

Thoracotomy for Chest Trauma: An Analysis of the Indications and Outcomes in UmuaHia, Southeast Nigeria

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Abstract

Introduction: Thoracic trauma directly accounts for 25% of trauma-related mortality and contributes to another 25% of cases. Significant progress has been made in thoracic surgical principles and procedures. Currently, more than 80% of chest injuries can be managed non-operatively.

Case Report: Evaluation of demographics, mechanisms of injury, indications for surgery, surgical approaches, and outcomes in patients who had an open thoracic operation following trauma in the first seven years at the Cardiovascular and Thoracic Surgery Unit, Department of Surgery, Federal Medical Center, Umuahia, Nigeria.

Discussion: Among other observations, a predominant finding was that patients with delayed thoracotomy had enhanced survival compared to those who underwent emergent or urgent procedures.

Conclusion: Mindful evaluation of chest trauma patients, optimal utilization of closed tube thoracostomy drainage, and rigorous adherence to an aseptic technique show that most chest trauma cases can be managed without open surgery.

Keywords: Endotracheal Intubation; Gunshot Wound; Mechanical Ventilation; Refractory Shock; Tamponade

Introduction

Thoracic trauma directly accounts for 25% of trauma-related mortality and contributes to another 25% of cases [1,2]. The progress made in thoracic surgical principles, particularly in endotracheal intubation, mechanical ventilation, and thoracic pain control, over the last two centuries has been rewarded by a corresponding reduction in mortality from a value of 80 – 90% during the American Civil war (1861 – 1865) to 4 – 7% in recent civilian experience [3,4]. Over 80% of chest injuries can be managed non-operatively using tube thoracostomy, appropriate analgesia, and aggressive respiratory treatment [5,6].

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Before establishing the Division of Cardiovascular and Thoracic Surgery Unit (Department of Surgery) at the Federal Medical Center, UmuaHia, Nigeria, about the year 2010, patients who required open thoracic surgical intervention either succumbed to the problem or were referred out.

Methodology

The medical records of patients who had an open thoracic operation following trauma in the first seven years of our Cardiovascular and Thoracic Unit (2010 – 2017) were retrieved and retrospectively analyzed. Data collected included patients’ demographics, mechanisms of injury, indications for surgery, surgical approaches, and outcomes.

Case Report and Results

Of the 168 patients admitted for chest trauma, 16 (9.52%) patients underwent thoracotomy. The male:female ratio was 3:1 (Figure 1); ages ranged from 19 – 65 years, and the average age was 37.5 years (Figure 2).

Gender	frequency	Percentage(%)
male	12	75
female	4	25
total	16	100

Figure 1: Male-female ratio.

	Min(Years)	Max (Years)	Mean(Years)
Age	19	65	34.75

Figure 2: Age range and mean.

Three cases (18.75) of the thoracotomies were emergent, urgent in 5 patients (31.25%), and delayed in 8 patients (50%) (Figure 3).

	Emergent	Urgent	Delayed	Total
survived	2(66.7%)	3(60%)	8(100%)	13(81.3%)
died	1(33.3%)	2(40%)	0(0%)	3(18.8%)

Figure 3: Outcome by the timing of surgery.

The outcomes per mechanisms of injuries are as follows (Figure 4):

	Stab	High Velocity GSW	Blunt trauma	Total
survived	5(100%)	3(50%)	5(100%)	13(81.3%)
died	0(0%)	3(50%)	0(0%)	3(18.8%)

Figure 4: Outcome by the mechanism of injury.

- Blunt injury in 5 patients (31.25%),
- Stab injury in 5 patients (31.25%)
- Gunshot wounds (GSWs) in 6 patients (37.50%).

The cause for intervention timing and mortality, and survival are as follows (Figure 5):

	Cardiac tamponade	Excessive Chest tube output	Retained haematoma	Empyema	Diaphragmatic hernia	Total
Survival	2(100%)	3(50%)	4(100%)	3(100%)	1(100%)	13(81.3%)
Died	0(0%)	3(50%)	0(0%)	0(0%)	0(0%)	3(18.8%)

Figure 5: Intervention timing and mortality and survival.

- Of the 3 patients with emergent thoracotomy, 2 procedures (66.67%) were due to tamponade following stab injuries to the heart.
- One patient (33.33%) was for refractory shock resulting from a GSW with significant pulmonary vascular damage.
- In the urgent thoracotomy group, all 5 cases (100%) had penetrating pulmonary injuries from high-velocity GSWs.
- In 4 cases (50%), delayed thoracotomy was for retained haemothorax empyema thoracis in 3 patients (37.50%) and diaphragmatic hernia in 1 patient (12.50%).
- All patients who had delayed thoracotomy were initially treated elsewhere and subsequently referred to us due to worsening symptoms.

Discussion

Our findings agree with previous reports that thoracotomy for chest trauma is more likely to be indicated when the underlying injury mechanism is penetrating [7,8].

Our results also support that increasing blood loss is associated with significantly increased mortality risk [10], even in the absence of shock or a specific diagnosis [11].

Our data revealed that high-velocity GSWs to the chest were typically associated with excessive bleeding with a concomitant increase in fatal outcomes—similarly reported by Elkbuli, *et al.* (2020) [12].

