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Diagnostic Role of Ultrasound and Chest XRAY In Comparison To Sole Chest XRAY in Acute Rib Fractures

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ABSTRACT

Introduction

Rib fractures are one of the most common chest wall injuries due to blunt chest trauma.Ultrasound promises a quick, radiation free, conveniently repeatable alternative to chest Xray fordiagnosis of rib fractures in blunt chest trauma. Most ERs are well equipped with a portable ultrasoundmachine, which scrubs need for physical relocation of patients, as is required for Xray diagnosis.Though ultrasound poses certain faults diagnoses wise, for example factors posing variability between patients and fracture sites as in difficulty visualising subscapular/infraclavicular rib segments, impediment due to breast tissue/ in obese patients; it has found to be more sensitive than conventional chest radiography for diagnosis of rib fractures, especially sternal and costal cartilage injuries. Evidences for bony injury on ultrasound are detected by a disruption in anterior echogenic margin, linearacoustic edge shadow/focal hematoma.

With increasingly more procedures and diagnostic modalities in ER utilising ultrasound compounded with the weight of evidence favouring it' s use in rib trauma diagnoses – it is promising to appraise the practice.

Aim

In this study we aimed to study the diagnostic utility of POCUS in acute rib injury.

Methodology

Rib fractures are evidenced on ultrasound by disruption in anterior echogenic margin, loss of linear acoustic shadow, focal hematoma and on X-ray from ortical disruption.

Data collected is recorded on the data sheet and compared. Data collected over the 2 years of study duration compiled. Confidentiality of all patients duly maintained.

Result:

The study comprised 200 participants, with a notable concentration (29%) in the 65-74 age group, and a predominant male majority at 60%. The ultrasound accuracy rates were impressive: the B profile demonstrated 97.46% sensitivity for pulmonary edema, while the normal profile achieved 96.59% sensitivity for COPD and asthma. The A profile plus venous thrombosis exhibited 88.23% sensitivity for pulmonary embolism, and indicators like absent anterior lung sliding, anterior A lines, and a positive lung point search yielded 87.5% sensitivity for pneumothorax. Pneumonia sensitivity reached 96.875% with the A profile plus PLAPS. These findings underscore the efficacy of ultrasound in diverse respiratory conditions.

Conclusion:

Our Study concludes that the application of the BLUE protocol in acute dyspneic Emergency Department (ED) patients is reliable. To enhance diagnostic effectiveness in EDs, it is advised to adapt the BLUE protocol specifically for evaluating pleural and pericardial effusions.

I. INTRODUCTION

POCUS (Point of Care Ultrasound) or a more older closely related term, Bedside Ultrasound has been used to acknowledge the use of ultrasound, (most often a portable equipment), for diagnostic and therapeutic purposes at the patient bedside, so as to not inconvenience the patient by physically relocating them to the ultrasound room for the same. POCUS has seen rapidly evolving diagnostic applications in multiple medical disciplines over the years, especially in Emergency Medicine.

Traumatic rib fractures are one of the commonest findings in blunt chest trauma, presenting to the ER. CT Chest is the gold stamdard for rib injury. Xray Chest is a preliminary investigation

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often ordered, which frequently necessiates CT Chest for further clarification of findings or confirmation. Bedside Ultrasound has many utilities in the ER and poses several pros when considered for rib injury evaluation, hence it is beneficial to test and study the use of the same.

Traumatic Chest Injury

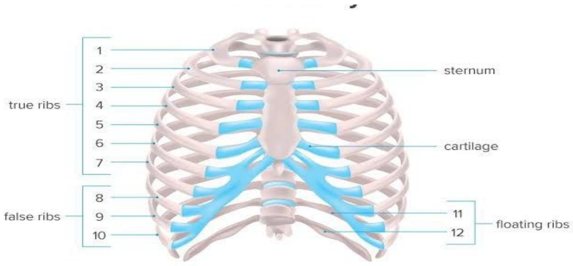
Traumatic chest wall and pulmonary injuries often have fatal potentiality. One out of four trauma patients die from thoracic injury or its complications. Traumatic chest injuries can be blunt or penetrating, the former of which is commoner. Blunt chest trauma usually results from motor vehicle accidents, fall from height, physical assault, accidental instrumental injuries. Chest wall injuries range from rib fractures to flail chest, pneumothorax, haemothorax, pulmonary contusion, vessel injury to tracheobronchial insults.

With definite diagnosis, morbidity and mortality can be significantly reduced.

In this study, rib fractures are studied specifically among the varied chest injury findings. When significant disruptive force encounters the rib border, there is cortical disruption and fracture. There are 12 pairs of ribs, first 7 of which attach anteriorly to the sternum and posteriorly to the spine, ribs 8,9 and 10 attach anteriorly to the costal cartilage. Ribs 11,12 are floating ribs(only attached to spine posteriorly). Ribs 4 to 10 are more susceptible to fracture. Ribs 1 to 3 are the hardest to fracture, so disruption of these ribs could signify a greater mechanism of injury.

Rib fractures can be traumatic or atraumatic. Most casesbof rib fractures presenting to ER are due to blunt force trauma. Elderly individuals sustain fractures mostly due to falls.
Children are less likely to be candidates for traumatic fractures due to increased elasticity of bones, and hence childhood fracture cases must be investigated thoroughly to rule out child abuse.

Rib fractures can entail serious complications like flail chest, haemothorax, pnemothorax, lung parenchyma injury. Flail chest refers to the paradoxical movement of the chest wall during respiration due to a segmental separation of the chest wall from 3 or more ribs being fractured in 2 or more places. Haemothorax and pneumothorax refer to the collection of blood or air in the pleural space.



The clinical features of rib fractures range from chest wall pain, breathing difficulty, tachypnea Abnormalities in vital signs like hypoxia, tachycardia, hypotension should necessiate further investigations to rule out haemothorax, pneumothorax. Patients with lower rib injuries must be evaluated for kidney, liver and spleen injuries. In this study, we evaluate rib fracture diagnosis in patients with stable haemodynamics.

Simple rib fractures are managed conservatively with advice for rest, ice and analgesia. Incentive spirometry is advised to prevent lung collapse. Prolonged analgesia might be required especially in geriatric populations.

Ultrasound equipment

Bedside ultrasound is increasingly being used in the emergency department to aid clinical diagnosis, so much so, it's referred to as an "extension of the hand". A portable ultrasound machine has various components including the different probes, viewing screen and control panel. The transducers often put to use in the Emergency department are linear, curvilinear and phased array probes. For the purpose of chest wall screening, linear probe is best used.
Linear probe emit sound waves with higher frequency and hence provide better resolution with limited depth making it suitable for examining superficial structures like blood vessels, musculoskeletal components. Curvilinear probe, on the other hand, emit more fanned sound waves, providing greater depth penetration, making it suitable to view deeper structures like internal organs.

Rib fracture is denoted by a cortical hyperdensity disruption, which in an intact bone is seen as a linear hyperechoic line. Though ultrasound wave detection pose a drawback of tissue impedence, especially relevant in female (breast tissue), obese individuals and deeper ribs like medial aspect of first rib; it is highly sensitive to detail.

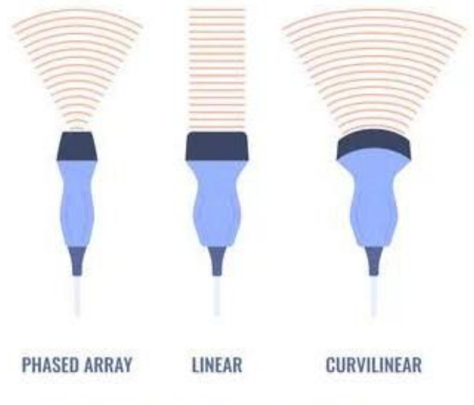


Fig. Types of ultrasound probes

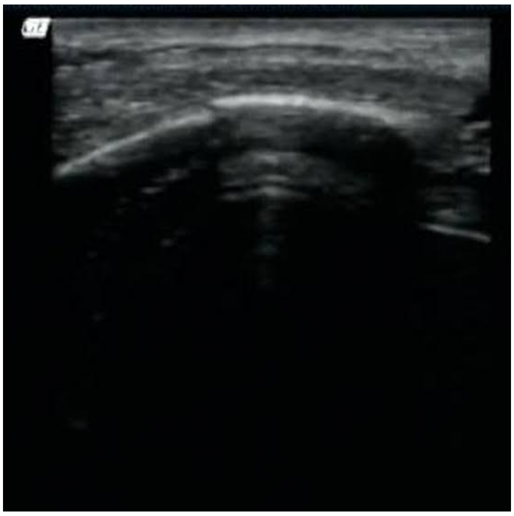


Fig. Cortical disruption in rib fracture

Diagnostic evaluation

For the purpose of this study, cases with blunt force injury to chest wall, presenting to Emergency department were subjected to POCUS in primary survery along with other adjuncts such as Xray and electrocardiogram. Plain CT of Chest is done to confirm the extent of injuries.

