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Research Article

ACUTE KIDNEY INJURY: CAUSES, LABORATORY FINDINGS AND IMPACT OF CONSERVATIVE MANAGEMENT ON ITS OUTCOME

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Abstract:

Objective: To know the major causes, changes in laboratory findings and impact of conservative treatment on outcome in patients with AKI.

Design of Study: this study is like retro.

Material and methods: Young children of both gender and age between 1 month to 2 year diagnosed with AKI were included while patients with other and chronic co-morbid were excluded. A predesigned proforma was used to extract the data regarding demographics, investigations, diagnosis, and outcome. Data was analyzed using SPSS v.20.0.

Results- In total of 50 patients the means age of the sample was recorded as 6.82 ± 5.95 years, in which 29 (58%) were males and 21 (42%) were females. The serum creatinine of had a mean value of 2.06 ± 1.23 mg/dl, while blood urea recorded a mean of 137.75 ± 62.80 mg/dl. Majority 45 (90%) of patients were admitted with diagnosis of septicemia leading to AKI. In total, 30(60%) patients got discharged, 18(36%) patients expired and 2(4%) patients were referred to other centers.

Conclusion- Septicemia is leading cause of AKI in young children and high mortality was recorded for conservative management.

Keywords: children, acute kidney injury, septicemia, outcome

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INTRODUCTION:

The definition of acute injury of kidney is “the abrupt loss of kidney function, leading to a decrease in glomerular filtration rate (GFR), and impaired control of acid-base, electrolyte and fluid balance.” Both high morbidity and mortality is linked with it. It is also associated with an important children’s problem admitted in dependency unit and unit of intensive care. Chronic injury of kidney can be caused in children who are a patient of AKI in long term. It is shown in studies that paediatric patients can be a patient of CKD after facing issue of AKI.

In children, AKI can be predicted by a number of procedures but the very first technique used is RIFLE to identify and manage AKI.

Serum Creatinine is likewise utilized for appraisal of AKI yet, it is harsh marker rather it is late marker of intense kidney injury. The degree of serum creatinine rises at the point when there is deficiency of 25-half renal function. There are advance AKI markers like cystatin C, neutrophil gelatinase-related lipocalin, interleukin 18, kidney injury particle 1, neutrophil elastase-2 and liver-type unsaturated fat restricting protein.⁶ However these development markers are not accessible in a large portion of the tertiary consideration emergency clinics in underdeveloped nations. The specific rate of AKI isn't known in kids, yet various examinations have revealed diverse rate. One examination structure Africa indicated the frequency of AKI in youngsters 12.7/1000 confirmations. Extreme AKI was available in 64.7% and death pace of 26.5%.⁷ Another investigation from Nigeria demonstrating the rate of AKI 17.4 cases/1000 youngsters in one of instructing hospital.⁸ The rate of AKI in Pakistan is not known as no such examination has been done. Writing search has indicated the frequency of AKI 5% in kids who were hospitalized. While kids who were admitted to pediatric emergency unit (PICU) and neonatal emergency unit having occurrences of 30% each.

A lot of information relation to AKI patient children and their management are collected from west. Numerous studies are available related to it now but all the studies have some limitations. AKI can be developed in the children who are present in HDU and PICU. Causes of AKI are not given in any study conducted in Pakistan and results of management are also not described. The study aimed for causes of AKI, alternations in findings of laboratory and results of treatment on patients.

MATERIAL AND METHODS:

This study was conducted in CMH Hospital, Lahore from jan 2018 to jan 2019. This was retrospective study and data was retrieved from the patient records after approval of institutional review board. It was cross sectional study. Sample size was calculated by open epi sample size calculator taking incidence of AKI 5%, confidence limit 5% and confidence level 95%.⁹ Calculated sample size was 73 patients. But as our hospital is not referral center for paediatric nephrology services, so the estimated sample size was 50 patients.

