

Rapid Assessment and Treatment in Emergency

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INTRODUCTION

Emergency department has challenging working environment; most of the patients present with acute illness, severe pain and in great discomfort, and often these patients do not get appropriate privacy and empathy what they deserve. Emergency department system is not uniform across the country so that different triaging scales are used by various emergency departments for assessing the severity of illness. Patients admitted to emergency with wide variety of complaints like simple fever pain to severe sepsis shock, polytrauma, stroke, exacerbation of asthma, and chronic obstructive lung disease and also as mass casualties. Various assessment tools like ABCDE (airway, breathing, circulation, disability, exposure) approach, START (simple triaging and rapid treatment for disaster) and various *triage* methods are based on time, make the patient to wait according to categories, makes delay in treatment and increase in errors and cost of unnecessary tests. Since different disease presentations in emergency has different requirements so that superior method should be applied in which care plan (including investigation; treatment chart, admission requirement and referral) is initiated only by experienced qualified emergency team then instruction should be followed by rest of the team. Rapid assessment and treatment of patient by *experienced and qualified team* in emergency increases the patient safety and satisfaction as well as improves patient flow and also solve the problem of emergency department overcrowding.

BENEFITS OF RAPID ASSESSMENT

- Team lead by senior doctor attend the patient
- Appropriate investigation of blood, electrocardiogram (ECG), X-rays, computed tomography (CT), urinalysis (unnecessary investigations can be avoided) and early treatment plan like analgesia, antibiotics, and intravenous

infusion can be decided in early stage. Investigations and treatment are initiated in early stage in time bound emergencies like stroke and myocardial infarction

- Early identification of patients for admission, prompt bed requests and for discharge after treatment
- Risk stratification can be done to identify patients for resuscitation or for transfer to high dependency unit or ward thus clinical risks are minimized
- Improves patient safety, quality and outcome
- Reduces the overcrowding, and provide learning experience for junior doctors.

REQUIREMENTS FOR RAPID ASSESSMENT

- Dedicated team consists of senior doctor consultant, attending consultant, qualified nurse, social worker, general duty attendant
- Manager to arrange bed and manage patient flow
- Point-of-care testing devices like arterial blood gas (ABG), glucometer and card test.

STEPS FOR RAPID ASSESSMENT AND TREATMENT

- All patients are changed into gowns on arrival and given identification bands
- A brief history (allergy history), examination, and documentation of management plan
- Assessment and resuscitation of patient as soon as they arrive in emergency by senior doctor and nurse
- On the basis of presenting complaints, investigations are decided
- Point-of-care testing like blood sugar, ABG, card test, D dimer is used
- Medications are prescribed and delivered as per guidance
- Necessary referral should be taken from the specialty if required

- Nonmedical need should be assessed by social worker.
- Patient should be admitted or discharged on the basis of comprehensive assessment.

COMPONENTS OF RAPID ASSESSMENT AND TREATMENT (FLOW CHART 1)

Resuscitation and Assessment

Resuscitation should be started within minutes of arrival of the patient. Assessment starts with shaking hands with the patient as it provides many clinical informations like level of consciousness, airway patency and peripheral perfusion of the patient, along with this it also provides confidence to patient and attendant. Focused history, examination and investigation history from the patient and attendant should be obtained.

Assessment of Airway

Complete airway obstruction leads to death within minutes but partial airway obstruction is quite common and can be recognized by noisy breathing such as snoring or gurgling which causes reduced level of consciousness (due to reduced airway muscular tone, loss of protective airway reflexes, principally the gag and cough reflexes, retention of oropharyngeal secretions and tongue malposition). Level of consciousness can be rapidly assessed using the AVPU method (alert, responds to voice, responds to pain, unresponsive). If the patient can talk, then this usually implies that the airway is safe. Simple maneuver such as jaw thrust or a chin lift can relieve the partially obstructed airway. Airway adjuncts such as oropharyngeal or nasopharyngeal devices can also be useful.

