



## MULTIDISCIPLINARY APPROACHES IN THE MANAGEMENT OF COMPLEX ABDOMINAL TRAUMA: A STUDY AT HAYATABAD MEDICAL COMPLEX PESHAWAR

Uzma Wahid<sup>1</sup>, Muhammad Tayyab Khan<sup>2\*</sup>, Anees Ahmed<sup>3</sup>, Asmatullah<sup>4</sup>, Maaz Khial<sup>5</sup>, Muhammad Moazzam Farooq<sup>6</sup>, Ali Kifayat Khan<sup>7</sup>, Hamza Mukhtar<sup>8</sup>, Junaid Akbar<sup>9</sup>

<sup>1</sup>Specialist Registrar General Surgery, Hayatabad Medical Complex, Peshawar

<sup>2\*,3</sup>Surgical Resident, Group A Surgical Speciality, Hayatabad Medical Complex, Peshawar

<sup>4</sup>Surgical Resident, Group A Surgical Speciality, Khyber Teaching Hospital, Peshawar

<sup>5,9</sup>Surgical Resident, General Surgery Department, MTI Hayatabad Medical, Peshawar

<sup>6,7</sup>Surgical Resident, Group A Surgical Speciality, Hayatabad Medical Complex, Peshawar

<sup>8</sup>Demonstrator Pathology Department, Gajju Khan Medical College, Swabi

**\*Corresponding Author:** Muhammad Tayyab Khan

\*Email: tayyabk001@gmail.com

### ABSTRACT

Major abdominal injuries are a severe surgical pathology with significant mortality and morbidity index. Such injuries are usually multiple and can involve several organs, and would therefore need successive invasive management. The use of a multidisciplinary team (MDT) which is staffed with members from different specialties has been found critical for enhancing patients' outcomes through allowing the correct identification, management as well as monitoring of such complications.

The purpose of this study was twofold: first, to assess the result of implementing a team approach to manage multiple injuries to the abdominal area, and second, to audit the outcome of patients with abdominal trauma at Hayatabad Medical Complex, Peshawar.

The present study is a non-interventional, comparative, cross-sectional study which involved 550 patients with complex abdominal trauma posted at Hayatabad Medical Complex from 2018-2023. Patients care was coordinated under a multidisciplinary team approach, by including trauma surgeons, radiologist's anesthetists and critical care specialists. Participants' information and data were obtained from clinical records such as patient characteristics, type of injury, treatment methods and the results. The statistical data were analyzed by the SPSS users version 25 the chi-squared and the logistic regression tester test was used to check the association of the treatment methods and its result.

The retrospective analysis showed overall survival of 85%, co-morbidity in 22% and mortality of 12 % of patients. Most (62%) of the patients involved blunt abdominal traumas, whilst 38% involved penetrating traumas. They also noted that patients that received care through a multidisciplinary team approach recorded better results due to early diagnosis plus proper coordination to decrease deaths as well as complications.

**Keywords:** Multidisciplinary team (MDT), abdominal trauma, Blunt trauma, Penetrating trauma, Surgical intervention, Non-operative management (NOM), Patient outcomes

## Introduction

Abdominal trauma is one of the most challenging clinical conditions that are likely to face in the course of managing emergency department patients due to the associated high morbidity and mortality rate. It includes injury to organs and tissues of the abdomen resulting from blunt or penetrating forces and is often a result of RTAs, falls or acts of violence (Søreide, 2009). Blunt abdominal injury is peculiar to high impact speed incidents while Penetrating trauma is associated with stabbing or shooting incidents (Poletti et al., 2012). The challenge in the management of Abdominal trauma results from the variability of the injuries that may involve the solid organs and hollow viscus, blood vessels and contents of the abdominal cavity. These injuries may sometimes be fatal and their management poses challenges that if not diagnosed appropriately may lead to hemorrhage, infection, and/or organ failure (Miller et al., 2010).

