

Trauma Care: Role of Trauma Intensivist

Zia Arshad

Received on: 20 May 2024; Accepted on: 30 June 2024; Published on: 20 July 2024

ABSTRACT

Trauma is a major health issue all over the world and is associated with a high rate of death and disability in both developed and developing countries. There has been a dramatic change in the management of trauma patients in the last two decades. The term damage control resuscitation and damage control surgery came into light during the last 20 years. Physician involvement is increased in trauma victims' care as the physiological derangements, maintenance of hemodynamics, and infection control are equally catastrophic for the patient, so the focus is shifted to the intensive care unit (ICU) from the operating room (OR).

The objective of this article is to emphasize the role and importance of trauma intensivists in the management of polytrauma patients. Trauma intensive care is a new horizon for anesthesiologists who can manage trauma in association with a trauma surgeon, and their role will increase day by day with the advancement of imaging techniques and interventional radiology.

To summarize, the duties and responsibilities of a trauma intensivist start with pre-hospital care and transport to damage control resuscitation with ABC care, maintaining hemodynamic, inter-hospital transport, preparing for damage control surgery, postoperative resuscitation, respiratory support, pain management, follow-up, and rehabilitation.

Keywords: Acidosis, Coagulopathy, Hypothermia, Intensive care unit, Resuscitation, Trauma.

Journal of Trauma Intensive Care STIC (2024): 10.5005/jtric-11018-0004

INTRODUCTION

Trauma is a major health issue all over the world and is associated with a high rate of death and disability in both developed and developing countries. There has been a dramatic change in the management of trauma patients in the last two decades. The term damage control resuscitation and damage control surgery came into light during the last 20 years. The involvement of critical care physicians is increased in trauma victims due to physiological derangements, the need for maintenance of hemodynamics, and infection control, which are equally important for the patient. The intensive care unit (ICU) is the place where the focus is on correcting physiological derangements. After damage control resuscitation, when the patient's condition is stabilized, the patient is shifted to the operating room (OR) if required for definitive surgical care. The aim of this article is to highlight the role of trauma intensivists in the management of trauma patients. The role of a trauma intensivist is to resuscitate, maintain physiology, identification of complications, draw a further treatment plan, and prepare the patient for the OR.¹

Management approach towards trauma patients has now shifted towards more conservative than operative. Most of the trauma patients are now first resuscitated in the ICU. Those who were earlier directly shifted to the OR in an attempt to complete the surgical procedure resulted in catastrophic results. The lethal triad of hypothermia, acidosis, and coagulopathy is an important cause of death in trauma patients. Other complications like abdominal compartment syndrome, along with a triad of hypothermia, acidosis, and coagulopathies, are the factors that require early detection and prompt management in the ICU, of course, with expedited surgical completion. If this triad is not interrupted early, it can prove fatal for the patient.

This change in outlook for polytrauma patients poses a challenge for trauma care intensivists. They must address the problems that were dealt with by anesthesiologists earlier during

Department of Anesthesiology and Critical Care, King George's Medical University, Lucknow, Uttar Pradesh, India

Corresponding Author: Zia Arshad, Department of Anesthesiology and Critical Care, King George's Medical University, Lucknow, Uttar Pradesh, India, Phone: +91 9415722226, e-mail: ziaarshad13@gmail.com

How to cite this article: Arshad Z. Trauma Care: Role of Trauma Intensivist. *J. Trauma Intensive Care STIC* 2024;1(1):17–19.

Source of support: Nil

Conflict of interest: Dr Zia Arshad are associated as the Editorial board members of this journal and this manuscript was subjected to this journal's standard review procedures, with this peer review handled independently of these Editorial board members and their research group.

prolonged surgeries on unstable patients. Before a decade or two, laparotomies were performed to achieve hemostasis, injury repair, decontamination, resection, and anastomosis or stoma formation.

The term "damage control surgery", also known as abbreviated laparotomy or staged laparotomy, is a new, rapidly growing surgical approach to manage unstable trauma patients.

Damage control can be defined as multiple surgeries at different intervals of hours to days to achieve definitive repair of injuries depending upon the condition and physiologic status of the patient. The goal of the initial surgery is to control life-threatening hemorrhage and decontamination. After the damage control, the patient is shifted back to the ICU for further resuscitation to restore physiologic reserve and prepare the patient for more definitive surgery, which includes further repair and reconstruction after stabilization.^{2–4}

Some previous retrospective studies document about a 50% decrease in operative time, which results in salvage of 20–60% in

severely injured trauma patients who formerly died in the OR.^{3,5} This approach provides some relief to the anesthesiologist and shifts responsibility toward the critical care physician.⁶

The duties of trauma intensivists do not end by shifting the patient to the OR, but the care of polytrauma patients continues after they come out of the OR. After damage control surgery, the patient may still require resuscitation and, thereafter, definitive repair.