Retrieved from data young children of either sex from age of 1 month to 2 years were selected. Admitted patients who remain in HDU with diagnosis of acute kidney injury and preceding cause and who were given dopamine infusion in renal dose i.e. 3-5 microgram/kg/min were included in the study. Children known case of renal anomalies, chronic kidney disease, syndromic features and post-operative surgery were excluded. Due to non-existence of paediatric subspecialties including paediatric nephrology and infrastructure, peritoneal dialysis was not done in any of the patient. Patients with acute kidney injury and underlying pathology, age, sex, weight, urea, creatinine, diagnosis and outcome in hospital were recorded on predesigned proforma. Any patient in whom serum creatinine 1 mg/dl or more were taken as acute kidney injury and outcome recorded in form of discharge, expire, referred and left against medical advice. Data was analyzed by SPSS 20 and Chi square test applied.

RESULTS:

There were total of 50 patients included in the study, 29 (58%) were male and 21 (42%) were females. Age of patients ranged from 1 month to 24 months with mean age of 6.82 ± 5.95 years. Out of 50 patients, 45 (90%) patients were 12 months or less in age while only 5 (10%) patients were more than one year of age. Weight of patients ranged from 1.8 kg to 12 kg with mean weight of 5.68 ± 2.69 kg. The serum creatinine of patients ranged from 1.08 mg/dl to 7.60 mg/dl with mean value of 2.06 ± 1.23 mg/dl. Blood urea ranged from 70 mg/dl to 416 mg/dl with mean of 137.75 ± 62.80 mg/dl.

Ultrasound of renal tract could not be done during the hospital stay in 36 (72%) patients due to critical condition. In 14 patients where ultrasound was done, one (2%) patient had normal study, 3 (6%) patients had urinary tract anomaly and 10 (20%) patients had renal parenchymal disease and increase echogenicity. During the stay urine detail report could not be done in 35 (70%) patients. In remaining 15 (30%) patients, 11 (22%) patients had microscopic hematuria.

Majority 45 (90%) of patients were admitted with diagnosis of septicemia leading to AKI. Other diagnosis included 2 (4%) patients with pyogenic meningitis, 2 (4%) patients with acute gastroenteritis and severe dehydration, one (2%) patient with diabetic ketoacidosis. Out of 50 patients, 30 (60%) patients got

discharged, 18 (36%) patients expired and 2 (4%) patients were referred to other centers. Males had more expiry as compare to females as shown in table 1. Patients with age one year and less also had more expiries as compare to over one-year children as shown in table 2.

Table 1. Gender vs outcome

Sex	Outcome			Total
	Discharge	Expire	Referred	
Male	17	11	1	29
Female	13	7	1	21
Total	30	18	2	50

Table 2. Age category vs outcome

Agecategory	Outcome			Total
	Discharge	Expire	Referred	
12.00 months and less	26	17	2	45
12.01 months and above	4	1	0	5
Total	30	18	2	50

DISCUSSION:

AKI is one of the common complications in children admitted to paediatric intensive care unit and HDU.10 Though AKI was considered to be self limiting after recovery from the hospital yet literature has shown that it is associated with chronic sequelae.11 Studies have shown that paediatric patients with AKI had more visits to doctor and have increase chance of hospitalization after discharge form hospital.12 Devarajan P9 in mini review recommended to use the early non invasive biomarkers for diagnosis of AKI in children but in our set up availability of these biomarkers is limited. Muhle-Goll C et al13 did one pilot study and concluded that Nuclear magnetic resonance spectroscopy in children with AKI has got high diagnostic accuracy. But this in not available in our part of the world and we have to rely on clinical findings for diagnosis. In this study the patients with AKI had increased serum creatinine. Though serum creatinine is insensitive biomarker yet it indicates serious renal damage. This study has been done to know the major causes, changes in laboratory findings and impact of conservative treatment on outcome in patients with AKI. Quenot JP et al14 in one of editorial reported the incidence of AKI in children 45 to 70% with sepsis, while is our study the patients in whom AKI develop, sepsis was in 90% of patients.

It is too high in our study population. Bekele BA et al15 in one of study included children aged 4 months

to 15 years where as in our study patients were aged from 1 month to 2 years. In their study females were 54.3% while in our study females were 42%. Sepsis along with diarrhea and pneumonia constitute for 20% of cases with AKI while in our study sepsis and diarrhea accounted for 94% of AKI.

CONCLUSION:

This study concluded that younger males have higher incidence of AKI and sepsis was found to be the major cause of AKI. The study also recorded a high mortality with conservative management.

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