Assessment of Breathing

Increased respiratory work commonly associated with severity of illness as a result of an increased metabolic rate and oxygen consumption. This may lead to respiratory distress, signs of which include inability to complete sentences, high respiratory rate, diaphoresis, accessory muscle use and cyanosis. Focused clinical examination including tracheal palpation, percussion and auscultation may pinpoint the diagnosis (tracheal deviation and hyperresonance chest indicate tension pneumothorax, dull percussion note indicate pleural effusion or emphyema, wheeze/silent chest indicate acute severe asthma, bronchial breath sound indicates

pneumonia). High flow oxygen should be administered to all acutely ill patients; the effects of therapy should be assessed using pulse oximetry, and the target oxygen saturations should be 94–98%. The appropriate oxygen delivery device to use is a mask with a reservoir bag. It is vital that the reservoir is kept inflated at all times; this is usually achieved by setting the flow rate of oxygen to 15 L/min. This mask will usually deliver an inspired oxygen concentration (FiO_2) of 60–85%.

Assessment of Circulation

Assess the radial pulse, rate, rhythm and character. Attach cardiac monitor, note the blood pressure. Clinical signs that are common to hypovolemic, obstructive and cardiogenic shock include confusion or agitation, cold extremities, reduced capillary refill, tachycardia, absent or small volume peripheral pulses, hypotension and oliguria. The jugular venous pulse assessment is useful in distinguishing between hypovolemic states (low) and cardiogenic or obstructive shock (elevated). Circulatory features of septic shock include warm peripheries (vasodilatation) and a bounding pulse. Peripheral cannula can usually be inserted into antecubital fossa or external jugular veins and central lines can be inserted into internal jugular, subclavian and femoral veins. Sizes of peripheral cannula are determined by gauge (16 largest, to 26 smallest). Two 16-gauge lines are recommended for resuscitation.

Assessment of Disability

Assessment of neurological status, relevant clinical examination would include level of consciousness (LOC), focal and localizing neurological signs, pupillary reflexes and signs of meningism. Rapid assessment of neurosurgical status can be done by using AVPU scale.

Pain Management and Patient Needs Assessment

Pain management is an important aspect in the emergency department and described in another chapter while assessment of nonmedical need of the patient is equally important and involvement of social worker is helpful.

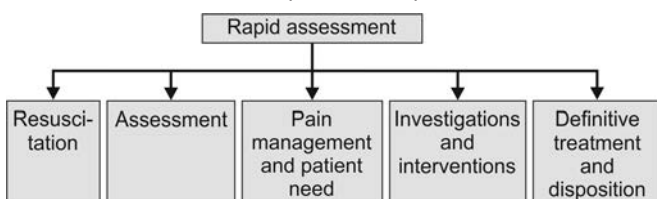
Investigations and Intervention

Important relevant investigations are carried out once the assessment part is over, e.g. blood tests, X-ray, ultrasound, CT scan, while point of care testing is helpful in rapid assessment of critically ill patient. Other interventions like specialty reference should be taken on the basis of investigations result for definitive care.

Diagnosis, Definitive Treatment and Disposition

Once a diagnosis is certain or the causes understood, definitive treatment can be started. This may require transfer

Flow chart 1 Components of rapid assessment



of the patient to the operating theater, interventional cardiology, laboratory, endoscopy suite, intensive care unit (ICU) or high dependency unit. Proposed management should be carefully communicated to the patient and close relatives of the patient. If patient is discharged to home, medication prescription, indicating diagnosis, follow-up test, and consultation should be clearly mentioned on the discharge summary.

CLINICAL QUALITY INDICATORS FOR RAPID ASSESSMENT

- Time to analgesia
- Time to delivering urgent medication, including antibiotics and bronchodilators
- Time to starting intravenous fluids
- Time to blood tests
- Time to imaging
- Time to specialty referral and assessment.

RAPID ASSESSMENT, EARLY INTERVENTIONS AND IMPROVING OUTCOME IN SEPSIS, STROKE AND TRAUMA

Timely recognition and intervention are important in reducing the morbidity and mortality due to sepsis and shock. Clinical suspicion, thorough physical examination, and laboratory screening using base deficit or lactate can improve outcome (**Tables 1 and 2**).