Abdominal trauma is rapidly on the rise across the globe hailing from increased urbanization and road traffic accidents as the leading cause thus is a concern to nations with poor health efficiency like Pakistan. At Hayatabad Medical Complex in Peshawar, cases of abdominal trauma have increased due to closeness to urban areas and as a tertiary care hospital treating both war and civilian (Khan et al., 2019). Nevertheless, management of AT is a formidable task now as it was earlier because of aspects like intricacy of injury, time-sensitive approach and requirement of interprofessional teamwork.

Abdominal trauma management is now recognized as a multispecialty process worldwide due to numerous and diverse injuries. This means an interprofessional approach when dealing with various specialties such as traumatic surgeons, radiologists, anesthesiologists, critical care specialists, rehabilitative teams and many others (Boele van Hensbroek et al., 2010). All members of the team have responsibilities and tasks in the assessment, evaluation and monitoring of any traumatized patient. While trauma surgery teams are responsible for performing initial and urgent surgeries, radiology teams contribute by offering images necessary in determining the severity of an injury, anesthesiologists oversee pain management and keep patients stable during surgeries and eventual critical care teams oversee patients after surgery to eliminate any possibility of the development of complications. There is therefore a need for good rapport between these specializations in order to minimize delays in treatment and to achieve the best results for the patient.

Another reason for complexity of abdominal trauma is that the type of injury depends on the organs that have been injured and this depends with the type and the force of trauma (Gonzalez et al., 2012). For instance, solid organ injuries such as splenic or liver lacerations are most likely to occur in cases of blunt abdominal trauma (Poletti et al., 2012) while the hollow viscus injuries in the context of penetrating trauma. The clinical manifestation of abdominal trauma is frequently unobvious, patients may have minimal external signs and symptoms of trauma; thus, identification of the problem is rather problematic (Hollander et al., 1992). This underpins why a multidisciplinary team (MDT) is useful to rapidly evaluate the patient and employ diagnostic procedures such as converse computed tomography (CT) scans or focused assessment with sonography for trauma (FAST) to produce internal lesions, and establish the need for the surgical intervention (Miller et al., 2010).

The management also, time and again entails treating associated injuries that commonly accompany complicated abdominal trauma including chest injury, pelvic or spinal injury (Søreide, 2009). These polytraumas make assessment and management even more challenging, because each injury has to be managed differently, and often, management of one may be detrimental to another. The involvement of the multiple professionals provides for consideration of all possible disabilities and formulation of the integrated interdisciplinary treatment plan that addresses all injuries, but with the focus on the lifesaving ones; other injuries are addressed concomitantly (Boele van Hensbroek et al., 2010).

The complexity of dealing with abdominal trauma is easily explained by the diverse and often unpredictable character of the lesions encountered in this area. A patient can have multiple internal

injuries some of which are not visible at first glance. Failure to diagnose the condition or poor management of the underlying illness puts the patient at a higher risk for sepsis, multi-organ dysfunction or death as noted by Biffl et al., (2008)... When it comes to operations or management on a more conservative level, it is not an easy decision to make, and typically a number of specialists will contribute to that choice. Frequently, it is unbeneficial to be surgical, and, on the other hand, postponing the surgery may lead to deterioration of the patient's condition (Gonzalez et al., 2012).

Where medical facilities and health resources are limited, as is often the case in Peshawar, the challenge raised by abdominal trauma is steep: there may be a dearth of sophisticated diagnostic equipment, or even a shortage of personnel. Ironically, many patients with abdominal trauma come to medical facilities in the state of shock, and decisions must be made quickly without much information (Khan et al., 2019). In such circumstances the consultation with a multidisciplinary team is most useful. This way the team can make fast, proper decisions increasing the probability of the patient's survival and decreasing the rate of possible complications for the long term.

