Continuous Hemodialysis in Children in the Cairo University Pediatric Hospital (CPNT). A Retrospective Study

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

سور البقرة آية ٣٢

ABSTRACT

The current work has been designed as a cross sectional and limited longitudinal retrospective study intending towards a numerical as well a functional assessment of in the medical care provided to candidates admitted in our centre for Hemodialysis.

Beside the general and administrative information, the main bearing would focus on statistical data as well as special statistical information, pertinent to clinical assessment upon admission, follow up complications taking place, screening for HIV or hepatitis B or else, to assess kt/v; -a dependable indicator for dialysis efficiency; hence a reliable resolution for hemodynamic instability, vascular access or the factual application of HD.

Problems arising, be it medical per se or through service delivery by personnel, would consequently be identified and hence a design to suitable modalities, aiming at early detection, proper selection, and prompt intervention; would be implemented.

Information obtained would be the first step, the *sine qua non* of registry that would ultimately serve as a **database** to fit and feed appropriate bioinformatics systems; which would put the HD programs in our center, at the doorstep of the DB formulary, making use of the myriads of its constructive potentials.

The supremacy of a DBMS comes from its ability to define new relationships from the basic ones given by the tables and to use them to get responses to queries.

Key Words

Chronic renal failure, Management of chronic renal failure, Hemodialysis, Medical Database .

DEDICATION

To my beloved parents, for their ever-needed guidance and utmost support and for their unconditional love.

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“It is a great misfortune not to have enough wit to talk sense, or enough judgment to keep silent.”

Bearing with the wise saying, my gratitude is due to all esteemed persons who had their effort and concern cordially set to direct me all the way in presenting the work at hand.

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List of Abbreviations

ACE	Angiotensin converting enzyme
ASPN	American Society of Pediatric Nephrology
Alk Ph	Alkaline Phosphatase
AGA	Appropriate for Gestational Age
CKD	Chronic Kidney Disease
CME	Continuous Medical Education
CPM	clinical perfornace measures
CAPD	Continuous Ambulatory Peritoneal Dialysis
CCPD	Continuous Cyclic Peritoneal Dialysis
Ccr	Creatinine Clearance
CMS	Center for Medicaid and Medicare Services
CRP	Creative Protein
EBM	Evidence Based Medicine
ESA	Erythropoiesis-stimulating agents
ESPNT	Egyptian society of pediatric nephrology & transplantation
ESRD	End Stage Renal Disease
EPO	Erythropoietin
GFR	Glomerular Filtration Rate
GH	Growth Hormone
HD	Hemodialysis
HDL	High Density Lipoprotein
IGFs	Insulin Like Growth Factors
IGFBPs	Insulin Like Growth Factors Binding Protiens
IPD	Intermittent Peritoneal Dialysis
IVP	Intravenous Pyelography
K/ DOQI	Kidney Disease outcome Quality
LBW	Low Birth Weight
LDL	Low Density Lipoprotein
NAPRTCS	North American Pediatric Renal Transplant Cooperative Study sssStudy
NIH	National Institute of Health
NSAIDs	Non Steroidal Anti inflammatory Drugs
NKF	National Kidney Foundation
PTH	Parathyroid Hormone
PD	Peritoneal dialysis
r-Hu EPO	Recombinant Human Erythropoietin
r- Hu GH	Recombinant human Growth Hormone
RO	Renal Osteodysterophy
RRT	Renal Replacement Therapy
SD	Standard Deviation
VA	Vascular Access

Introduction & Aim of work

INTRODUCTION

Basic concepts of homeostasis indicate that the kidney ranks highest among the organs concerned with defending the constancy of the "Milieu Interieur" to which Claude Bernard attached so much significance.

As such the occurrence of renal failure usually marks the beginning of an inevitable, sometimes relentless, downhill course in the natural history of most variable nature nephropathies.

At times by-gone, urea retention was thought of as the main culprit conducive to morbidity and mortality of such cases, to which the all-purpose non-committing term of uremia was coined.

It soon became to be known that urea is one of the least noxious of the retained substances; and that retention of other nitrogenous waste products, should be endowed with due significance; and hence the biochemical term azotemia, was thought of and adopted as a better alternative .

Perception of the profound role of water and electrolyte disturbances in these cases came as a more recent knowledge; and at present, few would deny that the final clinical setting is a composite of several factors including those of the frequently abortive compensatory mechanisms, as hypertension, polyuria, amoniacal breath etc…

The relative significance of such multifactorial disturbances, is still a subject of debate since, and as it is expected, tends to vary from one case to another.

In fact nothing short of continuous monitoring of such factors, is adequate if proper assessment and anything like sound therapeutic approach; is aimed at.