Sepsis: Improving Outcome through Early Recognition

Improving outcome has been described in **Table 1**.

Stroke: Improving Outcome through Early Recognition

Improving outcome has been described in **Flow chart 2**. **Table 3** shows neurology assessment in stroke patient (stroke syndrome).

Trauma: Improving Outcome through Early Recognition

Blunt injury: Nonpenetrating but including crush laceration amputation

Penetrating: Bullet knife or spike

Long bone injury: Fracture or dislocation of femur, tibia, humerus, ulna, radius, and fibula

Polytrauma or multiple trauma: Injury to one body cavity (head, thorax, and abdomen) + two long bone or pelvic fracture or injury of two body cavities.

Trauma Team

Trauma team includes:

- Emergency team
- Neurosurgery
- Orthopedics
- Surgery/gastrointestinal (GI) surgery
- Critical care
- Thoracic surgery, vascular surgery.

Criteria for Trauma Team Activation

Criteria include:

- Blunt trauma, penetrating injury, gunshot wounds, stab wounds with systolic blood pressure (SBP) less than 90 mm Hg, require endotracheal intubation
- Mechanically unstable pelvic injury (open or obvious by physical examination)
- Respiratory compromise, obstruction, or intubation with presumed thoracic, abdominal, or pelvic injury
- Glasgow coma scale or score (GCS) less than 8 with presumed thoracic, abdominal, or pelvic injury, amputation proximal to the ankle or wrist
- Transfer patients from other facilities receiving blood to maintain vital signs or suspicion that patient likely will require urgent operative intervention.

Primary Survey (ABCDE)

It includes:

- Check patency of airway and clear secretion
- Oropharyngeal airway
- High concentration oxygen
- Intubation and initial normal-ventilation of trauma patient
- Cervical spine stabilization (c-spine collar)
- Two large bore cannula simultaneously obtain blood for analysis; complete blood count (CBC), blood grouping and typing
- Initial fluid therapy normal saline (NS) or Ringer's lactate (RL), control bleeding
- GCS score, pupil size, assess spinal injury
- Prevention of hypothermia
- *Adjuncts:* ABG, cardiac monitoring and insertion of urinary and gastric catheters
- Consider need for chest X-ray, pelvic X-ray and focused assessment with sonography for trauma (FAST).

Secondary Survey

This survey includes:

- Detail history and examination
- Obtain history of injury producing event and mechanism of injury

Table 1 Sepsis: Improving outcome through early recognition

Sepsis cascade			
SIRS (systemic inflammatory response syndrome)	Sepsis (SIRS + infection)	Severe sepsis (sepsis with organ dysfunction)	Shock (severe sepsis and shock)
<ul style="list-style-type: none"> • Temperature >100.4 and <96.8°F • Heart rate >90 beats/min • Respiratory rate >20 • WBC >12,000 or <4,000 	<ul style="list-style-type: none"> • Fever • Cough • Dysuria • Documented positive culture for blood, urine, and sputum 	<ul style="list-style-type: none"> • Fluid-responsive hypotension • Hypoxia • Low urine output • Rise in creatinine • Lactate liver enzyme • Low platelet • Altered sensorium 	<ul style="list-style-type: none"> • Not responding to fluid (30 mL/kg)

