

Acute Peritoneal Dialysis in Children (Indication and Complication)

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Abstract

Objectives: The aim of this study was to review the Indications and complications Acute peritoneal dialysis.

Method: A descriptive study was performed in pediatric central teaching hospital in Baghdad City on fifty-nine cases was admitted for peritoneal dialysis for different reasons.

Results: Show that the pre renal causes of PD was the most common cause which represent more than sixty percent followed by chronic renal failure and other causes, acute gastroenteritis as a cause of renal failure is most commonly seen in the first four years of life while calculi mostly seen after age of two years, sepsis is seen in the first two years of life, catheter blockage was the most common complication followed by bleeding and other complications, indications for acute peritoneal dialysis in the study group uremic symptom and oliguria was the most common indications, male to female incidence is nearly equal.

Conclusion: PD was the most common cause of CKD, chronic renal failure, acute gastroenteritis, sepsis and catheter blockage was the most common complication followed by bleeding and other complications.

Keywords: Acute peritoneal dialysis, children, indication, complication

Introduction

There are two major types of dialysis available these days: Peritoneal dialysis and Hemodialysis. PD was the modality first used for treatment of AKI. In western countries, peritoneal dialysis is not commonly used in dialytic management of acute kidney injury due to the availability of newer HD techniques and development of continuous renal replacement therapies.¹ Nevertheless, acute PD remains a viable option for the treatment of selected patients with AKI, particularly those who are hemodynamically compromised or have severe coagulation abnormalities, or when other modalities are not readily available.² PD was widely used in the because of its inherent advantages:

- The technique can be initiated simply and quickly, because no highly trained personnel nor expensive and complex apparatus are needed.
- Patients with ARF are commonly debilitated, malnourished, or hemodynamically unstable and thus unable to tolerate more intensive measures.
- Systemic anticoagulation is not needed. However, in severe acute illness (pulmonary edema, poisoning, drug overdose, hyperkalemia, extreme catabolism), PD was considered less effective than HD, and so continuous PD techniques.^{3,4} PD can be performed intermittently or continuously and either manually or via an automated device. Performance of acute PD requires only an intact peritoneal cavity.⁵

1. *IPD (Classical Intermittent Peritoneal Dialysis)*. IPD is the most commonly used regimen of PD. The usual exchange time is 1 hour. It can be done either manually or by using a cycling device programmed to deliver a predetermined volume of peritoneal dialysis fluid and to drain the peritoneal cavity at fixed intervals.^{6,7} 2. *CPD (Continuous Peritoneal Dialysis)*. It is a modified form of CAPD in which manual exchange is done every 3–6 hours depending upon patient clearance and fluid removal requirements.⁸ 3. *TPD (Tidal Peritoneal Dialysis)*: With this technique, after an initial exchange of the peritoneal

cavity with peritoneal dialysis fluid, only a portion of dialysate is drained. The drained volume is replaced by fresh dialysate with each cycle leaving a variable amount of dialysate in constant contact with the peritoneal membrane until the end of dialysis session when the fluid is drained as completely as possible.^{9–12} Access is one of the important determinants of successful peritoneal dialysis. A peritoneal catheter is inserted in the peritoneal cavity to gain access to the peritoneal space for initiation of dialysis. There are two different types of peritoneal catheters: (1) *Semi rigid Acute Catheter*. This can be inserted at bedside by a nephrologist and does not need surgical help.¹³ (2) *Cuffed Permanent Catheter*. This is usually a Tenckhoff catheter. It has a much lower risk of infection, can be used immediately after insertion, has a lower risk of bowel perforation, and avoids the need for repeated punctures.¹⁴ The aim of this study was to review the Indications and complications Acute peritoneal dialysis.

Methods

The present study was performed in pediatric central teaching hospital in Baghdad City. This hospital is one of the main pediatric hospitals for providing care to children in Iraq where they are referred to from different administrative areas of Iraq. A prospective study was adopted to achieve the purposes of the study. The study was conducted in a period of four months from the beginning of October 2014 to the 29th of January 2015. Fifty-nine cases admitted for PD during the study period were enrolled in this study. A questionnaire was designed by the researcher. Information was collected from parents of the participants via a face-to-face interview and included age, gender, residence, duration of illness, family history. Written consent was taken from parents of each child enrolled in this study. The weight was measured by precision dial scale (Seca Optima). Participants were weighed in light clothing as far as possible and without shoes. The scales were calibrated before use. Height was measured by using the (Centre of Diseases Control) CDC measuring board. Individuals were measured barefoot and standing erect, with feet together and head

against the measuring rod, looking straight ahead, with arms hanging loosely at the sides and palms facing thighs. Here we use Acute PD (Classical Intermittent Peritoneal Dialysis) With use a Semi Rigid Acute Catheter as Peritoneal Access. Basic investigation:

- A. Complete blood count, ESR, blood film.
- B. B. urea, s. creatinine, S. Na, S. K, S. Ca, S. Ph
- C. GUE
- D. Prothrombin time and partial thromboplastin time.
- E. Blood sugar
- F. C3, C4, ANA, Ant double strand AB
- G. Total Serum protein, S. albumin
- H. Radiology including abdominal ultrasound examination
- I. Renal biopsy examination

Data were entered into Statistical Package for Social science (SPSS) program for Windows version 15. Quantitative variables were summarized by finding mean \pm SD.

