

Case Report

Nutritional Approach of Neonatal with High Output Stoma Due to Long Segment Hirschsprung Disease: A Case Report

Aris Primadi¹, Filla Reviyani Suryaningrat¹¹Neonatology Division, Department of Child Health, Faculty of Medicine Padjadjaran University, Dr. Hasan Sadikin General Hospital, Bandung, Indonesia

This work is licensed under **Creative Commons Attribution - Non Commercial 4.0 International License**.

Corresponding author:
Aris Primadi
aris.primadi@yahoo.co.id

Published:
31st August 2023

DOI:
<https://doi.org/10.58427/apghn.2.3.2023.33-8>

Citation:
Primadi A, Suryaningrat FR. Nutritional Approach of Neonatal with High Output Stoma Due to Long Segment Hirschsprung Disease: A Case Report. *Arch Pediatr Gastr Hepatol Nutr.* 2023;2(3):33-8.

Abstract:

Background: High Output Stoma (HOS) continues to be one of the most challenging problems for pediatrician especially in neonates. One of the most common causes in neonatal HOS is post resection long segment Hirschsprung disease.

Case: We reported a case of three-day-old baby boy diagnosed as Hirschsprung diseases with peritonitis possibility and did laparotomy with ileal resection, double barrel ileostomy and biopsy. Nutritional management is a major subject on taking care of this type of neonatal patient. We share our experience in limited facilities with all the patient uniqueness

Discussion: Loss of a significant length of the small bowel results in interrelated physiologic events as a result of decreased small intestinal mucosal absorptive cell. This leads to a lesser fraction of ingested food and intestinal secretion thus causing an excessive volume loss. The introduction of early enteral feeds promotes intestinal adaptation, with subsequent weaning off parenteral nutrition. Most off patient with high output stoma will require parenteral nutrition which is associated with acute and long-term complications. In our case, we did early nutritional intervention using parenteral and enteral nutrition, counting ongoing fluid loss trough stoma and adjust it to total daily fluid requirement. We found weight loss during hospitalized due to HOS, and we do catch up at the end. We found difficulties to adjust comparison between enteral and parenteral intake to maintain the weight gain.

Conclusion: Although parenteral nutrition is often necessary, at least initially, the therapeutic goal should be to enhance intestinal adaptation and enteral nutrient assimilation, and thereby reduce parenteral nutrition requirements. Daily monitoring for ongoing fluid loss very crucial for adjusting nutrition.

Keywords: high output stoma, hirschsprung, neonatal, nutrition

Introduction

High Output Stoma (HOS) continues to be one of the most challenging problems for pediatrician especially in neonates. One of the most common causes in neonatal HOS is post resection of long segment Hirschsprung disease. Nutritional and metabolic effects ensue from diminished intraluminal digestive capacity and rapid intestinal transit leading to an excessive loss of fluids, nutrients, electrolytes and bile salts. Nutritional support should begin promptly, either by the parenteral route or the enteral route.

In our case, we describe the nutritional management that we provide to neonatal HOS patients with all the uniqueness and limited facilities.

Case

A 4-day-old term infant transferred to our referral hospital due to abdominal distention in the last 3 days with brownies vomit and has never defecated since birth. Baby was born spontaneously by midwife, crying immediately with birth weight 3450 grams. Mother did prenatal care every month and three times ultrasonography with normal result. There was no risk factor on pregnancy, mother nor delivery. Baby's weight at arrival 3025.

We did rectal touché, radiologic barium enema examination and suction biopsy. We suspected this patient as Hirschsprung disease with peritonitis possibility and did laparotomy with ileal resection, double barrel ileostomy and biopsy on the day after. Intraoperatively, the patient was found to have total colon non-ganglion with multiple impending rupture. The patient was subsequently admitted to the neonatal high care unit after surgery. Post operative examination found the patient was stable, without respiratory support and normal lab results. **Figure 1** showed pre-operation, intra-operation and post-operation condition of the patients.