While rib fractures are specifically studied, few additional findings are also noted such as pneumothorax, hamoethorax.

The linear probe is used for ultrasound examination of the Chest.Chest.The probe is placed vertically across the ribs and intercostal spaces, and mapped from it's anterior to posterior attachments.

II. AIMS & OBJECTIVES

- To study the diagnostic role of Ultrasound and Chest Xray in comparison to sole chest xray in acute rib fractures.

III. REVIEW OF LITERATURE

1. S.A. Dulchavsky and colleagues conducted a prospective study to assess the effectiveness of thoracic ultrasound in detecting pneumothorax among patients with high suspicion of the condition. Ultrasound findings such as "lung sliding" or "comet tail" artifacts were evaluated prior to radiographic confirmation by residents trained in thoracic ultrasound. The results were compared with standard radiography. A total of 382 patients were enrolled, with blunt trauma (281 patients), gunshot wounds (22 patients), stab wounds (61 patients), and spontaneous pneumothorax (18 patients) identified as causes. Pneumothorax was confirmed on chest radiographs in 39 patients, with ultrasound correctly identifying 37 cases (95% sensitivity). Two pneumothoraces were missed due to interference from subcutaneous air. The specificity of thoracic ultrasound was 100%. The study concludes that thoracic ultrasound is a reliable method for diagnosing pneumothorax. It suggests expanding the use of focused abdominal sonography for trauma (FAST) protocols to include thoracic assessment in both terrestrial and space medical settings .

2. James Gilertson et al aimed to systematically review the evidence comparing the diagnostic accuracy of chest ultrasonography to CT scans in detecting rib fractures. The study adhered to PRISMA guidelines and conducted searches across five databases and gray literature from inception to October 2021. Two independent reviewers conducted study selection, data extraction, and assessed risk of bias using the QUADAS-2 tool. Summary measures were derived using the Hierarchical Summary Receiver Operating Characteristic model. Out of 1,660 citations screened, seven studies met inclusion criteria, with six providing sufficient 2× 2 data for meta-analysis (totaling n = 663).

Among these, three studies involved chest ultrasonography performed in emergency departments and three in radiology settings. The pooled sensitivity of chest ultrasonography for detecting any rib fracture was 89.3% (95% CI, 81.1 to 94.3), with a specificity of 98.4% (95% CI, 90.2 to 99.8) compared to CT imaging. The presence of a fracture on ultrasonography, defined by cortical irregularity, yielded a positive likelihood ratio (+LR) of 55.7 (95% CI, 8.5 to 363.4) for diagnosing rib fractures on CT scans, while the absence of an ultrasonography-detected fracture had a negative likelihood ratio (-LR) of 0.11 (95% CI, 0.06 to 0.20). No significant difference in diagnostic accuracy was found between emergency department-performed and radiology-performed ultrasonography (P = 0.11). However, the overall risk of bias across the included studies was identified as high, primarily due to patient selection biases. In conclusion, chest ultrasonography demonstrates both high sensitivity and specificity in diagnosing rib fractures following blunt trauma

3. Mahmoud Yousefifard et al. conducted a comprehensive meta-analytic systematic review to evaluate
the diagnostic accuracy of ultrasonography in detecting thoracic bone fractures. Their methods included independent systematic searches across Medline, EMBASE, ISI Web of Knowledge, Scopus, Cochrane Library, and ProQuest databases. Data from 17 surveys involving 1,667 patients (807 with and 860 without thoracic fractures), spanning an age range from 0 to 92 years, were analyzed using a mixed-effects binary regression model in STATA 11.0 software.The pooled sensitivity and specificity of ultrasonography for thoracic bone fractures were 0.97 (95% CI: 0.90-0.99; I2= 88.88, p<0.001) and 0.94 (95% CI: 0.86-0.97; I2= 71.97, p<0.001), respectively. In comparison, chest radiography demonstrated a sensitivity of 0.77 (95% CI: 0.56-0.90; I2= 97.76, p<0.001) and specificity of 1.0 (95% CI: 0.91-1.00; I2= 97.24, p<0.001). Ultrasonography showed higher sensitivity in detecting rib fractures (97%) compared to sternum or clavicle fractures (91%), and sensitivity was higher when performed by a radiologist (96%) versus an emergency medicine specialist (90%). The study concludes that ultrasonography performs better than radiography in detecting thoracic bone fractures, particularly in cases of rib fractures and when performed by radiologists

4. W.S. Lee et al. aimed to assess the sensitivity of chest wall ultrasonography, clinical findings, and radiography in detecting costal cartilage fractures. Between April 2008 and May 2010, 93 patients suspected of rib or sternal fractures underwent radiological examinations including posterior-anterior chest radiographs, oblique rib views, sternal views, computed tomography, and chest ultrasound. The cohort comprised 47 men and 46 women with a mean age of 51.8 ± 15.9 years (range 17-78 years), all presenting minor blunt chest trauma without evidence of rib fractures or other major injuries on radiography or CT. Ultrasonography using a 7.5-MHz linear transducer identified chondral rib fractures in 64 patients (68.8%), with an average of 1.8 ± 0.8 fracture sites per patient (range 1-5). Subperiosteal hematoma was the most common associated finding (n = 14, 15.0%), followed by sternal fractures (n = 9, 9.7%). Ultrasonography detected these fractures more effectively than conventional imaging modalities, suggesting its utility in early and accurate diagnosis of costal cartilage and sternal fractures following minor blunt chest trauma, often missed by radiography and CT scans

5. J. Malghem et al. aimed to characterize the CT and sonographic findings of 15 costal cartilage fractures observed in eight patients, encompassing two women and six men aged 19 to 52 years (mean age, 32 years; median age, 27.5 years) from 1989 to 1999. Among them, five patients had a recent history of chest wall injury, while others reported involvement in contact sports or previous falls. CT or sonography was conducted due to severe posttraumatic parasternal pain unexplained by initial radiographs or suspicious parasternal masses without clear trauma history. Notably, one patient underwent surgical biopsy revealing chondroid tissue with atypical chondrocytes, prompting concern for a malignant chondroitic tumor, while another patient's needle biopsy showed nonspecific hemorrhagic material.
CT scans consistently showed low-density areas within the costal cartilage, sometimes accompanied by calcifications around older fractures and gas density within clefts.
Sonographic findings demonstrated interruptions of the smooth anterior aspect of the cartilage, highlighting its utility in visualizing these fractures.

