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PROFILE OF PAEDIATRIC PATIENTS WITH ACUTE KIDNEY INJURY IN THE SETTING OF PAEDIATRIC INTENSIVE CARE UNIT

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ABSTRACT

Objective: The aim of this study was to see how children with acute kidney injury fared in the PICU in the short term. **Setting:** GBP hospital Srinagar's PICU (Paediatric Intensive Care Unit). **Result:** Sepsis and encephalitis were the most common conditions associated with Acute kidney Injury. Acute kidney Injury was caused by pre-renal causes in 54.3% of cases. Stage 3 had the highest proportion of Acute kidney Injury patients ($p < 0.001$) 63.8 percent of the population. Acute kidney Injury Stages 1, 2, and 3 were diagnosed in 11 (15.9%), 14 (20.3%), and 44 (63.8%) of Acute kidney Injury patients in the current study. Acute kidney Injury was linked to a higher risk of death ($p < 0.001$). When compared to non- Acute kidney Injury patients, the survival rate was 34.8 percent. **Conclusion:** Acute Kidney Injury continues to be linked to adverse consequences, which may increase the morbidity and mortality. Early detection of Acute kidney Injury using new identified criteria (AKIN, RIFLE, p RIFLE), as well as early and adequate management of risk factors, would avoid Acute kidney Injury progression and reduce Acute kidney Injury patient death and morbidity.

KEYWORDS: Acute kidney Injury, AKIN, RIFLE, p RIFLE, Paediatric Intensive Care Unit.

INTRODUCTION

Acute kidney Injury is described as a rapid decline in renal function that results in the retention of nitrogenous wastes and the kidney's inability to maintain fluid and electrolyte homeostasis. According to research, AKI is linked to a bad prognosis.[1] Due to a lack of objective diagnostic criteria in the past, different interpretations for this condition have been used.[2]

Acute kidney injury is a serious condition that affects hospitalised patients and has been linked to poor short- and long-term outcomes.[3,4] The mortality rate in critically ill children with Acute kidney Injury is high, ranging from 9% to 67%, and increases if multiorgan failure, organ transplantation, or acute respiratory distress syndrome are present. The most common cause of incident Acute kidney Injury is acute tubular necrosis (ATN), which can be caused by hypovolemia, sepsis, or the use of nephrotoxic drugs.

The prevalence and severity of Acute kidney Injury in developing countries may vary from those in developed countries.[5]

The RIFLE classification recommended by the Acute Dialysis Quality Initiative Group and the one proposed by the Acute Kidney Injury Network have recently been standardised for the definition and staging of Acute Kidney Injury (AKIN). These classifications have been used to characterise Acute kidney Injury in hospitalised adults and children.[6]

The detection of Acute kidney Injury 's outcome is critical for starting preventive and therapeutic strategies[7]. The purpose of this research is to assess the short-term clinical outcomes in children with acute kidney injury who are admitted to PICU of GB Panth Hospital Srinagar.

MATERIALS AND METHODS

This was a prospective observational study in which 500 patients (age group of 1 month to 18 years) were screened, all of whom were admitted to the GBP Hospital's PICU (Paediatric Intensive Care Unit) between February 2017 to April 2018.

Sample Size: 500 Patients.

Inclusion Criteria
Patients in the paediatric intensive care unit range in age from 1 month to 18 years (PICU)

Exclusion Criteria
Patients who had a history of kidney disease, such as congenital polycystic kidney disease, and children who had been diagnosed with chronic kidney disease on their first visit.

Methodology
Clinical history and examination were performed, comorbidities identified, and pertinent data relating inquiries extracted for all children admitted to the PICU after informed parental consent. Creatinine levels in the blood were measured at admission and at daily intervals in PICU patients until they were discharged. Urine output was measured and recorded in millilitres per kilogramme per hour. The Acute Kidney Injury Network (AKIN) definition and classification was used to diagnose and stage Acute Kidney Injury.

From the time they were admitted to the PICU until they were discharged, all patients had their serum creatinine levels checked. Patients with Acute Kidney Injury had their serum creatinine checked before they left the hospital. A CBC, urinary routine, blood urea, serum electrolytes, and USG abdominal was performed if appropriate.