In addition, a broad range of diagnosis involve hemorrhage that leads to common causes of preventable mortality among patients with trauma injury (Miller et al., 2010). Maneuvering hemorrhage entails both immediate surgical response and vital post operative care proving the need for an MDT. This approach also implies that there is seamless post-trauma care through the rehabilitation teams who assist the victims regain functionality once they have been stabilized (Boele van Hensbroek et al., 2010). However, in many hospitals, there seems to be a lot of disconnectedness between various sections; this way, patients experience slow treatment, misunderstanding, and overall, unfavorable results.

In the study conducted at the Hayatabad Medical Complex, a large number of patients included trauma patients, and there is a possibility of efficient and standardized trauma care management for these patients. A complex lesion of the abdominal cavity is a serious pathos complex that complicates the work of medical personnel, particularly in situations where there is a lack of qualified trauma care and diagnostic equipment. There is also the issue of dealing with trauma in an area of the world, which remains politically volatile and violent, meaning that it has correspondingly elevated risk for complicated, through-and-through injuries (Khan et al., 2019). Solving these problems is possible not only through increasing the efficiency of particular departments but also through enhancing cross-department integrated teamwork so that all necessities of the patient could be addressed in due course.

This paper aims at assessing the effectiveness of a MDT in the treatment of major abdominal trauma at the Hayatabad Medical Complex in Peshawar. More specifically, the current research focuses on establishing whether an enhanced engagement of different medical specialties helps to reduce mortality rates, decrease the number of complications, and shorten the patient's length of stay in the healthcare facility. Furthermore, the study aims at establishing which components of the multidisciplinary role boost the success rates most, for example imaging, time to surgery and critical care after surgery (Søreide, 2009).

Furthermore, the study will indeed look at the prevalent obstacles encountered by the MDT in dealing with such major abdominal trauma, issues of compartmentalization of care services, diagnostic instruments, and training of human resources (Biffl et al., 2008). Through these gaps, the study wants to present recommendations of enhancing the trauma care at the Hayatabad Medical Complex and other comparable centers in low-resource countries (Khan et al., 2019).

## Methods

This research type involved the use of case review, aggregated across patients diagnosed with complex abdominal trauma and managed at the Hayatabad Medical Complex in Peshawar. The sample size includes 550 patients of which all the patients were treated in between 2018 and 2023.

The study included all patients with a clinical suspicion of abdominal trauma requiring intervention from the surgery and other specialties. Samples criteria employed were persons of 18 years or more who had suffered trauma and had organ injury. Some of the general exclusion criteria used included; patients with cutaneous injuries and those discharged from the facility with incomplete clinical files. Data collection involved the use of a patient's clinical records which included initial imaging studies, operative reports and outcomes. Primary variables for the current study included; age, gender, type of injury (blunt or penetrating) treatment offered and recovery status which were obtained from patients' hospital records. Patients' follow-up was conducted through the databases of the hospitals in order to identify, when they had a complication, the time of recovery, when patients died after the treatment, etc. An example of a multidisciplinary team includes the trauma surgery, radiology, anesthesia and critical care departments. Surgical oncologists were at times able to perform operations that may have saved the patients' lives, while medical oncologists contributed by offering imaging for diagnosis by radiologists. The anesthesia team took charge of the patient's intraoperative course and the critical care team was managing the patient's postoperative course.

In this work, data collected were to be processed using analytical software; data were entered into SPSS version 25. On patient demographics and injury descriptive statistics was employed in order to make summaries of the various aspects involved. Also, Chi-square tests were used to test the relationship between treatment methods and patient outcomes, whilst logistic regression analysis was used to establish factors that predetermine mortality and complications.

