



Use of plasma neutrophil gelatinase associated lipocalin level to identify critical patients with acute kidney injury that require renal replacement therapy: is it a reliable biomarker?

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High levels of plasma neutrophil gelatinase associated lipocalin (pNGAL) have been reported to show strong correlation with renal replacement therapy (RRT) for patients with acute kidney injury (AKI). Current literature outlines several benefits and associated risks of RRT in intensive care unit (ICU) (1). However the proposed parameters for starting RRT are inconsistent such as the use of blood urea nitrogen and serum creatinine. Also the duration of RRT in AKI for ICU patients is not clearly defined (2). pNGAL has been reported as a reliable novel AKI biomarker (3). This study aims to find the use of pNGAL level to identify high-risk AKI patients before starting RRT and also using the level of pNGAL as a monitoring tool for renal recovery in critical care settings.

The authors have studied 60 patients with AKI who were not previously on dialysis and had a serum creatinine level of more than 2 mg/dL in males while more than 1.5 mg/dL in females. Based on the pNGAL levels, patients were classified in two main groups: high pNGAL group with pNGAL more than 400 ng/mL and low pNGAL group with below 400 ng/mL. About 40 patients had a high pNGAL value. These patients were randomly divided into two groups. One group had early initiation of RRT (within 12 hours). The other group had RRT initiated based on refractory acidosis, hyperkalemia with ECG abnormalities, fluid overload, reduced urine output and elevated blood urea nitrogen above 60 mg/dL. For both the groups

pNGAL levels were assessed daily for one week then weekly for 28 days along with basic metabolic panel, urine output and timing of continuous RRT. The primary outcome was mortality that was 15% compared to 45% in the standard. Similarly, other outcomes including ICU free days were not statistically different. However significant decrease in ventilation days was observed in early arm.

Hence pNGAL may be a reliable biomarker of positive fluid balance and renal injury. It may be included in a set of prerequisites for deciding upon RRT initiation in the ICU. Other studies have also looked at variables to find a defining criterion for RRT like using blood urea nitrogen level which currently is not an indicator. But most of these studies have smaller sample size. Small sample size is a weakness which limits the power to discriminate significant mortality. About 1,500 patients for each group are required for valid results (1). Another weakness is a very high cut off point of pNGAL in this study which can cause delay in enrollment time. This is because the patients with pNGAL below 400 ng/mL may also need RRT. Despite limitations, this study clearly reveals that it may be possible to use pNGAL levels as a biomarker in deciding when to initiate RRT in patients with severe AKI. Additionally, these levels can help in identifying the patients who will get the most benefits from early RRT initiation. Larger randomized controlled studies are needed to further validate the use. We look forward to the trials looking at a list of variables along

with pNGAL that can be used as a scoring tool to initiate RRT in critically ill patients (4,5).

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Footnote

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