



Patterns of Plain Radiographic Findings among Patients with Chest Trauma in Awka, Nigeria

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ABSTRACT

Introduction: Chest trauma is the leading cause of morbidity and mortality. The most common cause of chest trauma is road traffic accident (RTA). The combination of chest trauma and other system injuries increases mortality. It is important for patients to be properly assessed after trauma because of the danger posed by trauma to the organs.

Aim: The study aims to evaluate the pattern of findings in chest trauma in the Awka state of Nigeria. **Method:** This is a retrospective study among patients with chest trauma from May 2012 to March 2017, in Awka. **Results:** The key findings of the study show that 181 patients were included in the study, 68% were males and 32% were females. The male: female ratio was 2:1. The mean age of patients was 34.7 years. The age range of patients was between 3-79 years. The greatest cause of chest trauma was RTA (77.3%) and the least was gunshot (0.6%). Most of the patients involved in the study were found to be normal (60.36%). The most common traumatic finding was a fracture, with rib fracture being the commonest. **Conclusion:** The main finding that the youths are mostly involved in chest trauma and that majority of them are also males agrees with the studies done in other places. These youths form the economic backbone of the society and calls for stern preventive measures against chest trauma. A plain chest radiograph was also discriminatory enough to help in planning the treatment and further investigations.

Keywords: Plain chest radiograph, Chest trauma, RTA

INTRODUCTION

Trauma is defined as the injury of the human tissues and organs resulting from the transfer of energy from the environment or body, wound or shock produced by sudden physical injury either from violence or accident [1].

Chest trauma is among the leading causes of morbidity and mortality ranking third after head and extremity in USA [2]. Chest trauma can be classified into blunt and penetrate depending on the nature of its causation.

The most common cause of chest trauma is road traffic accident (RTA) [1-5]. Blunt chest trauma poses a great threat to the airway, breathing, and circulation in the traumatized patient thus directly affecting the clinical course and outcome [5]. The combination of chest trauma and another system injury will increase the mortality rate [3].

Chest trauma poses a great danger, therefore it is necessary that patients with visible or suspected chest trauma are properly assessed and treated. This will reduce the consequences of injury. In poor resource setting like ours, a plain chest radiograph is a good screening test. Even in developed nations, a plain chest radiograph is still a good screening method. It is still considered as a useful and cheap method of providing valuable information in the initial evaluation of trauma patients [6-8]. Abedi, et al., showed that the screening performance characteristic of chest radiograph in the diagnosis of traumatic intrathoracic injuries was more than 90% in pathologies except for pneumothorax [6]. Screening patients with chest trauma find other categories of injury which was involved, and therefore leads to necessary early therapeutic intervention with a consequent reduction in the duration of the therapy and also save unnecessary therapeutic intervention.

Looking at South Eastern Nigeria and Awka in particular, not much of the study has been done and therefore this study

will add to the useful local data needed for effective planning to reduce the effects of chest injuries. This will definitely save the society and economic damages or losses following these injuries.

Aim of the Study

This study is aimed at documenting the pattern of chest injuries seen in the chest radiograph of patients with chest trauma and also to encourage the physicians to send these patients to the available investigative modality early enough, as this will help in reducing the danger of managing patients without proper information and will reduce the attendant complications consequent on the investigative delay.

Justification for the Study

The lack of local data in an important matter of trauma has reduced the attention of policymakers in making a case for this important source of morbidity and mortality.

Reviewing the pattern of findings in chest trauma patients will help physicians to appreciate the diagnostic usefulness of the chest radiograph in chest trauma and the need to institute an early investigation and subsequent appropriate therapy, hence reducing the morbidity and mortality.

Also knowing the morbidity that comes from chest trauma and the causes will make for the institution of appropriate infrastructure to reduce these injuries and their cause.

METHODOLOGY

This study was undertaken in Amaku teaching Hospital in Awka and Amen Specialist Diagnostic Clinic, a pioneer Private radio-diagnostic clinic manned by the radiologists. These centers cater to the needs of patients in Anambra and the neighboring state of Enugu.

This is a retrospective study in the centers involving all patients who were presented with chest trauma between May 2012 to March 2017 and who were investigated with plain chest radiograph and also met all other inclusion criteria.