Statistics
Student t test, Z test, chi-square or Fischer exact test were used to compare biochemical and other numerical parameters. Findings were considered significant if P-value <0.05

RESULTS

In our study, the age group 1-5years had the highest number of cases (152, or 38.0 percent), followed by 5-10years (107, or 26.7 percent), and 15-18years had the lowest number of cases (5, or 1.3 percent). Boys and girls had mean age and SD of 4.56 ± 3.84 and 4.49 ± 4.01, respectively. Males and females had no statistically significant age difference (P>0.05).
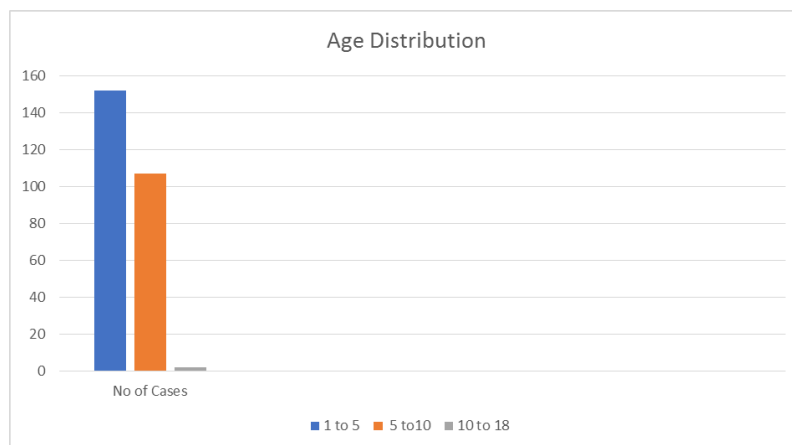

Fig. I: Age Distribution.

In the study, 292 males (58.4%) and 208 females (41.6%) participated. The male to female sex ratio was 1.4:1.
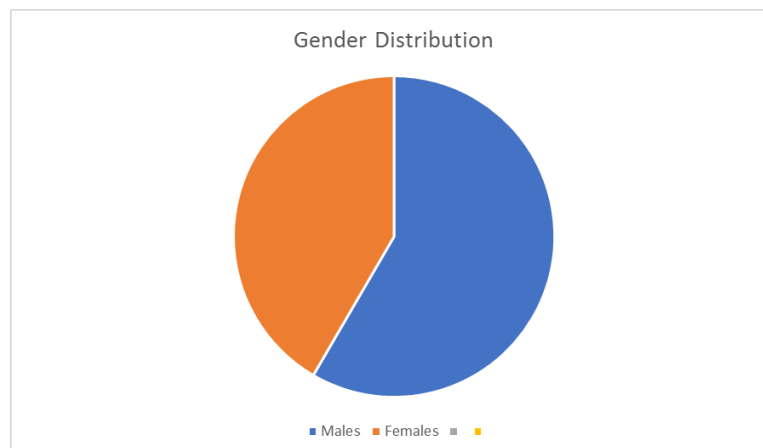

Fig. II: Gender Distribution.

Differences in common aetiologies of Sepsis and Encephalitis between Acute kidney Injury and Non-Acute kidney Injury groups were statistically significant ($P<0.001$). In Acute kidney Injury cases, the proportion of Sepsis and Encephalitis cases was considerably higher than in non- Acute kidney Injury cases.

Table I: Common Causes amongst Acute kidney Injury and Non- Acute kidney Injury.

Common Causes	AKI (n= 34)	Non-AKI (n=466)	χ^2-values P-value & significance
Dengue fever	2(5.8%)	65(13.9%)	χ^2=5.23 P<0.05, S
Sepsis	5(14.7%)	17(3.6%)	χ^2=23.06 P<0.001, VHS
Encephalitis	6(17.4%)	22(4.7%)	χ^2=19.48 P<0.001, VHS
Pneumonia	1 (2.9%)	20 (10.72%)	χ^2=3.03 P>0.05, NS

Between the Acute kidney Injury and non- Acute kidney Injury groups, there was no statistically significant difference in the common aetiology of pneumonia ($P>0.05$).

Fig III shows that the majority of cases (78.3%) belong to the pre-renal stage, followed by the renal stage (13.8%), and the post-renal stage (2.9%).
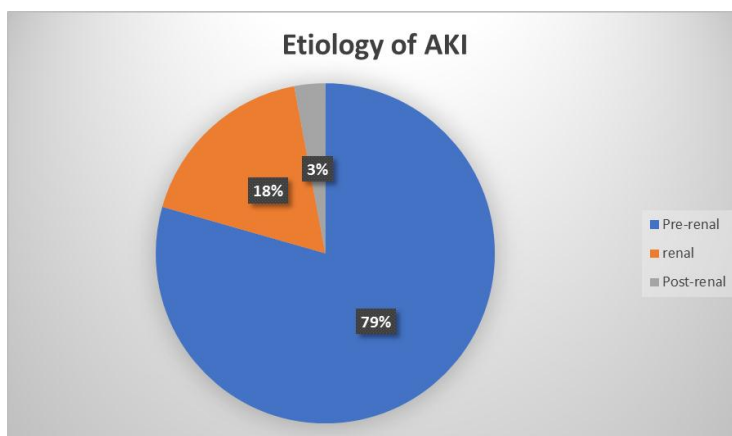

Fig. III: - Aetiology of AKI.

Table II: Shows that the third stage had the highest number of cases (22,64.7%), followed by the second stage (7,20.5%), and the first stage had the lowest number of cases (5,14.7%).

