Original Article

Findings of Chest Radiographs of OPD Patients in T.U. Teaching Hospital

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Abstract

Introduction: Chest X-ray is the most frequently requested and performed diagnostic radiological examination in the Radiology Department for the identification of the problem in the thorax including main airways, lungs, mediastinum, heart, pleura and the chest wall. To enlist the common findings and the trend of findings in the chest radiographs in the context of Nepalese population, the present study was conducted.

Methods: In this prospective cross-sectional study, chest radiographs of 1274 patients from OPDs including the general OPD and GHC clinic, who had come to Radiology department of T.U. Teaching Hospital for the radiographic examination of the chest, were evaluated. The study was conducted over a period of 2 months between July and August 2013. The findings were classified under various categories and tabulated in the proforma. The collected data were analyzed using SPSS software system and the results were shown in frequency, percentage, tables, bar diagrams and graphs.

Results: Among 1274 patients, 1190 (93.41%) were from general OPD and 84 (6.59%) patients were from GHC clinic. Of these, 675 (52.98%) were males while 599 (47.02%) were females. A total of 817 (64.13%) patients had normal or negative findings while only 457 (35.87%) patients had positive findings on their radiographs. Pleural thickening or effusion was the most common finding accounting for 110 (8.63%) cases followed by pneumonitis and fibrotic changes seen in 83 (6.52%), COAD in 77 (6.04%), cardiomegaly 69 (5.42%), apparent cardiomegaly 44 (3.46%), calcification/calcified granulomas 48 (3.77%), prominent broncho-vascular markings 33 (2.59%), bronchiectasis 18 (1.42%), bony abnormality 24 (1.89%) and tuberculosis 11(0.86%). The less common findings were lymphadenopathy in 8 (0.63%) and mass lesion/opacity in 7 (0.55%) radiographs. There were findings other than the above mentioned in 30 (2.36%) radiographs.

Conclusion: Pleural thickening/effusion was the most common finding in chest radiographs of OPD patients in T.U. Teaching Hospital; followed by pneumonitis, fibrotic changes, COAD changes and cardiomegaly with the least common finding being mass/lesion and lymphadenopathy.

Key Words: Cardiomegaly, chest pathology, chest x-ray, pleural thickening, pneumonitis.

Introduction

Chest radiograph is the most frequently ordered and performed radiographic examination accounting for up to 45% of all diagnostic radiological investigation in many hospitals.[1,2,3] It is almost always the first radiologic study ordered for evaluation of diseases of the thorax. The natural contrast of the aerated lungs provides a window into the body to evaluate the patient for diseases involving the heart, lungs, pleura, tracheobronchial tree, esophagus, thoracic lymph nodes, thoracic skeleton, chest wall, and upper abdomen. In both acute and chronic illnesses, the chest radiograph allows one to detect a disease and monitor its response to therapy. For many disease processes (e.g., pneumonia and congestive heart failure) the diagnosis can be established and followed till resolution with no further imaging studies.[4]

In certain acute situations, a basic understanding of the chest radiograph may save a patient's life. In the acute setting, even basic radiographic findings may profoundly alter patient management. The chest radiograph is an enormously powerful investigation that conveys a mass of information. It is not only easily available but also relatively cheap. Frequently, it is the chest radiograph that will provide the vital information that suggests a diagnosis and points ways to appropriate treatment. Chest radiography is a proven and useful procedure for evaluating the airways, lungs, pulmonary vessels, mediastinum, heart, pleura, and chest wall. The common and accepted practice consists of postero-anterior (PA) and left lateral radiographs obtained in the upright position.[5]

The chest radiography is performed for a wide variety of medical conditions, including primary lung disease and pulmonary effects of diseases of other organ systems. Such effects produce significant changes in the appearance of the lung parenchyma and may vary over time depending on the nature and extent of the disease.[6]

The chest x-ray is typically the first imaging test used to help diagnose symptoms.[7] The chest radiographs demonstrate five basic radiographic densities: air, fat, soft tissue, bone, and metal (or x-ray contrast agents). Air attenuates very little of the x-ray beam, allowing nearly the full force of the beam to blacken the image. Bone, metal, and radiographic contrast agents attenuate a large proportion of the x-ray beam, allowing very little radiation through to blacken the image.[8]

A normal chest radiograph will show normal structures for the age and medical history of the patient while the abnormal chest radiograph may show the findings like[9]: lung collapse, consolidation, ground glass opacity, masses, nodules, cavities, pulmonary tuberculosis, pneumonia, chronic obstructive airway disease (COAD), pleural effusion/thickening and cardiomegaly.

Methods

The study was a prospective cross-sectional study using non-probability convenience sampling technique involving 1274 chest radiographs of OPD patients including general OPD and General Health Check-up (GHC) clinic. The study was carried out in the Department of Radiology and Imaging of Tribhuvan University Teaching Hospital (TUTH), Kathmandu, Nepal, which is one of the major multi-specialty referral central hospitals of the country. It is the hospital with well-equipped radiology department where more than 400 radiographs are performed each day in computed radiography (CR) system.