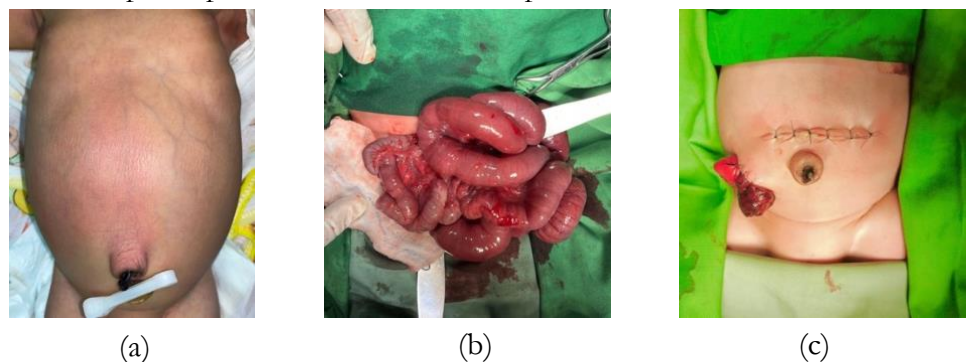


Figure 1. Physical examination (a) abdominal distention; (b) intestinal dilatation with spastic of colon; (c) stoma post operation.

Total Parenteral Nutrition (TPN) was already performed before operation, and we also correct the dehydration. Central venous line was established. Ongoing fluid losses

were calculated and added in TPN solution with daily adjustment. Fluid maintenance on 4 days of age were given 120 ml/kg body weight/day. Adequate quantities of micronutrients and fat-soluble vitamin also added.

Enteral feeding was given after we found residue on stoma on post operation day (POD)-3 starting at 10ml/ kg body weight /day every 3 hours with protein extensively hydrolysate formula. Combination of enteral and parenteral nutrition was done, as soon as enteral feeding reached 70 ml/kg body weight/day we decrease the parenteral nutrition. We use full concentration of 0.67 Calories/ml. High output stoma start at POD-4 with 28 ml/kg body weight/day but getting better on the next day. Therefore, we continue to increase the volume every 1-3 days as tolerated. Tolerance to enteral feeding is determined by monitoring volume and consistency of stoma production. We still cannot evaluate for specific nutrition, vitamins nor mineral malabsorption.

Figure 2 showed high output stoma post operative day 4 and day 16.



Figure 2. High output stoma (a) post operative day 4; (b) post operative day 16.

Appropriate enteral feeding device are selected base on the patient condition and the duration of expected adaptation interval. In our case we use oral feeding, but we start continues feeding on POD-18 due to repeated high output stoma. Details on post operative enteral feeding and body weight are provided in **Table 1**.

Table 1. Record for calculation ongoing fluid losses and enteral nutrition

Post Operative Day (POD)	Feeding	Body Weight (Gram)	Output Stoma
POD 4	8x8 cc (20cc/kg/day)	3235	86 cc (28cc/kg)
POD 5	8x16 cc (40cc/kg/day)	3315	56 cc (16,9cc/kg)
POD 6	8x25 cc (60cc/kg/day)	3315	56 cc (16,9 cc/kg)
POD 7	8x25 cc (60cc/kg/day)	3320	35 cc (10,5cc/kg)
POD 8	8x33 cc (80cc/kg/day)	3240	35 cc (10,9 cc/kg)
POD 9	8x33 cc (80cc/kg/day)	3199	58 cc (18,1 cc/kg)
POD 10	8x40 cc (100cc/kg/day)	3210	62 cc (19,3 cc/kg)
POD 11	8x50 cc (120cc/kg/day)	3155	93 cc (30 cc/kg)
POD 12	8x50 cc (120cc/kg/day)	3170	61 cc (19,6 cc/kg)
POD 13	8x50 cc (120cc/kg/day)	3155	93 cc (30 cc/kg)
POD 14	8x55 cc (130cc/kg/day)	3145	57 cc (18,3 cc/kg)
POD 15	8x55cc (130cc/kg/day)	3085	40 cc (13,3 cc/Kg)
POD 16	8x55 cc (130cc/kg/day)	2980	127 cc (43,7 cc/Kg)
POD 17	8x40 cc (100cc/kg/day)	2985	313 cc (107 cc/Kg)
POD 18	8x40 cc (100cc/kg/day) Start continuous feeding	3070	102 cc (34 cc/Kg)
POD 19	8x40cc (100cc/kg/day)	2995	122cc (40,6 cc/Kg)
POD 20	8x40 cc (100cc/kg/day)	3012	70cc (23 ,3 cc/Kg)
POD 21	8x40 cc (100cc/kg/day)	3130	75 cc (24,19 cc/Kg)
POD 22	8x55 cc (130cc/kg/day)	3185	57 cc (18,3 cc/kg)
POD 23	8x55 cc (130cc/kg/day)	3220	40 cc (13,3 cc/Kg)
POD 24	8x60 cc (150cc/kg/day)	3268	35 cc (10,9 cc/kg)
POD 25	8x60 cc (150cc/kg/day)	3315	35 cc (10,5cc/kg)

