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Chronic end-stage renal disease dialysis in children: management of the patient not yet treated.

Insuffisance rénale chronique terminale dialysée chez l'enfant : gestion du patient non encore planifié

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Summary :

Renalfailure isa public healthproblem;its frequency isgradually increasingin westernAlgeria.

Our workis a retrosingle-centerprospective studyover a period of23 years, rangingfrom01/09/1994to01/03/2017 include284records of childrenadmittedhemodialysis unitpediatric.

Our goal is to describe the impact of late referral on outcomes.

Theage of the patientsranged from3 years-18 years, median ageof 10.05±2.49yearsold and thesex ratiois 1.4. 33% are glomerular diseases in 27 % of IRC was secondary to genetic causes .Then reflux nephropathy accounted for 13% and 27% remained undetermined causes.Before their first hemodialysis session, 19% of children were uremic coma (n = 54) in 66 % (n = 190) the position corresponded to a fluid overload complicating 70% of systolic-diastolic hypertension, 37 % of acute pulmonary edema, hypertensive encephalopathy in 15 %, pericarditis in 6%.

11% of our patients initially treated by hemodialysis (after a median time of 02 months on hemodialysis) were transferred on chronicambulatoryperitoneal dialysis (CAPD)for vascular problem among very young children, hemodynamic intolerance and some support for the impossibility in many dialysis facilities in southwestern Algeria. 5% of our children have died. Congestive heart failure (OR = 0.51; 95% CI: 0.20 to 0.93), sepsis (p = 0.003) and malignant hypertension complicated by stroke (p = 0.045) were predictors of death .3% of children were grafted from a parental gift which one received a kidney transplant in pre emptive. Even if the owner is presented few, he asked management problems upstream of intensive care unit or for the benefit of early detection of so-called preventable diseases, the diagnosis early, to develop other centers for pediatric dialysis and kidney transplant encourage from encephalic dead.

Key words: Child, child, clinical presentation, hemodialysis, peritoneal dialysis, outcome.

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Abbreviation:

ESA = erythropoiesis stimulating agent

SD = standard deviation

CKD = chronic kidney disease

CKDE= end chronickidney disease

APE = acute pulmonary edema

CAPD= ambulatoryperitoneal dialysischronic

Hb=hemoglobin

Introduction:

Chronic renal failure is rare in children by comparing it to the Algerian adult population. It specifies its peculiarities in terms of etiology, substitute modality without forgetting the height and weight growth delay which results in psychological problems and difficulties of integration in adulthood. Our goal is to describe the epidemiological, clinical and developmental profile in dialysis children.

Patients-methods:

We conducted a retro-prospective, descriptive, single-center from the hemodialysis patient records in the hemodialysis unit of the University Hospital of Oran over a period of 23 years from 01/09/1994 to 01 / 03/2017.

The variables analyzed were: age, sex, clinical and biological status before first hemodialysis session, initial nephropathy,and etiology andoutcome mode.

All patients after the first initiation of dialysis enter the protocol of daily dialysis until improvement of the clinical and hemodynamic state. Then the dose of dialysis will be 3 to 4 times per week.

Results:

A total of 284children started their first session of hemodialysis in our unit. The children come from the west and south west ALGERIEN thus covering 250 kilometers at 300 Km away. Hospital average frequency of chronic renal failure in children is 13,3nouveaux cases / year. (Fig. 1) (Table 1) slightly lower frequencya was observed in connection with the opening of a child dialysis center in Oran in 2005.

