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Chest X-Ray Findings Among Adult Patients Attending Usmanu Danfodiyo University Teaching Hospital Sokoto North-western Nigeria

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Abstract

Background: Chest x-ray is the most frequently performed diagnostic examination particularly in patients with respiratory and cardiac diseases and for routine medical checkup and planning for surgery. A study on the image quality of chest x-rays had been conducted but the findings on the chest x-rays have not been studied in this tertiary health institution. This study aimed at revealing the most common pathologies and sex distribution of the pathologies on chest x-rays of adult patients attending the hospital.

Materials and Methods: A retrospective study of 190 adult (aged 18 and above) patients' chest x-ray reports was conducted using the existing reported documents of chest x-rays from the archives of Radiology Department of Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto from January 2018 - October 2019 using data capture sheet as instrument for data collection. Data was analysed using Microsoft excel version 2010.

Results: Out of the 190 chest x-rays, 54% were for male while 46% were for female patients with the highest number of patients in the 29-38 years age group. Most of the radiographs studied were normal examinations (38.95%). Moreover, the most common pathology was hypertensive heart failure (26.84%) with male preponderance (13.68%).

Conclusion: Hypertensive heart disease is the most common pathologic finding of adult chest x-ray in the study area with elderly male preponderance.

Key words: Thoracic cage, Chest x-ray, Radiographic findings, Cardiac pathology, Lung pathology.

Introduction

Almost every patient has some form of medical imaging performed during his\her investigations in the hospital. The commonest type of imaging performed on patients is the chest x-ray (1,2). Chest radiography is the most common radiographic procedure performed in medical imaging departments in hospitals and one of the most often repeated examination based on practical experience by the authors as they are all practicing radiographers for over 10 years. It is estimated that in the United States, about 68 million chest radiographs are performed each year (3). It is the most frequently performed diagnostic examination particularly in patients with respiratory and cardiac diseases. It can also be done for the purpose of medical check-up and preparation of patients for surgery (4). Chest radiography is usually performed to evaluate the lungs, heart and thoracic viscera. Additionally, disease processes such as pneumonia, heart failure, pleurisy and lung cancer are common indications (5).

Chest x-ray uses very small ionizing radiation to produce images of the inside of the chest. It is used to evaluate the lungs in cases of collapse, bronchial asthma, mass and metastases. It is also used to evaluate the heart in cases of hypertension, congenital anomalies and chest wall deformities. Chest radiographs can be used to diagnose and monitor treatment for a variety of lung consolidations such as pneumonia, emphysema, and cancer. It's also useful in emergency situations and has been the standard diagnostic tool in the initial evaluation of chest trauma patients (6).

Plain chest radiography is also the mainstay of imaging for screening for pulmonary tuberculosis and monitoring response to tuberculosis treatment. This is because it is the primary method of identifying suspected pulmonary tuberculosis in immigrant health assessment program (HAP) (7). Chest x-ray is also an important diagnostic tool in assessing respiratory complications as well as manifestation of HIV infection (8).

Chest x-ray is considered a useful and non-expensive method when compared to CT (Computed Tomography) providing valuable information in the initial evaluation of trauma patients (9). Even though there is a study conducted on image quality of adult chest x-rays in this study area which revealed an overall image quality of 41% (1). However, findings on the adult chest x-rays at the institution were not revealed and hence the need for this study which aimed at revealing the findings and age/sex distribution of the findings on the radiographs.

Materials and method

Ethical consideration

The ethical clearance to conduct this study was obtained from the ethical clearance committee of the Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto with clearance certificate number UDUTH/HREC/2019/No. 847

Study design and study area

This was a retrospective cross-sectional study conducted in the Department of Radiology Usmanu Danfodiyo University Teaching Hospital UDUTH Sokoto, which covered adult chest radiographs done from January 2018-October 2019. The study lasted for three months. The study area (UDUTH Sokoto) a tertiary teaching hospital commissioned in 1989 and a referral hospital/regional center for Neurosurgery. The Department of Radiology had sixteen consultants and eighteen resident doctors as at the time of the study.

Inclusion and exclusion criteria

All existing reported documents of adult chest radiographs in Radiology department of UDUTH were included while unreported documents were excluded from the study.

Sampling Technique

Convenient Sampling.

Method of Data collection

Existing reported documents of adult chest radiographs were retrieved from the archives of Radiology Department using data capture sheet as instrument for data collection.

Data analysis

Microsoft excel version 2010 was used and data reported using descriptive statistics (mean, frequency and percentages).

