

## INTRODUCTION

Persistent pulmonary congestion is a predictor of poor outcomes in critically ill patients. The risk of death are up to four times higher when these patients show signs of pulmonary congestion on ultrasound (Zoccali, 2013). Point-of-care ultrasonography (PoCUS) can contribute to the early identification of the increased fluid volume status in patients with acute kidney injury, which can improve patient safety.

## STUDY GAP & PURPOSE

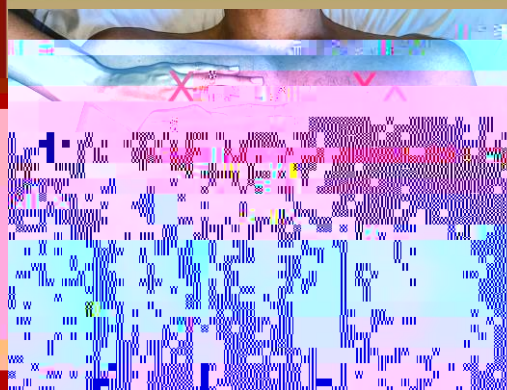
Despite the increase in the number of publications about the use of PoCUS by nurses, no studies were found aimed at evaluating the accuracy of PoCUS for identifying increased fluid volume. This study protocol aims to evaluate the diagnostic accuracy of nurse-performed pulmonary ultrasound in the assessment of Excess fluid volume in patients with acute kidney injury.

## METHOD

110 consecutive adult patients with acute kidney injury from a Brazilian private Intensive Care Unit (ICU) will take part in this prospective diagnostic test accuracy study. The pulmonary ultrasound (Figure 2) will be performed by a nurse specialist according to BLUE protocol (Figure 1) (Lichtenstein; Mezière, 2011). The outcome variable will be the radiological findings of pulmonary congestion (reference test) (Figure 3). Pulmonary ultrasound will be performed by the researcher (index test) for three days after the patient diagnosis of acute kidney injury. The KDIGO criterion (Khwaja, 2012) will be used in the first 48 hours of ICU admission. To assess the agreement between the index test and the reference test, the AC1 statistic will be used. In addition, the corresponding measures of prevalence, sensitivity, specificity, positive and negative predictive values will be calculated.

## Diagnostic accuracy of nurse-performed pulmonary ultrasound in the assessment of excess fluid volume in patients with acute kidney injury: study protocol

Bruna Barbeiro, RN; Karina Mendes, PhD, RN; Emilia Carvalho, PhD, RN; Cristina Zamarioli, PhD, RN; Fernanda Gimenes, PhD, RN  
University of São Paulo, Ribeirão Preto College of Nursing



**Figure 2** - Pleural line and A-line seen in the healthy lung. The bat sign and the pleural line outline a silhouette reminiscent of a bat



**Figure 3** - B-lines indicating the presence of transudate in a patient with acute kidney injury

## POTENTIAL IMPACT

We hope to show a good accuracy of nurse-performed ultrasound in the diagnosis of pulmonary congestion as a defining characteristic of the nursing diagnosis Excess fluid volume. Prompt identification of pulmonary congestion will improve the quality of care and patient outcomes.

## REFERENCES

Khwaja, A. KDIGO clinical practice guidelines for acute kidney injury. *Nephron Clin Pract.* 2012;120(4):c179-84. DOI: 10.1159/000339789.

Lichtenstein, D.; Mezière, G. The BLUE-points: three standardized points used in the BLUE-protocol for ultrasound assessment of the lung in acute respiratory failure. *Crit Ultrasound J.* 2011;3:109-110. 10.1007/s13089-011-0066-3

Zoccali, C. et al. Pulmonary congestion predicts cardiac events and mortality in ESRD. *J Am SocNephrol.* 2013;24:639-46. DOI: <http://dx.doi.org/10.1681/ASN.2012100990>



