

The Role of a Nurse in Early Trauma Management

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Introduction

TRAUMA is a serious Health Care issue. It has no respect for age, presents without warning, causes profound loss of function and the emotional costs are immeasurable. Traumatic injury, both accidental and intentional, is a leading cause of death in the first four decades of life and therefore results in a significant loss of productive work-years.

Fatalities due to trauma are usually due to neurologic injury of severe blood loss from cavitory haemorrhage. A considerable number of these deaths can be prevented if there is rapid transport from the scene of the accident to the hospital which is fully staffed and prepared to care for such patients. This period is referred to as the "golden hour" when resuscitation and early management dramatically alter the outcome. The goal of Trauma Care systems is to provide an organised approach to timely resuscitation and stabilisation.

The quality of initial assessment and management of a severely injured patient has a significant influence on the final outcome. Nurses observe and record assessment and, therefore, a clear understanding of the pathophysiology of Trauma and its manifestation is essential. In the tense busy environment of Emergency Department, the Nurse must be able to focus on the significant findings and to fully and accurately record the sequence of assessment and interventions. Knowledge of anatomy and

physiology is a prerequisite to the understanding of the pathophysiology of trauma.

In current practice of Traumatology, the early management of significant trauma is undertaken as a protocol which has three aspects in the following order of action: Primary Survey, Resuscitation and Secondary Survey. Resuscitation would intervene every step of the Primary Survey if there is evidence of deterioration.

Nurses play an important role in providing assistance at every stage of management.

Primary Survey

The purpose of primary survey is to assess the ABCs and to initiate appropriate measures in the presence of life and limb threatening injuries. This usually takes 30 to 60 seconds to complete and is performed on every patient.

Air Way: In any situation, airway is of primary importance. No other therapeutic assessment or intervention should precede airway management. Patency of the airway is assessed first and the first action of the care giver should always be to establish an open airway. A noisy airway generally indicates obstruction. Blood, vomituous and secretions from the mouth should be removed by finger-sweep action and suction. An oropharyngeal airway may be inserted to maintain patency. Anyone who tolerates an airway needs the airway! Nasopharyngeal airway is preferred if the patient's teeth are loose or the

tongue is swollen. Unconscious patients may need intubation to protect their airway from obstruction and to prevent aspiration. If severe facial trauma has occurred and the breathing compromised (respiratory rate < 8/min) and if oro-tracheal intubation is not possible, a surgical airway is resorted to. In our department, we prefer to perform crico-thyroidotomy to tracheostomy in view of its ease and rapidity. It is the Nurse who prepares and assists in this procedure.

In patients with suspected cervical spine injury, it is imperative that the neck is immobilised when the patient is being intubated orally. Less movement occurs when in-line stabilisation of the neck is provided by an assistant as compared with the use of a hard cervical collar with no manual assistance.

While intubating a patient, a few important points are to be remembered: Start pre-oxygenation with Ambu Bag and Mask; Administer Inj. Diazepam 20 mg IV to ensure adequate relaxation; Check your suction, laryngoscope, endotracheal tube of the appropriate size; Position the patient's head on a folded sheet and do not extend the neck; Always ensure that cricoid pressure is provided by your colleague who is helping with the resuscitation. It helps in intubation as well as protection of the airway by prevention of aspiration.

In children, the commonest cause of airway obstruction is posterior displacement of the tongue. Early use of oral airway is therefore recommended. If intubation is necessary, uncuffed tubes are preferred since the pliable cricoid cartilage provides a

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natural cuff. Nasal endotracheal routes are preferred in children over 6 years of age, because they are easier to secure.

Breathing: Once an adequate airway has been established, ensure that the patient is breathing adequately. Chest excursion, symmetry of breathing and rate of respiration should be observed. Paradoxical chest wall motion may indicate the presence of a flail chest. The flail segment will move inward with inspiration and outward with expiration. The type of breathing pattern can provide clues about the presence of neurologic injury. For example, no chest wall expansion with abdominal breathing indicates a cervical cord lesion. Adventitious sounds, decreased air entry and crepitations indicate intra-thoracic bleed or collapse of lung. Children normally have an abdominal breathing pattern. Retraction occurs when lungs lose compliance. The child is unable to increase intrathoracic volume. So the chest wall moves inward with inspiration.

Tension pneumothorax is a life threatening condition unless recognised and intervened immediately. It is the progressive accumulation of air under pressure within the pleural cavity. This results in the shift of mediastinum to the opposite hemithorax with compression of the contralateral lung and the great vessels. The cardinal signs are hypotension, tachycardia with soft heart sounds and jugular venous distension. Other signs include hyper resonance to percussion of the affected lung, shift and muffling of the cardiac impulse and tracheal deviation to the opposite side. When the diagnosis is suspected clinically, the pressure should be relieved immediately with needle thoracostomy. In our department, the attending Emergency Resident usually inserts a 20G intramus-

cular needle which is attached to a Luer-Lock glass syringe, on the involved side in the second or third intercostal space. When tension pneumothorax is present, the piston is pushed out from the barrel due to the raised intra-pleural pressure. Soon after, a large bore (16 or 18G) intravenous cannula is inserted, the stillete removed, and the cannula is connected to underwater seal. This needle thoracostomy is a life-saving procedure. Subsequently it is converted to a formal intercostal chest tube placement.

All trauma patients in our department are routinely administered supplemental oxygen at 8 L/min by mask. We monitor the oxygen saturation of peripheral capillary blood non-invasively with the pulse oximeter which has proved to be of immense help in identifying hypoxic patients.