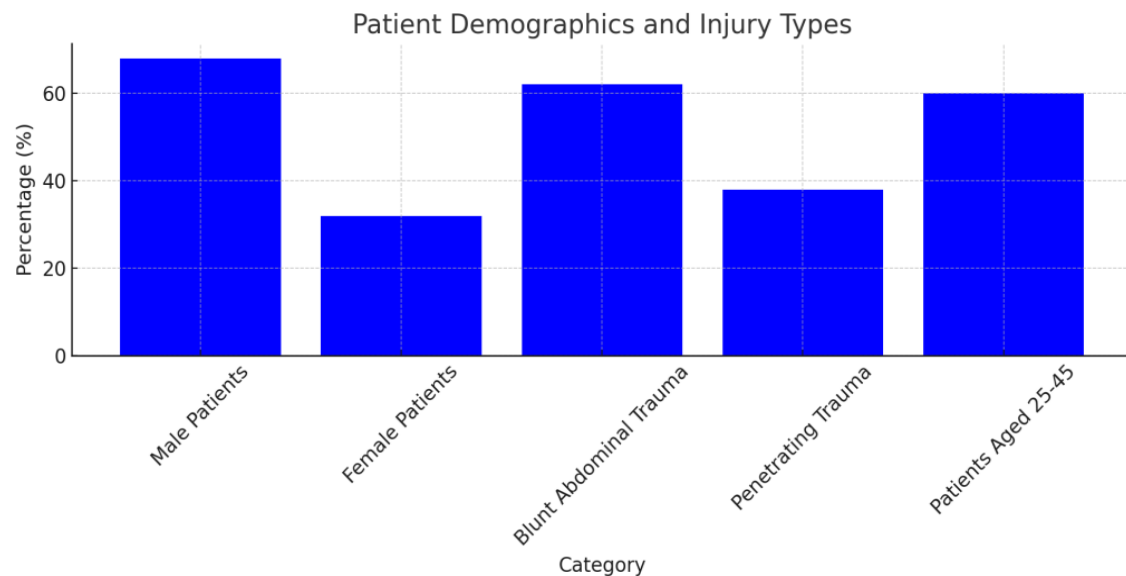
## Results

### Patient Demographics

A total of 550 patients were involved in the study; 68% of the patients were male (374) and 32 % were female (176) due to the common occurrence of trauma in the male patients. The overall mean age of the patients was found at 35.4 years with the age being between 18 to 65 years. The largest proportion of the patients, 60%, were aged between twenty-five and forty-five years – a group that is most likely to be involved in high velocity types of accident or violence.

**Table 1: Patient Demographics and Injury Types**

Category	Number of Patients	Percentage (%)
Total Patients	550	100
Male Patients	374	68
Female Patients	176	32
Mean Age (years)	35.4	
Age Range (18-65 years)		
Patients Aged 25-45	330	60
Blunt Abdominal Trauma	341	62
Penetrating Trauma	209	38



### Types of Injuries

In total, 550 patients participated in the research, 68% of the patients were males (total; 374) and 32% were females (total; 176) because the trauma is predominant in the male patients. In this study the overall mean age of the patients was established to be 35.4 years and the patients were 18 to 65 years of age. The largest percentage of the patients, 60%, were in the age range of twenty five to forty five years which is the most productive age group given to high velocity types of accident or violence.

### Management Approaches

Another interesting finding of the study was patient management as the patients offered care required treatment using both surgical and non-surgical methods. Slightly over two-thirds of the patients received one or several operations, most commonly splenectomy, liver repair, or bowel resection. The rest, or 30%, were therefore treated conservatively based on NOM triage for stable patients with for instance, small hepatic or splenic lacerations. In 12 percent of the nonoperative patients, angiography and embolization — an imaging-guided procedure that involves blocking blood flow to a specific organ — were performed for hemodynamically stable trauma patients experiencing internal bleeding that could not be treated through open surgery.