6. Ali Çelik et al. conducted a prospective observational study to compare the diagnostic accuracy of ultrasound (US) with computed tomography (CT) in detecting rib fractures inadult patients presenting to the emergency department (ED) with blunt chest trauma (BCT).They included 145 patients who reported thoracic pain within 24 hours post-injury. US, performed by an emergency physician, was evaluated against thoracic CT for diagnostic efficacy. The study found that US had an overall diagnostic accuracy of 80%, with a sensitivity of 91.2% and specificity of 72.7% for detecting any rib fracture (positive likelihood ratio 3.4 and negative likelihood ratio 0.12). When analyzing each rib individually, US showed a sensitivity of 76.7% and specificity of 82.7%, achieving an accuracy of 81.3%. The authors concluded that a negative US in

the area of greatest tenderness and adjacent ribs significantly reduces the likelihood of a rib fracture in patients with BCT presenting with localized pain. However, US performed less reliably in pinpointing the exact location and number of fractured ribs when compared to CT

7. In their retrospective study at emergency department spanning an 18-month period, Alessandro Riccardi et al. reviewed all patients presenting with blunt thoracic injuries (BTI). Point-of-care ultrasound (PoCUS) was utilized as an initial diagnostic tool before proceeding to chest X-ray (CXR) or CT scans. Among 1672 patients with BTI, rib fractures were identified in 689 cases (41.21%). PoCUS examinations were conducted in 190 patients. The study underscores the growing importance of PoCUS in emergency medicine, particularly in assessing BTI, although its specific role in detecting rib fractures remains less defined. Nevertheless, PoCUS appears effective in diagnosing rib fractures, especially when performed collaboratively and in a focused manner on the most tender areas identified by patients themselves, potentially reducing examination time and patient discomfort

8. Eun Gu Hwang et al. aimed to investigate the effectiveness of ultrasonography (US) in identifying rib fractures and to determine the factors influencing its effectiveness. From October 2003 to August 2007, 201 patients with blunt chest trauma underwent both chest radiographic and US examinations for rib fracture diagnosis. The study compared the effectiveness of these two modalities based on radiographic readings and US examination results, and also examined factors affecting US examination effectiveness. Rib fractures were detected by radiography in 69 patients (34.3%), while 132 patients showed no fractures. US examination diagnosed rib fractures in 160 patients (84.6%). Among the 132 patients without radiographic evidence of rib fractures, US detected fractures in 92 cases. Additionally, among the 69 patients with radiographic evidence of rib fractures, US identified additional fractures in 33 cases. Overall, 76 patients (37.8%) had identical results from both radiographic and US examinations, while 125 patients (62.2%) had fractures detected by US that were either undetected by radiography or additional to those detected by radiography.

The study found that age, the duration until US examination, and fracture location were not significant influencing factors. However, US was significantly more effective in detecting fractures in patients who had no fractures detected by radiography (P=0.003). US examination proved valuable in identifying rib fractures that were not visible on simple radiography, particularly in patients with no radiographic evidence of fractures. Therefore, increased attention should be given to patients with chest trauma who do not show fractures on radiography.

9. Beat Dubs-Kunz aimed to establish a suitable sonographic approach for examining the chest wall. The study describes section planes and normal sonographic findings. Ultrasonography's potential for detecting rib fractures is highlighted, with typical signs outlined and compared to X-ray findings. While sonography is a valuable technique for imaging traumatic lesions of the chest wall, it has the significant limitation of not being able to examine the entire chest wall region. Sonography is not very suitable for the initial and systematic search for primary tumors or metastases; however, once localized, these findings can be observed very well.

10. Sabri, Y.Y. et al. aimed to establish the role of transthoracic ultrasound as a bedside, available, and affordable technique for imaging chest trauma patients, comparing its sensitivity, specificity, and accuracy to that of CT. The study included 107 cases of chest trauma or polytrauma with chest involvement. Both transthoracic ultrasound and MSCT were evaluated and compared through statistical analysis. Of the injuries, 13.1% were penetrating, and 86.9% were blunt trauma.Using CT as the standard, ultrasound detected pleural injuries in 60.7% of patients with a diagnostic accuracy of 93.4%, parenchymal lesions in 39.3% with a 64.4% accuracy, chest wall lesions in 15.9% with an 89.7% accuracy, and mediastinal lesions in 9.3% with a 94.3% accuracy.

The study concluded that chest ultrasonography has significant value in diagnosing complications of blunt and penetrating chest trauma, with acceptable sensitivity and high specificity, particularly for pleural lesions and rib fractures, and is especially beneficial for imaging small children and uncooperative patients

11. Figen Turk et al. aimed to investigate rib fractures using ultrasound, focusing on those overlooked by chest X-rays, and to analyze clinical predictors of these fractures in minor blunt chest ttrauma. The study included 20 patients with minor chest trauma and normal radiographic findings but

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ongoing symptoms. Radiographs were reviewed by two radiologists, while ultrasonography was performed by one radiologist using a linear transducer. Ultrasound detected 26 rib fractures in 18 of 20 patients. The most common cause of trauma was falls (60%). The study concluded that ultrasound reveals more fractures than radiography in patients with suspected rib fractures

IV. MATERIALS AND METHODS

This was a single centred Prospective, Observational study hospital based study. Planned to be performed in the Emergency department of PRS Hospital, Trivandurum with all advancements, well trained staffs and faculties to handle all medical and surgical emergencies 24 x 7, with Dr . Ashish Salim as Deputy Chief and Consultant and mentor. The study period was 1year, starting from Jan 2023 to Jan 2024

Study period: 1 year.

Sample size:

With this the sample size was calculated using the formula N = 4pq /d^2
N = 4x90(100-95)/ 5^2 N = 144
where n is the sample size, p is the prevalence, q is 100-p, d is the absolute precision which will be taken as 5%. So an approximate of 200 patients who presented with breathlessness.

These items will be assessed:

1. Rib fractures detected on POCUS
2. Rib fractures detected by Chest Xray
3. Rib fractures on final CT Chest

The diagnosis if rib fractures by POCUS was established without interrupting managementprotocol. Diagnosis established in hospitalisation reports using standardized test by otherclinician.

Inclusion Criteria

Acute casesof blunt chest trauma with suspected rib injuries as evidenced by increased chest wall pain on cough, inspiration, change in position, breathing difficulty.

Exclusion Criteria

Severe or penetrating chest trauma, unstable haemodynamics Lack of consent

V. RESULTS

Table 1 Age distribution of the patients and their percentages

Age	Frequency	Percent
30 and below	21	14.8
31 - 40	48	33.8
41 - 60	62	43.7
61 - 80	9	6.3
81 and above	2	1.4
Total	142	100.0

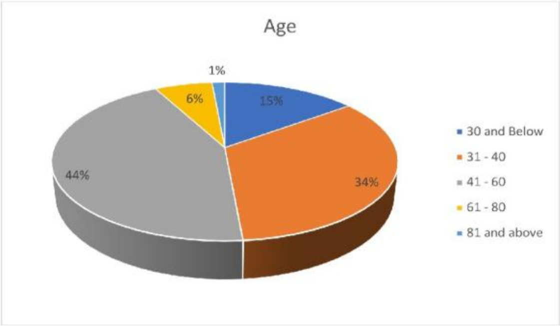

Table 2 Gender distribution of the patients and their percentages

Gender	Frequency	Percent
Female	77	54.2
Male	65	45.8
Total	142	100.0

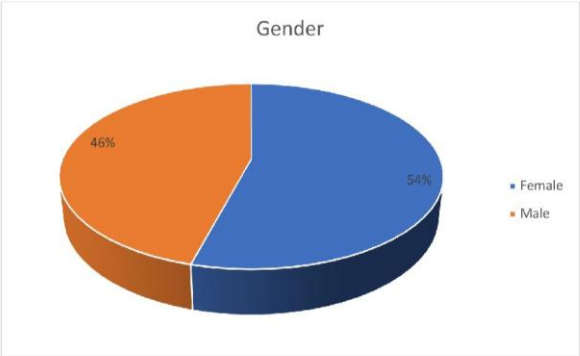

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Table 3 USG findings distribution of the patients and their percentages

USG Findings	Frequency	Percent
Negative Findings	48	33.8
Positive Findings	94	66.2
Total	142	100.0

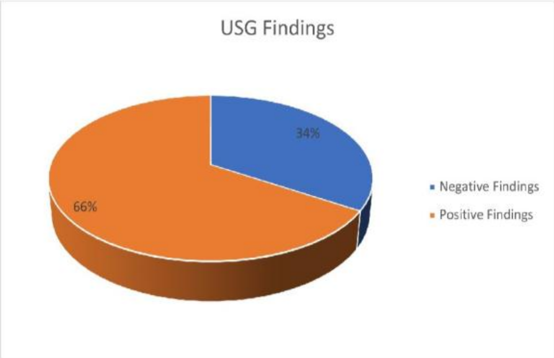


Table 4 Chest Xray Findings distribution of the patients and their percentages

Chest Xray Findings	Frequency	Percent
Negative Findings	62	43.7
Positive Findings	80	56.3
Total	142	100.0