Results

The pre renal causes of PD was the most common cause of PD which represent more than sixty percent followed by chronic renal failure and other causes in Table 1.

Table 2 shows that male to female incidence is nearly equal in all cases. Table 3 show the age distribution in relation to the cause, acute gastroenteritis as a cause of renal failure is most commonly seen in the first four years of life while calculi mostly seen after age of two years, sepsis is seen in the first two years of life. Table 4 show occurrence of complications in the study group, catheter blockage was the most common complication followed by bleeding and other

Table 1. Causes of PD in the study group

Indication	Frequency	Percentage
Acute gastro enteritis	27	45.7
Sepsis	9	15.2
Acidosis	4	6.7
Complicated nephrotic syndrome	6	10.1
Acute GN	4	6.7
Chronic renal failure	7	11.8
Renal calculi	2	3.3

Table 2. Gender distribution in relation to the cause

Cause	Total	Male	Female
Acute gastro enteritis	27	14	13
Sepsis	9	4	5
Chronic renal failure	7	3	4
Complicated nephrotic syndrome	6	3	3
Acidosis	4	2	2
Acute GN	4	2	2
Renal calculi	2	1	1
	Total	29	30

complications, there is overlap between complications because some patient has more than one complication. Table 5 Indications for acute peritoneal dialysis in the study group uremic symptom and oliguria was the most common indications, there is overlap between indications because some patient has more than one indication.

Discussion

Peritoneal dialysis is a simple procedure that can be started easily and without delay. The PD treatment modality is invaluable in patients with ARF, in whom short-term dialysis support can be life-saving and can effect a complete cure. Similarly, in patients with CRF, in whom various aggravating factors have caused acute exacerbation of their illness, short-term dialysis support can help both to reverse the acute component and to treat the precipitating factors. With restoration of renal function to baseline level, patients may remain independent of dialysis for several months or years.¹⁵ Mean age in the present study was 2.7 years with majority of patients being below 4 years of age which is consistent with the studies done locally.^{16,17}

Table 3. Age distribution in relation to the cause

Cause	Total no.	1–24 months	25–48 months	>49 months
Acute gastro enteritis	27	15	9	3
Sepsis	9	7	2	0
Chronic renal failure	7	4	2	1
Complicated nephrotic syndrome	6	4	1	1
Acidosis	4	3	1	0
Acute GN	4	1	3	0
Renal calculi	2	0	1	1

Table 4. Occurrence of complications in the study group

Type of complications	No.	%
Blockage	12	20.3
Bleeding	9	15.2
Leakage	4	6.7
Catheter displacement	4	6.7
Peritonitis	3	5
Exit cellulites	3	5
Perforation of viscera	1	1.6

Table 5. Indications for acute peritoneal dialysis in the study group

Indication	Number	Percentage
Uremic symptoms	42	71.1%
Oliguria	38	64.4%
Acidosis	36	61%
Electrolyte disturbance	34	57.6%
Fluid over load	13	22%

Male dominance seen in the present study was also similar to that reported by others.¹⁷ The common causes are secondary to acute diarrheal losses and renal hypo perfusion secondary to systemic sepsis associated with multi-organ failure like other research done globally.^{18,19} Catheter blockage was the most common complication 20.3% followed by bleeding 15.2%, Peritonitis was 5% in this study which similar to 6% reported in a study from Lahore¹⁶ and unlike Pakistan's study in which peritonitis was (31.6%).²⁰ In the present study, the commonest indication for dialysis was uremic symptoms and anuria which is like that reported from Lahore.¹⁶ In the Lahore study¹⁶ metabolic acidosis and fluid overload were the indications in 26% cases each, in contrast to high figures seen in the present study (73%). This could be due to higher number of newly diagnosed acute kidney injury in the absence of pre-existing chronic kidney disease in our study. Similarly, uremic

symptoms (71.1%) were also higher than the 24% reported in same study¹⁹ and this is also due to predominance of acute kidney injury rather than chronic kidney disease in our study. Also electrolytes imbalance (57.6%) in our study is much higher than the 8% of hyperkalemia reported by Saeed et al.¹⁹

Conclusion

PD was the most common cause of CKD, chronic renal failure, acute gastroenteritis, sepsis and catheter blockage was the most common complication followed by bleeding and other complications.

Conflicts of Interest

None. ■

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