The period of the study was of two months from 1st July to 30th August 2013. It involved the 1274 chest radiographs of general OPD and GHC clinic patients excluding ward, emergency, portable and pediatric patients for diagnostic or screening purpose who were referred by the clinicians for chest radiographic study and the radiographs were taken by Hitachi 500 mA x-ray machine and processed and printed by AGFA CR system.

The findings of the each chest radiograph were recorded in the predesigned proforma sheet everyday. The data from proforma were tabulated and analyzed using SPSS version-20.0 software. Descriptive statistics was used to analyze data for frequency, percentage, bar diagram and pie charts.

Results

Distribution the patients on the basis of general OPD and GHC clinic

In the present study, a total of 1274 radiographs were selected where 1190 patients were referred from general OPD and 84 patients were from GHC clinic, which is depicted in figure no.1.

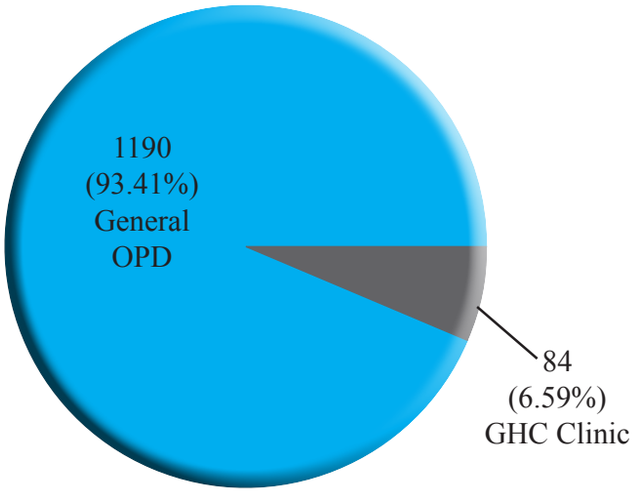

Figure No. 1: Distribution of the patients on the basis of general OPD and GHC clinic

Sex distribution of the patients

Among 1274 patients, 675 patients were male and 599 patients were female. The distribution of the patients on the basis of sex is given in table no. 1.

S.N.	Sex	Number of Patients				Total OPD Patients		Remarks
		General OPD		GHC clinic				
		Number	Percentage	Number	Percentage	Number	Percentage	
1	Male	631	49.53 %	44	3.45 %	675	52.98 %	
2	Female	559	43.88 %	40	3.14 %	599	47.02 %	
Total		**1190**	**93.41 %**	**84**	**6.59 %**	**1274**	**100.00 %**	

Table No. 1: Sex distribution of the patients

Distribution of patients on the basis of normal and abnormal findings

Among 1274 patients, 817 patients had normal findings and 457 patients had abnormal finding as shown in table no. 2.

S.N.	Study	General OPD			GHC Clinic			Total			Remarks
		Male	Female	Total	Male	Female	Total	Male	Female	Total	
1.	**Total Patients**	**631**	**559**	**1190**	**44**	**40**	**84**	**675**	**599**	**1274**	
		49.53 %	**43.88 %**	**93.41 %**	**3.45 %**	**3.14 %**	**6.59 %**	**52.98 %**	**47.02 %**	**100.00%**	
2.	**Normal Findings**	394	363	**757**	29	31	**60**	423	394	**817**	
		30.93 %	28.49 %	**59.42 %**	2.28 %	2.43 %	**4.71 %**	33.20 %	30.93 %	**64.13 %**	
3.	**Abnormal Findings**	237	196	**433**	15	9	**24**	252	205	**457**	
		18.60%	15.38%	**33.98%**	1.18%	0.70 %	**1.88 %**	19.78%	16.09%	**35.87%**	

Table No.2: Distribution of the Patients on the basis of normal and abnormal Findings

Distribution of the abnormal findings

The findings of the study were divided in fifteen categories which include normal study, pneumonitis, fibrotic changes, pleural thickening/effusion, COAD changes, cardiomegaly, apparent cardiomegaly, prominent broncho-vascular markings, calcification/calcified granuloma, bronchiectasis, lesion/mass/tumor/opacity, bony deformity, tuberculosis, tuberculosis, lymphadenopathy and others.

