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RESEARCH ARTICLE

ANALYSIS OF REPEAT RADIOGRAPHY AND CORRECTIVE MEASURES IN TEACHING HOSPITAL IN TERTIARY HEALTH CARE CENTRE

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Abstract

Aim and objective: The main aim of this study is to investigate the cause of repeat radiography and corrective measures in teaching hospital in the tertiary health care center.

Materials and Methods: A prospective study was conducted to investigate the causes of repeat radiography in the Department of Radio-Diagnosis and Imaging, SGT Hospital Gurugram, Haryana India. A total number of 1600 samples were collected from 1st January 2022 to 30th January 2022. Result: Overall repetition rate was 1.87% including all the investigations collected in this study.

Discussion: There are so many factors affecting repeat radiographs in the computed radiography technique. Such factors include (a) body mass index of patient, (b) selection of technical factors, (c) patient's instruction during the exposure, and (d) patient preparation.

Conclusion: Repeat radiography is a key indicator to evaluate the service quality of the medical imaging department.

Introduction:-

Radiography is a technique to provide good quality of radiographs of the internal body structure.After a long time of discovery of x-ray, radiography is a widely used diagnostic tool to investigate the suspected pathologies of the internal body structure, such as fractures, cause of pain, perforation etc. It is very common to see that, patients underwent various repeated X-ray examinations, after the initial examination gets rejected due to poor image quality, leading to patient's extra cost and increase radiation dose [1].High quality radiograph is required for a more accurate diagnosis and also it overcomes the repeat radiography. Good quality of the radiographic image and précises diagnosis is depends upon the various factors such as positioning of the patient, selection of proper exposure factors and control of film processing conditions.[2]. To create a good quality radiograph, radiographers need to be updated with newer technology in the respective field and able to operate the modalities [3-4]. Radiographic film rejection analysis is an essential tool to evaluate the quality of service provided by radiology professionals [5]. Most of the radiographs are repeated or rejected due to the wrong patient's positioning, patient or equipment motion and also due to inappropriate selection of exposure factors [6, 7, 8, 9]. Rejection analysis can help to increase the workflow of the department, patient waiting tie and expanses also. It has to be mandatory to explore the causes of film rejection and repeat X-ray examinations, assist to achieve a key measure in reduction of extra cost and over radiation exposure. Quality assurance of the radiology department contributes a crucial role to improve radiology service to the patient. A Clinical audit should be conducted fora systematic review of service quality in the radiology department [10], it can help to audit the film rejection cause and rate of rejection also. Reduced quality of

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the radiographic image may lead to repeat radiographs and also leads to unnecessary radiation dose for the patients [11].

Aim and objective:-

The main aim of this study is to investigate the cause of repeat radiography and corrective measures in teaching hospital in the tertiary health care centre**.**

Materials and Methods:-

A prospective study was conducted to investigate the causes of repeat radiography in the Department of Radio-Diagnosis and Imaging, SGT Hospital Gurugram, Haryana India. The rejected radiographs were kept in a separate place under lock and key. At the time of analysis, it was collected and analysed accordingly. Total number of 1600 samples was collected from 1stJanuary 2022 to 15th January 2022. The data collected in this investigation includes routine radiographs only comprising Chest PA, Abdomen AP, Pelvis AP, Extremities etc. Total number of five fixed radiography modalities were involved in data collection, including one 800Ma with IITV, two 600 Ma, and two 500 mA equipment.

The data were collected with the help of radiology professionals including radiographers and medical imaging students of the department. Basic training was provided to data collectors to know about the objective, reasons, and benefets of this survey.

Data Analysis:

All the data including reasons for repeat exposure were recorded using Microsoft Excel 2010. The repeat rates of radiographs were calculated using this formula as recommended as per NABH 5th edition

Rate of redo = Total number of repeat exposure x100
Total Number of Test Perform

Result:

During one month of period, we record 1600 patients' data. The number of repeat radiography was 30 with multiple reasons.

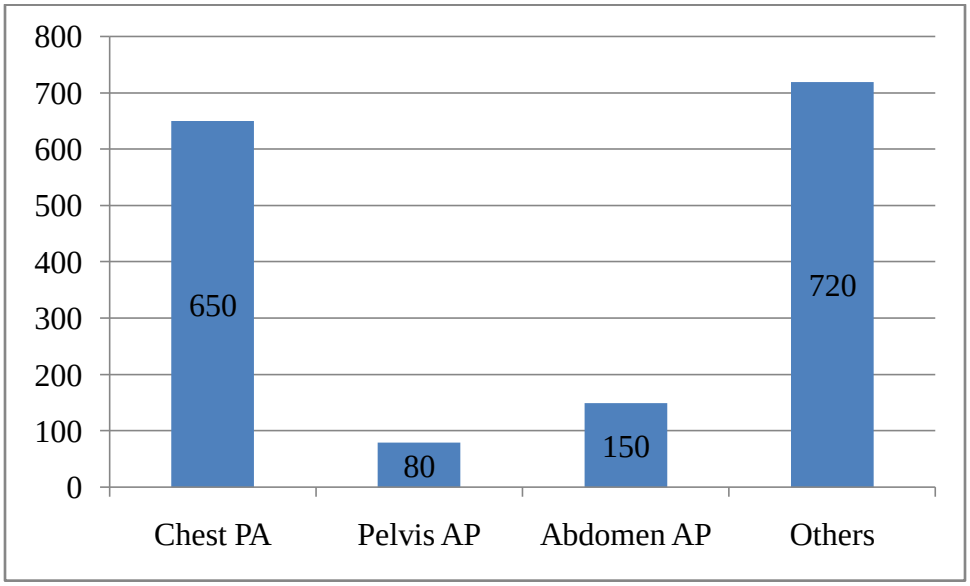

Fig 1:- Total number of investigations.

