

Study on Acute Kidney injury in Burn Patients.

Dr. Prashant Kumar, Dr. Md. Eqbal Ahmad, Dr. Sudhir Kumar, Dr. Vinita Sinha, Dr. Kishor Kr. Das.

Corresponding Author: Dr. Prashant Kumar

Date of Submission: 09-02-2019

Date of acceptance:23-02-2019

I. Introduction

Acute kidney injury (AKI) is a common and morbid complication on after severe burn and it is accompanied by a high mortality rate. AKI occurs in approximately one quarter to one third of patient in major burn injury. Burn related kidney injury is typically classified as early (0-3 days after injury) or late (4-14 days after injury). Early burn AKI is typically due to Hypovolemia, poor renal function and direct cardiac suppression while late –onset renal failure is usually the consequence of sepsis and is often associated with other organ failure. Of burn patients who survive AKI, the vast majority do not receive long term Hemodialysis and lead to end stage renal disease.

II. Material And Methods:-

We identified and studied 100 (hundred) case with burn more than 20% total body surface area, age more than 18 years in NMCH Patna during Jan 2015 to Dec 2018. Burns were characterized by both severity (Presence of 2nd or 3rd degree burns) and total surface area.

III. Observation:-

Urinary output is the key parameter in evaluating both renal function and the patients circulatory state. Generally a urine volume of 0.8-1.0 ml/kg/hr. reflects adequate perfusion. In non –oliguric renal failure, urine volume is of no value in the diagnosis. Urine and Serum osmolality, Sr. creatinine, blood urea and electrolyte concentration studied.

Table:1
Incidence of AKI among Patients with >20% TBSA Burn

| Burn Severity | No AKI | AKI |
|---------------|--------|-----|
| First degree | 99% | 1% |
| Second degree | 90% | 10% |
| Third degree | 85% | 15% |

Table: 2
Sex- incidence

| Sex | No of Cases | Percentage % |
|--------|-------------|--------------|
| Male | 15 | 15% |
| Female | 85 | 85% |

Table: 3

Association of AKI Development with clinical out comes (Intial Hospitalization)

| | | |
|------------------------|---|----|
| Pulmonary failure | - | 10 |
| Mechanical ventilation | - | 8 |
| Pneumonia | - | 7 |
| Wound Infection | - | 5 |
| MI | - | 2 |
| DVT | - | 3 |

IV. Discussion

In this study AKI after burn injury was associated with a significant increase in morbidity and mortality during initial Hospitalisation and also a significant increase in the development of severe CKD. Conversion to chronic dialysis , hospital re admission and mortality 1 Year after burn injury.

Mortality – AKI associated with proformed increase in mortality during initial hospitalization and upto 1 year after burn. Burn patient with AKI experiences a 1 year mortality rate of 30% for all burn patients .The development of AKI has a grave effect on the prognosis of critically ill patients.

Cardiopulmonary Function

Among all burn patients AKI was associated with a 10 fold increase in the rates of pulmonary failure, mechanical ventilation and pneumonia. These pulmonary complications have also been linked to excessive fluid administration during resuscitation. It is clear that burn patients are at the risk for serious pulmonary sequelae after both under and over – resuscitation. Standansed system to provide appropriate fluid requirements would help alleviate those morbidities.

A casual effect of burn injury on MI is well – documented as is the causal effect of MI on development of AKI.

CKD and Dialysis

Among all burn patients, AKI was associated with a significantly increases rate of severe CKD and conversion to chronic Dialysis in the year after burn injury. Most important part of management of AKI in burn patient is adequate fluid balance. Fluid overload should be avoided in order to prevent pulmonary oedima and heart failure. In burn patients with extensive raw surfaces, Fluid loss through the wound is not accurately assessed. Central venous pressure and/or pulmonary capillary wedge pressure monitoring is recommended. Diutretics are indicated in pre-renal oliguria but not in established organic renal failure.

Serum potassium level above 6.0m Eq/L and/or abnormal ECG and indication of the need for immediate treatment.

Hemodialysis :- Early and frequent hemodialysis (HD) is recommended. The criteria for the introduction of HD to treat acute renal failure in burn patients are as –

Table :- 4

| |
|-------------------------------|
| Blood urea nitrogen > 70mg/dl |
| Creatinine > 5mg/dl |
| Potassium > 6m Eq/L |
| Base excess <_ 15m Eq/L |
| Pulmonary Oedema |
| Systemic sign of Uraemia |

Although HD is most effective in the management of renal failure, it is sometimes difficult to ensure stable circulation . Also , in extensive burns, bleeding through wounds may be a problem due to the use of anti coagulants. In Hypotensive patients, albumin or blood should be transfused prior to HD. To remove excess water and circulatory toxic substances other than creatinine & urea , continuous haemofiltration can be combined with HD.

Nutritional Support :- In burn patients energy requirements are high and adequate nutritional support is critical to the outcome. Renal failure itself does not increases the metabolic rate, but the stress causing renal failure may induce a hypermetabolic state.

V. Conclusion

Finally, our findings are meant to emphasise the need for better understanding of the mechanism behind AKI development in burn patients. We know that inappropriate fluid resuscitation and sepsis are the leading cause of AKI during recovery after a burn injury. Renal failure as a common complication with deleterious consequences is one of the most important issue in burn management. In the systematic review the magnitude of the problem together with possible methods of prevention & treatment highlighted. In burn victims, if renal failure is effectively predictely and promptly managed, there will be a significant reduction in morbidity and overall mortality, espesicially in severe burn injury.