Result

Out of the 190 chest radiographs included in the study, 54% were for male patients while 46% were for females. The mean age of patients in this study was 49 years, with an age range of 18-88 years while the modal age was 29-38years (10.53%) followed by 49-58years (10%). The age group with the highest number of radiographs was the 29-38 years group (20%). Most of the radiographs

studied were normal examinations (38.95%). The most common pathology reported in the radiographs was hypertensive heart failure (26.84%) with male preponderance (13.68%), followed by pulmonary tuberculosis (12.11%) and the least was pneumoperitoneum with 0.53% (Table 1). The age group of 79-88 had 1.57% of radiographs studied which is the lowest (Table 2). Hypertensive heart disease was slightly higher in males (14.2%) than females (13.1%), likewise most of the pathologies. Though metastases, cardiomegaly and bronchopneumonia were higher (3.68% for females 1.05% for males, 4.21% for female 1.58% for males, 1.58% for females 0% for males respectively) in females (Figure 1).

Table 1: Radiographic findings of the chest x-rays studied

Radiographic finding	Number	Percentage (%)
Normal	74	38.95
HHDx	51	26.84
PTB	23	12.11
Cardiomegaly	11	5.78
Pleural effusion	8	4.21
Metastasis	9	4.74
Pneumothorax	2	1.05
Emphysema	3	1.58
Rib fracture	3	1.58
Pneumoperitoneum	1	0.53
Lobar pneumo-consolidation	2	1.05
BPN	3	1.58
Total	190	100

HHDx = Hypertensive heart disease, PTB = Pulmonary tuberculosis, BPN = Bronchopneumonia

Table 2: Age distribution of the patients in relation to the radiographic findings on the radiographs

Findings	Young Adults	Middle Age	Elderly
Normal	38	30	6
Hypertensive heart failure	7	21	23
Pulmonary tuberculosis	8	10	5
Metastasis	0	3	7
Pneumothorax	1	1	0
Pleural effusion	3	2	3
Bronchopneumonia	3	0	0
Cardiomegaly	3	6	2
Emphysema	2	1	0
Rib fracture	2	1	0
Pneumoperitoneum	1	0	0
Lobar pneumonia consolidation	1	1	0
Total	69	76	46

Young Adults = 18-35 years, Middle Age = 36-59 years, Elderly = 60 years and above.

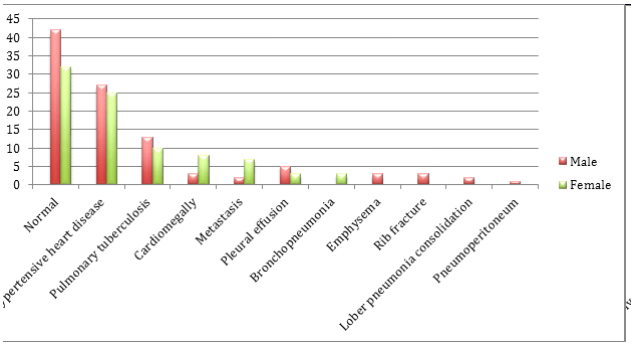

Figure 1: Gender distribution in relation to radiographic findings

Discussion

Normal findings were the commonest in this study with 38.95% with the highest number found among the young adults (20%), followed by the middle age (15.8%) and the least was among the elderly (3.2%) which could be due to weaker immune system in the elderly. Hypertensive heart disease was the commonest pathology with 13.68% of radiographs. And the least pathology was pneumoperitoneum with 0.58%, which is

similar to a study conducted with a lesser sample size (102) than this study and which showed 53%, 27%, 6.9%, 5.9% and 1% as normal, bronchopneumonia, cardiomegaly, congestive cardiac failure (CCF) and bronchitis respectively (10). Similarly, in another study of chest radiography findings in a health institution in Turkey (11) with sample size of 53 revealed the most common pathology as patchy consolidation with 38% prevalence which is higher than the one revealed by this study with 13.68% prevalence and also contrary to this study in terms of the commonest pathology revealed. Moreover, a study conducted in Durban (12) on chest xray findings of adults with a sample size of 45 reported the commonest finding to be consolidation (53.5%) followed by lymphadenopathy (35.6%), bronchopneumonic opacification (33.3%) and cavities as the least with 31.1%. However, compared to our study all the literatures cited had lesser sample size.

Conclusion

Normal findings were the commonest in this study of all radiographs studied with the highest number found among the young adults, followed by the middle age and the least was among the elderly. Hypertensive heart disease was the most common radiographic pathology of the adult chest radiographs studied in Radiology Department Usmanu Danfodiyo University Teaching Hospital Sokoto which is a major health problem and majority of the radiographs were for elderly male patients.

Limitation(s)

There are several chest radiographs that have met the requirements for inclusion, but the reports were missing.

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