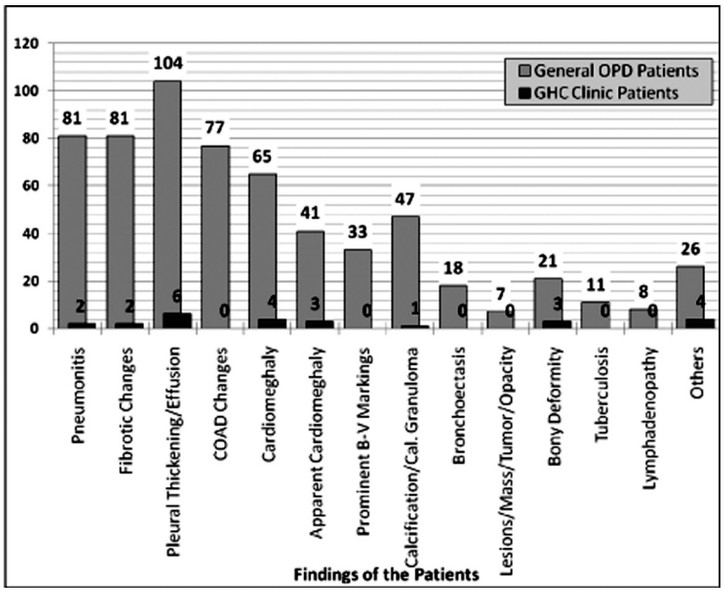

Figure No. 2: Distribution of abnormal radiographic findings

Discussion

Chest radiography is the most common radiographic examination performed in medical imaging departments. It is done to evaluate the lungs, heart and thoracic viscera. The value of chest radiograph lies in detecting diseases, establishing a baseline for future reference, providing information about normal appearance and reassurance to the patient about present state.[10] The study aimed to focus on the findings in chest radiographs of general OPD patients for complaints of the chest problems as well as screening of chest for GHC clinic.

The study included 1274 patients who visited the Department of Radiology and Imaging of T.U. Teaching Hospital for chest radiographs from OPDs. The OPD patients included different general clinical OPDs and GHC clinic. The study excluded the pediatric patients of less than fifteen years and patients from emergency, wards and portable X-rays. Among the OPD patients, 1190 (93.41%) patients were from general clinical OPDs and 84 (6.59%) patients were from GHC clinic. The age of the patients were 15 to 90 years in which with 20-24 was the most common age group accounting for 147 (11.54%) of the total patients with the least from the age group > 80 which had total of 17 (1.34%). Among the GHC clinic patients, the age group of 35-39 had the maximum number 13 (1.02%) of total patients and no patients were from the age group >80. Similarly from the general OPD, the maximum number was in the age group 20-24 comprising 140 (10.99%) patients and minimum number in the age group >80 with 17 (1.34%) patients. Likewise, the study had majority of male patients with 675 (52.98%) in number and 599 (47.02%) female patients.

The study showed various findings in the chest radiographs. The findings were divided into fifteen categories according to the incidence of the occurrences. The categories were normal findings, pneumonitis, fibrotic changes, pleural thickening/effusion, COAD changes, cardiomegaly, apparent cardiomegaly, prominent broncho-vascular markings, calcification/ calcified granuloma, bronchiectasis, mass/lesion/tumor/ opacity, bony deformity, tuberculosis, lymphadenopathy and others.

In the study, nearly 2/3 of the radiographs had normal findings. Out of total 1274 patients, 817(64.13%) were found to have normal radiographs where 757 were from general OPD and 60 were from GHC clinic. Around 1/3 of the patients accounting 457 (35.87%) of the total had abnormalities in the radiographs. Among the abnormalities, the most common finding was seen to be Pleural thickening or effusion, which was seen in 110 out of 1274 total radiographs comprising 104 from general OPD and 6 from GHC clinic.

The second most common findings were pneumonitis and fibrotic changes comprising 83 radiographs with each of 81 from general OPD and 2 from GHC clinic patients. The third most common finding was COAD changes which was found in 77 radiographs from general OPD with no patient form GHC clinic. Cardiomegaly was the fourth most common finding in the chest radiographs with 65 from general OPD and 4 from GHC clinic. The calcification or the calcified granuloma was the next common finding. A total of 48 patients had calcification or calcified granuloma in the radiographs with 47 from general OPD and 1 from GHC clinic.

Sometimes the improper techniques or positioning of the patients during radiography affects the finding that was the case in cardiomegaly. Due to rotation of the patient or inadequate inspiration and other causes, cardiomegaly seems to be frequent. In the present study also, a total of 44 patients had apparent cardiomegaly with 41 from general OPD and 1 from GHC clinic.

The study found 33 general OPD patients with findings of prominent broncho-vascular markings in their chest radiographs. Bony abnormality was the next the finding in the chest radiographs of 24 (1.89%) OPD patients among the 1274 patients including 21 patients from general OPD and 2 from GHC clinic. Bronchiectasis was also the finding seen in 18 general OPD patients but not in GHC clinic patients. In the study, all the 11 patients who were found to have tuberculosis were from general OPD and none from GHC clinic.

Among the less common findings, lymphadenopathy was found in only 8 patients from general OPD and not in GHC clinic. The mass (mass lesions or tumor or opacity) was the least common finding seen in 7 radiographs from general OPD patients.

Conclusion

A total of 1274 patients from OPD were included for the findings in their chest radiographs performed in the Department of Radiology and Imaging, T.U. Teaching Hospital. There were 1190 patients from general OPD and 84 from GHC clinic.

Two third (64.13%) of the total patients had normal chest radiographs and one-third (35.87%) of the patients had abnormal findings in their chest radiographs. Pleural thickening or effusion was the most common finding followed by other pathologies like pneumonitis, fibrotic

changes, COAD, cardiomegaly etc. Lymphadenopathy, mass or lesion/tumor/opacity were the least common findings.

Conflict of interest: None Declared

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