

# PATTERN OF RADIOGRAPHIC FINDINGS IN TRAUMA OF THE UPPER EXTREMITIES AT FEDERAL TEACHING HOSPITAL GOMBE, NIGERIA

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## ABSTRACT

**BACKGROUND:** Trauma is defined as a physical wound or injury such as a fracture or blow. It is a major public concern throughout the world and probably the most serious of all health problems. Plain radiography is used as an imaging modality to assess fractures and dislocations in patients presenting with trauma to the upper extremities. Other imaging modalities such as Computed Tomography (CT), Ultrasound and Magnetic Resonance Imaging (MRI) are not generally indicated in acute trauma, but have an important role in diagnosing soft tissue pathology.

**OBJECTIVE:** This study aims at establishing pattern of plain radiographic findings in patient with trauma to the upper extremity at Federal Teaching Hospital Gombe, North Eastern Nigeria.

**METHOD:** The data was retrospectively acquired from the radiology film archive of the hospital, involving accident and emergency reports of consecutive patients that have undertaken X-ray examination of the upper extremities for the period of six months. Data were presented as percentages.

**Results:** A total of 126 reports were analyzed, with male and female representing 63.4% and 36.6% respectively. The patients were between the age range of 1 to 54 years (mean age 31.0+11.55 SD). Majority of the patients affected were in the age range of 25-29 years having a frequency of 44(35%). Of the 126 radiographs that were reviewed, 12(10%) cases were found to be normal and 114(90%) cases demonstrated pathology.

Out of the abnormal findings, Colles fracture was the highest which accounted for 22 (17.5%) and fracture of the surgical neck of humerus was the lowest with frequency of 2(1.6%). The forearm was the most predominantly injured part of the upper extremities and accounted for 38(30.2%) of all the cases while elbow was the least injured, accounting for only 13(10.3%) of the trauma cases.

**CONCLUSION:** Colles fracture is the commonest radiological findings in patients that underwent plain radiographic examination of the upper extremities at Federal Teaching Hospital Gombe.

**KEY WORDS:** Trauma, plain radiography, fracture

## INTRODUCTION

Trauma is a major public concern throughout the world and probably the most serious of all health problems<sup>2</sup>. Furthermore, it is the leading cause of morbidity and mortality<sup>3</sup>. Traumatic injuries may result from all forms of human activities, at home, work and at play (domestic trauma), other causes of traumatic injuries include; road traffic accident, fall from height, gunshot and assault<sup>4</sup>. Fractures and dislocation are the common traumatic injuries seen after imaging investigation.

Plain radiography is used as an imaging modality to assess fractures and dislocations in patients presenting with trauma to the upper extremities<sup>4,5</sup>. Other imaging modalities such as Computed Tomography (CT), Ultrasound and Magnetic Resonance Imaging (MRI) are not generally indicated in acute trauma, but have an important role in diagnosing soft tissue pathology<sup>5</sup>.

Plain radiography of trauma patients whether undertaken in the emergency room or within the imaging department should be considered as an imaging specialty in its own right<sup>6</sup>. Evaluation of the critically ill or traumatized patient is a demanding but an exciting challenge for both the radiographer as well as the Radiologist. It is demanding because the patient requires urgent help. Conventional and specialized radiographic studies form the bottom line of the diagnostic investigations in these situations that enable the physicians to formulate a correct decision in treatment planning<sup>7</sup>.

This study aims at establishing pattern of plain radiographic findings in patient with trauma to the upper extremity at Federal Teaching Hospital Gombe, North eastern Nigeria.

**MATERIALS AND METHODS**

The data was retrospectively acquired from the radiology film archives of the hospital, involving accident and emergency reports of consecutive patients that have undertaken x-ray examination of the upper extremities for the period of six months (August, 2011 – February, 2012). The examination was carried out using a 3-phase, 6-pulse GE X-ray machine and model (5189248). The radiographs were reported by a consultant radiologist, resident doctors in the department of radiology, Federal Teaching Hospital Gombe. Only patients that have X-ray due to trauma of the upper extremities were included in this study, while patients that underwent X-ray of all parts of the body apart from traumatic injuries to the upper extremities were excluded in this study. The collected data was recorded using a data capture sheet categorized based on gender, age, indication and radiographic findings. The radiographs termed normal were those that provided no diagnostic information while those termed abnormal were those that showed sign of pathology and aided in the diagnosis of the patient. With the aid of Microsoft Excel 2007 package, data was statistically analyzed using descriptive statistics. Ethical consideration was obtained from the hospital research committee of the Federal Teaching Hospital Gombe, also all information obtained was treated with utmost confidentiality. Data were presented as percentages.

**RESULTS**

A total of 126 reports were analyzed in this study. This comprises male and female representing 63.4% and 36.6% respectively. The patients were between the age range of 1 to 54 years (mean age 31.0+11.55 SD). Majority of the patients affected were in the age range of 25-29 years having a frequency of 44(35%)(Table 1).