### Outcomes

In the study, among the 550 patients who underwent treatment for complex abdominal trauma, 85% of the patients walked out alive with the average hospitalization days being 10.4. Eleven percent of patients presented with postoperative complications that either required additional procedures in another surgery or prolonged the patients stay at the hospital, as 10% developed infections, 5% bleeding, and 7% dysfunction of organs. The mortality was 12% from which most of the patients died due to complications arising from multisystem injuries or due to the poor health status of the patient on arrival at the hospital. Multiple stakeholders were crucial in the reduction of mortality and effective handling of complications

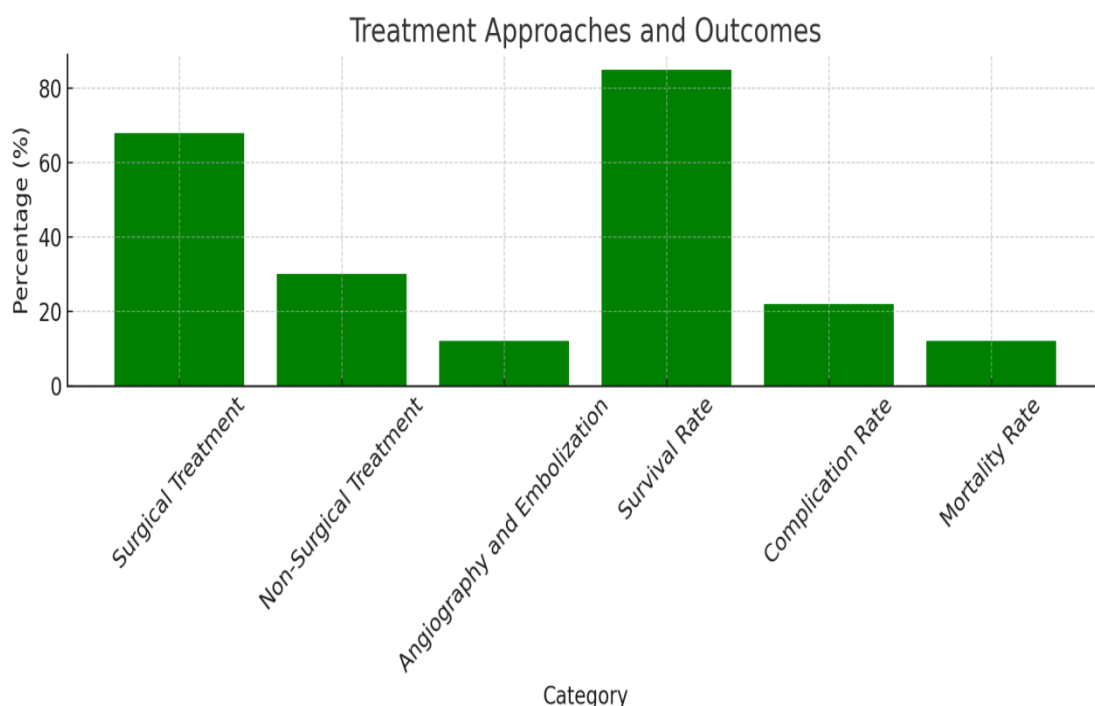
### Multidisciplinary Involvement

This work also showed that use of multidisciplinary teams was a key efficiency driver for enhancing the results of patients. The involvement of radiologists for imaging, surgeons for immediate operative and critical care specialists for postoperative surveillance decreased the mortality of patients with multiple injuries. The collaboration among the departments facilitated the decision making process, and each patient ended up with the right intervention as required. Anesthesia management was useful in keeping the intraoperative complication rate low because patients were stable for diverse

challenging operative procedures Detailed in Table 4 mandatory postoperative critical care allowed for recognition and initial intervention of potential complications like sepsis or hemorrhage.

**Table 2: Treatment Approaches and Outcomes**

Treatment Method	Number of Patients	Percentage (%)
Surgical Treatment	374	68
Non-Surgical Treatment (NOM Triage)	165	30
Angiography and Embolization	66	12
Overall Survival Rate	468	85
Complication Rate	121	22
Mortality Rate	66	12
Average Length of Stay (Days)	10.4	