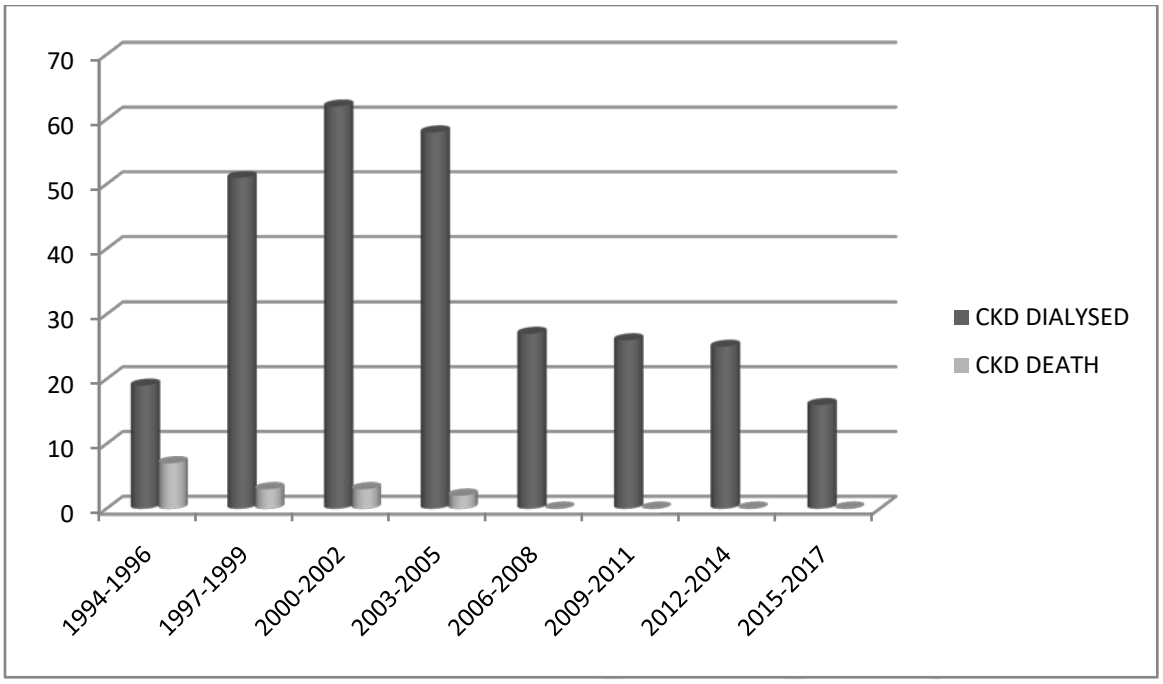

Fig 1: Frequency of CKD

Demographic and clinical characteristics of studied patients	**Results**
Overall pediatric admission incidence, pmcp/year (N [range]) Fig 1	500 [189-727]
Overall mean CKD dialysed incidence, pmcp/year (N [range])	13,3 [3-22]
Latepresentation (N cases, %)	242 (85)
Pre-diagnosis duration of illness symptoms, months (median [range])	1 [0-24]
Male gender, N (%)	169(59,5)
Female gender	115(40,49)
Age, years (mean ± SD) Fig 2	10.05±2.49years

Age group, years (N (%)	22
<6	108
6-10	151
11-15	3
16-18	

Table 1: Demographic and characteristics clinical

The age of the patients ranged from 3 to 18 years old with a mean of 10.05±2.49years old .Children in preschool were 22 in number. The age group between 6-10 years accounted for 38% of cases (n = 101), and that between 11 to 15 years accounted for 53% of cases (n = 151) (Fig 2) (table 1)