Out of the 126 radiographs that were reviewed, 12(10%) cases were found to be normal and 114(90%) cases demonstrated pathology (Table 2).

Among the abnormal findings, Colles fracture was the highest which accounted for 22 (17.5%) and fracture of the surgical neck of humerus was the lowest with frequency of 2(1.6%)(Table 3).

The forearm was the most predominantly injured part of the upper extremities and accounted for 38(30.2%) of all the cases while elbow was the least injured, accounting for only 13(10.3%) of the trauma cases (Table 4).

**Table 1: Frequency Distribution of Sex based on Age Group**

<b>Age (years)</b>	<b>Males(%)</b>	<b>Females(%)</b>	<b>Total(%)</b>
0-9	4(3.2)	1(0.8)	5(3.9)
10-19	4(3.2)	7(5.6)	11(8.7)
20-29	25(19.8)	19(15.1)	44(35.0)
30-39	23(18.2)	12(9.5)	35(27.8)
40-49	19(15.1)	6(4.8)	25(19.8)
50-59	5(3.9)	1(0.8)	6(4.8)
<b>Total</b>	<b>80(63.4)</b>	<b>46(36.6)</b>	<b>126(100)</b>

**Table 2: Frequency Distribution of Normal and Pathological Findings**

<b>Findings</b>	<b>Frequency</b>	<b>Percentage(%)</b>
Normal	12	90
Abnormal	114	10
<b>Total</b>	<b>126</b>	<b>100</b>

**Table 3: Common Radiographic Findings in Trauma of the Upper Extremities**

Findings	Frequency	Percentage
Colles' Fracture	22	17.5
Fracture of the Humerus	19	15.1
Dislocation	17	13.5
Fracture of the Forearm	15	11.9
Fracture of the Clavicle	15	11.9
Normal	12	9.5
Benettes' Fracture	6	4.7
Scapula Fracture	3	2.4
Fracture of the Surgical neck of Humerus	2	1.6
<b>Total</b>	<b>126</b>	<b>100</b>

**Table 4: Frequency Distribution of Anatomical Sites involved in Traumatic Injury of the Upper Extremities**

Body Parts	Frequency	Percentage(%)
Hand/wrist	26	20.6
Forearm	38	30.2
Humerus	18	14.3
Elbow	13	10.3
Shoulder	31	24.6
<b>Total</b>	<b>126</b>	<b>100</b>

## DISCUSSION

In the present study, out of 126 patients the most vulnerable age group in traumatic injuries of the upper extremities is in the young adult between the ages of 20-29 years in both sexes and males are more involved having a frequency of 80 (63.5%). This is consistent with the findings in a study carried out by Abdulkadir et al, 2011, where the most affected age group was 20-29 years and male are more involved having a frequency of 44(61.1%)<sup>8</sup>. This is due to the fact that male are more predisposed in day- to- day activities and the age group is the most active age group in the society.

The most common radiographic findings in trauma of the upper extremities is Colles fracture according to this study, with a frequency of 22(17.5%). This is almost similar to the study conducted in Hong Kong in 1999, where the most common fracture was the distal radius with 20.2%<sup>9</sup>. About 15(11.9%) of the result was found to be fracture of the forearm in this study. Analysis of trauma of the upper extremities shows that scapular fracture account for 3(2.4%). Result from the current study revealed that clavicular fracture was found to be 15(11.9%). The clavicular fractures were classified into three forms: the lateral third (10%), the middle third (85%) and medial third (5%)<sup>10</sup>. Results from this study shows that 15(11.9%) of the findings accounted for fracture of the hand. This is however, not similar to the research conducted by Petit et al<sup>11</sup>, who found incidence of hand fracture in paediatrics to be 25.7%. The dissimilarities may be due to the age differences between the two studies. The study conducted by Petit et al was limited to only paediatrics while this study cut across all the age groups ranging from paediatrics to adults. In this study humeral fracture accounted for 15 (11.9%). This is nearly similar to a research carried out by Admassie et al<sup>12</sup>, who reported the incidence of humeral fracture to be 12%. Result from the current study revealed that, fracture of the forearm accounted for 15(11.9%) of the findings. Dislocation has a frequency of 17(13.5%) of the findings. The glenohumeral articulation is the commonest joint to dislocate and this relates to the anatomical lack of constraint provided by the shallow glenoid to the larger surface area of the humeral head, which is also why it allows an extensive range of movement.

Dislocation of the elbow is second only to the shoulder in frequency<sup>10</sup>. This study shows that the frequency of Bennettes fracture was 6(4.7%) of the findings. Fracture of the surgical neck of humerus has the least frequency of findings with 2(1.6%) of cases.

Result from the current study revealed that most of the radiographs in the upper extremities reviewed has a diagnostic yield of 90% and 10% are normal. This is contrary to the result obtained by Petit et al. Perhaps, these differences may be due to geographical location, environmental factors and differences in age group studied.

### CONCLUSION

Colle's fracture was the commonest findings in traumatic patients that underwent plain radiography of the upper extremities and male were more commonly affected with the highest incidence in the age group of 20-29 years

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