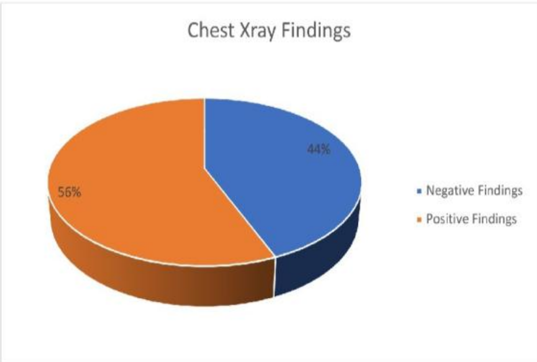
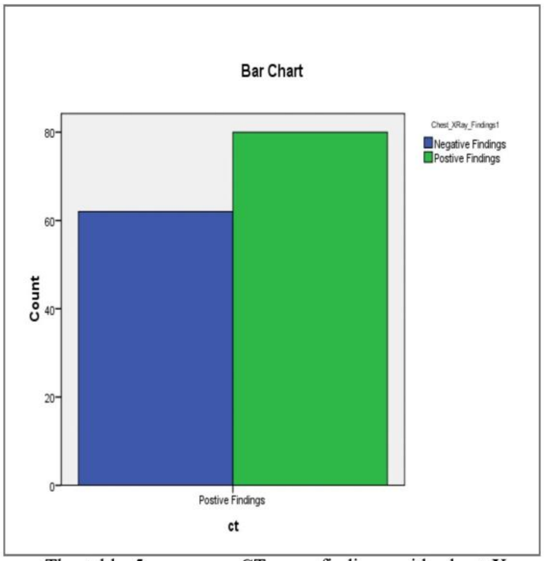


Table 5 :- Compares CT Scan and chest X-ray findings

Chest Xray Findings	Observed N	Residual	Chi-Square	P - Values
Negative Findings	62	-9.0		
Positive Findings	80	9.0	2.282[a]	.131
Total	142			



The table 5 compares CT scan findings with chest X-ray findings, showing 62 negative findings and 80 positive findings, with residuals of -9.0 and 9.0, respectively. The total number of observations is 142. The Chi-Square value is 2.282, and the p-value is 0.131. Since the p-value is greater than 0.05, the difference between the CT scan and chest X-ray findings is not statistically significant, indicating that the distribution of negative and positive findings is similar across both diagnostic methods.

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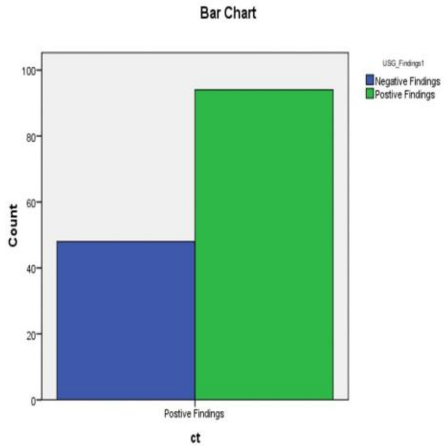
Table 6:- Compares CT Scan and USG Findings

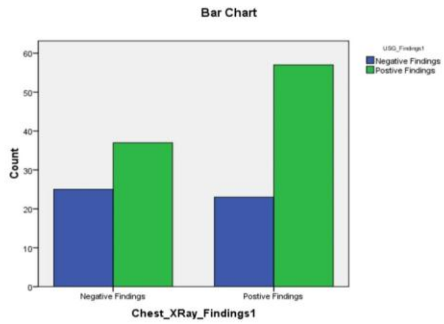
USG Findings	Observed N	Residual	Chi-Square	P - Values
Negative Findings	48	-23.0		
Positive Findings	94	23.0	14.901ª	.000
Total	142			



The table 6 compares CT scan findings with USG findings, showing 48 negative and 94 positive findings, with residuals of -23.0 and 23.0, respectively. The total number of observations is 142. The Chi-Square value is 14.901, and the p-value is 0.000. Since the p-value is less than 0.05, this indicates a statistically significant difference between the CT scan and USG findings. The significant association suggests that the distribution of negative and positive findings varies notably between these two diagnostic methods.

Table 7:- Compares CT Scan and chest X-ray findings with USG findings

CT and Chest X-ray Findings		USG Findings: Negative Findings	USG Findings: Positive Findings	Total	Chi-Square	P - Values
Chest Xray Findings	Negative Findings	25	37	62		
	Positive Findings	23	57	80	2.091ª	0.148
Total		48	94	142		



The table 7 compares chest X-ray findings with USG findings.

- Negative chest X-ray findings: 25 cases had negative USG findings, and 37 had positive USG findings.
- Positive chest X-ray findings: 23 cases had negative USG findings, and 57 had positive USG findings.

The Chi-Square value is 2.091 with a p-value of 0.148. Since the p-value is greater than 0.05, there is no statistically significant association between chest X-ray and USG findings.

Table 8 :- Compares CT Scan and chest X-ray findings (Haemothorax and Pneumothorax

Chest Xray Findings	Observed N	Residual	Chi-Square	P - Values
Negative Findings	130	59.0		
Positive Findings	12	-59.0	98.056ª	0.001
Total	142			

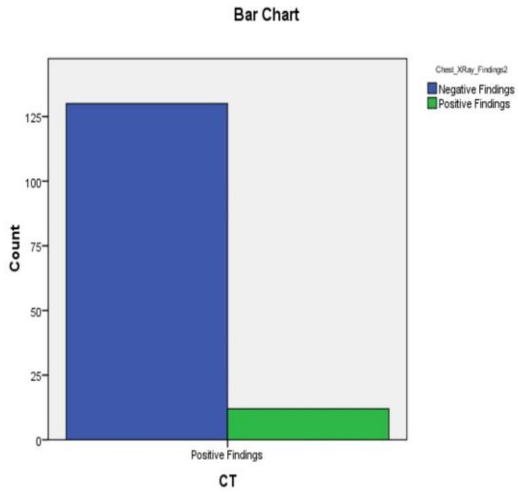


Table 8 compares the findings of haemothorax and pneumothorax between CT scans and chest X-rays. The data indicates a significant discrepancy between the two diagnostic methods. Out of 142 cases, 130 had negative findings on the chest X-ray, while only 12 showed positive findings. The residuals indicate a significant deviation, with negative findings having a residual of 59.0 and positive findings showing -59.0. The chi-square value of 98.056 is highly significant, with a p-value of 0.001, indicating a strong statistical difference between the CT scan and chest X-ray results. This suggests that CT scans may be more reliable or sensitive in detecting haemothorax and pneumothorax compared to chest X-rays.

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Table 9 :- Compares CT Scan and USG Findings (Haemothorax and Pneumothorax)

USG Findings	Observed N	Residual	Chi-Square	P - Values
Negative Findings	48	-23.0		
Positive Findings	94	23.0	14.901ª	0.001
Total	142			

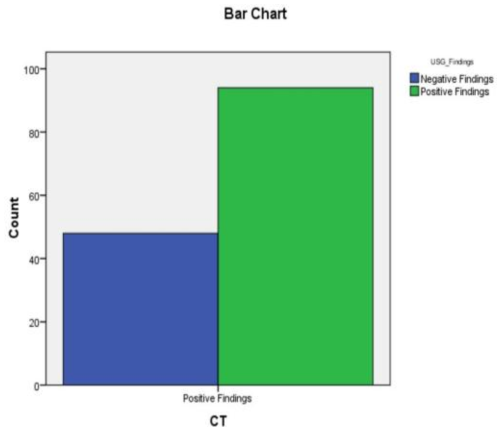
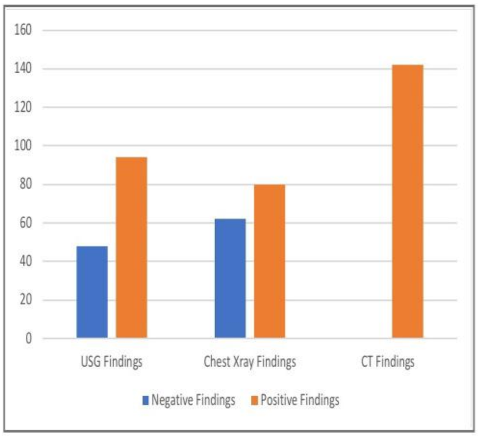


Table 9 compares the findings of haemothorax and pneumothorax between CT scans and ultrasound (USG). In the sample of 142 cases, USG identified 48 negative findings and 94 positive findings. The residuals indicate a notable discrepancy, with negative findings showing a residual of -23.0 and positive findings a residual of 23.0. The chi-square value of 14.901 is highly significant, with a p-value of 0.001. This indicates a statistically significant difference between the findings of CT scans and USG. Specifically, USG tends to identify more positive cases of haemothorax and pneumothorax than might be expected, suggesting it could be a sensitive tool for detecting these conditions compared to CT scans.

