



Challenges in Peritoneal Dialysis: Case Study Experience from a Low Resource Setting

Irira Michael Emmanuel¹, Mchaile Deborah Nerey^{2*}

¹Department of Paediatrics and Child Health, Mawenzi Regional Referral Hospital, Moshi, Tanzania

²Department of Pediatrics and Child Health, Mount Meru Regional Referral Hospital, Arusha, Tanzania

Email: *deborahsia@hotmail.co.uk, michaelrira@gmail.com

How to cite this paper: Emmanuel, I.M. and Nerey, M.D. (2026) Challenges in Peritoneal Dialysis: Case Study Experience from a Low Resource Setting. *Open Access Library Journal*, **13**: e13130. <https://doi.org/10.4236/oalib.1113130>

Received: February 21, 2025

Accepted: February 25, 2026

Published: February 28, 2026

Copyright © 2026 by author(s) and Open Access Library Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Introduction: Acute kidney injury (AKI) is a common complication, affecting almost one-third of critically sick children and also noncritically ill children admitted to wards. It is common in pediatric intensive care units (ICUs) and has an incidence of 10% to 35%. AKI is also common in wards, especially in children receiving aminoglycosides and multiple nephrotoxins during their hospital stay. In the developing world, especially in rural regions, the etiological factors remain as dehydration, sepsis, and hemolytic uremic syndrome. Peritoneal dialysis (PD) is a method to treat acute kidney injury (AKI) and is a commonly accepted method. There are different types of catheters and various insertion methods although the results in their outcomes do not differ a lot. We share our first experience of peritoneal dialysis using Foley catheter in a low resource setting. **Case Presentation:** 2years old boy who was admitted with complain of fever, cough. This is a known patient with global developmental delay. The patient was started on IV Ampicillin and Metronidazole as aspiration Pneumonia was suspected. On day 2 of admission, mother reported the child had not passed urine for 3days and clinically the patient was found to be in Septic Shock. The patient was given a bolus of IV Ringers Lactate and later was given packed red blood cells. Urine catheter after 24hours had 5mls of urine despite maintenance fluid, blood and bolus IV fluids. The patient was started on IV Meropenem (adjusted to GFR) and Metronidazole was continued. Day 5 after admission, patient still had no change in urine output. Peritoneal Dialysis was initiated and patient was transferred to ICU. Whilst in ICU, patient received several cycles of Peritoneal Dialysis (2.5% PD at 290mls 2hrly) and was improving clinically from Glasgow Coma Score (from 3 to 9), urea decreased, creatinine decreased and urine output increased to 104mls per 24hours. The patient had hyperkalemia and suffered cardiac arrest but was resuscitated and recovered. On day 10, the patient sustained respiratory failure and was desaturating to 64%. He was put on Ventilator but 9hours later suc-

cumbed due to cardiac arrest.

Subject Areas

Pediatrics

Keywords

Peritoneal Dialysis, Arusha

1. Introduction

Acute kidney injury (AKI) is a common complication, affecting almost one-third of critically sick children and also noncritically ill children admitted to wards [1] [2]. It is common in pediatric intensive care units (ICUs) and has an incidence of 10% to 35% [3]-[5]. AKI is also common in wards, especially in children receiving aminoglycosides and multiple nephrotoxins during their hospital stay [6] [7]. Severity of AKI several classification systems have been proposed and include the RIFLE, AKIN, and KDIGO criteria [8], whereas in children, AKI is staged using broadly similar criteria to adults, modified as pRIFLE [9]. Rates of AKI in hospitalised children across North America and observed were 3.9 episodes of AKI per 1000 admissions [10] with AKI being more common in those admitted to paediatric ICU, and was associated with poor outcome, including increased mortality [11]. In the developing world, especially in rural regions, the etiological factors remain as dehydration, sepsis, and hemolytic uremic syndrome [12]. Whereas in Tanzania, local herbs, nephrotoxic agents and infections have been postulated as one of the causes [13]. We report a case of a child with acute kidney injury who underwent peritoneal dialysis.

