

P063

P063 -Weight-based Assessment of Fluid Overload in Patients with Acute Kidney Injury

Adj A/Prof Chang Yin Chionh¹, Mr Bing Lun Chow², Dr Cheng Boon Poh¹
¹Singhealth, , Singapore , ²University of Aberdeen, Aberdeen, United Kingdom

Purpose

Fluid overload following an acute kidney injury (AKI) is associated with adverse clinical endpoints in critically ill patients. Accurate determination of volume status is therefore paramount to prevent fluid excess. Weight measurement is a logical surrogate for this purpose, and it provides convenience over the conventional fluid charts. We postulate that fluid overload measured by a weight-based assessment is correlated with mortality, greater length of stay, AKI severity (AKI stage 2 or 3), and the need for dialysis.

Methods

In this pilot study, we performed a single-centre, prospective review of 63 hospitalised patients with an AKI and referred for nephrology consult. Percentage fluid overload based on fluid chart (PFOi/o) and that of based on weight (PFOw) were compared and analysed against clinical outcomes; and were defined as per equation 1 and 2 respectively:

Equation 1: $PFOi/o = [Fluid\ Input\ (L) - Fluid\ Output\ (L)] \div Admission\ Weight\ (kg)$

Equation 2: $PFOw = [Maximum\ Weight\ (kg) - Baseline\ Weight\ (kg)] \div Baseline\ Weight\ (kg)$

Results

Amongst the 63 patients recruited in this study, five were excluded due to having singular or no weight data during the entire hospital stay. The overall baseline demographic data for all 58 participants are summarised in Table 1. Of the twenty-nine out of 58 patients with complete daily fluid input/output data, PFOi/o had no linear correlation with PFOw (Figure 1; $P=0.531$). Those who required dialysis had a higher PFOw ($P=0.026$) but had no correlation with PFOi/o ($P=0.987$). There was no significant association between AKI severity against neither PFOw ($P=0.096$) nor PFOi/o ($P=0.598$). Of the 58 patients with weight datapoints, patients who required dialysis (Figure 2, $P=0.003$) and those who had a severe AKI (Figure 3, $P=0.025$) had a higher PFOw. In a multivariate analysis that included sepsis, only PFOw was significantly associated with the need for dialysis ($P=0.004$) and AKI severity ($P=0.024$). The area under curve receiver operating characteristics (AUC ROC) is 0.819 and 0.703, with optimal cut-off at 0.5% and 0.25% PFOw for patients who required dialysis (Figure 4) and for those with AKI severity respectively (Figure 5). Length of stay and mortality outcomes will only be reported subsequently pending further data collection.

Conclusion

The use of weight-based assessment of volume status benefits from requiring fewer points of measurements, being non-invasive, and its acknowledgement of non-liquid intake and losses. Our data suggests that the percentage fluid overload based on weight is more useful and reliable to that based on fluid input/output charts within the general floor; and it indicates that the former is an important prognosticator for renal function amongst the low acuity AKI patients. Amongst the various factors in our multivariate analysis, only PFOw was associated with severe AKI and need for dialysis. Barring the cause-effect conundrum, the detrimental impact of fluid overload in AKI is clear. Therefore, monitoring daily weights may help avoid the poorer outcomes associated with fluid overload. Further studies are required to elucidate the mechanisms for this association, and to elicit the optimal corrective measures to fluid overload.