Table 10:- Comparing the fracture detection results across ultrasound (USG), chest X-ray, and CT imaging

Fracture Detection	Negative Findings	Positive Findings
USG Findings	48	94
Chest Xray Findings	62	80
CT Findings	0	142



Comparing the fracture detection results across ultrasound (USG), chest X-ray, and CT imaging modalities reveals notable differences in their efficacy.

Starting with USG findings, out of 142 cases examined, it identified 94 positive findings and 48 negative findings. This indicates a higher sensitivity in detecting fractures compared to chest X-rays, which reported 80 positive findings out of 142 cases, with 62 cases being negative. CT imaging, on the other hand, showed the most impressive results with all 142 cases presenting positive findings and none negative. This suggests CT as the most sensitive modality for detecting fractures among the three.

While USG and CT imaging demonstrate high sensitivity, it's also important to consider their accessibility, cost-effectiveness, and any potential risks associated with radiation exposure, especially in the case of CT scans. Chest X-rays, although less sensitive in this context, still play a valuable role in initial screening due to their widespread availability, lower cost, and minimal radiation exposure.

In summary, CT imaging emerges as the most sensitive modality for fracture detection, followed by ultrasound, and then chest X-rays.

VI. DISCUSSION

Rib fractures, frequently occurring in blunt chest trauma, serve as indicators of potential internal injuries . Despite physical examination and radiography being primary diagnostic methods, they detect only 49% of fractures. Given the limitations of radiography, ultrasound (USG) has gained attention for its potential in detecting these fractures . USG offers advantages such as non-invasiveness, portability, and lack of radiation exposure, making it an appealing diagnostic tool. This study aims to compare the effectiveness of USG and radiography in detecting rib fractures.

In our study the sample comprised 142 individuals, predominantly aged 31-60 (77.5%), with smaller proportions below 30 (14.8%) and above 60 (7.7%). Only 1.4% were over 80, and comprised 54.2% female and 45.8% male. The study revealed

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33.8% negative and 66.2% positive USG findings among participants. The study showed 43.7% negative and 56.3% positive chest X-ray findings among participants. Like our findings, most studies have shown significant differences in rib fracture detection between ultrasound (USG) and radiography, with USG often being proposed as the more sensitive method [] . Mattox et al. demonstrated that ultrasound (USG) exhibits greater sensitivity than chest radiography in detecting rib fractures [] .Conversely, Hurly et al. found that ultrasound (USG) did not notably enhance the detection rate of rib fractures In our study findings the comparison between CT scan and chest X-ray findings reveals 62 negative and 80 positive results, with a Chi-Square value of 2.282 and a p-value of 0.131. This indicates no statistically significant difference between the two diagnostic methods.

Likewise the comparison between CT scan and USG findings shows 48 negative and 94 positive results, with a Chi-Square value of 14.901 and a p-value of 0.000. This indicates a statistically significant difference in the distribution of findings between the two diagnostic methods.

In the comparison between chest X-ray and USG findings, 25 cases with negative chest X-ray findings had negative USG findings, while 37 had positive USG findings. For positive chest X-ray findings, 23 cases had negative USG findings, and 57 had positive USG findings. With a Chi-Square value of 2.091 and a p-value of 0.148, no statistically significant association was found between the two diagnostic methods.

Findings comparing haemothorax and pneumothorax between CT scans and chest X-rays show a significant discrepancy. With 130 negative and 12 positive findings in 142 cases, CT scans exhibit higher sensitivity.

Comparison between CT scans and ultrasound (USG) findings of haemothorax and pneumothorax shows significant differences. USG identified 48 negative and 94 positive findings in 142 cases, suggesting its potential sensitivity in detecting these conditions compared to CT scans.

Comparison of fracture detection efficacy across ultrasound (USG), chest X-ray, and CT imaging shows CT as the most sensitive, detecting all 142 cases positively, followed by USG with 94 positive findings.

Our findings align with Carlos Galvez et al.'s research, which concluded that imaging tests are valuable and dependable for categorizing injuries, particularly in life-threatening and high-energy trauma scenarios [] . Tests like chest X-ray and bedside ultrasound (FAST and e-FAST exams) offer quick, non-invasive means of early detection for conditions such as tension pneumothorax, massive hemothorax, or pericardial tamponade, necessitating urgent interventions or immediate surgery.

Additionally, chest CT scans are crucial in high-energy trauma cases to anticipate intrathoracic or intrabdominal secondary lesions, providing further insights for subsequent injury management.

Efficient and timely performance of these tests can be life-saving and profoundly influence final outcomes.

VII. CONCLUSION

In conclusion, the study provides a comprehensive analysis of diagnostic findings across different imaging modalities in a sample of 142 individuals. The demographic distribution indicates a predominant age group of 31-60 years, with a slight male predominance. USG and chest X-ray findings revealed varying proportions of negative and positive results, while comparisons between CT scans and other modalities demonstrated significant differences in detecting haemothorax, pneumothorax, and fractures. Overall, CT imaging emerges as the most sensitive modality for fracture detection, followed by ultrasound, with chest X-rays being less sensitive. These findings underscore the importance of selecting appropriate imaging techniques based on diagnostic needs and patient characteristics.

BIBLIOGRAPHY

[1]. Radiography Versus Sonography in the Detection of Acute Fractures: A Case Series. Rula Al-Baghdadi, MD, Timothy J. Yu.
[2]. Bornemann P, Jayasekera N, Bergman K: Point-of-care ultrasound: coming soon to primary care? J Fam Pract 2019
[3]. Bolandparvaz S, Moharamzadeh P, Jamali K: Comparing diagnostic accuracy of bedside ultrasound and radiography for bone fracture screening in multiple trauma patients in the ED. Am J Emerg Med 2013
[4]. Perone M, Tablon C: Musculoskeletal ultrasound in the emergency department: is there a role? Semin Roentgenol 2020
[5]. Champagne N, Eadie L, Regan L, Wilson P: The effectiveness of ultrasound in the detection of fractures in adults with suspected upper or lower limb injury: a systematic review and subgroup meta-analysis. BMC Emerg Med 2019
[6]. Pishbin E, Ahmadi K, Foogardi M, Salehi M, Seilanian Toosi F, Rahimi-Movaghar V: Comparison of ultrasonography and radiography in diagnosis of rib fractures. Chin J Traumatol 2017
[7]. Liu R, Mandacia D: The history of POCUS in

International Journal of Humanities Social Science and Management (IJHSSM)
Volume 4, Issue 6, Nov.-Dec., 2024, pp: 225-239 ISSN: 3048-6874
www.ijhssm.org

emergency medicine. ACEPNow. September 25, 2018.

[8]. Morgan T, Motamedi D: Incorporating musculoskeletal ultrasound into your radiology practice: patients, patience, and why your department cannot do without it. Skeletal Radiol 2019

[9]. Lee WS, Kim YH, Chee HK, Lee SA: Ultrasonographic evaluation of costal cartilage fractures unnoticed by the conventional radiographic study and multidetector computed tomography. Eur J Trauma Emerg Surg 2012

[10]. Patel DD, Blumberg SM, Crain EF: The utility of bedside ultrasonography in identifying fractures and guiding fracture reduction in children. Pediatr Emerg Care 2009

[11]. Lewiss R, Liu R, Strony R: Point-of-care ultrasound is having a moment. POCUS J 2020

[12]. Ultrasound to detect haemothorax after chest injury. Kirsty McEwan, Medical Student, Peter Thompson. BMJ 2007

[13]. Disclosure of unnoticed rib fractures with the use of ultrasonography in minor blunt chest trauma. EACTS 2003

[14]. Danher J., Eyes B.E., Kumar K.. Oblique rib views after blunt chest trauma: an unnecessary routine?, Br Med J, 1984

[15]. High-Resolution Sonography of the Rib: Can Fracture and Metastasis Be Differentiated? AJR March 2005.

