

The role of the emergency nurse in trauma management

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Abstract

Trauma is a major cause of morbidity and mortality globally. Rapid and effective management of trauma patients from the moment they are admitted to the emergency department directly impacts survival rates and long-term prognosis. In this process, the emergency nurse plays a critical role as a central member of the multidisciplinary team. This review aims to examine the role of the emergency nurse in trauma management from a comprehensive perspective, encompassing initial assessment, resuscitation, monitoring, and psychosocial support. In light of current guidelines and literature, the knowledge, skills, and responsibilities of the emergency nurse will be emphasized. Trauma can have serious psychological effects on patients and their families. The emergency nurse provides psychosocial support, informs patients and their families of relevant resources when necessary, and refers them to relevant units by approaching them empathically. Effective communication and coordination within the multidisciplinary team play a key role in the accurate and complete transfer of patient information. Finally, the emergency nurse keeps their knowledge and skills up-to-date by constantly following current guidelines and new treatment approaches in trauma management. This multifaceted and critical role is essential for the survival and best outcomes of trauma patients.

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Introduction

The first step in admitting trauma patients to the emergency room is triage. The emergency nurse quickly assesses the general condition of the trauma patient, identifies life-threatening conditions (airway obstruction, severe bleeding, respiratory failure, etc.), and determines the appropriate level of urgency. International guidelines such as ATLS (Advanced Trauma Life Support) or TNCC (Trauma Nursing Core Course) are used as a basis in this process [1].

Primary assessment and resuscitation (ABCDE Approach)

Primary assessment is the foundation of trauma management and requires the active participation of the emergency nurse. The "ABCDE" approach proceeds systematically:

- A (Airway): Ensure that the airway is open. If necessary, an oropharyngeal or nasopharyngeal airway is inserted, and aspiration is prevented. If there is a suspicion of cervical spine injury, manual stabilization is provided or an appropriate neck collar is worn.

- **B (Breathing):** It is assessed whether breathing is adequate. Respiratory rate, depth, respiratory sounds, and the presence of cyanosis are checked. If necessary, oxygen therapy and ventilation support are provided.
- **C (Circulation):** Pulse, blood pressure, skin color, and capillary refill time are assessed. External bleeding is controlled. Intravenous (IV) access is established, and intravenous fluid resuscitation is initiated. Blood product transfusion can be initiated rapidly in patients with signs of shock [2].
- **D (Disability):** Level of consciousness (Glasgow Coma Scale - GCS), pupillary reactions, and motor functions are evaluated.
- **E (Exposure):** The patient's clothing is completely removed to detect hidden injuries, while appropriate precautions are taken to prevent hypothermia (blankets, heaters, etc.).

Secondary evaluation

After the patient has been stabilized through the primary assessment and resuscitation processes, the next critical step in trauma management is the secondary assessment. At this stage, we describe in more detail the acquisition of detailed and comprehensive information about the general status of developments. The emergency license plays an active role in this process, collecting basic data to detect spores that can be missed by looking and to guide the planning of treatment [3]. Secondary assessment typically consists of the following components:

- **Detailed History Taking (SAMPLE approach):** The emergency nurse systematically takes the history from the patient or the patient's relatives using the abbreviation SAMPLE [4]
 - **Symptoms:** The patient's current complaints and pains.
 - **Allergies:** Known allergies (drugs, food, latex, etc.).
 - **Medications:** Regularly used medications, dosages, and frequency of use.
 - **Past medical history:** Past illnesses, surgical history, chronic illnesses.
 - **Last oral intake:** Time and content of last food or drink (especially important if surgery is planned).
 - **Event/Environmental factors:** How the trauma occurred, the mechanism of the event, the position at the time of the accident, and relevant environmental factors. This provides important clues about possible injuries [5].

Detailed physical examination from head to toe: The emergency nurse meticulously examines each body system of the patient. This examination aims to reveal injuries that may have been overlooked in the primary evaluation or that do not pose an immediate threat but are important. During the examination, attention is paid to the following:

- **Head and Face:** Trauma signs, deformities, tenderness, asymmetry.
- **Neck:** Swelling, tenderness, tracheal deviation, jugular vein distension.
- **Chest:** Crepitation, symmetry of breath sounds, tenderness to palpation.
- **Abdomen:** Distension, tenderness, guarding, bowel sounds.