Inclusion Criteria

All patients with chest trauma within the study period whose data (biodata) and radiologist report were available were included in the study.

Exclusion Criteria

Any patient though with chest trauma within this study period but whose biodata or the radiologist report was not available or was either incomplete or lost from the record were excluded from the study.

Statistical Analysis

The results were analyzed and presented in the form of tables and charts using SPSS Version 20 produced in Chicago USA.

RESULTS

A total of 181 patients were selected for this study with 68% of these being males and 32% of females showing a male: female ratio of 2.1:1.

The mean age of patients involved in this study was 34.3 years with a median age of 30.7 years with an age range of 3-79 years. The modal age involved was 21-30 years (29.5%) followed by 31-40 years (18.6%).

The greatest cause of chest trauma in our study was from RTA (77.3%), followed by fall from height (16.6%) and the least is gunshot injury (0.6%).

This revealed that most of the patient involved in this study was normal (60.36%). Apart from the incidental findings of cardiomegaly and aortic unfolding found in patients with advancing age, the most traumatic injury was a fracture (made up of sternal fracture (0.9%) and rib fracture of 4.51% and contusion (5.41%) (Table 1, Figures 1-3).

Table 1 Frequency distribution of type of injury

Type	Frequency (N)	Percentage (%)
Rib fracture	10	4.51%
Sternal fracture	2	0.90%
Contusion	12	5.41%
Haemothorax	2	0.90%
Pneumothorax	7	3.15%
Hemopneumothorax	3	1.35%
Elevated Hemidiaphragm	5	2.25%
Normal	134	60.36%
Aortic Unfolding	27	12.16%
Cardiomegaly	20	9.010%
Total	222	100.00%

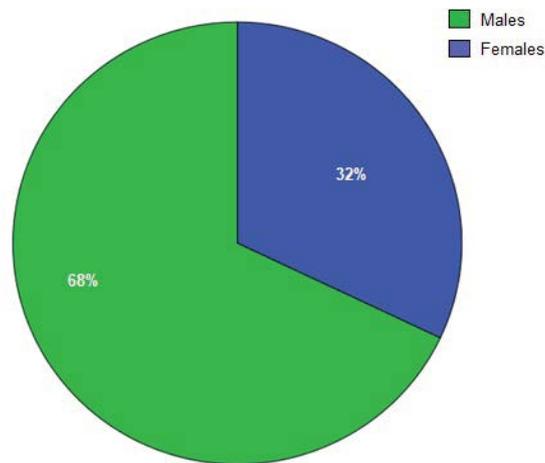


Figure 1 The sex distribution of patients

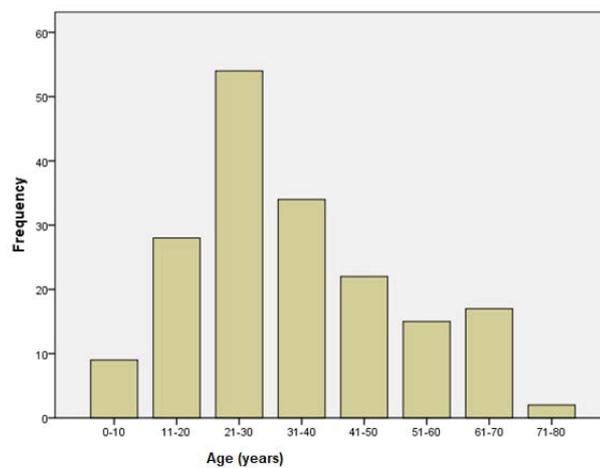


Figure 2 The frequency distribution of patient age

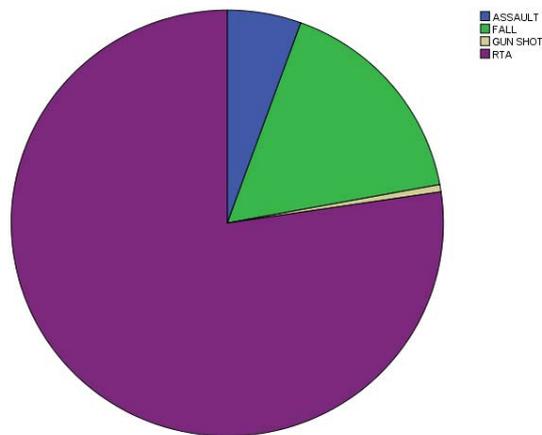


Figure 3 The frequency distribution of causes of chest trauma

The mean age of the patients in our study was 34.3 years. This agrees with most of the studies done in other places [9-11]. This age group typifies the youths which are the workforce of the nation. This will definitely affect the economic life of the families, states and the nation at large.

