Global Scientific JOURNALS

GSJ: Volume 8, Issue 10, October 2020, Online: ISSN 2320-9186
www.globalscientificjournal.com

Etiologies of acute renal failure in children: Results of a study in pediatric and neonatal intensive care unit at EHU Oran.

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Introduction:

Acute renal failure (AKI) is a frequent complication in the intensive care unit and represents a major factor in morbidity and mortality. The diagnosis of AKI is important; its prognosis depends on the initial aetiology and early management, made possible by the progress made in the treatment of this condition, represented by current methods of extra-renal replacement.

In children, two etiologies dominate: AKI secondary to renal hypo perfusion, and hemolytic and uremic syndromes (HUS). However, the possible causes are multiple, especially in older children, in whom certain etiologies are only recognized through careful investigation.

The objective of this study is to determine the etiological aspects of AKI in pediatric and neonatal intensive care unit at EHU Oran

Material-methods:

Retro-prospective study of the files of children admitted for ARI from May 2017 to October 202. The patients were classified according to the RIFLE classification. Blood creatinine (sometimes with estimation of DGF by Schwartz's formula) Was sometimes used in cases of anuria

The data from the files were collected and noted on an operating sheet the qualitative variables are expressed in% and compared to x^2 and the quantitative variables expressed as mean ± standard deviation and compared to Student's test. Non parametric tests were used whenever necessary. The significance level was set at 5% (p less than 0.05)

The inclusion criteria:

- In our study were

included patients who presented with ARI with or without recourse to extrarenal purification by hemodialysis (HD) or peritoneal dialysis (PD), from newborns up to the age of 15 years,

The IRA was held in front of:

-An increase in serum creatinine of 5 mg / l compared to the initial value

50% increase in serum creatinine from baseline

25% reduction in glomerular filtration rate from baseline

Diuresis <0.5 ml / kg / h for more than 6 hours (RIFLE criterion)

In NN, serum creatinine greater than 80 µmol / l at the end of the first week.

Affirm the acute nature: on renal ultrasound, kidneys of normal size and a well differentiated cortex

in biology, the absence of anemia in the absence of hemolysis

clinically, we evaluate the growth with the size which must be normal

Exclusion criteria: Children suffering from chronic renal failure,

Results: 66 boys and 10 girls. Average age = 45.26 months (extreme 5 days-15 years) the newborns number 06 of the workforce

The pathological history was sought to detect possible areas of risk and areas of comorbidity. They were presented as follows.

Table 1: pathological history

Pathological history	Number of patients
Infection	
urinary	03
digestive	17
pulmonary	03
meningea	04
liver disease	02
burns	06
polytrauma	15
Post operative	10
Nephrotoxic products	03
Digestive signs diarrhea vomiting	20
fetal anoxia	02

Table 2 : Clinical characteristics of patients at admission : The signs are often associated

Clinical Disorders	**N**
1. Oligoanuria	73
2. Hypotension	30
3. Hypertension	14
4. Acute respiratory distress	20
5. Edema	20
6. Coma	35
7. Convulsions	10
8. Acute edema of the lungs	12
9. Icterus	01

Clinical Disorders N

Table 3. The main causes of the ARF in children

Causes	%
Causes functionnal ARF	
1. Deshydratation	11.10
2. hypovolemia (absolute or relative)	09.70
Organic causes of ARF	
1.ATN	75
2. Glomerulopathies	1
3. Vascular nephropathy	2
Post renal causes of ARF	
Compression or obstruction of the urinary tract (non-tumor diseases)	2

Table 4 : ARF characteristics

Parameters	Value	Number
Diuresis :		
Oliguria		60
Anuria		10
Mean serum creatinine (mg/l)	41 .6 ± 2.031	
Mean serum uremia (g/l)	1.6 g/l ± 0.55	
Rifle:		
Rifle(R)		21
Rifle(I)		25
Rifle(F)		30

Different therapeutic means have been initiated for symptomatic or etiological depending on the causal involvement

45 patients were ventilated 39 patients were put on hemodynamic support, Hemodialysis in 10 patients, peritoneal dialysis in 06 newborns, obstacle removal in 03 patients, vascular filling in 56 patients, transfusion in 05 patients, administration of corticosteroids in 02 patients Treatment of hypaerkalaemia in 16 patients...

The out come is marked by a resumption of renal function in 86% of cases. 3% of the children maintained a disturbed renal function and 10% died during the acute phase, mostly following multiple organ failure secondary to a severe septic

Discussion :

The incidence of the ARF in the present study was 2.15%, however, children in post cardiac surgery with bypass were not included in the current study. The data obtained showed that 66 of the ARF cases were attributed to organic causes: 75 of ATN, 2% of glomerular

The causes of renal failure in pediatric intensive care unit are most often multiple and associated: Sepsis, cardiogenic and hypovolemic shock represent the main causes of ARI in the literature (1,2) and constitute an organic ARI with a frequency ranging from 56 to 81% of cases depending on the study (2,3). Acute tubular necrosis (75%) is by far the most common cause of acute organic renal failure It is retained in 25% (4) readily secondary to ischemic hypovolaemia in infants as is the case in our series as well as in other publications (5-7) which are also toxic or septic. 21% of our patients had sepsis (medical, surgical) with one or more DMV more present in infant <1 year old , same observation in the series of loza (8). Post-renal renal failure represents 2%; the causes of post-renal ARI in intensive care unit in children are uncommon in several series

The worst prognosis was observed in patients with a complicated sepsis MOF. Higher mortality rate was observed in septic children (24%) children. Septic patients face significantly higher risk with an OR 3.8 [95% CI: 2.9 to 4.8]. The presence of more than two organ failure has made the poor prognosis with a statistically significant difference ($p<0.002$) and RR13, 25 [95% CI: 2.6 to 25.9]. Several previous studies confirm the findings of the present investigation regarding the mortality rate in the ARF and most significantly in patients with severe sepsis complicated MOF [10-12] .In concordance with recent reports, the present study also concluded that diuresis could influence the prognosis of the ARF. In fact, patients with preserved diuresis have a better prognosis than those with oligomeric diuresis [8,13]. The mortality rate among non oligoanuriques subjects was 5% versus 95% for subjects oligoanuriques ($p=0.0027$).

The prognosis of AKI in children in intensive care still remains bleak, despite technological advances (diagnostic methods, EER techniques with a mortality of 22 to 35% [14].

Conclusion:

Currently, we have a more precise definition of IRA thanks to the RIFLE classification. This classification is also of prognostic interest. At present, thanks to the development of resuscitation techniques and REEs including in newborns, and thanks to early treatment, mortality observed in AKI is no longer linked to renal damage but to the severity of the associated damage.

AKI is a diagnostic and therapeutic emergency, the prognosis of which depends closely on the cause and the initial management. In intensive care, AKI is most often multifactorial and The most common cause of AKI is acute tubular necrosis of ischemic and septic origin .Overall, renal survival could be improved by preventive measures and adequate management.

The authors declare no conflict of interest

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