

Lung Ultrasound in CICU

Jonathan Johnston – Advanced Clinical Practitioner, Cardiac Surgery

Royal Sussex County Hospital 2017-2020

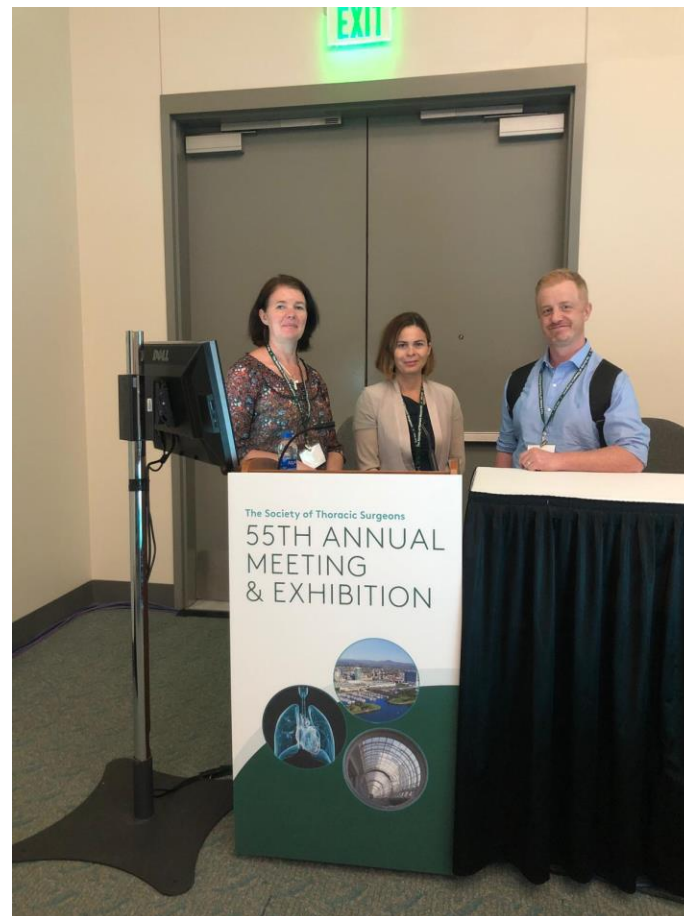
Background

- Group of eight ACPs introduced in 2016 in Royal Sussex County Hospital
- Encouraged to consider developing skills in lung ultrasound by our clinical supervisor
- Ran a small scale pilot study comparing chest x-rays to lung ultrasound for 4 common lung pathologies often encountered on cicu
- Pleural effusion, Pulmonary oedema/interstitial fluid, Consolidation and pneumothorax.
- Presented pilot study at SCTS, EACTS and STS conferences over 2018

Background

- The outcome of the pilot study was clearly that lung ultrasound was as good as chest x ray for these pathologies. Although the sample size was small and lacked statistical significance there was ample previous research to highlight lung ultrasound as being useful in this context.
- Therefore, after much discussion about how to move forward with our development it was decided that we would apply for the Ionescu Fellowship for Nursing and AHP.
- We were very excited to be able to secure that fellowship in 2019

STS Conference



Ionescu Fellowship

- Our fellowship plan was to spend time with a recognized center of excellence for lung ultrasound in critical care.
- Thankfully, we were able to find a colleague who was able to help and deliver the training we needed.
- Dr Luigi Vetrugno of Udine Hospital in Italy was known to our clinical supervisor and had published many papers on lung ultrasound
- He was also an advocate of using lung ultrasound on ward rounds which was something we had become interested in ourselves, so it seemed like a good fit.

Ionescu Fellowship

- In June 2019 Dr Vetrugno arrived and delivered his first teaching session. It was very detailed and covered the introductory information we would need including the physics of ultrasound and machine settings.
- He then went on to discuss diagnosis and pattern recognition, including the use of artifacts to rule in or out diagnoses.
- In the evening we got together and were able to ask questions and discuss at length what we had learned during the day.

