Life Support (ATLS) - stages

The ATLS came to life as a training program in 1978. The inspirational force was an orthopedic surgeon who suffered the consequences of inadequate emergency care after a plane crash in a rural area of Nebraska in 1976. The crux of the program is the creation of universal principles in the evaluation of the trauma patient with the use of assessment steps that help health professionals identify and manage the most life-threatening conditions in relation to the severity of risk they pose. The abridged main steps of the trauma assessment according to the ATLS comprise:

1. The Preparation
2. The Triage
3. The Primary Survey
4. The Resuscitation
5. The Secondary Survey
6. The Monitoring and Evaluation
7. The Definitive Treatment or transfer to a trauma center for definitive care

For the purposes of the present article we will focus on the steps of Preparation, Triage and Primary survey.

Preparation

The stage of preparation for the trauma patient is divided into the prehospital and the hospital phases.

Prehospital phase

During the prehospital phase the health care providers on scene and in the hospital must coordinate. The emergency team must make every effort to notify the hospital that will receive the patient, so that the hospital's trauma care members are ready and all resources are present and checked. As regards the patient, airway maintenance, hemorrhage and shock control, immobilization and quick transfer to the facility are the main concerns. The team on scene should also try and obtain information relating to the injury as well as patient information and patient history, if possible. This information can prove invaluable when reported to the receiving hospital, is very helpful during triage and can focus and expedite the necessary trauma patient care[13].

The use of prehospital care protocols such as the Prehospital Trauma Life Support (PHTLS)[14] in conjunction with the ability to access online medical direction can greatly ease and expedite the provision of care on site.

Hospital phase

During the hospital phase, advance organization is essential. All areas and equipment should be prepared and properly functioning. The availability of additional medical assistance should be organized by protocols. All personnel likely to come into contact with the patient should wear standard protection clothing and take standard precautions[13].

Triage

The aim of triage is to prioritize patients according to their needs of treatment and the resources available at the hospital. It is usually performed by the triage team that consists of a triage doctor and an experienced triage nurse. The triage nurse is responsible for prioritizing the assessment of the patient according to the severity of the injury in close collaboration with the doctor. Further duties of the triage nurse include: assessment of the patients in the waiting area for signs of worsening symptoms, delivery of the patients in the appropriate area for assessment, monitoring and systematically reevaluating the patients

after the assessment has been concluded and up to the point when the patient is transported to the appropriate treatment area, communicating the status of the patient's health to the doctor, communicating with the patient and the patient's family in the waiting area[22]. Precedence of treatment is determined after the consideration of the vital signs, the prehospital course, the severity of the injury, the age of the patient, identified or suspected comorbid conditions and the results of the primary survey[15,22].

Primary survey

The primary survey of the trauma patient takes place before obtaining the history of the patient and its purpose is not to provide a definitive diagnosis, but to keep the patient alive and make the first steps towards improvement. According to the ALTS, it is concisely presented in the mnemonic ABCDE[16]. In brief, "A" stands for the assessment of the Airway patency, "B" refers to the Breathing assessment, "C" indicates the Circulation assessment, "D" represents the Disability assessment, and "E" is the Exposure evaluation.

A: Airway

The aim of the airway assessment is the establishment of the airway. It can be clear if the patient is able to talk, partially obstructed if air entry is limited and noisy, or completely obstructed if there are no air sounds at the mouth or nose[16]. The causes of airway obstruction can be the patient's tongue, the presence of a foreign body, vomit, blood, secretions or local swelling[17]. The patient should be assessed for paradoxical chest and abdominal movements, skin color, sounds such as snoring, wheezing or gurgling, and the airflow should be determined[16].

The nurse makes the initial macroscopic assessment of the airway, listens for breath and feels for possible fractures, uses manual methods to open obstructed airways and intervenes in the case of compromised airways with the use of basic airway adjuncts. The nurse also helps in the maintenance of advanced airway adjuncts, delivers O_2 when needed, continually reassesses the patient with the use of the relevant monitors, communicates the condition of the patient to the doctors, interacts with the patient himself and informs the patient's relatives in the waiting area[23,24].

Airway obstruction is considered a medical emergency as it can lead to cardiac arrest, hypoxia, brain damage, heart and/or kidney failure and death[16]. Once the cause of airway obstruction has been identified, appropriate treatment (e.g. suction, oxygen administration) should be provided[18].