Table 2 Early recognition of sepsis and shock improve outcome

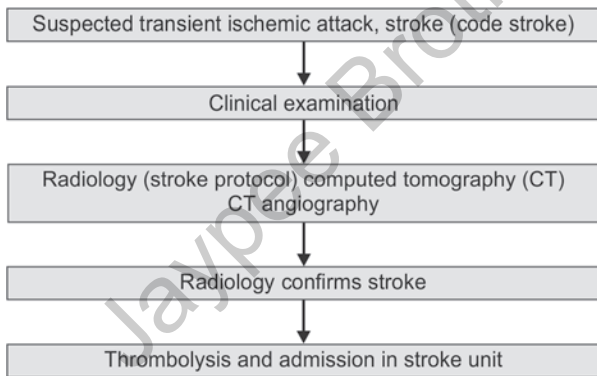
Early recognition of sepsis	Early recognition of shock	Priorities in severe sepsis
<ul style="list-style-type: none"> • White blood cells (WBC) high/low • Temperature high/low • High heart rate • High respiratory rate • Infection 	<ul style="list-style-type: none"> • Tachypnea • Tachycardia • Weak or bounding peripheral pulses • Delayed capillary refill (>2 seconds) • Pale or cool skin • Narrowed pulse pressure • Oliguria • Lactic acidosis • Elevated base deficit 	<ul style="list-style-type: none"> • Oxygenation and airway management • Fluid resuscitation • Hemodynamic stability • Blood culture • Lactate levels • Antibiotics • Intensive care admission when lactate >2

Table 3 Clinical features of stroke

Focus neurology assessment in stroke patient (stroke syndrome)	
Carotid	<ul style="list-style-type: none"> • Aphasia (dominant hemisphere) or neglect (nondominant hemisphere) • Contralateral homonymous hemianopsia • Contralateral motor/sensory loss of face, arm, and leg • Conjugate ipsilateral eye deviation
MCA	<ul style="list-style-type: none"> • Aphasia (dominant hemisphere) or neglect (nondominant hemisphere) • Contralateral homonymous hemianopsia • Contralateral motor/sensory loss face/arm > leg
ACA	<ul style="list-style-type: none"> • Apathy, abulia, disinhibition • Conjugate eye deviation • Contralateral motor/sensory loss leg > arm
PICA	<ul style="list-style-type: none"> • Ipsilateral palatal weakness, Horner's syndrome • Wallenberg syndrome • Ipsilateral limb ataxia • Decreased pain/temperature contralateral body
AICA	<ul style="list-style-type: none"> • Ipsilateral deafness • Ipsilateral facial motor/sensory loss • Ipsilateral limb ataxia • Decreased pain/temperature contralateral body
Basilar	<ul style="list-style-type: none"> • Altered consciousness • Oculomotor difficulties, facial nerve paresis • Ataxia, quadriplegia

Abbreviations: MCA, middle cerebral artery; ACA, anterior cerebral artery; PICA, posterior inferior cerebellar artery; AICA, anterior inferior cerebellar artery.

Flow chart 2 Stroke: Improving outcome through early recognition



- Re-evaluation and detail examination of head, face, cervical, spine, chest, abdomen, perineum, rectum, vagina, and musculoskeletal (**Table 4**)
- Re-evaluation of neurological status and GCS score.

Management of Shock in Trauma

Shock can be managed by:

- Fluid therapy initiation in hypotensive trauma patient
- Recommendation crystalloid
- *Rapid responder* require only crystalloid fluid

- *Transient responder* may need addition of colloids and blood
- Target systolic blood pressure (BP) 80–90 mm Hg and urinary output 0.5 mL/kg/h in adult and 1.0 mL/kg/h in children
- Addition of vasopressors and inotropic agents, if not responding to fluid therapy, norepinephrine is often used.

Blood and Blood Products and Control of Bleeding

- Target hemoglobin is 7–9 g/dL
- Use of blood and blood products
- Type specific blood is preferred, but type O negative blood indicated in massive hemorrhage (which is available within 10 min in most of the blood banks)

Table 4 Assessment, findings and investigations of system

Assessment of system	Findings	Investigations to confirm
Consciousness, pupil, head, cervical spine tenderness	GCS, <8 mass effect, scalp laceration, skull fracture	CT head and cervical spine
Maxillofacial area	Facial fracture and soft tissue injury	CT scan of facial bone
Neck and thorax	s/c emphysema, tenderness, hematoma, muffled breath sound and heart sounds	CECT thorax, angiography, bronchoscopy, tube thoracostomy
Abdomen and flank pelvis	Bruising, deformity, visceral injury, pelvic fracture, hematuria, perineal injuries	Ultrasound, CECT abdomen, angiography, laparotomy, pelvic X-ray urethrogram cystogra, IVP
Vertebral column and spinal cord	Quadriplegia, paraplegia nerve root injury, fracture dislocation	Plain spine X-ray CT/MRI
Extremities	Swelling bruising pain tenderness absent/ diminished pulse tense muscular compartment neurological deficit	Specific X-ray Doppler examination angiography
Polytrauma (mandatory investigations)	Injury to one body cavity (head, thorax, abdomen) + two long bone or pelvic fracture OR injury of two body cavities	CT head and cervical spine, screening of whole spine CECT chest and abdomen CT pelvis