APPENDIX

PROFORMA FOR CASE REPORT

Name : Serial No. : Age :

Sex :

IP No. :
Mechanism of Inj ury : Ultrasound findings:
Chest Xray findings : CT Chest findings

Data Sheet

S. No.	Name	Age (Years)	Sex (M/F)	Mechanism of Injury	USG Findings	Chest XRay Findings	CT Findings
1	Rema Devi	38	F	Scooter vs Car MVA	(L) 4,5,6 #	(L) 4,5,6 #	(L) 4,5,6 #; lung contusion (L) middle lobe with minimal haemorrhage pooling
2	Suresh Yadav	47	M	Bike vs Truck MVA	(R) 3,4 #; (L) 2,3#	(R) 3,4,5 #; (L) 2,3#	(L) 2,3#; Left 3rd rib fractured in 2 places; (R) 3,4,5,6 #; B/L lung contusions
3	Baby George	47	M	Cycle vs Car MVA	(L) 2,3 #	(L) 2,3 #	(L) 2,3 #, mimimal lung contusion
4	Sheela K	32	F	Pedestrian vs Car MVA	(R) 3,4 #; minimal effusion(R) ?haemothorax	(R) 3,4#	(R)3,4 #, minimal hameorrhage pooling (r) CP angle
5	Sandra Joseph	22	F	Bike vs Car MVA	(R) 2#	(R)2#	(R)1,2 #
6	Celine Mathew	59	F	Car vs Car MVA	(L) 4,5,6 #; minimal effusion(R) ?haemothorax	(L) 4,5,6#	(L) flail chest - 5 # in 2 places, 4,6#; (R) minimal haemothorax
7	Sadanand C.V.	59	M	Bike vs Truck MVA	(R) 4,5,6#; (L) 2,3#; minimal effusion (R) ? hamothorax	(R)4,5#; (L) 2,3#	(R) 4,5,6#; (L)2,3# with minimal haemothorax (R)
8	Bensy Koshy	46	M	Pedestrian vs Bike MVA	Posterior (L) 6,7,8#	Posterior (L) 6,7,8 ,?10#	(L) posterior 6,7,8,10 #, minimal haemothorax(L)
9	Sanchu John	35	M	Bike vs Car MVA, h/o ejection	(R) 5,6,7#	(R) 4,5,6,7 #	(R) 4,5,6,7# with extensive lung contusion
10	Adin Mohammed	19	M	Bike vs Car MVA	(L) 3,4 #	(L)3,4 #	(L)3,4 #
11	Saira Mathew	29	F	Scooter vs Car MVA	No obvious rib #, (L) clavicle#	(L) mid clavicle undisplaced #, (L) 1st rib undisplaced #	(L) mid clavicle mildly displaced #, (L) 1 # undisplaced mid clavicular line
12	Akaansh Devaraj	26	M	Cycle vs Car MVA	(L) 2,3#	(L)2,3 #	(L)2,3 #; 4 unicortical buckling#
13	Dona Philip	35	F	Car vs Car MVA	No obvious rib #	(L) 4# in MCL	(L)4#
14	Reji H.	43	M	Scooter vs Car MVA	(R)3,4 #	(R) 3,4#	(R)3,4 # , minimal lung contusion
15	Ganga Devi	41	F	Car vs Car MVA	(L) 5,6,7 #; minimal effusion (L) PLAPS ? haemothorax	(L)5,6,7,8 #	(L)5,6,7,8#; minimal hameorrhage pooling
16	Nabeesa Fathima	51	F	Car vs Mini Truck MVA	(R) 5,6 #	(R)4,5,6 #	(R)4,5,6 #; minimal lung contusion
17	Ashraf M.	58	M	Car vs Mini Truck MVA	(R) 2 #	(R)1,2 #; ?(R) shoulder dislocation	(R) 1,2 #; (R) shoulder subluxation
18	Jeena M.	37	F	Auto vs Car MVA	(L) 4,5 #	(L) 4,5 #	(L)4,5 #; minimal lung contusion
19	Saeeda K.	46	F	Pedestrian vs Auto MVA	(R) 2,3 #	(R)2,3 #	(R) 2,3#
20	Drisha Samuel	26	F	Scooter vs Car MVA	(R)3,4 #	(R) 3 #	(R) 3,4 #
21	Samson Thomas	72	M	Pedestrian vs Car MVA	(L) 4,5,6 #; (R) 3,4 #; poor lung sliding (R)	(L) 4,5,6#, (R) 3,4 - minimal pneumothorax (R)	(R) flail chest - multiple site#3,4; sucutaneous emphysema(R), <2cm pneumothorax (R); (L) 4,5,6#
22	Fiona Alvarez	43	F	Auto vs Car MVA	(R) 3,4#	(R) 3,4#	(R) 3,4#
23	Philomena	59	F	Pedestrian vs Auto	(L) 4,5#	(L) 4,5#	(L) 4,5,6#, mild pulmonary contusion
24	Suhara Beevi	37	F	Auto vs Car MVA	(R) 5#	(R) 5#	(R) 5 #, minimal contusion
25	Sajjad M.	45	M	Auto vs Car MVA	(L) 3,4,5# with minimal effusion	(L) 3,4 #	(L) 3,4,5 #, minimal ling contusion with hamorrhage pooling

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26	Seena Mathew	39	F	Car vs Bus RTA	(R) 2,3,4 # with effusion? haemothorax	(R) 1,2,3,4 #	(R) 1,2,3,4 # with minimal hameothorax
27	Daniel C.	40	M	Car vs Car MVA	Bilateral 2#	B/L 2 #	(B/L) 2#, (L) unicortical 3 #,
28	George Babu	39	M	Bus vs Car MVA	(L) 2,3 #	(L) 2,3 #	(L) 2,3 #
29	Abdul Jaffar	50	M	Fall from Height 15ft	(R) 3,4,5: (L) 4,5,6, (L) pneumothorax	(R) 3,4,5 #; (L) 4,5,6 #, (L) pneumothorax, (L) posterior shoulder dislocation	(R) 3,4,5 # with lung contusion: (L) 4,5,6 # with moderate pneumothorax
30	Farouk H.	36	M	Bike skid and fall	(R) 3 #	(R) 3 #	(R) 3 #
31	Hasna M.	34	F	Car vs Car MVA	(L) 3,4#; (R) 2,3,4#	(R) ?2,3,4#; (L) 3,4#	(R) 2,3,4#; (L) 3,4#; b/l lung minimal contusion
32	Gina Harris	22	F	Pedestrian vs Car MVA	(R) 5,6#; minimal effusion? haemothorax	(R)4,5,6#	(R)4,5,6# with minimal hameorrhage pooling
33	Archana Ramdas	42	F	Auto vs Pedestrian MVA	no obvious rib injury	normal	(L) 4,5# unicortical disruption
34	Deena Jibson	35	F	Car vs Bus MVA	(L) 3#	(L) 3#	(L)3#
35	Sajin Vinod	44	M	Pedestrian vs Car MVA	(R) 4,5#; minimal effusion ?haemothorax	(R) 4,5#	(R)4,5# with minimal haemorrhage pooling
36	Babu K.	52	M	Fall from 10ft height	(L) 3,4#	(L)3,4#; (R) mid clavicle #	(L)2,3,4#; (R) mid clavicle #; minimal (L) lung contusion
37	Agnes S.	54	F	Pedestrian vs Auto	(L) 6,7#	(L)6,7#, ?5#	(L) 5,6,7 #
38	Devananad M.	32	M	Auto vs Car MVA	no obvious rib injury	(R) communited clavicle #; ? (R) 4 #	(R) 3,4# with significant lung contusion; (R) communited clavicle #
39	Utsav Ramakrishnan	27	M	Bike vs Car MVA	(L) 6,7,8# with dinimished lung sliding- pneumothorax	(L) pneumothorax; (L) 6,7,8#	(L) pneumothorax; (L) 6,7,8#
40	Gana Raju	24	F	Pedestrian vs Bike MVA	(R) 3 #	(R) 3 #	(R) 3 #, 4 undisplaced unicortical #
41	Aparna S	48	F	Bike vs Car MVA	(R) 2,3# with reduced lung sliding	(R) 2,3, ?4# with minimal pneumothorax	(R)2,3# with small pneumothorax
42	Sreejith Nair	54	M	Bike vs Car MVA	(L)4,5,6,7 # with effusion	(L) 4,5,6,7 #; (L) clavicle#	(L) 4,5,6,7 #, (L) clavicle #, moderate haemothorax, minimal subcutanoeus emphysema
43	Divya Sreejith	39	F	Fall from 12ft ht	(R) 3,4 #	(R) 3,4#; ? (R) shoulder dislocation	(R) 3,4#, minimal lung contusion, (R) shoulder subluxation
44	Yana Arul	28	F	Bike vs Car MVA	(L) 2 #	(L) 1#	(L) 1#, 2 unicortical disruption
45	Arul Raj	60	M	Bike vs Car MVA with h/o ejection	No obvious rib #	Normal Xray	(L) AC joint disruption, subcutaneous chest wall edema
46	Keerthi Balan	33	F	Pedestrian vs Auto	(L) 3,4 #	(L) 3#, ?4#	(L) 3,4 #
47	Divya Aneesh	42	F	Auto vs Scooter	(R) 2#	(R) 2#, undisplaced mid clavicle # (R)	(R) 2#,mid clavicle undisplaced #
48	Fathima Suhara	43	F	Scooter vs Car MVA	(L) 5,6#	(L)5,6#	(L) 5,6 #
49	Thomas V.	48	M	Bike vs Bike MVA	B/L 3,4#; (R) 5 # with diminished lung sliding	B/L 3,4 # with minimal pneumothorax	B/L 3,4#; (R) 5#, 1.5cm pneumothorax at (R) hilum with minimal haemorragic fluid, mild lung contusion
50	Simon K.V	50	M	Car vs Car MVA	No obvious rib #	(L) 1#	(L) 1 #