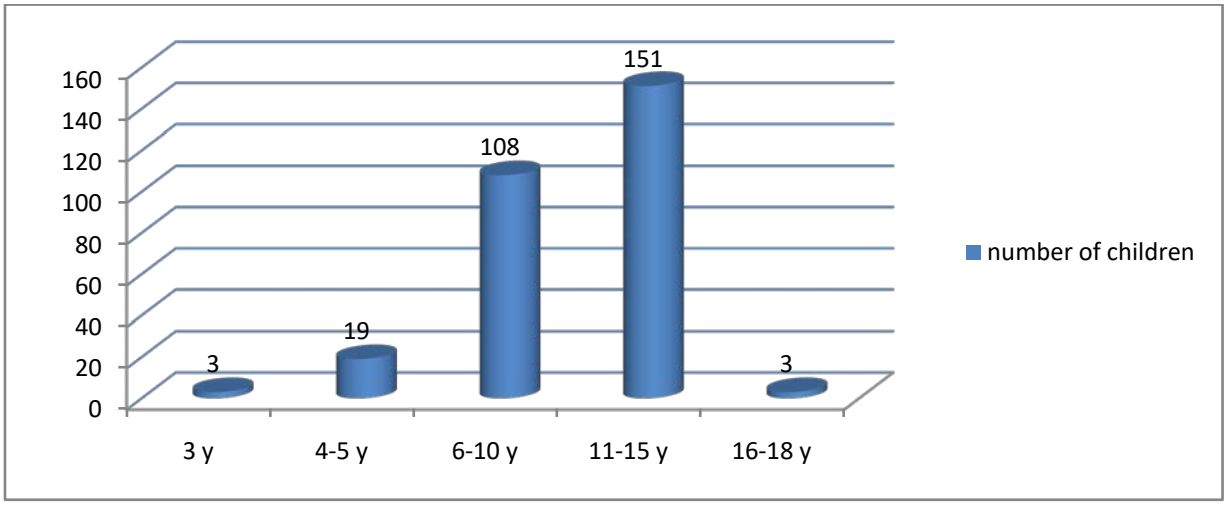

Fig 2: graphicdistributionage group

The workforce consisted of 115 girls and 169 boys. Among the causes of chronic renal failure retained: 33% are glomerular diseases in 27 % of IRC was secondary to genetic causes .Then reflux nephropathy accounted for 13% and 27% remained undetermined causes. (Fig. 3)

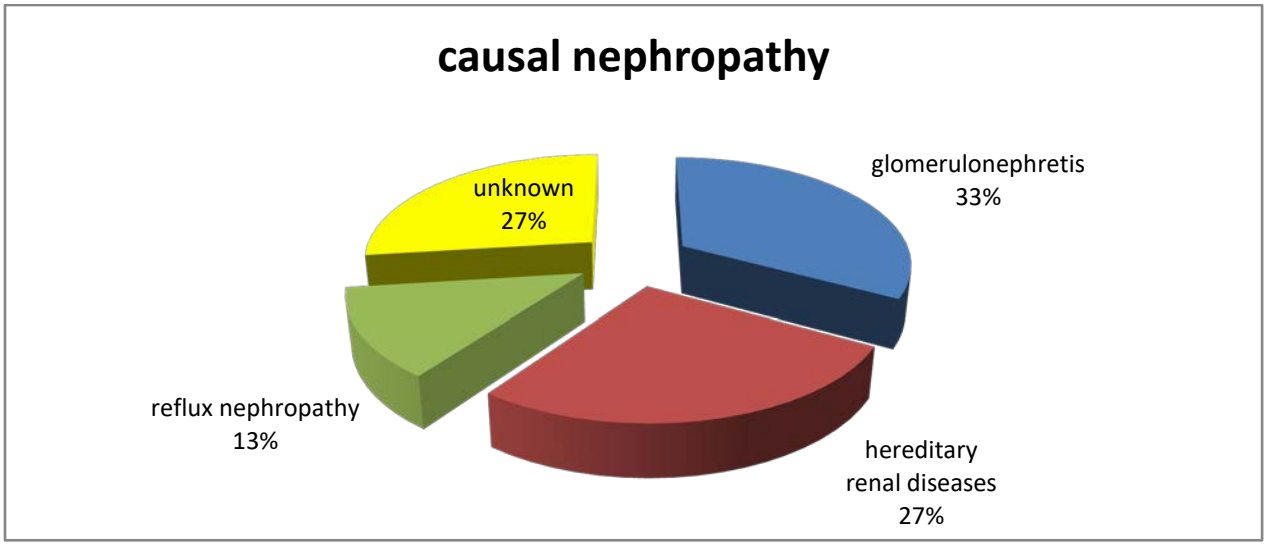

Fig 3: causal nephropathy

Ten children had a comorbidity associated with CKD: Isolated heart failure (n = 3), motor impairment (n = 05), chronic respiratory failure (n = 02). 60% had a stature which 27.3% had a significantly severe growth retardation (- 2, 5 SD). The average time betweenCKD andCKDE isnot known, respectively, for lack of medical filein mostpatients andmost patientsconsultedan average of1 month before thestartof dialysis.

Before their first hemodialysis session, 19% of children were uremic coma (n = 54) in 66 % (n = 190) the position corresponded to a fluid overload complicating 70% of systolic-diastolic hypertension, 37 % of acute pulmonary edema, hypertensive encephalopathy in 15 %, pericarditis in 6%. (Table 2)

Clinicalcharacteristicsat admission	workforce	percentage
short stature	170	59 %
uremic coma	54	19%
High blood pressure	190	67%
acutelungedema	106	37%
hypertensiveencephalopathyconvulsant	42	15%
pericarditis	18	6%
Associated comorbidities	10	
heart failure	3	
motor disability	5	
Chronic respiratory failure	2	

Table 2: Clinical characteristicsat admission

At the initiation of treatment, no patient was receiving erythropoiesis stimulating agent (ESA) and all had an average rate of hemoglobin to 6.76 ± 0.14 g / L, serum sodium 134 ± 1.5 meq / l, an average of hyperkalemia 6 ± 0.4 meq / l, hypocalcemia to 82,45mg / l and serum phosphate to 57,61mg / l. Mean creatinine was 74,7mg / l (37 -195mg / l).

