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Intra-Operative Triage- A Novel Technique In Doing The Best For The Most In Disasters

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Abstract:

Introduction: Disaster triage involves categorizing casualties according to the need of medical care in a disaster situation when number of casualties overwhelm the capacity of medical services available. Triage is a continuous process and done at different levels. They are done initially at the site of disaster at the site of transport to hospital and on arrival at accident and emergency department to determine priority for resuscitation again. This is followed by triage performed to send patient to operating theatre. Currently available literature does not describe a triage concept beyond this level although many agree that triage should be done periodically.

Aim: Aim of this article is to describe a new concept termed intraoperative triage which is an extension of general principals governing disaster triage in to the operating theatre.

Description of the concept: In a mass casualty situation a forward hospital may find available specialist surgical cover scarce compared to that of middle grade doctors and opened-up theater beds. Simpler components of operations as well as anesthesia can be performed by middle grade doctors but complex injuries need advice and often manual input of experienced surgeons who are in short supply. The surgeon need to shift between patients performing the specialized and urgent components only leaving less experienced to complete the rest.

Conclusion: Intraoperative Triage stretches the primary concepts governing triage further in to intra-operative delivery of health care in a mass casualty situation. It is a process which is required to be discussed, formalized and disseminated among trauma surgical community in order to save more lives of disaster victims.

Introduction

The word Triage means “to sort” in French, the original language it came to use. Disaster Triage, a concept and early applications credited to Baran Dominic Jean Larrey, Surgeon in chief to medical services of Napoleon’s Army (1). It involves categorizing casualties according to the need of medical care in a disaster situation when number of casualties overwhelm the capacity of medical services available. Simply put it is a desperate situation when individual benefit is placed aside to

do best for the most. Many tools are designed over the years to accomplish this difficult task effectively and efficiently, Some such as Injury severity score is designed using anatomical basis while others such as Triage Sort use Physiological derangements(2,4). The systems such as field triage system of USA use mix physiological and anatomical criteria along with mechanism of injury and as well as certain special criteria such as age and pregnancy (3). All triage systems have their relative merits as well as demerits and as a

result different countries and organizations use different systems.

Triage is a continuous process and done at different levels (5). At the site of disaster initial triage separate casualties according to the need for resuscitation and priority can change at the next triage done to assess the need for transport. For an example, one with a tension pneumothorax as the only injury after stabilized with a chest drain will come behind the list to give a place in the ambulance for an another patient requiring laparotomy to control bleeding. Third level triage is usually done at accident and emergency department to determine priority for resuscitation again. This is followed by triage performed to send patients to operating theatre .Currently available literature does not describe a specific triage concept beyond this level although many agree that triage should be done periodically (1-5).

This article describes a triage process performed during surgery in the operating room in a mass casualty situation a tier which has not drawn attention of scholars previously. It was based on author's experiences in ELAM war as a trauma surgeon in forward military hospitals providing care in mass casualty situations.

AIM

Aim of this article is to describe a new concept termed intraoperative triage which is an extension of general principals governing disaster triage in to the operating theatre.

Description of the concept

In a mass casualty situation it is not uncommon to encounter situation at a forward hospital where availability of specialist or experienced surgical cover overwhelms that of middle grade doctors, other health care personal as well as number of theater beds. Routine and simple components of operations as well as anesthesia can be performed by middle grade doctors but complex injuries

which are not uncommon in these scenarios require advice and often manual input of experienced surgeons who are in short supply. A simple example of such a situation is described in order to clarify above concept.

EXAMPLE:

Five injured patients with abdominal injuries are anesthetized, their abdomens opened and four quadrant packing is done for immediate control of bleeding by middle grade doctors simultaneously. Only one experienced surgeon is present.

Table 1- Bleeding from Ruptured spleen. Pulse rate 114/minute. Blood pressure 120/90(Class II shock)

Table 2- Two segments of small bowel three feet apart has major injuries. Pulse rate 90/minute. Blood pressure 120/80(Class I shock)

Table 3- Bleeding from significant liver laceration. Pulse rate 124/minute. Blood pressure 95/65(Class III shock)

Table 4- Severe bleeding from right pelvis which is shattered by a shrapnel. Pulse rate 144/minute. Blood pressure 70/40(Class IV shock)

Table 5- A penetrating injury through anterior wall of stomach. Pulse rate 104/minute. Blood pressure 120/90(Class II shock)

Scrubbed up surgeon go to each table and visualize injuries as demonstrated by operating middle grade doctors. To table-1 he advices to pack firmly until he arrive to perform splenectomy later as patient is only in class II shock and bleeding is controlled with packs at the moment. Surgeon advices the middle grade doctor in table-2 to resect two damaged segments of small bowel and perform anastomosis which falls within his capabilities. Table-3 receives the advice to pack above and below the liver and perform Pringle's

maneuver until the surgeon arrives while giving specific times to release the clamp periodically. Table-4 is to pack and wait with ongoing transfusions. Table-5 gets advice to inspect posterior wall of the stomach through lesser sac and control bleeding with pressure until surgeon arrives.

Once initial intraoperative triage (IOT) round is completed within few minutes, surgeon will attend to table-4 first due to reputation of pelvic fractures and the fact that patient is in advanced shock. He performs unilateral internal iliac ligation followed by packing of pelvic cavity and the posterior wound in addition to other maneuvers of damage control resuscitation which controls bleeding. Allowing middle grade to complete rest of the operation the surgeon moves to table-3 and find laceration is of grade IV. He decides to pack and close reaching for Damage control option. A middle grade will close the abdomen and arrange rest of the care. Table-1 receives surgeon's attention next. Splenectomy is performed by the surgeon who then move to table-5 where he sutures anterior and posterior lacerations of the stomach. After performing a second round of visual intraoperative triage the surgeon feels comfortable to leave the theatre to attend mounting number of other patient awaiting surgery.

Discussion

Disaster Triage is a challenging process in complexity, circumstances and time critical nature which leads to acceptance of less than ideal practices. Both clinical and situational factors contribute to urgency in making decisions on an individual patient (5). The whole mark of disaster situation is number of casualties overwhelming available healthcare resources. In the situation described above the number as well as the complexity of causalities overwhelm the required surgical expertise. This is an area which has not been addressed much in literature.

In the above example the surgeon employs intraoperative triage at least on two occasions, first when the patients are undergoing the initial part of their operation and later after the surgeon has completed the critical components of surgery usually those to control bleeding and contamination. He uses anatomical knowledge of injuries together with derangement of physiological parameters displayed on monitor when performing triage. Triage is usually based on inspection which saves time while in certain situations surgeon may decide to use his hands for a better assessment. IOT is required to be deliberated in depth and more reproducible and resilient systems using anatomical and physiological parameters in order to make it easily teachable tool for trauma surgical community. Certain attention from the research institutions is required for above purpose. Visual IOT alone can be provided via tele-medicine even from remote distances. Extending triage process along the time scale achieved by IOT is important as majority of trauma deaths occur within first 4 hours of injury (6)

Training middle grades in anesthesia and surgery who are capable of managing less than optimum disaster situation is much achievable than finding experts in trauma surgery in the increasingly disaster prone world. The IOT process will reduce mental and physical burden of a trauma surgeon in a disaster situation demanding his best-where he is the only one who can deliver.

Conclusion

Intraoperative Triage stretches the primary concepts governing triage further in to delivery of health care in a mass casualty situation. It is a process which is required to be discussed among trauma surgical community at conferences and meetings and more research to be directed in to.. Reliable simple consistent system, once developed and disseminated across trauma surgical

communities will do much benefit to save lives of disaster victims.

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