



ORIGINAL ARTICLE

## Role of Point of care ultrasound of lungs at pulmonology department of Gajju Khan Medical College, Swabi.

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**ABSTRACT... Objective:** To evaluate the usefulness of Point of care Lung Ultrasound at Pulmonology Department Gajju Khan Medical College Swabi. **Study Design:** Cross Sectional study. **Setting:** Department of Pulmonology, Gajju Khan Medical College, Swabi. **Period:** March 2019 to December 2019. **Material & Methods:** All the patients presented to OPD meeting inclusion and exclusion criteria were included, patients were selected by consecutive non-probability sampling technique. **Results:** Total of 139 patients were included in our study mean age was 50.40 years, range 21-93 years and standard deviation was  $\pm 18.257$ . Eighty one patients had Pleural Effusion, thirteen had pneumonia and 45 patients had diffuse alveolar-interstitial syndrome. Diagnostic thoracocentesis were performed on first attempt in all patients of pleural effusions without any complication. **Conclusion:** Our study concluded that Point of care lung Ultrasound is a useful strategy both for diagnosis and intervention of pulmonary patients at a resource limited areas.

**Key words:** ARDS, Gajju-Khan-Medical-College, Point-of-Care, Pakistan, Pneumonia, Pulmonary Embolism, Pneumothorax, Swabi, Ultrasound.

### INTRODUCTION

Point of care ultrasound has been rapidly expanding over the last few years both in community and academic settings. It is simple, easily available, has no risk of ionizing radiation and has good patient outcome. Ultrasound use has been started since 1950 in medical field for diagnosis. Initially only Radiologist were using Ultrasound but now a days many other specialties are using it. Point of care ultrasound is the one when physician takes history from the patient and do complete clinical examination followed by ultrasound at bedside to confirm findings and do needful interventions.<sup>1</sup>

Ultrasound produces high frequency echoes which passes through the human tissues, depending upon the nature of the tissues. Some echoes reflect back and absorbed by the transducers and gives rise to ultrasound image on machine. Air and bone have higher attenuation effects as compared to other tissues.

Lungs containing air surrounded by bones were previously considered limitations for Ultrasound.<sup>2</sup>

Lung Ultrasound can be used to diagnose pleural effusion and amount, nature and types of pleural effusion e.g simple, complicated, septated and Echogenic.<sup>3</sup> Also the following conditions can be diagnosed by point of care ultrasound e.g, Pneumonia<sup>4</sup>, Pneumothorax<sup>5</sup>, pulmonary Embolism<sup>6</sup>, Differentiation of dyspnoea cause in exacerbation of COPD and Heart Failure as comorbidity<sup>7</sup>, and Diffuse parenchymal lung disease.<sup>8</sup> Ultrasound guided procedures can also be done such as thoracocentesis and image guided pleural or lung lesion biopsy.<sup>9</sup>

Main aim of our study was to know the usefulness of Point of care Lung Ultrasound at Pulmonology department of Gajju Khan medical college Swabi. Also to get our data and share with our colleagues here to promote the use of Ultrasound at Pulmonology departments of our country

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because no data is available.

**MATERIAL & METHODS**

This cross section study was conducted at the procedure room of pulmonology department Gajju Khan Medical College Swabi, from 1<sup>st</sup> March 2019 till 31<sup>st</sup> December 2019. Patients were selected by consecutive non-probability sampling technique.

Patients with suspected pneumonia, pleural effusion, presence of unilateral/ bilateral crepitation's and with simultaneous findings of wheeze and crepitation were included in the study. Well informed written consent was obtained from all included patients.

All patients were examined by same operator who is fellow pulmonologist of college of physician and surgeons of Pakistan, with the same ultrasound machine. All the data was entered and analyzed in SPSS version 25.0. Ultrasound findings were noted and entered in SPSS like Simple Pleural effusion(anechoic), Complicated Pleural effusion(Anechoic lesion with fibrinous bands), Pneumonia(Localized B-lines, Hepatization with air bronchogram or fluid bronchogram, Subpleural anechoic areas with B-lines), Diffuse alveolar-interstitial Syndrome (Two or more than two Regions of Bilateral B-lines).

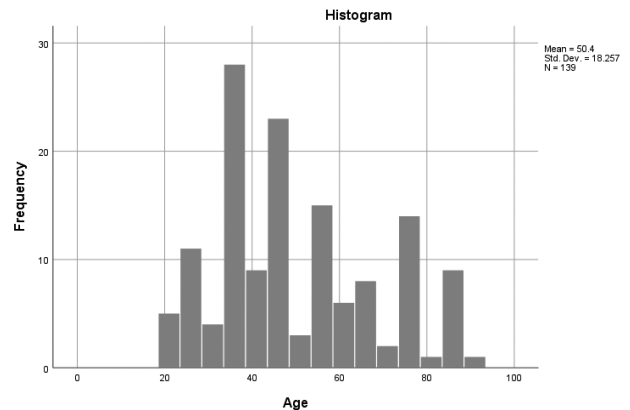
**RESULTS**

Total 139 patients participated in the study among which male were 84 (60.4%) and females were 55 (39.6%). Mean age was 50.40, range was 21-93 and standard deviation was ±18.257 as shown in Figure-1. Out of 139 patients, 64 (44.6%) were having simple pleural effusion as shown in Figure-2. Seventeen (11.5%) patients had complicated pleural effusion, 13 had pneumonia (10.1%) and 45 (33.8%) patients had diffuse alveolar-interstitial syndrome.