Patients in whom thoracotomy was delayed had enhanced survival than those who underwent emergent or urgent procedures—similarly noted by Marcaccio, *et al.* (2018) [13] and Joseph, *et al.* (2018) [14].

Conclusion

Most cases of chest trauma can be managed successfully without the need for open surgery. Excessive chest tube output (massive hemothorax) is the most typical indication of mortality after thoracotomy for trauma. Careful evaluation of chest trauma patients, optimal utilization of closed tube thoracostomy drainage (CTTD), and strict adherence to an aseptic technique in the early phase of trauma care would further reduce the requirement for delayed thoracotomy due to retained hemothorax and empyema thoracis.

Conflict of Interest Statement

The authors declare that this paper was written without any commercial or financial relationship that could be construed as a potential conflict of interest.

Authors Contribution

The manuscript was read and approved by both authors.

Supplementary Note

A previous abstract (appreciably updated herein) was presented at the Joint Association of Surgeons of Nigeria and the Nigerian Surgical Research Society Meeting, Umuahia, Nigeria, in July 2018 [15].

References

1. Beshay M., *et al.* "Analysis of risk factors in thoracic trauma patients with a comparison of a modern trauma centre: a mono-centre study". *World Journal of Emergency Surgery* 15.1 (2020): 45. <https://wjeb.biomedcentral.com/articles/10.1186/s13017-020-00324-1>
2. Walia BS., *et al.* "Clinical Features, Management, and Outcomes of Chest Trauma at a Tertiary-Care Centre in India: A Retrospective Observational Study". *Scientific World Journal* (2021): 8052586. <https://www.hindawi.com/journals/tswj/2021/8052586/>
3. Ekpe EE and Eyo C. "Determinants of mortality in chest trauma patients". *Nigerian Journal of Surgery* 20.1 (2014): 30-34. <https://pubmed.ncbi.nlm.nih.gov/24665200/>
4. Veysi VT., *et al.* "Prevalence of chest trauma, associated injuries and mortality: a level I trauma centre experience". *International Orthopaedics* 33.5 (2009): 1425-1433. <https://pubmed.ncbi.nlm.nih.gov/19266199/>
5. Unsworth A., *et al.* "Treatments for blunt chest trauma and their impact on patient outcomes and health service delivery". *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 23 (2015): 17. <https://pubmed.ncbi.nlm.nih.gov/25887859/>
6. Dogrul BN., *et al.* "Blunt trauma related chest wall and pulmonary injuries: An overview". *Chinese Journal of Traumatology* 23.3 (2020): 125-138. <https://pubmed.ncbi.nlm.nih.gov/32417043/>

7. Segalini E., *et al.* "Bologna Trauma Team collaborative group. Outcomes and indications for emergency thoracotomy after adoption of a more liberal policy in a western European level 1 trauma centre: 8-year experience". *Updates in Surgery* 71.1 (2019): 121-127. <https://pubmed.ncbi.nlm.nih.gov/30588565/>
8. Aghaei Afshar M., *et al.* "Evaluation of Injuries Caused by Penetrating Chest Traumas in Patients Referred to the Emergency Room". *The Indian Journal of Surgery* 77.3 (2015): 191-194. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4522250/>
9. Beshay M., *et al.* "Analysis of risk factors in thoracic trauma patients with a comparison of a modern trauma centre: a mono-centre study". *World Journal of Emergency Surgery* 15.1 (2020): 45. <https://wjeb.biomedcentral.com/articles/10.1186/s13017-020-00324-1>
10. Rossaint R., *et al.* "Task Force for Advanced Bleeding Care in Trauma. Management of bleeding following major trauma: an updated European guideline". *Critical Care* 14.2 (2010): R52. <https://ccforum.biomedcentral.com/articles/10.1186/s13054-019-2347-3>
11. Curry N., *et al.* "The acute management of trauma hemorrhage: a systematic review of randomized controlled trials". *Critical Care* 15.2 (2011): R92. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3219356/>
12. Elkbuli A., *et al.* "Successful management of gunshot wound to the chest resulting in multiple intra-abdominal and thoracic injuries in a pediatric trauma patient: A case report and literature review". *International Journal of Surgery Case Reports* 76 (2020): 372-376. <https://pubmed.ncbi.nlm.nih.gov/33080529/>
13. Marcaccio CL., *et al.* "Delayed endovascular aortic repair is associated with reduced in-hospital mortality in blunt thoracic aortic injury patients". *Journal of Vascular Surgery* 68.1 (2018): 64-73. <https://pubmed.ncbi.nlm.nih.gov/29452832/>
14. Joseph B., *et al.* "Improving survival after an emergency resuscitative thoracotomy: a 5-year review of the Trauma Quality Improvement Program". *Trauma Surgery and Acute Care Open* 3.1 (2018): e000201. <https://pubmed.ncbi.nlm.nih.gov/30402559/>
15. Abstracts of Papers Presented at the Joint Association of Surgeons of Nigeria and Nigeriansurgical Research Society Meeting, Umua-hia, Nigeria". *Nigerian Journal of Surgery* 25.1 (2019): 107-130. <https://www.nigerianjsurg.com/article.asp?issn=1117-6806;year=2019;volume=25;issue=1;spage=107;epage=130;aulast=;type=0>

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