- **Pelvis and perineum:** Stability, deformity, bleeding, tenderness
- **Extremities:** Deformity, tenderness, range of motion, neurovascular status (pulse, motor, and sensory).
- **Back and spine:** Careful palpation and inspection, especially if spinal cord injury is suspected.

Assisting with diagnostic tests: During secondary evaluation, necessary imaging (x-ray, CT, ultrasound) and laboratory tests (blood count, biochemistry, blood gas, etc.) are requested depending on the patient's condition. The emergency nurse plays an active role in the preparation, implementation, and follow-up of these tests [4].

Monitoring and treatment practices

Following the stabilization and comprehensive assessment of the trauma patient, the role of the emergency nurse continues with continuous monitoring and active treatment practices. This phase requires close monitoring of the patient's physiological responses and immediate intervention in critical situations. The nurse acts as a vital bridge to prevent possible complications and guide treatment by noticing even the slightest change in the patient's condition [5]. These responsibilities can be examined under the following main headings:

- **Continuous Monitoring of Vital Signs:** The emergency nurse monitors the vital signs (vital signs) of the trauma patient regularly and continuously. These findings provide instant and critical information about the patient's general condition [6]:
 - **Blood Pressure (BP):** Hypotension is one of the most important indicators of shock. Hypertension may indicate increased intracranial pressure or extreme pain.
 - **Pulse:** Heart rate and rhythm provide information about circulatory stability. Tachycardia may indicate blood loss or pain, while bradycardia may be seen in conditions such as brain damage.
 - **Respiratory Rate and Depth:** Respiratory failure is an important indicator of lung trauma or central nervous system involvement.
 - **Oxygen Saturation (SpO₂):** Indicates tissue oxygenation and is an early sign of respiratory failure.
 - **Body Temperature:** Hypothermia is a common complication, especially in major traumas and after intensive fluid resuscitation, and can negatively affect blood clotting and increase bleeding. Hyperthermia may indicate infection or central nervous system damage [4].
- Fluid and blood product management:** Since hypovolemic shock and blood loss are common in trauma patients, the emergency nurse meticulously administers intravenous (IV) fluid infusions and blood product transfusions [1]. During this process, the following are taken into consideration:
- According to the physician's order, the appropriate type and amount of fluid (crystalloids, colloids) and blood products (erythrocyte suspension, fresh frozen plasma, platelet suspension) are prepared and safely transfused.
 - The patient is closely monitored for transfusion reactions.
 - Fluid balance monitoring (intake-extraction monitor-

ing) is done.

- **Pain management:** Trauma patients often experience severe pain. The emergency nurse assesses the patient's pain and administers appropriate analgesics (opioids, non-opioid analgesics) according to the physician's order. Pain level and effectiveness of the medication are monitored regularly.

- **Application of other medical treatments:** All other medications (antibiotics, prophylactic tetanus, etc.) and treatments ordered by the physician according to the trauma patient's condition are administered by the nurse in the correct dose, by the correct route, and at the correct time.

- **Support for interventional procedures:** The emergency nurse provides active support to the physician in various interventional procedures performed during the care of the trauma patient [4]:

- **Central venous catheter insertion:** May be required for fluid resuscitation, drug administration, and central venous pressure monitoring. The nurse plays an important role in providing a sterile environment, preparing materials, and assisting the physician.

Urinary Catheter Placement: Necessary for monitoring urine output, assessing renal perfusion, and bladder decompression.

Nasogastric Catheter Placement: Can be used for stomach decompression, emptying stomach contents, and nutritional support.

Wound care and dressings

Cleaning, debridement, and covering traumatic wounds with appropriate dressings are critical to reducing the risk of infection and promoting healing. The emergency nurse performs these procedures per wound care principles [7].

Psychosocial support and communication

Trauma can have serious psychological effects on the patient and family. The emergency nurse provides psychosocial support to both the patient and the family by demonstrating an empathic approach. She provides information about the situation, answers questions, and provides a calming environment [8].

Multidisciplinary team collaboration

Trauma management requires multidisciplinary teamwork with the participation of surgeons, emergency medicine specialists, radiologists, anesthesiologists, and other health professionals. The emergency nurse ensures effective communication between team members, organizes the flow of information, and plays a key role in coordination [9].