2. Case Presentation

We present the case of a 2 years old boy who was admitted on 14th June 2022 with complains of fever and cough. This is a known patient with global developmental delay who was attending pediatric outpatient clinic regularly and was on Pheno-barbitone tabs 45 mg nocte, Carbamazepine 150 mg BD and was on Baclofen 5 mg three times a day. This patient on admission clinically was fair looking, febrile T- 38.6°C, conscious with a Glasgow Coma Score (GCS) of 15/15. His body weight was 9.7 kgs. On his respiratory system examination he had a respiratory rate of 36 with crackles heard in his lungs. The admitting doctor suspected Aspiration Pneumonia and the patient was started on IV Ampicillin and Metronidazole. On day 2 of admission, mother reported the child had not passed urine for 3 days and was also draining coffee ground material from the orogastric tube (OGT) and had 3 episodes of convulsions. Clinically he was sick looking, dyspneic, tachypneic, cold extremities grade 2, his heart rate was 207 beats per minute, temperature 38.1°C, respiratory rate 40 breaths per minute, blood pressure of 90/60 mmHg and the

oxygen saturation was 83% on CPAP. Bedside tests showed pH 7.2 (7.310 - 7.410), PCO₂ 39.1 (41.0 - 51.0), HCO₃ 16.2 (23.0 - 28.0), Creatinine 4.3 mg/dl (0.6 - 1.3), BUN 69 mg/dl (8 - 26). The diagnosis was changed to Septic Shock with Meningitis, Aspiration Pneumonia, Respiratory Acidosis, Acute Kidney Injury secondary to suspected local herb intake, Stress Gastritis. The patient was given a bolus of IV Ringers Lactate 97 mls to run over 1 hour, IV Pantoprazole 10 mg once a day for 7 days, Ampicillin was stopped and Meropenem 194 mg twice daily (given adjusted to the Glomerular Filtration rate) was initiated. After 2 boluses of Ringers Lactate, clinically there was no improvement so packed red blood cells 97 mls was given and his vitals stabilized (HR- 120 - 150 beats per minute). Urine catheter after 24 hours had 5 mls of urine despite maintenance fluid, blood and bolus IV fluids. Renal challenge was done with IV RL and IV Lasix 10 mg stat and produced 20 mls of urine. Despite a slight increase in urine output (from no urine to 5 mls to 20 mls) (**Table 1**), there was worsening of acidosis and renal function (**Table 2**).

Table 1. Trends in urine output.

Date	Amount	mls/kg/hr
17/6	18.6 mls	0.07
18/6	46.4 mls	0.19
19/6	50 mls	0.2
20/6	62 mls	0.2
21/6	104 mls	0.4

Table 2. Trend of electrolytes and gases from admission to during dialysis.

	Na (mmol/l)	K (mmol/l)	Cl (mmol/l)	pH	pCO ₂ (mmHg)	HCO ₃ (mmol/l)	Creat (mg/dl)	BUN (mg/dl)	Albumin
14/6	130	5.0	107						
15/6	144	6.0		7.226	39.1	16.2	4.3	69	
16/6	139	6.5		7.285	28.9	13.7	4.9	181.4	24.4
17/6							5.38	204.3	
18/6	139	4.5		7.194	49	14.3	5.68	218.6	
19/6	141	6.1		7.282	27.3	12.9	5.73	212.3	
20/6	139	8.3							
20/6 (2pm)	142	7	128				4.51	183.6	
20/6 (6pm)		7.8							
21/6	138	7	117				4.8	171	20.6
22/6	137	5.5	114				4.17	140.2	

Day 5 after admission, patient still had no improvement in urine output. Peritoneal Dialysis (PD) was initiated. A modified PD catheter was inserted in theatre

using a Foley urinary catheter and patient was transferred to ICU afterwards. Whilst in ICU, patient received several cycles of Peritoneal Dialysis (2.5% PD at 290 mls 2 hrly) and was improving clinically from Glasgow Coma Score (from 3 to 9), urea decreased, creatinine decreased and urine output increased to 104 mls per 24 hours.