The sex distribution of the patients involved in this study showed a preponderance of male over female; Male: Female relation of 2.1: 1. This is the same with studies done on the same topic in other places [12-14]. This is because the men are involved in lots of outdoor activities, they are more mobile, more active and participate in risky activities [15]. These are the breadwinners for their families and involvement in these injuries will bring so much stress to the families. It will be noticed that the ratio in our study points to a narrowing of the ratio between male and females due to more involvement of women in risky activities and mobility. The study by Anyanwu, et al., in 1981 showed male: female ratio of 5:1 while Ali, et al., in 2004 had male: female ratio of 3.8:1 and in 2012, Wilfred, et al., had male: female ratio of 2.8:1 [13,14]. In our study, we had male: female ratio of 2.1:1 (Figure 1).

The age range in our study is 3-79 years with the modal age group of 21-30 this was followed by 30-40 yrs. In most of the studies, the youths were more involved. This increased involvement of youth and also male predominance shows the great economic burden on the nation and the families in particular since men in this age group form the economic backbone of the families. It also important to consider this in policy formulation to provide infrastructure and laws that will help to protect the age group and also to reduce the occurrence of the traumatic injuries involved (Figure 2). The most common cause of chest trauma in our study is road traffic accident (77.3%). This is followed by falls (16.6%) and the least is gunshot (0.6%). RTA is agreed as the most common cause in the studies done in other centers [2-5] (Figure 3).

On the other hand, the study by Ali, et al., in Maiduguri Nigeria reported an increase in the rate of penetrating injuries due to an increase in crimes, urbanism, and terrorism [14]. The finding by Inci, et al., showed that with increasing urbanization there will be an increase in the penetrating injuries like guns, arrows, and knives [15]. The finding in our study, as well as others that RTA is the leading cause of injuries, will need to institute measures that reduce the accidents on the roads. These will include the use of helmets by motorcycle riders, seat belt by motor vehicle drivers and better road infrastructures [16-18]. The education of the road users and license and re-licensing of various grades of drivers will be very necessary [16,19].

Most of the patients examined using the plain chest radiography showed normal chest radiographic features. Apart from incidental findings of cardiomegaly and aortic unfolding which were found more in the advanced age bracket, the most other common findings are a fracture (made of rib fracture (4.5%), sternal fracture (0.9%)) and lung contusion.

This is similar with a study by Edaigbini, et al., in Zaria and Chima, et al., in Lagos which showed that chest radiography will help in the determination of injury pattern in patients with chest trauma [1,9]. This will help in taking initial management decisions and also helps in determining the possibility of further use of other imaging modalities.

The normal patients were found to be more affected than the patients with abnormalities needing interventions and hence the use of CT and other imaging modalities shows how far plain chest radiography will go in reducing the use

of costly and less available imaging modalities like CT and MRI. This will definitely reduce the use of CT and MRI and other imaging modalities to only severe cases thereby maximizing the use of scarce resources [6,13,20].

CONCLUSION

This study showed that plain chest radiograph help to screen out most of the patients that do not need further therapeutic intervention and will also not need any further diagnostic investigation. This will help in saving cost and avoiding unnecessary therapies. It will also be good in selecting a patient with skeletal injuries (fractures) and parenchymal injuries, for example, haemothorax and contusions. It will also point the way to patients that will need further diagnostic investigations and immediate surgical management. This means that plain chest radiography is still a good screening investigation, and in developing countries with inadequate clinical facilities, a conservative method of managing major clinical problems is still a very rational approach.

DECLARATIONS

Conflict of Interest

The authors have disclosed no conflict of interest.

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