

# **Abstract**

## **Background**

Acute renal failure is associated with increased mortality of septic patients; however, the exact influence of acute renal failure on patient outcome in severe sepsis and septic shock in such patients has not yet been determined.

## **Design**

A case control, retrospective, single center study.

## **Setting**

Critical Care Department (medical/surgical ICU), Nasser Institute Hospital.

## **Objective**

To determine the influence of acute renal failure on patient outcome in severe sepsis and septic shock.

## **Methods**

A total of 60 patients with a diagnosis of sepsis according to the definitions of the American College of Chest Physicians / Society of Critical Care Medicine consensus conference (**Bone et al., 1992**). These 60 patients of the study group were divided into different groups according to the incidence of ARF (Group **A** [non renal] & Group **B** [renal]), the severity of sepsis (Group **I** [severe sepsis] & Group **II** [septic shock]) and the mortality (Group **C** [Survivors] & Group **D** [Non survivors]) respectively. All included patients were subjected to full clinical evaluation, routine laboratory investigations, microbiological studies, abdominal and pelvic ultrasound also specific markers of kidney

injury including the fractional excretion of sodium and the creatinine clearance. All included patients were followed up daily to assess their clinical course, length of ICU stay, need for organ supportive measures (Mechanical ventilation, Inotropic/Vasopressor support and Hemodialysis), final outcome, recording of APACHE II score (in the first 24 hours of ICU admission), and the calculation of SOFA score (at ICU admission and serially thereafter throughout the study period). All patients were followed up from study day 1 or till the day of discharge or demise.

## **Results:**

- . 40% of all patients presented with severe sepsis and 60% with septic shock.
- . The chest and abdominal sepsis were the main sites of 1ry infection that comprised > 50% of the sources of sepsis.
- . The main organisms that were incriminated in infection were mainly gram negative (56.6%).
- . In all patients, the APACHE II score at 20 was predictive of mortality with sensitivity 77% and specificity 99% with AUC 86% and p value of 0.0001.
- . In all patients, the SOFA score at 7 was predictive of mortality with sensitivity 70.4% and specificity 79.8% with AUC 76% and p value of 0.0001.
- . 60% of all patients of the study group required vasopressor support, about 33% required hemodialysis and around 67% of all patients required MV.

. 40% of all patients of the study group died and 60% discharged from ICU.

. Fractional excretion of sodium (FENa): was significantly higher in group B patients (p value <0.001).

. Group B patients had significantly higher serum creatinine from first day till discharge, serum potassium level, creatinine clearance on admission and discharge compared to group A (p value <0.001).

. PH & Bicarbonate levels were lower in group B compared to group A patients. Group B patients had significantly lower serum bicarbonate and PH after 48h comparing to group A (p value <0.001).

. Group B patients had significantly higher SOFA score in first day (P value <0.001), APACHE II score on admission (P value 0.002) while was significantly lower regarding to APACHE II score on discharge (P value 0.011).

. Group B patients had significantly longer length of ICU stay (p value 0.037) compared to Group A. Need for hemodialysis was significantly higher in Group B patients compared to Group A. However there was no significant difference between both groups regarding to the need for MV and the need for vasopressors.

. In this study, 33.3% of ARF group were treated by conservative measures only; while 66.7% were treated by hemodialysis. 30% of group C patients were in need for hemodialysis vs. 70% in group D.

. The overall mortality rate in ARF group was 50% versus 30% in non renal group (p value 0.051).

. By analysis of ROC curve the FENA was found to have a cut-off point of 1.6 for prediction of mortality in sepsis with AUC 66% and p value 0.049 with sensitivity 65% and specificity 64%.

.There was a positive significant correlation between FENA and APACHE and SOFA scores as R was 0.4, 0.6 and p value 0.003, 0.001 respectively.

.There was a positive strong significant correlation between FENA and serum creatinine as R was 0.9 and p value 0.0001, while there was a negative strong significant correlation between FENA and creatinine clearance as R was -0.81 and p value 0.0001.

. Creatinine clearance was higher in group C patients compared to group D on discharge; however this difference was not statistically significant on admission. Serum creatinine level was high in Non Survivors compared to Survivors but the difference was statistically significant only after one week and on discharge.

. Group D patients had significantly lower PH (p value <0.001) from first day till discharge and serum bicarbonate level in all stages (p value <0.001) except in first day (p value 0.007) compared to Group C.

. Group D patients had significantly higher (p value <0.001) APACHE II score on admission and on discharge as well as SOFA scores (first day, mean, highest) compared to Group C.

. Group D patients had significantly longer ICU stay compared to Group C. The need for MV and hemodialysis was higher in Group D compared to Group C with significantly higher duration of MV in ventilated patients.

**Conclusions:**

ARF was a frequent complication in sepsis. ARF patients were already more severely ill and had a higher mortality (50%) compared with sepsis patients who did not develop ARF.

**Key words:** Acute Renal Failure, Sepsis, APACHE II, SOFA, FENa, Mortality.