On day 10, patient sustained respiratory failure and was desaturating to 64%. He was put on Ventilator but 9hours later succumbed due to cardiac arrest.

3. Discussion

Peritoneal dialysis is the mainstay of managing acute kidney injuries in the pediatric population in limited resource settings such as Tanzania. However, due to financial constraints many cannot afford the costs for the equipment necessary for peritoneal dialysis [14]. Acute peritoneal dialysis (PD) has been offered in Tanzania since 2009 with the aim of supporting health care providers in Acute PD [15]-[16]. In our region, this was the first attempt of Peritoneal Dialysis which was done and was successful though the patient succumbed to Respiratory failure.

4. Conclusion

Management of AKI is challenging in critical infants and children [18]. Peritoneal Dialysis is a treatment modality of choice to neonates and children with good treatment outcomes. Unfortunately not many people are conversant with how it is done or how to manage patients on peritoneal dialysis.

Acknowledgements

We are very grateful to the nurses in the intensive care unit who were very supportive, aggressive and diligent in providing care to this patient.

Authors' Contributions

MEI and DNM conceptualized and prepared the manuscript. MEI and DNM reviewed the patient medical records, and all authors have read and approved the final manuscript.

Availability of Data and Materials

Data for this work can be requested from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Our institution does not require ethical approval for reporting individual cases or case series.

Conflicts of Interest

The authors declare that they have no competing interests.

References

- [1] Devarajan, P. (2012) Pediatric Acute Kidney Injury: Different from Acute Renal Failure, but How and Why? *Current Pediatrics Reports*, **1**, 34-40. <https://doi.org/10.1007/s40124-012-0003-3>
- [2] Askenazi, D. (2011) Evaluation and Management of Critically Ill Children with Acute Kidney Injury. *Current Opinion in Pediatrics*, **23**, 201-207. <https://doi.org/10.1097/mop.0b013e328342ff37>
- [3] Schneider, J., Khemani, R., Grushkin, C. and Bart, R. (2010) Serum Creatinine as Stratified in the RIFLE Score for Acute Kidney Injury Is Associated with Mortality and Length of Stay for Children in the Pediatric Intensive Care Unit. *Critical Care Medicine*, **38**, 933-939. <https://doi.org/10.1097/ccm.0b013e3181cd12e1>
- [4] Alkandari, O., Eddington, K.A., Hyder, A., Gauvin, F., Ducruet, T., Gottesman, R., *et al.* (2011) Acute Kidney Injury Is an Independent Risk Factor for Pediatric Intensive Care Unit Mortality, Longer Length of Stay and Prolonged Mechanical Ventilation in Critically Ill Children: A Two-Center Retrospective Cohort Study. *Critical Care*, **15**, R146. <https://doi.org/10.1186/cc10269>
- [5] Kavaz, A., Özçakar, Z.B., Kendirli, T., Öztürk, B.B., Ekim, M. and Yalçınkaya, F. (2011) Acute Kidney Injury in a Paediatric Intensive Care Unit: Comparison of the pRIFLE and AKIN Criteria. *Acta Paediatrica*, **101**, e126. <https://doi.org/10.1111/j.1651-2227.2011.02526.x>
- [6] Moffett, B.S. and Goldstein, S.L. (2011) Acute Kidney Injury and Increasing Nephrotoxic-Medication Exposure in Noncritically-Ill Children. *Clinical Journal of the American Society of Nephrology*, **6**, 856-863. <https://doi.org/10.2215/cjn.08110910>
- [7] Goldstein, S.L., Kirkendall, E., Nguyen, H., Schaffzin, J.K., Bucuvalas, J., Bracke, T., *et al.* (2013) Electronic Health Record Identification of Nephrotoxin Exposure and Associated Acute Kidney Injury. *Pediatrics*, **132**, e756-e767. <https://doi.org/10.1542/peds.2013-0794>
- [8] Shen, Q., Jiang, X., Shen, X., Yu, F., Tu, Q., Chen, W., *et al.* (2017) Modified Laparoscopic Placement of Peritoneal Dialysis Catheter with Intra-Abdominal Fixation. *International Urology and Nephrology*, **49**, 1481-1488. <https://doi.org/10.1007/s11255-017-1593-z>
- [9] Paudel, K. (2021) Peritoneal Dialysis Catheters, Insertion Methods and Complications. *Pakistan Journal of Kidney Diseases*, **4**, 13-20. <https://doi.org/10.53778/pjkd42157>
- [10] Levi, T.M., Souza, S.P.d., Magalhães, J.G.d., Carvalho, M.S.d., Cunha, A.L.B., Dantas, J.G.A.d.O., *et al.* (2013) Comparison of the RIFLE, AKIN and KDIGO Criteria to Predict Mortality in Critically Ill Patients. *Revista Brasileira de Terapia Intensiva*, **25**, 290-296. <https://doi.org/10.5935/0103-507x.20130050>
- [11] McCaffrey, J., Dhakal, A.K., Milford, D.V., Webb, N.J.A. and Lennon, R. (2016) Recent Developments in the Detection and Management of Acute Kidney Injury. *Archives of Disease in Childhood*, **102**, 91-96. <https://doi.org/10.1136/archdischild-2015-309381>
- [12] Macedo, E., Cerdá, J., Hingorani, S., Hou, J., Bagga, A., Burdmann, E.A., *et al.* (2018) Recognition and Management of Acute Kidney Injury in Children: The ISN Oby25 Global Snapshot Study. *PLOS ONE*, **13**, e0196586. <https://doi.org/10.1371/journal.pone.0196586>
- [13] Sutherland, S.M., Ji, J., Sheikhi, F.H., Widen, E., Tian, L., Alexander, S.R., *et al.* (2013) AKI in Hospitalized Children: Epidemiology and Clinical Associations in a National