Circulation: Assessing circulatory status is the next step in the primary survey. Vital signs such as pulse and blood pressure are essential. Skin colour, temperature, moisture and capillary reperfusion are additional yardsticks. External pressure is applied to obvious sites of bleeding. When hypotension is present, an initial fluid bolus of Ringer's lactate solution is infused rapidly. If the patient is assessed to have lost more than 20% of the blood volume, blood is cross matched for transfusion while Plasma expanders such as Haemaccel and Heta-starch are being transfused. There is minimal role for central venous catheter placement in the early phases of resuscitation. Urinary output requires monitoring subsequently.

Resuscitation

This involves assuring patency of the airway, assisting with ventilation and supporting circulation with adequate amounts of fluid of blood

products. Vital signs are continuously monitored and we have found the non-invasive Blood Pressure Monitor to be of great assistance, especially when we are assisting in procedure. The choice of intravenous fluids is between crystalloid and colloid solutions. The latter includes blood, packed cells, Polygeline (Haemaccel) and Hydroxy-ethyl starch. Whole blood or packed red cells are required in patients with moderate and major blood loss to maintain a packed cell volume of 30%. In practice, we use a combination of a crystalloid solution and a colloid solution for patients with blood loss of more than 1 litre. O Negative blood is available in our blood bank for immediate transfusion in cases of life-threatening haemorrhage.

Secondary Survey

This is detailed evaluation of the various organ systems and is conducted after abnormalities that were noted in the Primary Survey have been rectified. The secondary survey includes the physical examination of various organ systems from scalp to toe. An organised pattern of assessment ensures that injuries are not missed and facilitates accurate documentation.

Head and Face: While the Nurse assesses the head, he or she should also evaluate the patient's level of consciousness, verbal and motor response and eye reaction. In our department, the Glasgow Coma Scale (GCS) is part of the Nurses' Record Sheet and is a frequently used neurologic assessment tool. The total score may range from 3 to 15, with 15 indicating the best response. Patients with a GCS score of less than 7 have poorer prognosis. GCS is routinely assessed for all head injury patients periodically. If there is dete-

rioration by a score of 2, the Neuro-Surgeon is informed for the possibility of immediate surgical intervention.

As the Nurse evaluates pupillary response, the eyes should be examined for foreign bodies and the conjunctiva observed for haemorrhagic discoloration. Visual acuity is assessed by asking the patient to state the number of fingers being displayed in the visual field. The nose and ears are assessed for bleeding and leakage of CSF.

Neck: All trauma victims with injuries above the clavicle should be presumed to have a cervical spine injury until proven otherwise. Until such injury is ruled out by appropriate radiological investigations the neck should be immobilised. Use of cervical collar will help in easy and effective immobilisation. In our department, we apply hard cervical collars which are available in 3 sizes – large, medium and paediatric—to all patients who complain of neck pain or who are high risk for cervical injuries such as coma, head injury, and under the influence of alcohol. The cervical spine in children is very flexible and spinal cord injuries can occur without a fracture.

Thorax: The chest is notorious for its subtle signs and is therefore re-examined for injuries. The chest X-ray is a mandatory investigation for all patients with polytrauma. Pulse oximetry is used to assess peripheral tissue oxygenation.

Abdomen: The Nurse observes the abdomen for contusions, abrasions and distension to determine if an acute abdominal emergency is present that requires surgical intervention. Any wound above the umbilicus may have penetrated thoracic contents. Bowel sounds should be listened to, since paralytic ileus is a common accompaniment of Polytrauma. Discoloration of the flanks may indicate retroperitoneal bleeding.

Pelvis: The integrity of the pelvic ring can be empirically evaluated by pushing on the wings of the iliac bones gently and determining if this action elicits pain. The urethral meatus is examined for the presence of blood, which may indicate ruptured urethra. The Nurse should inspect the vagina for the presence of blood and should evaluate rectal sphincter tone. The patient should be log-rolled with the head in alignment with the body so that the posterior surface of the body can be assessed. The vertebral column is examined for asymmetry and the presence of tenderness.

Extremities: The Nurse notes and compares colour, size, symmetry and temperature of the extremities. If the patient is conscious, sensation and motor ability are assessed. The nurse palpates the extremities for tenderness, crepitus and deformity. Suspected fractures and dislocations are to be splinted. The extremities are also evaluated for the presence, quality and the integrity of pulses.

Psycho-Social Nursing

Accidental injury is a traumatic event, both physiologically and psychologically. Since it occurs unexpectedly, the victim and family have not had time to prepare themselves. Therefore their behaviour may be uncharacteristic. The response to accidental injury varies from stoic, unemotional behaviour to that which is hysterical. The response at times, may not be proportional to the extent of the injury. Often, steps must be taken to calm the victim, family and friends. A warm supportive approach with quiet reassurance that help is available and that care will be given is usually effective. A very anxious relative or friend may need to be removed from the victim to prevent adding to the victim's safety, and a supportive person should remain with this relative.

The patient and the related persons need to be kept apprised of what is occurring. The presence of blood often leads persons to believe that injuries are more severe than they actually are. Frequent reassurance by the Nurse can decrease their anxiety.

Summary

Optimal care of the patient with multiple trauma injuries requires an enormous amount of effort which begins with planning and preparation of system development in which personnel are educated and trained. Guidelines must include all aspects of the patient's care and the team must be drilled well. Protocols for management should be customised to suit the facilities available and the needs of the patient.

The Primary Survey provides basic data essential when life is threatened. The Secondary Survey provides detailed assessment of the various organ systems. Inclusion of Psycho-Social aspects achieves a holistic approach to the victims of Trauma.

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