51	Suresh B.	38	M	Bike skid and fall	(R) 6,7# with minimal effusion ? haemothorax	(R) 6,7#	(R) 6,7 # with minimal haemorrage pooling
52	Devika P.	37	F	Fall from 7ft ht	(L) 4,5 #	(L) 4,5 #	(L)4,5#
53	Ganga Kiran	53	F	Car vs Mini Truck MVA	(L) 2#	(L)2#	(L) 2#
54	Shahir K.	47	M	Fall from 15ft ht	(R) post 7,8,9; (L) post8,9,10 with (R) effusion, ? haemothorax	(R) 7,8,9 #; (L) 8,9,10 ? 11#; blunting of (R) costophrenic angle	(R) 7,8,9 post #; (L) 8,9,10 # with significant parenchymal contusion, (R) minimal haemorrage pooling
55	Finny Iype	42	M	Bike skid and fall	(L) 3,4 #	(L) 3 #	(L) 3,4 #
56	Wesley M.	44	M	Pedestrian vs Auto	No obvious rib #	No obvious rib #	(L) 1 unicortical undisplaced #
57	Sharadamma	66	F	Pedestrian vs Bike MVA	(L) post 7,8# with minimal effusion, ? harmothorax	(L) 7,8 #	(L) 7, 8 # with minimal haemorrage pooling
58	Velappan N.	72	M	Auto vs Car MVA	(R) 4 #	(R) 4 displaced #	(R) 4 # with very mild lung contusion
59	Teresa George	28	F	Bike skid and fall	(L) 5 #	No obvious rib #	(L) 5 undisplaced minor #
60	Sally Abraham	60	F	Fall down 10 flight stairs	(L) 4,5 #	(L) 4,5 #; (L) shoulder subluxation	(L) 4,5 #
61	Mohammed S.	43	M	Bike skid and fall	(R) 2,3 #	(R) 2,3 #	(R) 2,3 undisplaced #
62	Hairanuissa M.	54	F	Scooter vs Car MVA	Undisplaced (R) 3 #	No obvious rib fracture	(R) 3 unicortical disruption, (R) 4 undisplaced #
63	Deepu M.	35	M	Car vs Mini Truck MVA	B/L 3,4 #; (R)2#	B/L 3,4 #; (R) 2#	B/L 3,4 #; (R) 2#; with minimal lung contusion
64	Saramma	50	F	Auto vs Scooter	No obvious rib #	Normal Xray	Normal
65	Sahya Haridasan	22	F	Bike skid and fall	(L)2 #	Normal Xray	(L) 2 undisplaced #
66	Surya Haridasan	28	F	Bike skid and fall	(R) 3,4 #	(R)3,4 #	(R) 3,4 #
67	Gana Sreejith	33	F	Bike skid and fall	(L) 2 #	(L) 1,2 # ; (L) clavicle #	(L) 1,2 #; (L) clavicle #
68	John Philip	32	M	Car vs Car MVA	B/L 4,5 # ; (R) 3# ; diminished lung sliding (R)	B/L 4,5 #; (R) 3 #; deepened CP angle	B/ L 4,5 #; (R) 3 # in 2 sites, very minimal pneumothorax (R)
69	Daniel George	48	M	Fall from 10ft ht	(L) 5,6#	(L) 5 6 #	(l (5,6, # with minimal lung contusion
70	Sajith Thomas	35	M	Car vs Car MVA	(R) 3,4 #	(R) 3,4 #	(R) 3,4 #
71	Jaya Rajan	40	F	Pedestrian vs Car MVA	(R) 4 #	(R) 4#	(R) 4# with minimal lung contusion
72	Diya Babu	41	F	Bike vs Car MVA	(L) 5,6#	(L) 5,6#; (L) mid clavicle #	(L)5,6#
73	Baby Mammen	52	M	Car vs Auto MVA	No obvious rib #	Normal Xray	Mild subcutaneous edema
74	Varghese G.	68	M	Car vs Car MVA	(L) 4,5#	(L) 4#	(L) 4,5#; mild lung contusion with minimal haemorrage pooling
75	Fathima H.	56	F	Auto vs Scooter	No obvious rib #	Normal Xray	mild sucutaneous edema
76	Ayan Dhruv S.	19	M	Bike skid and fall	(R) 5,6#	(R) 5,6#	(R) 5,6#
77	Rema G.	48	F	Fall down 10 flight stairs	(L) post 4,5,6#	(L) 4,5,6#; (R) AC joint disruption	(L) 4,5,6# post aspect
78	Nimmi Pious	36	F	Scooter vs Auto MVA	No obvious rib #	Normal Xray	Normal
79	Sheela M.	54	F	Auto vs Car MVA	(R) 4#	(R) 4,5 #	(R) 4,5#
80	Shylaja R.	61	F	Car vs Car MVA	(R) 2#,(L) 3#	(R)1,2#; (L) 3#	(R) 1,2#; (L) 3#