Abbreviations: GCS, Glasgow coma scale; s/c, subcutaneous; CT, computed tomography; CECT, contrast-enhanced computed tomography; IVP, intravenous pyelogram; MRI, magnetic resonance imaging

- Early use of red blood cells (RBCs) and fresh frozen plasma (FFP) improves the outcome (initial recommendations 10–15 mL/kg, additional dose depends on coagulation parameters PT or APTT 1.5 times the normal values)
- *Platelets* transfusion is recommended when platelets counts are <50,000
- *Tranexamic acid* 1 g over 10 minutes then 1 g over 8 hour
- *Rapid control of bleeding*—by local hemostatic procedures, packaging, direct surgical bleeding control, and angiographic embolization.

Disaster: Rapid Assessment

Mass casualty incident: An incident whenever the number of victims is greater than resource capability to provide usual standards of care. Situations when standard triage methods may be inadequate:

- Treat as many as possible who have a chance of survival
- Focus on easily treated conditions

- Perform rapid accurate assessment
- Reassess and re-triage.

START (Simple Triage and Rapid Treatment)

Only two treatments are allowed:

1. Open and clear airway
2. Control of major external hemorrhage:
 - *Respiration:* Airway breathing
 - *Pulse:* Circulation
 - *Mental status:* Disability

All patients are reassessed at treatment areas.

- Actions which save lives (early)
 - ABC
 - Control of hemorrhage
 - Chest decompression
- Actions which save lives (delayed)
 - Intravenous (IV) antibiotics
 - Dressings and splints

CONCLUSION

Rapid assessment and formulation of care of plan by senior doctor ensure the patient’s safety. Any important emergency or time critical interventions are instituted (blood tests/X-rays/ultrasounds/CT, etc.). Initial clinical assessment and plan clearly documented and communicated with nursing staff. This system improves the outcome of many critical illnesses like sepsis, trauma and stroke.

BIBLIOGRAPHY

1. Frost PJ, Wise MP. Early management of acutely ill ward patients. *BMJ*. 2012;24;345:e5677.
2. Frost PJ, Wise MP. Recognition and early management of the critically ill ward patient. *Br J Hosp Med (Lond)*. 2007;68(10):M180-3.
3. Frost PJ, Wise MP. Recognition and management of the patient with shock. *Acute Med*. 2006;5(2):43-47.
4. Hostutler JJ, Taft SH, Snyder C. Patient needs in the emergency department: nurses’ and patients’ perceptions. *J Nurs Adm*. 1999;29(1):43-50.
5. Muntlin A, Gunningberg L, Carlsson M. Patients’ perceptions of quality of care at an emergency department and identification of areas for quality improvement. *J Clin Nurs*. 2006;15(8): 1045-56.
6. NICE. (2013). Intravenous fluid therapy in adults in hospital. Clinical guideline 174. [online] NICE website. Available from <https://www.nice.org.uk/guidance/cg174?unlid=724084>. [Accessed January 2017].
7. NICE Short Clinical Guidelines Technical Team. (2006). Acutely ill patients in hospital: recognising and responding to deterioration. Clinical guideline [CG50]. [online] NICE website. Available from <https://www.nice.org.uk/guidance/cg50>. [Accessed January 2017].
8. O’Driscoll BR, Howard LS, Davison AG, et al. BTS guideline for emergency oxygen use in adult patients. *Thorax*. 2008;63:vi1-68.
9. Wilson JE, Pendleton JM. Oligoanalgesia in the emergency department. *Am J Emerg Med*. 1989;7(6):620-3.