

Profile of Chest Trauma in Zaria Nigeria: A Preliminary Report

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Abstract

Aims and Objectives

Trauma continues to be a major cause of morbidity and mortality world over. This study is aimed at the patterns of presentation and the outcome of management.

Materials and Methods

A prospective study of trauma patients admitted to Ahmadu Bello University Teaching Hospital through the Accident and Emergency units was commenced in January 2008. This preliminary report is for the period of 27 months. The clinical history, physical examination and outcome of management recorded in a predesigned proforma, were analysed with SPSS 15 and the patients were followed up in the surgical outpatient department.

Results

A total of 4784 patients (3143 men and 1641 women) were admitted during this period for trauma. There were a total of 628 (13.13%) deaths. Of the 42 consecutive patients identified with chest trauma 35 (83.3%) were males and 7 (16.7%) were females. The age range was from 5-75 years and the mean age was 35.4 years, while the most affected ages were in the range of 20 to 49 years. Blunt injury constituted 71.4% and penetrating injury constituted 28.6%. Road traffic accident was responsible for 61.9%, stab injury 21.4%, falls 7.1%, gunshot injury 4.8%, impalement 2.4% and animal attack also 2.4%. The average time taken between accident and admission was 31 hours, 40 minutes and 12 seconds while the average duration of hospital stay was 16.10 days. The injury pattern included rib fracture(s) (23.8%), hemopneumothorax (14.3%), hemothorax (7.1%), pneumothorax (4.8%), combinations of chest injuries (7.1%), chest laceration 7.1%, bruises 11.9%, lung contusion 4.8%, subcutaneous empyema 2.4%, flail chest 4.8% and no specific injury (11.9%). Associated injuries included head injury (63.6%), orthopaedic injury (27.3%) and combinations (abdominal, head, orthopaedic (9.1%). The fatality of road traffic accident was 36.8%. No patient was attended to by paramedics at the scene of accident while 21.9% of the patients had prehospital resuscitation in peripheral clinics before admission. The transfusion requirement was 14.3%. One patient (2.4%) required a median sternotomy and cardiopulmonary bypass, 54.8% required tube thoracostomy while 42.9% had general resuscitation /non-operative intervention. Only one (2.4%) required ICU care. The complication rate was 4.8%. The mortality rate was 2.4%. Only 7 (16.7%) patients were seen beyond the first outpatient clinic appointment.

Conclusion

Most patients arriving at the hospital survived, requiring general resuscitation or simple tube thoracostomy with few complications. Mortalities from trauma and the cause of death at the site of accident are often not accounted for due to non-presentation to the hospital and lack of autopsy for those that present.

Key words: Trauma, Chest, Presentations, Management, Recommendations

Introduction

Trauma is a major cause of morbidity and mortality world over as a result of rapid technology and the rising crime rate in the society¹. Thoracic trauma is responsible solely for 25% of all deaths from trauma and in another 25% contributes to the morbidity and mortality². Medical personnels must therefore understand not only the patterns of injury, but the pathophysiology and the outcome of management peculiar to their environment. This would aid not only individual patient's management, but also help in the formulation of policies geared towards preventive measures from deductions from the studies. This formed the basis for this study.

Aims and Objectives

Trauma continues to be a major cause of morbidity and mortality world over. Much has been written on it but with very little reference to the region of coverage of Ahmadu Bello University Teaching Hospital Zaria Nigeria.

This study is aimed at identifying the patterns of presentation and the outcome of management and proffering relevant recommendations bordering on prevention and management.

Materials and Methods

A prospective study of trauma patients admitted to Ahmadu Bello University Teaching Hospital through the Accident and Emergency unit was commenced in January 2008. This preliminary report is for the period of 27 months. The clinical history, examination and outcome of management recorded using a predesigned proforma, were analysed using SPSS 15 and the patients were followed up in the surgical outpatient department.

Results

A total of 4784 patients (3143 men and 1641 women) were admitted during this period for trauma. There were a total of 628(13.13%) deaths (information from ABUTH Health Information Service Unit January 2008- March 2010). Of the 42 consecutive patients identified with chest trauma 35(83.3%) were males and 7(16.7%) were females (Table 1).

Table 1: Sex Distribution.

| | | Frequency | Percent |
|-------|--------------|-----------|--------------|
| Valid | Male | 35 | 83.3 |
| | Female | 7 | 16.7 |
| | Total | 42 | 100.0 |

The age range was from 5-75 years and the mean age was 35.4 years, while the most affected ages were in the range of 20 to 49 years (Table 2).

