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Developing and integrating emergency & trauma services: Indian perspective

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As about 15% of all patients visiting any teaching hospital are having an emergency or trauma condition. Emergency conditions; including, Maternal, Pediatric& Traumatic Emergencies etc, are the leading causes of death and disabilities in India. Road Traffic Accidents (RTAs) alone is contributing to over 1.5 Lakh deaths annually in India.[1] Unfortunately, RTAs mostly affect the young persons, who often are sole bread earners of their families, leading to large socio-economical implications. It has been well documented that about 30% of all admissions in Emergency Departments (ED) are due to Trauma related issues.[2] Though, many trauma victims may not need any immediate surgical interference, except control of external hemorrhage, limb immobilization, wound stitches, or sometimes ICD etc, yet they often require continuous Medical Care, including ICU care. Many other emergency patients too often require ICU care at varying period of their stay in Emergency ward. It has been reported that over 26% of patients admitted in emergency wards, including traumatic emergencies require admissions in ICU.[3] Obviously, EDs serve a pivotal role in the continuum of care for critically ill patients from the pre-hospital environment to the definitive setting of an intensive care unit (ICU).

Moreover, it is also a reality that sending/ shifting patients to some other location even in the same hospital may take time, due to human factor, uncertainty of electricity supply, logistics and many more issues, causing added risk to patient's safety. More importantly, most Govt as well as private Medical Institutions are currently facing severe shortage of trained manpower, especially in the thickly populated Uttar Pradesh, which is likely to continue in future too. In the given scenario we should try to integrate our all acute care services at one place, as "more scattered we stand, more divided we are". Thus, we need to not only integrate our all our trauma related care with non-traumatic emergency care, but also need to provide ICU care, which should be considered as integral to Emergency & Trauma Care.

As we will continue getting surgical emergencies in the form of acute trauma, acute/ obstructed abdomen and other surgical emergencies, including, obstetric and pediatric emergencies in a busy ED, we need to ensure that facility for timely and appropriate surgical treatment is readily available round the clock. Moreover, handling emergencies in Emergency-OT itself will avoid complication due to delays, as well as save valuable elective OT time. In accordance, we need to continue working towards achieving, in due course, an Integrated Emergency, Trauma & ICU Block, made comprehensive by providing facilities for emergency surgical interventions, Radio-Diagnostic Services and a Point-of-Care Clinical Lab, with facility of a Whole Blood Storage Unit, i.e, a Single Window Care System for all Emergencies. Thus, as an integrated unit, our upgraded EDs require being a part of or in the vicinity of the parent/ another Hospital for referrals, transfers and other strategic support.

As most older and many newer Medical College Hospitals too must be having Medical Students rotating to clinical disciplines, including Emergency Departments (EDs), it is expected that all of them must have already activated their Emergency & Trauma Services, and organized them into a Department (ED). Never the less, the EDs of each of such hospitals should be developed in a manner, that in addition to being able to serve the needy patients, they should also be able to provide optimal teaching & training opportunities to medical students, and post-graduate trainees, including the development of academic departments of Emergency Medicine.

Keeping above needs in mind, as well as the fact that the ED is considered as the real face of every hospital, the Dept of Medical Education, Govt of UP has prepared following Advisory so as to guide all concerned as to how to plan their prospective EDs from beginning itself, so as to inculcate good practices in Emergency Care right from the inception itself.

(1) **Essential components:**

i. Integration of Emergency & Trauma Care into one, as Emergency Department (ED). In accordance, it is proposed that the integrated unit may be designated as Emergency

Department (ED).

ii. Number of beds in ED: To begin with we need a minimum of 30 beds (including 6 Emergency-ICU beds), clearly marked/ divided into Triage and Red, Yellow & Green Zones. When available/ made available the post-operative ward/ room and Emergency- ICU could also be counted as part of the total required 30 beds, or better and if space is available, made in addition to 30 beds.

