Use Of CAPD In A Child With Bilateral Ureterostomies
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Abstract: A three year old male baby weighing 10 kgs with congenital anomalies of kidney, ureter and bladder was initiated on CAPD. He had a functioning ureterostomy on the left side which was discharging urine and ureterostomy on the right side was closed previously. He is on 500cc of dialysate four times a day. This case report highlights usefulness of CAPD as a bridge for the transplant in a child with ureterostomy.

Key Words: CAPD in children, ureterostomy, posterior urethral valve.

Introduction
Congenital anomalies of the genitourinary tract and kidneys leading to chronic kidney disease in utero is a major diagnostic and therapeutic challenge. In spite of early diagnosis, surgical management after birth may not reverse or slow down the progress of CKD. Chronic kidney disease and resulting uremic complications predispose to neurological, metabolic, mineral bone density, hematological and growth retardation. However, conservative management and initiation of appropriate dialytic modality will enable growth and partial correction of other metabolic abnormalities. Chronic peritoneal dialysis including CAPD or APD are considered to be the choice of renal replacement therapy in neonates, infants and children, as this provides round the clock uremic control. Here, we describe the successful use of CAPD in a child who had posterior urethral valve repair and bilateral ureterostomy with urine drainage in the left flank (Figure 1).

Case report
A 3yr old boy, born on June 2005 by normal vaginal delivery had no urine output 2 days since birth. Ultrasound showed bilateral hydronephrosis with posterior urethral valve. Investigations revealed blood urea and creatinine were 46 mg/dl and 4.2 mg/dl respectively. On 3rd day of birth, suprapubic cystotomy was done and urine was drained. On 5th day of birth, fulguration of posterior urethral valve was performed. A week after the procedure, his renal parameters were elevated, for which bilateral ureterostomy was performed. Following the procedure, the blood urea and creatinine rose to 137 mg/dl and 7.3 mg/dl respectively, which came down subsequently. On September 2008, right ureterostomy closure was done. Further, he was managed with prophylactic antibiotics, sodium bicarbonate and vitamin D therapy.

Figure-1. Urine leaking from the ureterostomy site.

Later, the boy was admitted under our care for further management. On admission his temperature was 37.5 C, pulse 92/min, BP 101/57 mm Hg, height 90 cm, weight 10.6 kg and BSA 0.21 /m². Investigations revealed blood urea 162 mg/dl, serum creatinine 3.8 mg/dl, sodium 140 mEq/L, potassium 4 mEq/L, bicarbonate 35 mEq/L, chloride 92 mEq/L, hemoglobin 6 g/dl, WBC 11,900 cells/cu.mm, neutrophils 18.5%, lymphocyte 70%, eosinophil 5.9%, monocyte 4.6% and

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basophil 0.2%, calcium 10.3 mg/dl, phosphorus 6 mg/dl, magnesium 2.4 mg/dl, total protein 8.3 mg/dl, albumin 4.4 mg/dl, uric acid 5.1 mg/dl, 25-hydroxy Vitamin D - 26.8 ng/ml, Serum Iron 132 µg/dl, TIBC- 324 mg/dl. T.Sat 40.74%, hs CRP 0.47 mg/L and PTH 278 pg/ml. His medications are calcitriol 0.25 mcg OD, syrup. Cefaclor 2.5 mg HS, syrup calcium carbonate 10 ml HS, colloidal iron hydroxide 250 mg, folic acid 500 µg, vitamin B12 5 µg OD, syrup multivitamin 5 ml OD, Inj. Erythropoietin 1000 units/ twice weekly SQ.

In view of his uremia and stunted growth with metabolic abnormalities, a pediatric double cuff swan neck Tenchhoff catheter was inserted in the operating room under general anesthesia. The catheter was flushed with 500 ml of dianead, however the outflow was poor hence omentectomy was performed, after which the inflow and outflow was adequate. Omental biopsy showed lymphoid hyperplasia, congestion and was negative for granuloma as shown in figure 2. He was initiated two weeks later on three exchanges of 500 ml of 1.5% PD fluid with dwelling time of five hours with night dry. As he was hyperkalemic and continued to be hyperphosphatemic, dialysis exchanges were increased to 500 ml 4 times a day round the clock. Ultrafiltration achieved was 500 ml/day with urine output of 100-200 ml/day. The combined weekly peritoneal equilibration test (kt/v) was 2.18. To rehabilitate him, he plays football at home which has strengthened his lower limbs. Later, there was a significant improvement in weight gain, height and head circumference.

Figure-2. Omental biopsy showing inflammation and congestion

Discussion

Posterior urethral valve (also known as congenital obstructing urethral membrane) is the most common cause of bladder outlet obstruction in boys. The incidence may vary from 1 in 8000 to 1 in 25000 live birth,[1] and about 10% of prenatally diagnosed hydronephrosis.[2] The predisposing factors for occurrence of end stage renal disease in children with PUV are delay in the diagnosis, persistent vesicoureteric reflux and associated renal dysplasia[3] as in our patient.

Chronic peritoneal dialysis is a suitable therapy for children until they undergo a successful renal transplantation. The presence of nephrostomy should not deter the treating nephrologists from providing chronic peritoneal dialysis. However, the exchanges need to be performed with utmost precaution to prevent contamination from the urine coming out of the nephrostomy site. Treatment of anemia and mineral bone disease, nutritional, psychological counseling for parents and physical rehabilitation are essential compartment of uremia therapy in infants and children who are on chronic peritoneal dialysis. Table 1 summarizes the recommended nutritional therapy for children on chronic peritoneal dialysis (4-6). The use of vitamin D and phosphate binders along with appropriate nutrition and supplemental B-complex and other fat-soluble vitamins with periodic dietary counseling will prevent malnutrition. Early initiation of recombinant human growth hormone therapy (0.18 mg/kg body weight/week subcutaneous or intramuscular [Maximum of 0.3 mg/kg/week]) divided into equal doses given on 3 alternate days or 6 times/week or daily) is recommended to promote longitudinal growth and has been shown that it results in marked improvement of final adult height (7,8). Prevention of peritoneal catheter related infection in children include avoidance of pull and torsion of catheter, daily exit site care, prompt treatment of upper respiratory infections and prophylactic use of antibiotics with congenital abnormalities of genitourinary tract. Children on dialysis should receive all of the standard childhood immunizations in addition to expanded age group usage of the influenza and pneumococcal vaccines (9-11).
Table-1 - Guidelines for nutritional therapy for children receiving chronic peritoneal dialysis

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Infant</th>
<th>Pre-puberty</th>
<th>Puberty</th>
<th>Post-puberty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal/kg/day)</td>
<td>110-150</td>
<td>70-100</td>
<td>Male 60</td>
<td>Male 60</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Female 48</td>
<td>Female 48</td>
</tr>
<tr>
<td>Protein (g/kg/day)</td>
<td>1.5 - 2.0</td>
<td>1.4 - 1.5</td>
<td>1.0 - 1.2</td>
<td>1.0 - 1.2</td>
</tr>
<tr>
<td>Fat</td>
<td>50% of dietary intake (polyunsaturated : saturated fatty acid ratio of 1:5:1.0)</td>
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<tr>
<td>Carbohydrate</td>
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<tr>
<td>Vitamins</td>
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<tr>
<td>Pyridoxine (B6)</td>
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<td>0.3 - 0.6mg/day</td>
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<tr>
<td>Ascorbic acid</td>
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<td>15 - 45mg/day</td>
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<tr>
<td>Folic acid</td>
<td></td>
<td></td>
<td>60-200mg/day</td>
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References