**New Trends in Damage Control Resuscitation**

**Abstract:**Damage control resuscitation is a systemic approach to major exsanguinating trauma incorporating several strategies to decrease mortality & morbidity. Several authors applied the term “damage control” to this surgical resuscitation strategy and delineated damage control into three separate phases. Phase one consists of initial resuscitation and initial control of hemorrhage and contamination followed by intra peritoneal packing after management of abdominal injuries, particularly after gun shot wounds and rapid closure to allow for resuscitation to normal physiology in the intensive care unit and a subsequent definitive re-exploration. The second phase involves correction of acidosis, hypothermia, and trauma associated coagulopathy. Phase three involves the return to the operating room for definitive repair which includes anesthetic management of traumatic patients through perioperative monitoring, Induction of anesthesia by choosing appropriate type of anesthesia either general or regional anesthesia, dealing with post operative complications.

**Background:** Damage control resuscitation describes an approach to the early care of very seriously injured patients. The aim is to keep the patient alive whilst avoiding interventions and situations that risk worsening their situation by driving the lethal triad of hypothermia, coagulopathy and acidosis or excessively stimulating the immune-inflammatory system. It is critical that the concepts and practicalities of this approach are understood by all those involved in the early management of trauma patients. This review aims to summarize this and discusses current knowledge on the subject.

**Aim:**This essay has been suggested to review all literature about recent management of trauma patients , so that anesthetists are informed about all the basics , clinical aspects and recent advances in management of such cases to improve their out come.

**Conclusion:** Understanding of trauma resuscitation has greatly improved in recent years and continues to develop. It is important that the concepts and practicalities of damage control resuscitation are understood by all those involved in the early management of trauma patients and early recognition of those who might benefit from a damage control approach is critical. Given that interventions are so time dependent, it is likely that by developing trauma systems and protocols, further improvements in outcome can be achieved. Research work in this area will allow these approaches to be targetted more accurately to those patients who can benefit most.

**Key words:** Initial resuscitation of trauma patients, correction of acidosis \_hypothermia\_ coagulopathy ,anesthetic management of traumatic patients .

**List of Abbreviations:**

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| **ALS:** | Advanced Life Support |
| **ABG** | Arterial Blood Gases |
| **CVP** | Central venous pressure |
| **DIC :** | Disseminated Intra Vascular Coagulopathy |
| **IABP** | Invasive Arterial Blood Pressure |
| **MAC** | Minimal Alveolar Concentration |
| **RSI** | Rapid Sequence Induction |
| **TIVS** | Temporary Intra Vascular Shunts |

**INTRODUCTION:**

Damage control resuscitation is a systemic approach to major exsanguinating trauma incorporating several strategies to decrease mortality & morbidity.

Several authors applied the term “damage control” to this surgical resuscitation strategy and delineated damage control into three separate phases. Phase one consists of initial resuscitation and initial control of hemorrhage and contamination followed by intra peritoneal packing after management of abdominal injuries, particularly after gun shot wounds and rapid closure to allow for resuscitation to normal physiology in the intensive care unit and a subsequent definitive re-exploration. The second phase involves correction of acidosis, hypothermia, and trauma associated coagulopathy. Phase three involves the return to the operating room for definitive repair.[5]

Anesthesia for trauma patients presents unique challenges for anesthetists. Many urgent cases occur at night or during weekend shifts, when more experienced anesthetists are not available, patient information is limited, and previous medical history and details of chronic medication or allergies are unknown. Patients often present intoxicated, with a full stomach.[1]

In first stage of Damage Control Resuscitation, anesthetist will continue the resuscitation, which is fundamental to the outcome of the patient. Initial assessment of the patient according to ALS principles with special attention to Airway, Breathing and Circulation; remembered easily as: A, B and C. Proceeding to Later assessment including assessment of injury, past medical conditions, difficult airway, aspiration and pre medication.[1]

Arresting ongoing hemorrhage is the most crucial of damage control tenets, vascular damage control has been traditionally limited to vessel ligation. More recently, however, balloon catheter tamponade and temporary intravascular shunts (TIVS) has significant importance dealing with inaccessible (or difficult to access) major vascular injuries, large cardiac injuries and deep solid organ parenchymal hemorrhage (liver and lung). [3]

Second stage is concerned with the lethal triad, defined by the initial laboratory values and vital signs upon arrival to the ICU. Acidosis was defined by an initial pH<7.30. Hypothermia was defined as temperature <95.0 degrees Fahrenheit. Coagulopathy was defined as an INR value >1.5. [4]

Hypothermia remains an independent risk factor for mortality, reaching 100%when core temperature is less than 32°C in patients undergoing a laparotomy.[9]

Rewarming may increase vasodilation of peripheral vascular beds thus improving tissue perfusion.[5]

Third phase is concerned with return of traumatic patient to operative room for definitive repair which includes intra operative monitoring , choosing appropriate type of anesthesia either general or regional, dealing with post operative complications .[4]

Intraoperative management of traumatic patient:

Monitoring is critical specially before induction of anesthesia done through "Blood pressure, pulse, O2 saturation", in addition to Urine Output, Temperature, CVP, invasive ABP "through arterial line insertion", ABG, and blood sample sent for coagulopathy monitoring. [8]

Induction of anesthesia by choosing appropriate type of anesthesia either general or regional anesthesia .General anesthesia includes Rapid sequence induction (RSI) followed by orotracheal intubation is an effective method to secure the airway of trauma patient. RSI followed by direct laryngoscopy and tracheal intubation is a remarkably effective approach to emergency airway management. [6]

The key to safe anesthetic management is to administer small incremental doses of whichever agent selected "e.g. propofol, etomidate, ketamine, benzodiazepine, opioids" along with Neuro Muscular Blocker "e.g. Suxamethonium Or Rocuronium".[6]

Maintenance of anesthesia through low MAC volatile agent "e.g. isoflurane 0.5%", "small dose of opioid" analgesia e.g. fentanyl" and non-depolarizing muscle relaxant according to patient condition.[6]

Post-operative management of traumatic patient is concerned with pain relief, addressing post-operative complications "e.g. hypothermia, DIC, post operative complication of general anesthesia"[8]

**In conclusion**,

**Conflict of interest :**The authors declare that they have no conflict of interest.

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