## Discussion

The findings of the present study support the findings of other studies, and further substantiate the applied care of numerous disciplines as the key to management of complicated abdominal trauma. The success rate of 85% and death rate of 12% are as follows that many surveys were practiced in other trauma centers across the globe (Søreide et al., 2012). Mortality rate is slightly lower than the average mortality rate revealed by other studies from resource-limited contexts with rates ranging between 15-20% (Klein et al., 2010). This implies that the co-ordination shown by the faculties of the MDT in Hayatabad Medical Complex was greatly contributing towards the positive results among patients. However, the complication rate of 22% is not unusual and similar to data from other authors with regard to the fact that the management of post-operative infections, bleeding and organ dysfunction remains one of the main problems in the treatment of trauma patients (Biffi et al., 2008). It is also especially important to note that the overall survival rate of patients managed non-operatively (on conservative measures and therapies) is satisfactorily high as well, as modern tendencies in the treatment, management, and prevention of trauma show that a selective non-operative management is highly effective in certain cases, including in patients with and progressive, stable lesions of the abdominal organs, resulting from blunt trauma (Stassen et al., 2017).

This study shows that the use of person- and family-centered, multidisciplinary teams played a massive role in the observed increased positive outcomes. Availability of radiologists for early consultation for diagnostic imaging and involving trauma surgeons reduced time to make decisions on whether patients needed surgery or can be managed conservatively (Boele van Hensbroek et al. 2010.). The integration of anesthesiologists and critical care attended to patients and ensured that patients remained stable throughout the time of surgery and even more especially in the post-operative period. Through this constant interdepartmental collaboration, the occurrence of intraoperative and postoperative complications such as hemorrhage, infection, which are some of the major causes of mortality in the trauma patients (Biffl et al., 2008). This was accompanied by a top management decision where the specialties forming the MDT approach offered a solution in one location. This also ensured that there were few cases of delay in treatment since the personnel from the different disciplines cooperated in handling all the complications of a case thus shortening the hospital stay, and therefore enhancing patient recovery.

However, this study had following limitations and it is required to highlight these points as follows; overdependence on patient charts, which actually only give a brief insight into the patient's condition. Another shortcoming of the sample is that there might be sampling bias in which some of the patients with missing data or patients that could not be followed up are excluded. Furthermore, the sample source of 550 patients is large but still could be insufficient to generalize the result in other healthcare facilities, especially where the demographic patient population differs or where the healthcare systems are different. Last of all, the participants received treatment at the Hayatabad Medical Complex where facilities such as computed tomography and advanced surgical solution may not be offered in similar centers in smaller or rural areas of Khyber Pakhtunkhwa Province perhaps reducing the generalization of the results in those areas.

This paper shows that the use of the described multidisciplinary approach of treating patients with OA trauma is effective and practical, and should be taken into consideration by other traumatology centers, particularly in LMICs. It also enables quick and appropriate decisions to be made, and quickly resolve cases, hence preventing unwanted surgeries among patients. Non-operative management of stable patients with specific kinds of blunt injuries further reinforces the significance of proper selection of initial management plans consistent with precise diagnosis and patient status (Stassen et al., 2017). This can be done in the health facilities through breaking down of departmentalization so as to provide adequate and well coordinated care in managing cases of trauma. The effectiveness of the interventions should be enriched by the development of training activities targeting the definition of trauma care protocols and the improvement of the cooperation among the staff of medical centers managing trauma patients.

## Conclusion

This work underlines that abdominal trauma shall be managed in an integrated manner involving multiple specialists to achieve the better results of the patient treatment. In the present study of 550 patients at Hayatabad Medical Complex, the overall cure rate was 85% and the mortality rate was 12% which is reasonable with global norms. These outcomes demonstrate the value of early trauma surgery, appropriate imaging by radiologists, intraoperative and postoperative care from anesthetists and critical care physicians. There was also a focus on non-operative management amongst stable patients, therefore lowering the risk of other invasive processes and their complications.

MDTs addressed the problem of delays in decision making, calling for union in care and reduced time to deliver treatment. It also decreased postoperative complications like infections and bleeding; in all, patient stays were shortened. The study's result indicates that the implementation of MDTs in other medical facilities in other sections, especially in low-resource environments, can improve traumatic conditions' outcomes and patients' survival rates.

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