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However sound and energetic the therapeutic approaches might be, the fact remains that they have a very limited scope of action; namely that of supplementation of known or else presumed deficiency- as whenever feasible.

On the other hand, little could be done to the retained elements, the major participant being the setting of the clinical picture and its progress.

Among such abortive attempts may be mentioned dietary restrictions, diaphoresis, glucose and insulin infusion to initiate intra cellular escape of potassium.

The limited values of these, and possibly other therapeutic effects, become at once obvious when it is recalled that the kidney damage in chronic renal failure is, basically, irreversible.

In acute renal failure on the other hand, and though some of the cases recover spontaneously, others do not; and yet in a third group, the condition may be so overwhelming so as to end fatally unless early and prompt adequate measures are taken to tide the patient over the critical period.

Perception of all the afore mentioned facts and the justified defeatism- particularly in chronic renal failure, as well as the chance prognosis in the acute variety, would explain why the advent of dialysis was hailed as one of the most brilliant landmarks in the field of nephropatic management; and it is remarkable that the highly couplers kidney was the first organ for which man was able to devise a satisfactory functional replacement.

The era of extracorporeal dialysis began in 1913 when “Abel et al" devised the first artificial kidney while the credit of the first use of peritoneal membrane to remove "uremic” substances in man, goes to Ganter 1923.

In the pediatric field the variable factors conducive to renal failure set an immense challenge to the pediatric nephrologist evaluating the need

for, the duration of, and-of course- the type of dialysis to be undertaken paving the way for an eventual renal transplantation.

Basically in addition to the recipient problems of adult nephropatics, the evaluation should encompass pediatric psychosocial aspects, emotional as well as physical growth.

Technical difficulties related to the smaller size of the child –more so- an infant, should be properly emphasized considering the parental conviction, submission, and compliance to what they might indict as an "assault" of the physician on their child and whether this would be "justifiable" or not.

This parental concern is brought into a sharp focus when they become informed that dialysis is probably "forever", lest successful transplantation takes place; and what it might cost in one mode of dialysis than the other hence the importance of the choice of the method of dialysis as a replacement modality.

These factors among others led to the revival of P.D. which might not be if at all less efficient, than the long favourable method of H.D. for young nephropathics.

A wise point of view would be to rather select cases, some to be candidates for H.D. while others for P.D. without necessarily or pathetically, comparing between both that is to say- individually evaluate each scope and accordingly tailor the mode of management.

Jolly et al 1970 support P.D. as the selective mode treatment for all forms of acute renal failure in pediatrics while Miller et.al 1982 set forward many evidences for P.D. as strong competitor to H.D. dealing with a case presenting with End Stage Renal Disease (ESRD) or, to say the least serves as a compelling substitute to H.D. in selected cases; avoiding the disequilibrium syndrome for one.

They hold evidences to support the view that peritoneal membrane dialysis is by far more efficient than other membranes for management of acute renal failure.

On the other hand, there are no conclusive data that P.D. has a global advantage however over H.D. or vice versa and where the two methods have been balanced against each other, no difference in morbidity or mortality has been found (Stewart et al 1966- Metil 1966).

Because such study was performed 40 years ago and in view of the constant updating of the technicalities of HD careful follow up for further comparison and evaluation would, accordingly, be mandatory as well as incessant.

Kerr et al (1979), Cameron (1980) strongly suggest that P.D. can do everything H.D. can, with the advantage of fewer traumata.

Newer studies in units with comfortable workload revealed that P.D. provides smooth usually uncomplicated control of fluid and electrolytes and is by no means the favourable method for non obese non hypercatabolic patient without major respiratory or diaphragmatic complications.

Peritoneal dialysis is probably more suitable for children, particularly early infancy than HD.

It remains however and as in many alternative treatment modalities, that intense experience based upon cumulative data, observation, analysis and outcome weighing and overweighing the pros and cons, before the odds and even would give credit for granting the wide spread use of one mode over the other.

Truly so, this equally applies to dialysis in the pediatric field, and which method, PD. or HD is preferable.

Value would do injustice to the results, since no comparative data could be obtained, since fewer number of patient have undergone sequential

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“Hemo-Peritoneal Dialysis” initially; meaning before a downhill course would lead to shift from PD to HD for example.
As such, it would seem likely to apply the term “more suitable” or “optimal” than “better” in choosing between the two alternatives of dialysis; for a given case.

Awaiting such conclusions and leaning on the lend support of such data; it seems justifiable-as it is-to believe that a number of selected young nephropathics for a probably unlimited number of years could successfully profit of the merits of P.D. either through C.A.P.D. or through I.P.D.

All other candidates would have to take shelter under the extensive umbrella of HD with its entire intricate array.