B: Breathing

After the airway has been adequately treated, the breathing assessment can begin in order to evaluate the patient's ability to ventilate and oxygenate.

The patient can be examined by a nurse for general signs of respiratory distress, abnormal respiratory rate and rhythm, inadequate depth of breath and asymmetrical chest movement. Furthermore, the nurse checks the color of the skin and the condition of the skin and bony structures of the chest[24]. The next steps in the breathing evaluation performed by a nurse include measurement of the oxygen saturation with the use of a pulse oximeter, -and in some countries, such as the US- taking an arterial blood sample for blood gas analysis, and making an assessment of the air entry with the use of a stethoscope[17]. Breathing abnormalities are always referred to experts for treatment[16,24].

C: Circulation

During the evaluation of the patient's circulation, the necessary actions performed by a nurse are taking a blood sample for routine hematological, biochemical, coagulation, microbiological and cross-matching testing, the measurement of the blood pressure, the peripheral skin temperature, the measurement of the heart rate, the patient's temperature, the capillary refill time (CTR), as well as other general signs of abnormal heart output[16].

The treatment of circulation abnormalities is closely dependent to the cause and should be provided by expert. However, checking for external hemorrhage from wounds, drains or signs of concealed hemorrhage, replacing fluids and controlling hemorrhage with the aim of restoring/ preserving tissue perfusion in cases of cardiovascular collapse are usually necessary actions[16] performed -at least in countries like the US or the UK- by nurses.

D: Disability

The disability assessment refers to the evaluation of the patient's neurological status, only after the adequate assessment of the airway, the breathing and the circulation, since they are factors that can potentially affect the patient's neurological condition.

For a quick assessment of the patient's consciousness, the Awake, Voice, Pain and Unresponsive (AVPU) system is used[19] by nurses. With the use of this system, it is easily determined whether the patient is awake and responds to the environment (A), responds to voice stimuli (V), responds to pain (P) or is unresponsive (U).

If after the application of this system there are still concerns, the Glasgow Coma Scale (GCS) should be used, a more detailed, reliable and universally comparable way of recording the conscious state of a person, based on the overall score. The blood glucose levels should also be measured, along with the patient's pupil reaction[16]. The nurses are once again the care providers that make use of these tools.

During this stage, a nurse can perform an assessment of orthopedic injuries, which revolves around the notions of pain, swelling and instability. The nurse palpates the injury site looking for signs of tenderness, swelling, malformation or crepitus, checks the pupils of the patient and the neurological and motor function of the extremities[25].

The treatment of the unconscious patient should be provided by experts. However, all patients with no conscious response to stimuli whose airways are not protected should be placed -usually by a nurse- in the lateral position[16].

E: Exposure

By the time the primary survey reaches the stage of exposure, the care team should have a good idea of the injuries and problems of the trauma patient[17].

In this stage the patient should be thoroughly examined by a nurse from head to toe, after the removal of all his/her shoes and clothes while maintaining his dignity. The nurse also notes the temperature of the patient and takes all measures that would result in unnecessary heat loss. All notes and data relating to the patient is carefully documented and reviewed and appropriate help is sought if the patient shows no signs of improvement[16].

Conclusion

With traumatic injury being one of the leading causes of morbidity and mortality worldwide, the treatment of the trauma patient is of paramount importance on many different social, economical and political levels.

The state can and should play a major role in the care of the trauma patient. It is the obligation of the state to properly educate, organize and treat the people suffering from traumatic injuries since it is every citizen's right to be protected and properly cared for by the state in the case of threat against his/her life, physical integrity and the risk of partial or total disability[21].

The role of the nurse is of the outmost importance in all the stages of the treatment in order to keep the patient alive, stable and to help initiate the steps of the necessary treatment that has to follow. The survival of the trauma patient is not dependent on various chance factors but on the fast and synchronized collaboration of various health care providers. The treatment of the trauma patient calls for properly trained nurses that are an essential part of an organized team, are adept at quick decision making, are knowledgeable in the use of clinical tools and can follow protocols. They therefore have to continuously research, follow the new developments and be further educated in order to keep up with the ever rising needs in their field.

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