Ionescu Fellowship

- In September to November 2019 six of the ACPs travelled to Udine to spend time on the critical care unit and observe the use of lung ultrasound in context.
- Each group spent two full days with Dr Vetrugno and his team.
- We were made to feel very welcome in Udine Hospital and we were all impressed by the expertise of the team both medical and nursing and AHP.
- Udine hospital was a very large hospital which served a large area.

Ionescu Fellowship

- In Udine critical care the ward rounds are attended by a team similar to UK hospitals.
- During my experience there the attending team was made up of a consultant a registrar another junior doctor and the nurse in charge.
- The registrar would perform a focused assessment using lung ultrasound on every patient including focused echo.
- Everyone on the team was able to see and understand the images captured and discuss them as part of each patients assessment.

Ionescu Fellowship

- Dr Vetrugno was able to take extra time to go over the finer details of probe placement and settings.
- Equally he was able to talk about how they used the information to progress the care of each patient.
- This was of huge benefit to us as when learning new skills often the difficulty lies in how to implement it and when to implement it.
- Dr Vetrugno also shared some wisdom regarding these issues and resistance to change.

Ionescu Fellowship

- Once back in Brighton we were set the task of solidifying our skills learnt in Udine.
- We were given six weeks to perform ultrasound back in our own department and discuss within ourselves what further learning we might need.
- Then in January 2020 Dr vetrugno would return to Brighton for final comments and questions
- He provided a last lecture, took lots of questions and taught a final lecture introducing focused echo in critical care which we were all very grateful for.

Outcome

- When we first started learning about lung ultrasound there were many comments about its usefulness.
- In time after the fellowship experience, we very much became relied upon to perform lung ultrasounds on the unit.
- The phrase ‘can you just do a quick ultrasound?’ became very familiar.
- I think this really highlights the benefit of lung ultrasound in critical care.

Advantages

- Quick and easy imaging modality that can be shared with others immediately.
- No radiation exposure for the patient.
- Uses unit staff and does not require radiographic support (Note that if something looks very unfamiliar there would be a need to have some form of follow up diagnostic imaging reviewed by a radiologist).
- Can readily identify common lung pathologies in CICU patients with good sensitivity and specificity.

Disadvantages

- Unable to see the whole lung field
- Unable to view bones
- Unable to view mediastinum
- Requires extra training (Although this is very straight forward)
- Unable to view cardiac shadow (Although if you add echo to the focused assessment you get good information regarding heart function and size)
- Can be difficult to obtain images in patients with challenging body habitus.

Conclusion

- Lung ultrasound is an excellent and useful adjunct to assessment in the CICU.
- The skills are not difficult to learn although some attention should be paid to the limitations of lung ultrasound to make sure the correct investigation is sought.
- Lung ultrasound is not sufficient to replace chest x-ray completely in the CICU. However, it may be useful in reducing their numbers.
- The Inonescu fellowship has been of huge educational and clinical benefit to the staff and patients of the Royal Sussex Counts Hospital CICU.

Thank You!

- We would like to say thank you to the SCTS and Mr Ionescu and all of the fellowship coordinators for this opportunity.
- We would also like to thank all of the healthcare workers who have worked tirelessly through this difficult time to help patients and return services back to normal.
- Our fellowship ended just at the start of the COVID 19 pandemic and our colleague Dr Vetrugno was in a hospital very close to the epicenter in Northern Italy.
- We are thankful for his advice support during this times also.

References

- ***Effects of Volume Overload and Current Techniques for the Assessment of Fluid Status in Patients with Renal Disease*** Can Ekinia Merve Karaborka Dimitrie Siriopolb Neris Dincerc Adrian Covicb Mehmet Kanbayd. *Blood Purification*. 2018. Vol 46. PP 34-47.
- ***BLUE-Protocol and FALLS-Protocol Two Applications of Lung Ultrasound in the Critically Ill***, Daniel A. Lichtenstein, MD, FCCP. *CHEST* 2015; 147(6):1659-1670
- ***Fluid overload in the ICU: evaluation and management***, Rolando Claire-Del Granado1* and Ravindra L. Mehta2. *BMC Nephrology* (2016) 17:109