85 % of children have never beentreatedbeforedialysisstage, thereforeadmitted to intensive care in the contextof the emergencywho started hemodialysis on a central line. Hemodialysis was the modality most used first-line treatment in these patients.

From 2004, ESA and the injectable IRON were introduced at the pharmacy of the university hospital of Oran, allowing our patients to receive the AES and occasionally IRON injectable prescription variables adapted to changing balances. The optimum average dose of ESA was 150 IU / kg / week.The optimal dose of an average prescribed Iron is 75 to 120 mg per week, the dose is adjusted according to the blood level of ferritin; Hb ≤ a rate of 8 g / dl was observed in 12.33%, Hbbetween 9-10g / dl in 33.52%, Hb 11-12g / dl in 47.42%, an Hb> 12 g / dl in 09.71%; a serum ferritin below 100µ g / l was observed in 15.38%, from 100 to 300 µ g / l in 44.57%, and between 400 to 500 µ g / l in 33.16%. The transferrin saturation was respectively for each case 25%, 30% and 42%.

Growth hormone was introduced in 2011 only in 11% of our patients; the results are encouraging as long as there was a catch-up growth in these patients.

Our unit provides inbound and outbound inconstant flow dialysis. The evolution of these patients is characterized by a transfer to CAPD in 11.9% of patients (n = 34),one year of care1 child had received a preemptive transplant from a gift from her mother and only 4% of children grafted from a parental gift. 84% were taken over by their original service and 1 year of follow dialysis .5.2% of children (n = 15) died. Currently 07 children are supported by our unit. (Fig. 1)

Discussion:

If we considerthat Algeriahas 40million inhabitantsin 2015,on13.000dialysisrenal failurein Algeria[1],doctors are unable todeterminethe number of childrenwith this diseasewhich requiresthe implementationof thisregistryto identifyamong thosechronically illchildren.

The frequency ofrenal failureadmittedin hemodialysisis 13.3new cases per yearrecordedatour unitthat covers the entirewestand southwestof the territory,covering250to300 kilometers.Thisrate decreasedfrom 2005which corresponds tothe opening of apediatric hospitalwith anephrology departmentandalsothe emergence ofsome private clinicsin hemodialysis.

A fewstudies-havesreported aboutamuchhigherprevalenceofCRF, ofthe orderof18.5-58.3per millionchildpopulation[2, 3].

Compared to the adult population, the CKD in children is distinguished by its low incidence [4], by stunting [5-6], which reflects an imbalance in hormone axis and is aggravated by the anemia, acidosis and malnutrition. This delay often requires treatment with daily subcutaneous injections of growth hormone. 90% of our patients did not receive treatment predialysis as conservative treatment of CKD and ESA, because they are not followed by nephrologist's pediatricians, and are oriented at a stage of 'end stage renal disease, severe anemia in explaining 91% of our patients to dialysis initiation that required blood transfusions per dialysis. 41% of children and adolescents were receiving ESAs at the start of dialysis in the series by J. Harambat and al [7]. Short stature (-1.5 SD) was noted in 69.5% of patients and 27.3% in the case of a severe short stature (-2, 5 SD)in our series. In the series of Zouari[8], 64.1% of children had alsoshort stature.

In adults as, diabetes and high blood pressure account for about half of the causes of the MRC, pediatrics causes CKD are high constitutional majority (hereditary or congenital malformations) .According to records, the causes vary depending on the geographic origin, age and mainly ethnic group. [9-11].

At universityhospitalcenterOran,33% were glomerular in 13% of CKD was secondary to reflux nephropathy. Then the genetic causes accounted for 27%. At the Tunisian child, [8] it is mainly glomerulopathy (19%) and hereditary kidney disease .The incidence of hereditary renal diseases in our series is lower than in other studies [2,12] .Studies from Developing Countries in other Asia, Latin America, and Africa-have shown a high prevalence of glomerulonephritis in Their patients, with rates of over 50% in Nigeria and China [13-16].No cause was found for 27% of cases in our study and Nocause was foundfor12% of children in Tunisia[08], against4%in the series ofAbderahmaneM [17] There was an obvious male predominance in our series, as has been described in other similar studies from different parts of the world [7,11,18,19].