The overall repetition rate was 1.875% including all the investigations collected in this study. Out of 650 data collected from chest PA, only 1.84%repeat radiographs was reported. In pelvis AP, 12.5% repeat radiograph was reported, and only 1.11% repeat radiographs were reported in other including upper and lower extremities radiographs. There was no repeat radiography were reported in pelvis AP Projection. Overall cause of repetition

was an inappropriate selection of technical factors (kVp, mA,mAs), instruction gap between patient and radiographers, patient motion etc.

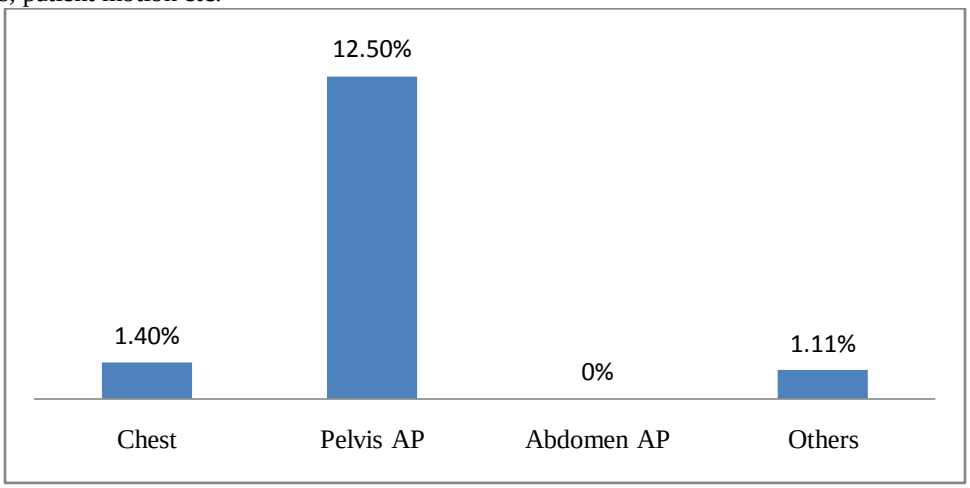

Fig 2:- Percentage of Repeat Radiography.

Discussion:-

The result shows that, the overall repetition rate of radiographs is 1.87%. There are so many factors affecting repeat radiographs in the computed radiography technique. Such factors including (a) body mass index of patient, (b) selection of technical factors, (c) patient's instruction during the exposure, (d) patient preparation. Other equipment related factors such as output of radiographic equipment and function ofCR System. CR system including proper function of cassette and reader is very important to produce a good quality of image. Any kind of damage on imaging plate i.e. Photo timulatingShosphor (PSP) may leads to artifact on the radiographs. It may cause repeat radiography, because artefacts may obscure the image quality as well information of image also.

1. Body mass index: BMI of patient is an essential factor to determine the image quality. All the factors set to create radiographs depends upon patient's body thickness. If patient is thin then need to set lower factor while if patient is thicker, need to set high technical factors.
2. Selection of technical factors: It describes the beam quality and quantity. Thus to avoid repeat radiography it is very important to use appropriate technical factor such kvp, mas, mA etc. so that x-ray beam quality and quantity should be sufficient to create a good quality of radiographs.
3. Patient's instruction: Some time we need to stop the breathing motion to avoid image artefact leading to repeat radiographs. For this reason we have to instruct the patients prior the start the scan, do not move, do not breath etc.
4. Patient preparation: Some it is reported that, repeat radiographs taken due to foreign particle, or inappropriate patient preparation. It may also lead to repeat radiographs.

Apart from this, in teaching hospital some time it also observe that, repeat radiographs taken due to some other reasons like intern or trainee students were taken radiography image without any supervision of senior trained radiographers or faculty member.

Therefore to avoid repeat radiography, we need to be very conscious about the radiology investigation and avoid taking it very lightly. Because it leads to damage the department reputation, quality of service, increase the radiation dose and also increase economically burden to the patients.

Conclusion:-

Repeat radiography is a key indicator to evaluate the service quality of medical the imaging department. While going to take radiographs always follow the rule of ALARA to reduce the radiation risk and use appropriate techniques to take a good and informatics image. It can also prevent the false diagnosis or wrong diagnosis in the radiology department.

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Abbreviations:
CR, PSP, IITV, ALARA, BMI, kVp, mAs, mA

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