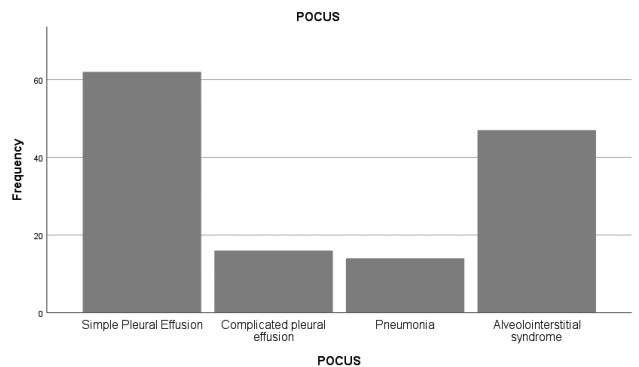
**DISCUSSION**

In this Point of care lung ultrasound study total of 139 patients were examined by same consultant pulmonologist in which 83 were male and 56 were female. Total of 64 patients had simple pleural effusion, 17 had complicated pleural effusion,

13 had pneumonia and 45 patients had diffuse alveolar-interstitial syndrome.



**Figure-1. Results of Point of care ultrasound (POCUS) lung in Gajju Khan medical college Swabi. (n=139)**



**Figure-2. Results of point of care ultrasound (POCUS) lung in Gajju Khan Medical College Swabi. (n=139)**

This study was conducted to know the importance of point of care ultrasound in pulmonology procedure room in a newly established pulmonology department because we come across lots of patients needing ultrasound chest. Because of less number of radiologist and higher patients burden Ultrasound chest were postponed to next day or so.

Simple pleural effusion were daignosed by seeing anechoic/hypoechoic areas with lung collapse,<sup>10</sup> while in complicated pleural effusion there were fibrin bands, septation or echogenicity.<sup>3,11</sup> Yang et al. examined nature of 320 patients of pleural effusion and then these patients were subjected to further investigation like thoracentesis, cytology and biopsy. They concluded that anechoic effusion may be transudate or exudate. Effusion having simple or complex septations

or echogenic effusions were exudative pleural effusion. Pleural nodules were seen in malignant pleural effusion.<sup>3</sup>

Pneumonia were labelled by seeing focal B lines, sub pleural anechoic area, air or fluid bronchogram on ultrasound.<sup>12</sup> One study performed in emergency department showed similar results of Lung sonography and chest x ray in the diagnosis of pneumonia, sometime ultrasound has better results than chest x ray.<sup>13</sup> Daniel A. et al study concluded that in 90.5% of acute respiratory failure cases lung ultrasound can get you diagnosis.<sup>14</sup>

Studies done globally shows similar results in classifying pleural effusion<sup>3,15</sup>, Pneumonia, differentiating pulmonary edema from acute exacerbation of COPD in a dyspnoic patient using lung ultrasound.<sup>16</sup>

Patients having minimal/loculated pleural effusion were difficult to aspirate, so with point of care lung ultrasound, thoracocentesis were performed in 81 patients in 1<sup>st</sup> attempt without any complication. Bhatnagar et al. Described the role of ultrasound guided thoracic intervention in their article will decrease complication rate.<sup>9</sup>

Assessment of B lines can detect Usual interstitial pneumonia by ultrasound in connective disease patients.<sup>17</sup> Gargani et al. examined 149 dyspnoic patients, lung sonography and NT-proBNP level done by two physician, 122-patient with cardiogenic dyspnoea were confirmed.<sup>16</sup>

Keeping in view history and clinical examination findings patients underwent some necessary interventions like Echocardiography in 29 patients, HRCT Chest in 15 patients and Ultrasound guided pleural fluid aspiration done in 81 patients successfully without any complication.

Further studies needed over the use of point of care lung ultrasound in developing countries like Pakistan in order to enhance the use of point of care ultrasound by pulmonologist.

## CONCLUSION

Our study concluded that Point of care lung Ultrasound is a useful strategy both for diagnosis and intervention of Pulmonary patients at a resource limited area.



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### AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Zia Ul Haq	Conceived idea, drafted study, collected data, Statistical analysis and Data interpretation.	
2	Muhammad Umar	Conceived idea, drafted study, Statistical analysis and Data interpretation.	
3	Imtiaz Khan	Conceived idea, drafted study, Collected Data, Statistical analysis and Data Interpretation.	