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81	Yasmeen Fathima	40	F	Auto vs Scooter	No obvious rib #	No obvious rib #; (L) mid clavicle undisplaced #	(L) 1 # undisplaced; (L) clavicle undisplaced #
82	Harsha R.	34	F	Scooter vs Car	No obvious rib #	No obvious rib #	mild chest wall edema
83	Rajam B.	44	F	Pedestrian vs Auto MVA	(R) 2#; (L) 4,5#	(R) 2#; (L) 4,5#	(R) 2#; (L) 4,5 #
84	George M.V.	62	M	Pedestrian vs Auto	(R) post 6,7 #	(R) 6,7#	(R) 6,7 post #; very minimal haemorrage pooling
85	Rachel George	60	F	Pedestrian vs Auto MVA	No obvious rib #	No obvious rib #; (R) mid clavicle #	No obvious rib injury
86	Teena Mathew	29	F	Car vs Car MVA	(L) 5,6#	(L) 4,5,6#	(L)5,6 #
87	Febin Ashraf	35	M	Bike skid and fall	(R) 3#	(R) 3#;?4#	(R) 3#
88	Suhail P.	40	M	Assault with blunt object(cricket bat)	(R) post 7,8 #; minimal effusion?hameothorax	(R) 7,8#; (L) 3#	(R) post 7,8,9#;(L) 3#; (R) minimal hameothorax
89	Jinson Jose	37	M	Bike skid and fall	No obvious rib fracture	No obvious rib #	minimal chest wall edema
90	Seethamma	68	F	Fall down 10 flight stairs	(L) post 7,8 #	(L) 7,8#	(L) post 7,8 #; moderate lung contusion
91	Rahelamma C.	84	F	Slip and fall	(R) 4,5 #	(R) 4,5 #	(R) 4,5#; mild chest wall edema
92	Sasidaran K.	55	M	Car vs Auto MVA	B/L 4,5 #; (L) 6#	B/L 4,5#; (L) 6#	B/L 4,5#; (L) 6#
93	Hashmi Babu	33	F	Bike skid and fall	no obvious rib injury	?(L) 5#	(L) 5 undisplaced #
94	Unaise B.	28	M	Bike vs Bike MVA	(R) 7,8# with minimal effusion	(R) 7,8,?9#	(R) 7,8#; minimal haemorrage pooling
95	Baiju N.	39	M	Bike vs Bike MVA	No obvious rib #	?(R) 3#	No obvious rib injury, minor chest wall edema
96	Geetha Moncy	44	F	Auto vs Car MVA	(R) 4#	(R) 4,5 #	(R) 4#
97	Saranya M.	57	F	Pedestrian vs Bike MVA	No obvious rib #	Normal Xray	Minor chest wall edema
98	Kajal P.	12	F	Bike skid and fall	No obvious rib #	Normal Xray	Minimal lung contusion
99	Hiba F.	28	F	Pedestrian vs Bike MVA	(L) 4#	(L)4,?5#	(L)4#
100	Jacob V.	56	M	Bike vs Car MVA	B/L 2,3#; (L) 4# with diminished lung sliding	B/L 2,3#; (L) 4#	B/L 2,3#; (L) 4#; small pneumothorax ~1cm (R)
101	Jincy P.	33	F	Bike vs Car MVA	No obvious rib #	No obvious rib #, mid clavicle #(L)	minor chest wall edema
102	Jasmine Peter	28	F	Auto vs Scooter	no obvious rib injury	No obvious rib #	Minor chest wall contusion
103	Taniya Varghese	30	F	Pedestrian vs Auto	(R) post 8,9#	(R) 8,9#	(R) post 8 9#; minor subcutaneous edema
104	Diya Mary	36	F	Scooter vs Bike MVA	(R) 2,3#	(R) 1,2,3#	(R) 1,2,3#; minor lung contusion
105	Thasneem M.	32	F	Auto vs Car MVA	(L) 3#	Normal Xray	(L) 3 undisplaced #
106	Hari L.	44	M	Fall from 12ft ht	B/L 2#; (L) 3#	B/L 2,3#	B/L 2#; (L) 3#; minimal haemorrage pooling (R)
107	Diana Babu	30	F	Scooter vs Pedestrian	(L) post 10,11#	(L) post 10,11#	(L) post 10,11#, minimal (L) haemothorax
108	Harish K.	41	M	Car vs Bus RTA	(R) 3,4,5#	(R) 3,4,5#	(R)3,4,5 #
109	Santhosh K.	46	M	Assault by unknown person	(L)11,12#	(L) 11,12 #	(L) 11,12#
110	Leena Mathew	41	F	Bike skid and fall	(R) 8,9 #	(R)8,9#	(R) 8,9#, extensive chest wall edema

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111	Jolly Johnson	44	F	Pedestrian vs Car MVA	(L) 4,5,6#	(L)4,5#	(L)4,5,6#
112	Tinu Joseph	38	M	Bike skid and fall	No obvious rib #	No obvious rib #	minimal chest wall edema
113	Jomon V.	55	M	Car vs Mini Truck MVA	B/L 3,4 #	B/L 3,4 #	B/L 3,4 #
114	Waheeda Banu	82	F	Slip and fall from stairs	(R) 5,6#	(R)5,6#	(R)5,6#; minimal lung contusion, haemorrage pooling
115	Iqbal Azhar	32	M	Fall from ht 12 ft	B/L 4,5#	B/L 4,5#	B/L 4,5#
116	Rafiq S.	38	M	Bike skid and fall	(L) 4,5#	(L) 4,5#	(L) 4,5#
117	Dorairaj V.	55	M	Car vs Car MVA	(R) 2,3,4#	(R) 3,4#	(R) 2,3,4#
118	Venkatesh Iyer	72	M	Slip and fall	(R) 6,7 #	(R) ?5,6,7#	(R) 7,6#, mild subcutaneous edema
119	Sanjeev	33	M	Bike vs Bike MVA	(L) 9,10#	(L)9,10#	(L) 9,10#
120	Rajeev A.	40	M	Pedestrian vs Auto	No obvious rib #	normal	mild chest wall edema
121	Eve Roji	37	F	Scooter vs Pedestrian	No obvious rib #	Normal Xray	undisplaced 5#
122	Gaurav Sukhla	30	M	Fall from 10ft height	(R) 5,6#; (L)5#	B/L 5#	(R) 5,6#; (L)5#
123	Qader M.	42	M	Car vs Car MVA	(L)4,5#	(L)4,?5#	(L)4,5#, with minimal haemorrage pooling (L)
124	Antony Koshy	37	M	Bike vs Car with h/o ejection	B/L 4#; (R) 3#	B/L 4#; (R) 3#	B/L 4#; (R) 3#; with moderate b/l lung contusion
125	George Thomas	49	M	Pedestrian vs Car MVA	(L) post9,10#	(L) post 9,10#	(L) post 9,10#; undisplaced 11 unicortical #
126	Oommen P.	52	M	Bike skid and fall	No obvious rib #	(L) clavicle undisplaced #	(L) 1 #; (l) clavicle minimally displaced #
127	Irene V.	27	F	Scooter vs Auto MVA	No obvious rib #	normal	(L) chest wall contusion
128	Preethi S	33	F	Scooter vs Auto MVA	(R) 2,3#	(R)2,3#	(R)2,3#
129	Seetha Nair	53	F	Fall down 10 flight stairs	Normal	(L) shoulder dislocation	Chest wall contusion post (L)
130	Bincy Kunjumon	31	F	Pedestrian vs Bike MVA	(R) 3,4#	(R) 4#	(R)3,4#
131	Reenu Sunny	46	F	Car vs Bus RTA	B/L 3#;	B/L 3#; ? (L) 4#	B/L 3#; (L)4#
132	Shaji P.	50	M	Car vs Bus MVA	(L)2,3#	(L) 3#	(L)2,3#
133	Evelyn Johnson	34	F	Scooter vs Auto MVA	Normal	Normal	Undisplaced (L)4 # with minimal chest wall edema
134	Vishnu Ajith	28	M	Bike vs Car MVA	(R) post 7,8#; minimal effusion? haemothorax	(R) 7,8#	(R) post 7,8#; mild Haemothorax (R)
135	Xavier Baby	44	M	Bike skid and fall	Normal	Normal Xray	minimal chest wall edema
136	Jishnu U.	37	M	Car vs Auto MVA	(R) 6,7#	(R)?5,6,7#	(R) 6,7#
137	Leelakumari	67	F	Slip and fall from stairs	(L) 5,6,7#	(L)5,6,7#	(L) 5,6,7# with lung contusion
138	Ginsu P.	34	F	Scooter vs Car	(R) 2,3#	(R)2,3#	(R) 2,3 undisplaced #
139	Meera S.	44	F	Scooter vs Auto MVA	No obvious rib #	?(L)3#	No rib injury, mild chest wall edema (L)
140	Jini Varghese	50	F	Car vs Car MVA	Normal	(L)1#; (L) mid clavicle #	(L) 1#, (L) mid clavicle #
141	Devina Sabu	24	F	Bike skid and fall	Normal	Normal, (L) AC joint disruption	Normal
142	Sabu P.	48	M	Bike skid and fall	(R) 3,4,5#; minimal effusion	(R) 3,4,5#	(R) 3,4,5#; minimal haemorrage pooling (R)