- Cohort. *Clinical Journal of the American Society of Nephrology*, **8**, 1661-1669. <https://doi.org/10.2215/cjn.00270113>
- [14] Kaddourah, A., Basu, R.K., Bagshaw, S.M. and Goldstein, S.L. (2017) Epidemiology of Acute Kidney Injury in Critically Ill Children and Young Adults. *New England Journal of Medicine*, **376**, 11-20. <https://doi.org/10.1056/nejmoa1611391>
- [15] Mwamanenge, N.A., Assenga, E. and Furia, F.F. (2020) Acute Kidney Injury among Critically Ill Neonates in a Tertiary Hospital in Tanzania; Prevalence, Risk Factors and Outcome. *PLOS ONE*, **15**, e0229074. <https://doi.org/10.1371/journal.pone.0229074>
- [16] Suleman, M., Shadrack, M., Msuya, D., Chugulu, S., Chilonga, K., Mchaile, D., *et al.* (2021) Foley Catheter Used for Peritoneal Dialysis. *Journal of Pediatric Surgery Case Reports*, **75**, Article ID: 102085. <https://doi.org/10.1016/j.epsc.2021.102085>
- [17] Kilonzo, K.G., Ghosh, S., Temu, S.A., Maro, V., Callegari, J., Carter, M., *et al.* (2012) Outcome of Acute Peritoneal Dialysis in Northern Tanzania. *Peritoneal Dialysis International: Journal of the International Society for Peritoneal Dialysis*, **32**, 261-266. <https://doi.org/10.3747/pdi.2012.00083>
- [18] Kilonzo, K., Mathew, A. and Croome, A.J. (2013) Establishment of an Acute Peritoneal Dialysis Program in Tanzania. *Kidney International Supplements*, **3**, 186-189. <https://doi.org/10.1038/kisup.2013.11>

Abbreviations

AKI	Acute Kidney Injury
BUN	Blood Urea Nitrogen
GCS	Glasgow Coma Score
GFR	Glomerular Filtration Rate
ICU	Intensive Care Unit
OGT	Orogastric Tube
PD	Peritoneal Dialysis
RL	Ringers Lactate