Table 2: Age Distribution.

| Age in Years | Freq | Percent |
|--------------|-----------|--------------|
| Valid 0-9 | 3 | 7.1 |
| 10-19 | 4 | 9.5 |
| 20-29 | 9 | 21.4 |
| 30-39 | 8 | 19.0 |
| 40-49 | 9 | 21.4 |
| 50-57 | 3 | 7.1 |
| 60-69 | 4 | 9.5 |
| 70-79 | 2 | 4.8 |
| Total | 42 | 100.0 |

Blunt injury constituted 71.4% and penetrating injury 28.6%. Road traffic accident was responsible for 61.9%, stab injury 21.4%, falls 7.1%, gunshot injury 4.8%, impalement and animal attack were 2.4% respectively (Table 3).

Table 3: Distribution According to Mechanism of Injury.

| | Frequency | Percent |
|--------------|-----------|--------------|
| Valid fall | 3 | 7.1 |
| stab | 9 | 21.4 |
| impalement | 1 | 2.4 |
| gunshot | 2 | 4.8 |
| RTA | 26 | 61.9 |
| ANIMAL | 1 | 2.4 |
| Total | 42 | 100.0 |

The average time taken between accident and admission was 31.67 hours while the average duration of hospital stay was 16.10 days. The injury pattern included rib fracture(s) (23.8%), hemopneumothorax (14.3%), hemothorax (7.1%), pneumothorax (4.8%), combinations of chest injuries (7.1%), and no specific injury (11.9%) (Table 4).

Table 4: Nature/Pattern of Injury.

| | Frequency | Percent |
|-----------------------|-----------|--------------|
| Valid Rib Fracture(S) | 10 | 23.8 |
| Laceration | 3 | 7.1 |
| Bruise | 5 | 11.9 |
| Pneumothorax | 2 | 4.8 |
| Hemothorax | 3 | 7.1 |
| Lung Contusion | 2 | 4.8 |
| S.C. Emphysema | 1 | 2.4 |
| Hemopneumothorax | 6 | 14.3 |
| Flail Chest | 2 | 4.8 |
| No Specific Injury | 5 | 11.9 |
| Combinations of 1-9 | 3 | 7.1 |
| Total | 42 | 100 |
| Total | 42 | 100.0 |

Associated injuries included head injury (63.6%), orthopaedic injury (27.3%) and combinations (abdominal, head, orthopaedic) (9.1%). The fatality of road traffic accident was 36.8%. No patient was attended to by paramedics at the scene of accident while 21.9% of the patients had prehospital resuscitation in peripheral clinics before admission. The transfusion requirement was 14.3%. One patient (2.4%) required a median sternotomy and cardiopulmonary bypass, 54.8% required tube thoracostomy while 42.9% had general resuscitation /non-operative intervention (Table 5).

Table 5: Intervention /Treatment Options.

| | Frequency | Percent |
|-----------------------|-----------|--------------|
| Tube Thoracostomy | 23 | 54.8 |
| General Resuscitation | 18 | 42.9 |
| Sternotomy | 1 | 2.4 |
| Total | 42 | 100.0 |

Only one (2.4%) required ICU care. The complication rate was 4.8%. The mortality rate was 2.4%. Only 7(16.7%) patients were seen beyond the first outpatient clinic appointment.

Discussion

Trauma is the leading cause of death and disability in the first four decades of life and the 3rd leading cause of death the world over³. The American Academy of Science has labelled trauma, 'the neglected disease of modern society'³. There is nowhere else where this clause is more applicable than in sub-Saharan Africa and in Nigeria in particular. Furthermore the bloated emphasis on Malaria, Tuberculosis, HIV & AIDs relegates trauma to an orphaned position. In her quarterly report titled the 'alarming statistics of road accident', the Federal Road Safety Commission of Nigeria, noted 1056 deaths from 7737 (13.65%) accidents between Dec 2009-Mar 2010⁴. When extrapolated to the general population, the report by the FRSC of Nigeria and our observed accident fatality rate of 36.8% would dwarf mortalities from infectious diseases on critical analysis. As in many previous findings in our subregion,^{5,6} road traffic accident accounted for most cases of chest trauma (61.9%). That no patient was attended to by paramedics, and the prolonged injury admission time of 31.67 hours is an indication of absent Emergency Medical Services(EMS) and poor health delivery system. Majority of the patients(71.4%) had blunt chest trauma as observed in many previous studies proving that the pattern has changed little over time⁷. Ali and Gali⁸ in Maiduguri however found a higher incidence of penetrating injury(61.53%) and this they attributed to urbanization and its attendant high crime rate. The relatively low incidence of gunshot

wounds(4.8%) compared to stab wound (21.4%) is the reverse of what obtains in developed society and is simply explained by accessibility to these weapons⁸. Our finding on sex distribution, mean age, and age range were in keeping with other findings.^{5,8,11} The implication of this is depletion of the productive workforce required even more in developing societies. As we observed, it is now generally agreed that the majority of chest injured patients (97.6%) require no more than tube thoracostomy for adequate management reserving thoracotomy for those patients with significant hemorrhage or for patients who are hemodynamically unstable, with proven surgical pathologies^{3,5-7}.

