

# Analysis of Chest X ray and CT Findings in Trauma Patients at a Tertiary Care Hospital

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## ABSTRACT

**Background:** Trauma is still the leading cause of death among teenagers and a major cause of morbidity and mortality among the elderly, which is a growing area of concern. The modern trauma centers rely heavily on CT scans for assessment of solid organ injuries. Hence; the present study was undertaken to assess effectiveness of chest X ray and CT findings in trauma patients.

**Materials & Methods:** A total of 200 patients with blunt abdominal trauma were included in the present study. Only those patients were included that reported to the emergency department with history of blunt abdominal trauma. Chest X ray and CT scan was done in all the patients. Complete medical and clinical details of all the patients were obtained. All the results were compiled in Microsoft excel sheet and were analyzed by SPSS software.

**Results:** Additional relevant findings on chest X-ray were present in 40 percent of the patients. Additional relevant findings on CT scan were present in 45 percent of the patients. on chest X ray, additional Cardiovascular, respiratory and gastrointestinal findings were found to be present in 42, 35 and 20 patients respectively. On CT scan, additional

Cardiovascular, respiratory and gastrointestinal findings were found to be present in 54, 40 and 25 patients respectively.

**Conclusion:** Trauma patients, if hemodynamically stable, should be screened with chest X ray, followed by CT scan (if required) for early detection of extent and severity of internal injuries.

**Key words:** Chest X ray, Computed Tomography, Trauma.

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## INTRODUCTION

Trauma is still the leading cause of death among teenagers and a major cause of morbidity and mortality among the elderly, which is a growing area of concern. The modern trauma centers rely heavily on CT scans for assessment of solid organ injuries. Besides providing information on acute trauma-related injuries, CT scans could also reveal pathologies not related to trauma called 'incidental findings', which may or may not require further investigation.<sup>1-3</sup>

There are multiple interests driving the effort to decrease duplicate imaging. One reason is a heightened public awareness of the risks associated with CT, primarily the exposure to ionizing radiation and increased risk of malignancy. In addition to radiation exposure, intravenous contrast administration often is duplicated. The overall volume of contrast infused is an independent risk factor for contrast-induced nephropathy and should be minimized.<sup>4-6</sup> Hence; under the light of above mentioned data, the present study was undertaken to assess chest X ray and CT findings in trauma patients.

## MATERIALS & METHODS

The present study was planned in the Department of Radiodiagnosis, Saraswathi Institute of Medical Sciences, Hapur UP (India) and it included assessment of chest X ray and CT findings in trauma patients. A total of 200 patients with blunt abdominal trauma were included in the present study. Only those patients were included that reported to the emergency department with history of blunt abdominal trauma. Inclusion criteria included:

- Patients with blunt abdominal trauma,
- Patients who were hemodynamically stable,
- Patients in between the age group of 25 to 60 years
- Patients with negative history of diabetes or hypertension

Chest X ray and CT scan was done in all the patients. All the radiographic procedures were carried out under the hands of skilled and experienced radiologists. Complete medical and clinical details of all the patients were obtained. All the results were compiled in Microsoft excel sheet and were analyzed by SPSS software.

**RESULTS**

In the present study, a total of 200 patients were analyzed. Mean age of the patients of the present study was 51.5 years. Additional relevant findings on chest X-ray were present in 40 percent of the patients. Additional relevant findings on CT scan were present in 45 percent of the patients. In the present study, on chest X ray,

additional Cardiovascular, respiratory and gastrointestinal findings were found to be present in 42, 35 and 20 patients respectively. In the present study, on CT scan, additional Cardiovascular, respiratory and gastrointestinal findings were found to be present in 54, 40 and 25 patients respectively.