Before 2004, our pediatric intensive care unit was the only center that received emergency children in acute decompensation of their renal disease and it is only after the acute phase has passed children are redirected to the original services.Our study revealed that 19 % were comatose and 57 % were fluid overload complicating severe hypertension, acute lung edema lung and pericarditis, to dialysis initiation began as part of the emergency.CKD defined by a creatinine clearance between 15 and 80 ml / min / 1.73 m² is a shared assumption by the general practitioner and nephrologist. The more we approach the threshold of 15 ml / min / 1.73 m², the nephrologist becomes more prominent interlocutor but the reality does not match this ideal in most cases [20] because of imperfections coordination within the medical profession.

85 % of our workforce was referred late to nephrologists explaining the clinical severity on admission in pediatric intensive care and dialysis start as part of the emergency on a central line, with blood transfusions in per dialysis .However decision in charge of anemia in dialysis patients has

improved considerably from 2004, but differences persist between clinical practice and the international recommendations because of the frequent breaking of the availability of ESA.

Growth hormone introduced in 2011 has yielded encouraging results .The mean standardized height improved from -2,5±0,5 at baseline to -0,9±0,5 at 4years (p=0,0004) in 10% of ourpatients treatedatour unitandwhose parentsare affiliated to thesocial security fundfor the repaymentof the drug.

11, 5% of our patients initially treated by the method of periodic hemodialysis (after a median time of 02 months in hemodialysis) were transferred in CAPD. The reasons are many: the vascular problem among very young children, hemodynamic intolerance and some unable to care dialysis in several structures of the southwest Algerian.

The dialysis unithasfaced manylogisticalproblemsbefore 2004vascular accessdysfunctional, inadequatedialysis, complexcomplications: infection ofvenous catheters, non-availability of anerythropoiesis-stimulating agent. Thedialysis with acetate sothat the solutebicarbonateimproves theacid-basebalance [21]

The causesof deathwere:arrhythmias(1 case), severe anemia withsystolic dysfunction(5 cases)treatment as partof the emergency (02 cases), severe sepsis(03) patients), stroke (03patients), hypoxicpulmonary disease (01patient), unknown (1).

In multivariate analysis: congestive heart failure(OR =0.51; 95% CI:0.20 to 0.93), sepsis (p =0.003)andmalignanthypertension(p =0.045) werepredictorsof death.Largerdeathsbetween1994and1996., and perhaps this can be explained by the delay in treatment, and the inexperience of the unit at the initiation of the replacement therapy.

When consideringalldialysis patients, kidney transplantationis by farthe first treatmentin children,only01of our patientsreceived apreemptivetransplantfromhis mother anddonateda total of 8% childrenwere graftedin 23 years, taking into accountthe number ofchildrentransplantedat twocenter throughout westernAlgerian .31 preemptive transplantations were performed accounting for 27.7% of new patients [22].

The proportion of pre-emptive transplants varies between countries and centers: on average 15% of transplants in France, 50% in the Nordic countries and 24% in the US [23,24]. Kidney transplantation in Algeria faces several difficulties and this, despite efforts by health authorities. A third of kidney disease is due to diseases of the kidneys and urinary tract, and diagnosis of these diseases from the birth of the child through the medical imaging guards against the use or before the transplant. Hereditary factors, including intermarriage may also occur, reducing this type of union can help to preserve 20% of children of this serious condition.

Conclusion:

The number of chronic renal failure is constantly growing in all provinces of western Algeria.The results presented show that the workforce, few asked specific management problems upstream of the pediatric intensive care, should be put forward, hence the importance of early detection of so-called preventable diseases, of early diagnosis, develop more pediatric dialysis centers and encourage grafting using the encephalic dead. Renal transplantation remains the treatment of choice for CKD with good long-term results in children.

The challenge of pediatric nephrologist is to bring the child to the graft with optimum support its growth,nutrition and bone health, as well as his personal and family psychological well-being

Our aspirations are to continue to develop the comprehensive diagnostic and treatment facilities at all unit at the same time as educating pediatrician's country wide in better recognition and management of CRF.

CONFLICTS OF INTEREST

the authors declare that there is no conflict of interest.

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