Trauma intensivists are physicians with experience in trauma care, critical care, and anesthesiology. They must understand the respiratory, cardiovascular, metabolic, and immunologic consequences of trauma resuscitation and massive transfusion protocol to address the ongoing needs and identify and address the patient's complications beforehand.

Polytrauma patients with severe hemorrhage and shock, severe tissue injury, and deranged physiologic parameters present great challenges to trauma intensivists during resuscitation in the ICU. Complications such as abdominal compartment syndrome, transfusion-related complications, acute lung injury, acute kidney injury, metabolic derangements, and altered mentation after post-trauma resuscitation are presented.⁷

The scenario of trauma is quite horrific in a country like ours. Not only in terms of numbers but also the healthcare facilities and public awareness. Level-one trauma centers are not adequate, and the number of trained trauma surgeons and trauma intensivists is much lower compared to the amount of road traffic accidents.

In the 11th 5-year plan, 116 District Hospitals/Medical Colleges in 17 States were identified for implementation during this period. The total number of Level III Trauma Care Facilities (TCF) is 58, Level II TCF is 57, and Level I TCF is 1. Out of 116 TCFs, 105 are reported to be functional. This information is sourced from the National Programme for Prevention and Management of Trauma and Burn Injuries.

The concept of trauma intensive care is not new to India, but their work is divided between anesthesiologists and critical care physicians. In most trauma centers, the anesthesiologist has to take responsibility for both, as the anesthesiologist is the person looking after the ICU, either in the form of a post-anesthesia care unit or trauma ICU. So there is the need of the hour to train the anesthesiologist, physician, and surgeon (MS general or trauma surgery) in damage control resuscitation, which includes ABC care, postoperative care, which includes interruption of the lethal triad, maintaining near normal physiology, and critical care.

In the 11th FYP, the Indian government decided to start 116 new TCFs, out of which 105 are functioning. In the 12th FYP, the Indian government plans to develop 85 more new trauma centers. So, the anesthesiologist must take one step ahead and should get trained in trauma critical care. This will include comprehensive training in trauma management and critical care medicine. Currently, only one or two institutes are running super specialty courses in trauma and critical, which are insufficient to fulfill the need for trauma care intensivists. DNB also offers a two-year fellowship in trauma anesthesia and critical care but is still not able to meet the requirements of a trained trauma intensivist.

In India, there is a need for awareness regarding trauma intensivists among the general public, surgeons, and even anesthesiologists. There are various societies for trauma surgery and Critical Care Medicine like, Indian Society of Trauma and Acute Care, Indian Society of Critical Care Medicine, Society of Neurocritical Care National Association of Critical Care Medicine, etc. Unfortunately, no such platform exists for critical care at present.

This is the gap that the anesthesiologists have to fill with their efforts and knowledge in view of population interest as well as exploring more space and excellence for young anesthesiologists in the field of medicine.

Trauma intensivists are the person who is trained in the practice of trauma critical care and are able to function expertly in trauma-related intensive care management of all types of trauma patients. The Trauma intensivists are supposed to do rapid assessments of trauma victims, prioritize emergency intervention and resuscitation, and plan for safe transfer to a higher-level trauma center or, if in a trauma center, then either in the ICU or for further management. The trauma intensivist also does damage control resuscitation, intraoperative care, intra-hospital transport, and pain management. They have expertise with special skills in intensive monitoring and managing critically ill trauma patients. In this way, the trauma intensivist plays a leadership role in the development and organization of care for trauma victims and providing critical care services.

The objective of this article is to emphasize the role and importance of trauma intensivists in the management of polytrauma patients. Trauma intensive care is a new horizon for anesthesiologists who can manage trauma in association with a trauma surgeon, and their role will increase day by day with the advancement of imaging techniques and interventional radiology. With this modality of diagnostic imaging and advanced interventional radiological procedures, the majority of trauma patients tend to be managed more conservatively than previously. So, the role of trauma ICU has increased with the advent of a more conservative approach to trauma management. Patients are transferred first to the trauma ICU for resuscitation and interruption of the lethal triad of acidosis, hypothermia, and coagulopathy, thereafter shifted to the OR if needed. The incidence of negative laparotomies declined to 12% in the USA with a high crude mortality rate in this population with negative laparotomy despite a lower injury severity score.⁸ Anesthesiologists must upgrade them to cope with the increased demand for specialists in trauma care by acquiring advanced skills and knowledge for more meticulous management in the field of trauma care.