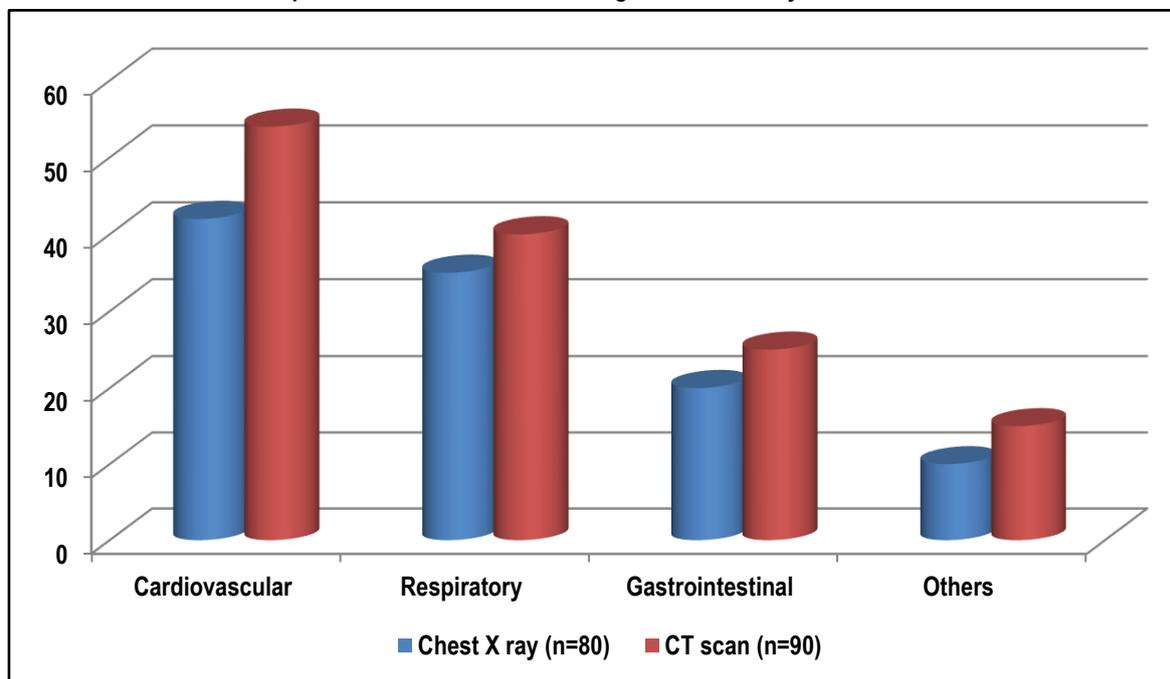
**Table 1: Relevant Chest-X ray findings**

Parameter	Number of patients	Percentage of patients
Total patients	200	100
Additional relevant findings on chest X ray	80	40
Additional relevant findings on CT scan	90	45

**Table 2: Additional relevant findings on Chest X ray and CT scan**

Organ	Chest X ray (n=80)	CT scan (n=90)
Cardiovascular	42	54
Respiratory	35	40
Gastrointestinal	20	25
Others	10	15

**Graph 1: Additional relevant findings on Chest X ray and CT scan**



**DISCUSSION**

Trauma is the most important cause of death during the first four decades of life. In this context, traumatic intrathoracic injuries comprise 25-40% of mortalities. Prompt diagnosis of such injuries can decrease mortality and the resultant burden. Computed tomography (CT) scan is the gold standard for this diagnosis. Although this diagnostic tool is highly accurate in detection of intrathoracic injuries, patients undergoing CT scan examination receive a high radiation dose.<sup>7-9</sup>

In the present study, a total of 200 patients were analyzed. Mean age of the patients of the present study was 51.5 years. Additional relevant findings on chest X-ray were present in 40 percent of the patients. Additional relevant findings on CT scan were present in

45 percent of the patients. Grieser T et al evaluated prospectively whether and to what extent both thoracic computed tomography (Tx-CT) and supine X-ray of the chest (Rx-Tx) are able to show additional findings that are therapeutically relevant. They performed Rx-Tx and Tx-CT in 102 consecutive, haemodynamically stable polytrauma patients (mean age, 41.2 yrs; age range, 12-93 yrs). Of 102 patients, 43 (42.2%) had a total of 51 therapeutically relevant findings. Rx-Tx alone yielded 23 relevant findings (45.1%) in 23 patients (22.5%). Of them, Tx-CT has shown additional important findings in 7 patients (30.4%). Polytrauma patients if haemodynamically stable may profit from computed tomography of the chest when therapeutically relevant

thoracic injuries are looked for or early therapeutical interventions are to be checked.<sup>10</sup>

In the present study, on chest X ray, additional Cardiovascular, respiratory and gastrointestinal findings were found to be present in 42, 35 and 20 patients respectively. Golden J et al hypothesized that limiting chest CT to patients with an abnormal mediastinal silhouette identifies intrathoracic vascular injuries not otherwise seen on CXR. All blunt trauma activations that underwent an admission CXR at our Level 1 pediatric trauma center from 2005 to 2013 were retrospectively reviewed. Patients who had a chest CT were evaluated for added diagnoses and change in management after CT. They concluded that the use of chest CT should be limited to the identification of intrathoracic vascular injuries in the setting of an abnormal mediastinal silhouette on CXR.<sup>11</sup>

In the present study, on CT scan, additional Cardiovascular, respiratory and gastrointestinal findings were found to be present in 54, 40 and 25 patients respectively. It is very important to do the scan in necessary cases to avoid unnecessary costs and aid in rapid and correct medical decision making. This is even more important in emergency cases, such as trauma patients, where rapid decisions can save a patient's life. In cases of multiple-organ trauma, the required scan may be either selective (scan from a pre-determined point) or non-selective (whole body scan from head to hip). Due to its more accurate diagnosis, detection of hidden injuries in asymptomatic cases and aid in more rapid and correct decision making, pan CT scan is very interesting for some physicians.<sup>11, 12</sup>

## CONCLUSIONS

Under the light of above mentioned results, it can be concluded that trauma patients, if hemodynamically stable, should be screened with chest X ray, followed by CT scan (if required) for early detection of extent and severity of internal injuries. However; further studies are recommended.

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