Stage	No of Cases	Outcome		χ^2-values P-value & significance
		Improved	Died	
1st	(5,14.7%)	4(80%)	1(20%)	
2nd	(7,20.5%)	5(71.4%)	2(28.5%)	χ^2= 4.12 P<0.05 S
3rd	(22,64.7%)	12(54.5%)	10(45.5%)	
Total	34	21(61.7%)	13(38.2%)	-

Table III: In the Acute kidney Injury cases, there was a statistically important distinction in the stages and outcomes ($P<0.05$). This study also found that as the stages progressed, the percentage of improvement decreased and mortality increased. Acute kidney Injury had a 34.8 percent case fatality rate.

Table III: The difference in outcome between Acute kidney Injury and non- Acute kidney Injury.

Group	No of Cases	Outcome		χ^2-values P-value & significance
		Improved	Died	
AKI	34	21(61.7%)	13(38.2%)	
Non- AKI	466	461(98.9%)	5(1%)	χ^2= 230.19 P<0.000 VHS
Total	500	482(96.4%)	18(3.6%)	-

The difference in outcomes of the cases was statistically very extremely important (P0.001). Non- Acute kidney Injury had a case fatality rate of 1.0 percent, and Acute kidney Injury had a case fatality rate of 38.2 percent. The overall mortality rate was 3.6%.

DISCUSSION

Acute kidney injury is a common complication in seriously ill children in the paediatric intensive care unit. Acute kidney Injury has been linked to a poor prognosis in many studies. There is a scarcity of published data on

Acute kidney Injury in Indian toddlers. The majority of the data is from developing countries. Only a few Indian researchers have looked at the prevalence of Acute kidney Injury in paediatric ICUs. In India, a few studies on the epidemiology of AKI in critically ill children in PICU have revealed that the occurrence ranged from 10% to 82 percent, depending on study population, regional variation, and study design.[8] The aim of this research is to learn more about how acute kidney injury affects children who are admitted to a tertiary care centre's paediatric intensive care unit.

In this study, the median age was 4.56 percent for boys and 4.49 percent for girls, with 58 percent of Acute kidney Injury patients being males, which is similar to Krishnamurthy et al,[9] research.

Acute kidney Injury Stages 1, 2, and 3 were diagnosed in 6 (17.6%), 7 (20.5%), and 22 (64.7%) of Acute kidney Injury patients in the current study. The stage with the highest number of Acute kidney Injury patients was Stage 3. In the same vein as Krishnamurthy et al.[9] The stage with the highest number of Acute kidney Injury patients was Stage 3.

In this study, sepsis was the most common condition linked to Acute kidney Injury, followed by encephalitis, cardiac causes, DKA, dengue fever, and gastroenteritis in that order. Pneumonia was the most common illness associated with Acute kidney Injury in Krishnamurthy et al.[9] studies.

Pre-renal causes accounted for 54.4 percent of Acute kidney Injury in the current study. This is in contrast to previous research by Krishnamurthy et al.[9] Prerenal cases were more closely accompanied by kidney and post renal cases in the Garuda Rama et al.[7] study. This is comparable to our research. Renal patients made up (6) 17.6% of our findings, while post-renal cases made up (1)2.9 percent.

The current study's mortality rate was 34.8 percent, which is higher than that of Krishnamurthy et al.[9] However, it is lower than Garuda Rama et al.[7] and Srinivasa et al.[6] The death rate in this study was similar to that reported by Mehta et al.[3]

Mortality was 9.1% in Stage 1 and 28.5 percent in Stage 2 in the current study. It was 43.3 percent in Stage 3. Stage 3 had a high mortality rate.

In this study, the median PICU and hospital stay in the Acute kidney Injury group was 9.98±7.27 days, compared to 7.41 ± 5.62 days in the non- Acute kidney Injury group (p0.001).

CONCLUSION

The most common condition associated with Acute kidney Injury was found to be sepsis, followed by encephalitis. Acute kidney Injury was caused by pre-

renal causes in 27(79.4%) of cases. Acute kidney Injury Stages 1, 2, and 3 were diagnosed in 6 (17.6%), 7 (20.3%), and 22 (64.7%) of Acute kidney Injury patients in the current study. Stage 3 had the highest proportion of Acute kidney Injury patients (p<0.001) 63.8 percent of the population. Acute kidney Injury was linked to a higher risk of death (p<0.001). When compared to non-Acute kidney Injury patients, the survival rate was 34.8 percent. Mortality was 9.1% in Stage 1 and 28.5 percent in Stage 2 in the current study. It was 43.3 percent in Stage 3. Stage 3 had a high mortality rate.

It should be noted that Acute kidney Injury is very common in children. Acute kidney Injury continues to be linked to negative outcomes, such as high death and morbidity.

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