The job of trauma intensivist does not end here only, but as they are well aware of the injury, damage, repair, disabilities, treatment or procedure done in ICU and the neuropsychiatric effect of this critical illness.

Trauma intensivists must follow them in the ICU follow-up clinic. In the follow-up clinic, they use a holistic approach and provide consultation for their chronic illness, which may be one of the causes of their readmission to the ICU. They also provide rehabilitation and counseling and seek expert opinions of other super specialties as and when required. This requires the help of a respiratory therapist, a physiotherapist, and a mental health nurse, along with a trauma intensivist.

There is a longstanding debate on who should lead the trauma team. The team leader is usually an experienced physician or trauma surgeon. There is still no consensus on who should lead the team trauma. The team composition varies in different parts of the world; the majority include a surgeon, an emergency medicine physician, and an anesthesiologist trained in ATLS, airway management, and resuscitation. Despite the constant debate, the best available evidence suggests that whether the trauma team is led by a surgeon or physician, there is no significant difference in patient outcomes.⁹⁻¹¹

Trauma intensive care differs from its medical counterpart in that the trauma or surgical patients require ICU-level care as a result of acute insult, either trauma or surgical intervention or both, and not due to aggravation of their chronic illness. This is especially true in the management of trauma patients who already suffer from chronic disease, in addition to their acute traumatic insult or injuries. The study by Lee et al. concluded that a trauma intensivist-driven model can be successfully adopted in a community trauma program without the need for surgery residents. They demonstrated a significant reduction in mechanical ventilation days and length of ICU stay without increasing mortality. There is strict adherence to established, evidence-based ICU protocols, which is likely the cause of a successful trauma intensivist model.¹²

To summarize, the duties and responsibilities of a trauma intensivist start with prehospital care and transport and end with damage control resuscitation with ABC care, maintaining hemodynamics, interhospital transport, preparing for damage control surgery, postoperative resuscitation, respiratory support, pain management, follow-up, and rehabilitation.

REFERENCES

1. Sagraves SG, Toschlog EA, et al. Damage control surgery-The intensivist's role. *J Intensive Care Med* 2006;21(1):5–16. DOI: 10.1177/0885066605282790.
2. Burch JM, Ortiz VB, Richardson RJ, et al. Abbreviated laparotomy and planned reoperation for critically injured patients. *Ann Surg* 1992;215(5):476–483. DOI: 10.1097/00000658-199205000-00010.
3. Morris JA, Eddy VA, Blinman TA, et al. The staged celiotomy for trauma: Issues in packing and reconstruction. *Ann Surg* 1993;217(5):576–584. DOI: 10.1097/00000658-199305010-00019.
4. Moore EE, Burch JM, Franciose RJ, et al. Staged physiologic restoration and damage control surgery. *World J Surg* 1998;22(12):1184–1190. DOI: 10.1007/s002689900542.
5. Sharp KW, Locicero RJ. Abdominal packing for surgically uncontrollable hemorrhage. *Ann Surg* 1992;215(5):467–475. DOI: 10.1097/00000658-199205000-00009.
6. Gentilello LM, Pierson DJ. Trauma critical care. *Am J Respir Crit Care Med* 2001;163(3Pt 1):604–607. DOI: 10.1164/ajrccm.163.3.2004106.
7. Shere-Wolfe RF, Galvagno SM Jr, Grissom TE. Critical care considerations in the management of the trauma patient following initial resuscitation. *Scand J Trauma Resusc Emerg Med* 2012;20:68. DOI: 10.1186/1757-7241-20-68.
8. Atkins K, Schneider A, Charles A. Negative laparotomy rates and outcomes following blunt traumatic injury in the United States. *Injury* 2023;54(8):110894. DOI: 10.1016/j.injury.2023.110894.
9. Hajibandeh S, Hajibandeh S. Who should lead a trauma team: Surgeon or non-surgeon? A systematic review and meta-analysis. *J Inj Violence Res* 2017;9(2):107–116. DOI: 10.5249/jivr.v9i2.874.
10. Tiel Groenestege-Kreb D, van Maarseveen O, Leenen L. Trauma team. *Br J Anaesth* 2014;113(2):258–265. DOI: 10.1093/bja/aeu236.
11. Hjortdahl M, Ringen AH, Naess AC, et al. Leadership is the essential non-technical skill in the trauma team—results of a qualitative study. *Scand J Trauma Resusc Emerg Med* 2009;17:48. DOI: 10.1186/1757-7241-17-48.
12. Lee JC, Rogers FB, Horst MA. Application of a trauma intensivist model to a level ii community hospital trauma program improves intensive care unit throughput. *J Trauma* 2010;69(5):1147–1152. DOI: 10.1097/TA.0b013e3181f5a867.