It is envisaged that every institution should develop the ED in a way that whenever the patient load demands the ED beds could be increased proportionately to a minimum of 10%, preferably 15 % of total hospital beds.

iii. The Triage: The triage room should be equipped with facilities for Triaging patients, including 2 Mobile & 2 Stable beds. It needs to be equipped with all the Resuscitative equipments, a defibrillator and requisite monitors, including ECG machine, piped Oxygen supply and

a suction apparatus, and adequate working space for the duty staff and patient relative/s for history giving, patient support and other needs.

iv. Operation Theatre/s (OT): Every ED must have 1 Major & 1 Minor Emergency OT (E-OT). Ordinarily, the plaster room could be combined with Minor E-OT. However, the busier EDs with more trauma patients need to have a separate plaster room and another Major E-OT.

PS: The Emergency-OT block should be designed in a way that atleast 1, preferably 2 Major-OT could be added later when integration of Obstetric Emergencies with the main ED is possible/ incorporated.

v**.** One Pre cum Postoperative Room: A 4-6 bedded pre cum postoperative ward/ room willbe required to monitor & manage patientsbefore (if required) and after surgery until they fully recoverfromAnaesthesia and residual sedation etc., gaining optimal homeostasis before being shifted to the ward.

(2) **Desirable bomponents;**

Most of these should already be available in older Medica Colleges, while they could be developed, in newer Medical Colleges, in next few years.

i. **Essential Radio-Diagnostic Services,** especially a mobile X-Ray & a CT Scan.

ii**. Ultra-Sonography (USG) Equipment:** Itis desired that 2 dedicated mobile USG machines are available in every ED—one for monitoring trauma victims (E-FAST), and the other for point-of care ultrasonography (POCUS) in monitoring fluid status, cardio-respiratory functions and fluid/ blood collections etc, as well as to prognosticate the ICU patients.

iii**. Emergency Intensive Care Unit (E-ICU**): Availability of atleast 4, preferably 6-8 bedded E-ICU is considered a must, as it will complement our Emergency & Trauma services by improving overall outcomes and satisfaction of stakeholders.

iv. **Availability of a point of care lab facility**: It is desirable to have a point-of-care laboratory (POC-L) for prompt & timely investigations of salient tests required in emergency conditions, mainly; Hemoglobin, CBC, PT/PTT, INR, ABG, blood sugar, urea, creatinine, electrolytes, serum ketones, D-dimer, cardiac-troponins and liver enzymes etc.

(3) Innovative & futuristic services; could be developed, if &when feasible:

i. **Provision of keeping 4-6 units of whole blood in the POC-L,** kept relatively fresh by regularly exchanging with the main blood bank. Recent evidences suggest that timely transfusion of relatively fresh Whole Blood is helpful in saving lives in severely bleeding trauma and obstetric patients.[4,5]

ii. **Creation of thrombolysis service:** It is well documented that early thrombolysis is helpful in ischemic stroke, and the outcome in terms of mortality and long term morbidity is directly proportional to the timing of thrombolysis, earlier (within initial 90 min to 6 hrs, preferably within 4 & half hrs) is the medication given, better are the outcomes.[6] Similarly, thrombolysis within 6, and even upto 12 hours after an episode of acute S-T segment elevated myocardiaI infarction (STEMI) is found to reduce morbidity & mortality significantly. In accordance, its availability within the EDs can make thrombolysis a frontline therapy for initial treatment of ischemic brain stroke as well as acute STEMI.[6,7] Thrombolysis could be started as an **"one room service/ center",** located at a clearly Visible location within the emergency department, with provision of 1 ECG Machine, 1-2 NIBP equipment, provision of CT head (to exclude cerebral hemorrhage in stroke), random blood sugar, cardiac troponin tests, and the thrombolytic drug, preferably injection Alteplase (rt-PA) or Tenecteplase. As the Tenecteplase is atleast as effective as Alteplase and costs lesser, it may be preferred drug.[8] Moreover, it can be given by slow and single IV bolus over 30-60 seconds, unlike Alteplace, requiring slow & repeat IV infusions.

iii. **Emergency endoscopy & dialysis facility**: Additional Services, like these will transform the ED into a truly comprehensive and futuristic service.

It is expected that above advisory, will be able to emphasize on the need of having a well-organized and integrated ED, in a way that it could ultimately be developed into a more Integrated, Comprehensive and Responsive, One Window System.

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