The use of ultrasound for the management of pleural effusions.

Laura-Jane Erunlu ST5 Anaesthetics trainee, West of Scotland

Jamie Hornsby Intensive Care and Respiratory Medicine Consultant, Royal Alexandra Hospital

Richard Cowan Intensive Care and Anaesthetics Consultant, Glasgow Royal Infirmary

SOA21

Introduction

Pleural effusions are common in critically ill patients. Most are of limited clinical significance, however, some are important; either due to their size and consequent impediment to respiratory mechanics, or, due to the underlying pathology[1].

A retrospective audit of our patients in 2017 showed that 31% of patients admitted to our ICU with pneumonia had evidence of pleural effusion on their X-Ray imaging. Of these patients, only 12.5% had the possible effusion assessed further with thoracic ultrasound. Within the population assessed, there were patients who had been treated in ICU for pneumonia, not had their possible effusion assessed beyond X-Ray imaging, and then re-presented to hospital following ICU discharge with empyema.

We created a guideline for the assessment and management of pleural effusions in the ICU. The focus was on risk stratification and ultrasound assessment to identify those effusions at high risk of being complex/exudative and therefore need further evaluation with pleural fluid sampling. We then aimed to re-audit the assessment of effusions after the introduction of our pleural infection guideline to evaluate the impact of it on the management of these patients.

Methodology

We reviewed all chest x-rays taken in the level 3 area of our ICU from December 2019 to July 2021. These images were searched for on Carestream PACS based upon the unique geographical identifier for our level 3 area. The X-Ray images were then reviewed to identify possible effusions, irrespective of the reason for the CXR being done.

The electronic patient records of patients with possible effusions were examined to identify those patients with an effusion who had a listed diagnosis of pneumonia. For those patients who had a diagnosis of pneumonia and radiographic evidence of an effusion, we then looked to see if the guideline had been followed. This meant having a pleural ultrasound assessment documented in the electronic record and all recommended tests sent if the pleural effusion had been aspirated.

Data was collected and analysed in Microsoft Excel.

Results

974 X-Rays were reviewed for the period December 2019 – July 2021.

34% (329) of the X-Rays showed evidence of a possible pleural effusion. 160 of these x-rays (48%) were in patients with a diagnosis of pneumonia. 75 (47%) of x-rays with evidence of effusion in a patient with pneumonia were further investigated with a pleural ultrasound. Following this assessment, 44% of effusions were considered appropriate for pleural fluid sampling. A majority (86%) of the sampled effusions were exudative and required further intervention or management.

Conclusions

The results show that the use of our pleural infections guideline increased the proportion of patients who had appropriate assessment of possible pleural effusions in the level three ICU by almost four-fold. The effusions that were identified by the guideline as being suitable for pleural fluid sampling were mostly exudative and required further intervention; illustrating the importance of sampling suspected parapneumonic effusions to ensure appropriate management.

Of interest, the Covid-19 pandemic caused our level 3 patient cohort to increase by 200% but due to their geographical location within the hospital, it was not possible to include patients out-with the original level 3 ICU in our search parameters. Further work to analyse this wider patient cohort is required.

The initial investigation for a suspected pleural effusion should be a PA chest X-Ray[2] but In critically ill patients, most chest X-Rays will be AP supine/ semi-recumbent and the sensitivity and specificity for identifying an effusion is reduced[1]. This audit shows the value of implementing a guideline to ensure appropriate management of pleural effusions and highlights the usefulness of pleural ultrasound in the critically ill population. Given this, in the future we plan to work on further embedding ultrasound assessment of possible pleural effusions into our ICU practice.

References

No conflicts of interest.

1. Maslove DM, Chen BT-M, Wang H, Kuschner WG. The Diagnosis and Management of Pleural Effusions in the ICU. Journal of Intensive Care Medicine. 2013;28(1):24-36. doi:10.1177/0885066611403264

2. BTS Pleural Disease Guideline 2010 Thorax 2010;65(Suppl 2):ii4eii17. doi:10.1136/thx.2010.136978

Intensive Care Society