Record keeping and documentation

All assessment findings, treatments administered, patient responses, and timelines must be accurately and completely documented from a legal and clinical perspective. This is vital to ensure traceability and quality of the treatment process [3].

Advanced practices: rapid blood transfusion, advanced hemorrhage control, and REBOA support

- The role of the emergency nurse is critical in the management of trauma patients, especially in cases of massive hemorrhage.

- **Rapid Blood Transfusion Protocols:** Protocols have

been developed for the rapid and effective administration of blood products in trauma patients requiring massive blood transfusion. Emergency nurses play a central role in the implementation of these protocols [10].

- **Advanced Methods in Bleeding Control:** Knowing and applying advanced bleeding control methods such as tourniquet application and hemostatic gauze [4].

- **Resuscitative Endovascular Balloon Occlusion: Aorta (REBOA) Support:** Supporting the team in REBOA application, which is a life-saving intervention in severe pelvic or abdominal traumas [11].

Challenges and future perspectives

Caring for the trauma patient is one of the most dynamic and challenging areas of the emergency department. Emergency nurses play a vital role in this complex environment and must both confront current challenges and adapt to future developments.

Challenges

The main challenges faced by emergency nurses in managing trauma patients are:

- **High workload and stress:** Trauma cases are often sudden, life-threatening, and require intensive intervention. This situation causes a high physical and psychological burden on nurses in emergency departments. Managing multiple critically ill patients at the same time, making rapid decisions, and being constantly alert can increase the risk of burnout. Staff shortages and inadequate resources can further exacerbate this burden.

- **Complex cases and continuously evolving knowledge:** Trauma can be a complex condition involving multiple organ injuries rather than a single pathology. Emergency nurses must have a broad knowledge of all types of trauma mechanisms and injuries that may develop as a result. In addition, since trauma management guidelines and treatment approaches are rapidly evolving, there is a need for continuous education and up-to-dateness [4].

- **Team communication and coordination:** In trauma management, which requires multidisciplinary teamwork, effective communication and flawless coordination among surgeons, emergency medicine specialists, radiologists, anesthesiologists, and other healthcare professionals are vital. However, in busy and stressful environments, miscommunication or lack of coordination can lead to errors that can endanger patient safety.

- **Resource constraints:** Emergency departments, especially in less developed regions or in high-density state hospitals, may experience staff, equipment, and technology limitations. This can negatively impact the quality of care provided to trauma patients [12].

- **Legal and Ethical Issues:** Trauma cases, especially forensic cases, substance abuse, or suspected abuse, can present emergency nurses with legal and ethical dilemmas. In such cases, keeping accurate records, adhering to confidentiality, and complying with legal processes pose an additional burden [5].

- **Future perspective:** The future of emergency trauma nursing will be shaped by technological advances, innovations in education, and changing healthcare service models:

- **Integration of Technology:**

- o **Teletrauma and remote consultation:** In trauma centers located in rural or remote areas, opportunities for remote access to specialist physicians or better-equipped centers via teletrauma technologies (such as teleconferencing and tele-ultrasound) will increase. Emergency nurses will play a key role in managing the flow of information and consultancy processes using these systems.

- o **Artificial Intelligence (AI) and machine learning:** AI-powered algorithms can be used for early diagnosis and risk assessment of trauma patients, predicting potential deterioration by analyzing vital sign data, and even optimizing triage processes. Nurses will learn to interpret the data provided by these systems and integrate it into their decision-making processes [13].

- o **Wearable technologies and patient monitoring:** Wearable sensors and smart devices can integrate pre- and in-hospital care by enabling continuous vital sign monitoring during patient transport or even in the field.

- **Development of education and simulation:**

- o **Advanced simulation applications:** High-quality human simulators and Virtual Reality (VR)/Augmented Reality (AR) environments will enable nurses to practice trauma management skills (airway management, bleeding control, team leadership, etc.) in realistic scenarios in a risk-free environment.

- **Conclusion**

In conclusion, trauma nursing will continue to be a dynamic and challenging field in the future. However, with technological innovations, advanced educational strategies, and holistic care approaches, emergency nurses will be able to provide more effective, safe, and comprehensive care to trauma patients.

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