Our observed mortality of 2.4%, ICU requirement(2.4%), transfusion requirement(14.3%) and complication rate(4.8%) for admitted patients may all be a reflection of increased understanding of the pathophysiology of chest trauma and therefore better treatment outcome. The observed complications were pneumothorax in one patient and empyema in another while the mortality was as a result of adult respiratory distress syndrome in a multiply injured patient. Cardiopulmonary bypass was required in one patient with arrow injury to the heart⁹. The average duration of hospital stay of 16.10 days which was as a result of associated head(63.6%) orthopaedic(27.3%) or combination(9.1%) injuries. While only 23.8% of our patients had rib fracture, Iyer et al⁹ in India found 51.1% . The follow-up response (16.7%) was poor probably as a result of distance and financial constraints.

Conclusion

Most patients arriving at the hospital survive requiring general resuscitation or simple tube thoracostomy with few complications. Mortalities from trauma and the cause of death at the scene of accident are often not accounted for due to non-presentation and lack of autopsy for those that present. The patterns of chest injury vary very little in most centres. Most patients arriving alive at the hospital require no more than tube thoracostomy even in developing societies. The major difference lies in the prehospital care due to absence of EMS in most developing societies.

Although this is a preliminary report, we regret the small sample size and our inability to obtain the exact number of chest trauma victims relative to the total trauma cases (logistic problems in health information system). We however proffer the following recommendations which we believe if implemented would impact on prevention and outcome of management.

1. Governments and NGOs should pay more attention to trauma with respect to prevention.
2. There is need for post-mortem for patients arriving dead at the hospital to ascertain the true cause of death.
3. There should be:
 - a) Computerization of health information system and employment of more skilled hands.
 - b) Provision of EMS on our major roads at every 20-30km distance.
 - c) Training and retraining of health personnel involved in trauma management.
 - d) Enforcement of road safety measures and educating road users adequately on these safety measures.
 - e) Improvement in the quality and safety of our roads.
 - f) Reducing dependence on road by providing and making affordable other modes of transportation like air and rail transport.
 - g) Improvement in general security. When enforced, these recommendations would reduce the incidence of trauma and improve on the outcome of management.
3. Ryan JM. Accident and Emergency. In: Russell RCG, William NS, Bulstrode C.J.K.(Eds). Bailey and Love's Short Practice of Surgery 23rd Ed. London; Arnold Publishers,2000; 270-280.
4. The Daily Sun Newspaper, Wednesday May 12, 2010; page 18 vol. 6, No.1752.
5. Archampong EQ, Anyanwu CH, Ohaegbulum SC, Yeboah ED. Management of the injured patient. In: Principles and practice of surgery, including pathology in the tropics 3rd Ed. Badoe EA, Archampong EQ, Jaja M.O (eds). Ghana Publishing Company, Tema. 1994; 142-177.
6. Frimpong-Boateng K, Amoati ABG. Chest injuries in Ghana. Abstracts from the 40th Annual Conference of the West African College of Surgeons. West Afr J Med 2000; 19: 175.
7. Anyanwu CH, Swarup AS. Chest trauma in developing countries. Ann R Coll Engl 1981; 63: 102-104.
8. Ali N, Gali BM. Pattern and Management of chest injuries in Maiduguri, Nigeria. Annals of African Medicine Vol. 3, No. 4; 2004: 181 184.
9. Inci I, Ozçelik C, Taçyildiz I, Nizam O, Eren N, Ozgen G. Penetrating chest injuries: unusually high incidence of high-velocity gunshot wounds in civilian practice. World J Surg 1998 May; 22(5):438-42.
10. Nwiloh J, Edaigbini S, Danbauchi S, Muhammad B.M, Oyati A. Arrow injury to the heart. Ann Thor Surg 2010;90:287-9.
11. Iyer R.S, Manoj P, Jain R, Venkatesh P, Dilip D. Profile of Chest Trauma in a Referral Hospital: A Five-Year Experience. Asian Cardiovasc Thorac Ann 1999;7:124-127.

References

1. Adebonojo SA. Management of chest trauma: a review. West African J Med 1993;12:122-32.
2. Wilson RF, Murray C, Antonenko DR. Nonpenetrating Thoracic Injuries. Surg Clin North Am 57: 17-36, 1977.