Electrolyte monitoring was done by blood examination every 5-7 days. Our patient experience mild hyponatremia that did not require special management. Other electrolyte was normal during our treatment. Optimal growth is very difficult to achieve under HOS conditions, on our monitoring, we found weight decreased during 2 weeks of treatment with optimal nutrition including lipids and protein each 4 grams/kg body weight/day. Weight gain catch up start after POD-19

Discussion

Loss of a significant length of the small bowel results in interrelated physiologic events as a result of decreased small intestinal mucosal absorptive cell. This leads to a lesser fraction of ingested food and intestinal secretion thus causing an excessive volume loss.¹ In our case we did laparotomy with long segment ileal resection, double barrel ileostomy and biopsy thus give possibility of high output stoma acquired.

The introduction of early enteral feeds promotes intestinal adaptation, with subsequent weaning off parenteral nutrition.² Most patients with high output stoma will require parenteral nutrition. This associated with a host of acute and long-term complication. Malabsorption of non-essential and essential nutrition, fluids and electrolyte if not compensated for by increased intake, leads to diminish body stores, subclinical and clinical deficiencies.^{1,3} In our case we did early nutritional intervention using parenteral and enteral nutrition, counting ongoing fluid loss through stoma and adjust it to total daily fluid requirement. We found weight lost during hospitalized due to HOS, and we do catch up at the end. We found difficulties to adjust comparison between enteral and parenteral intake to maintain the weight gain.

Impaired fat absorption leads to deficiency of fat-soluble vitamins.¹ In our center we do not assess vitamin levels, so there is no data to confirm this, yet we still give fat-soluble for our patient. The overall morbidity and mortality are extremely high with complication like sepsis, electrolyte imbalances, thrombosis or infection of the catheter, TPN related cholestasis, weight/ age deficit greater than 40% and malabsorption syndrome.^{2,4} Central venous access needs to be performed in this patient. We did routine blood examination for all the risk evaluation and only mild hyponatremia experienced.

Tolerance to enteral feeds is determined by testing for reducing substances in stools and monitoring volume and consistency of stool. Malabsorption of fat, protein, carbohydrate, vitamins and heavy metal deficiency should be monitored.⁵ In our center we cannot do routine examination for this but still we try to calculate the ongoing fluid loss.

Continuous feeds give more advantages for HOS with poor tolerated bolus feeds.⁵ In our case we give oral feeding at the beginning after surgery due to good appetite of the patient but we change to continuous feeds after recurrent HOS and got improvement.

Conclusion

Although parenteral nutrition is often necessary, at least initially, the therapeutic goal should be to enhance intestinal adaptation and enteral nutrient assimilation, and thereby reduce parenteral nutrition requirements. Daily monitoring for ongoing fluid loss very crucial for adjusting nutrition.

Conflict of Interest

None declared.

Funding Statement

There is no specific grant from any funding agency involved in this study.

References

1. Crealey M, Walsh M, Awadalla S, Murphy JF. Managing newborn ileostomies. *Ir Med J.* 2014;107(5):146-8
2. Bindi E, Molinaro F, Ferrara F, Fusi G, Taddei A, Sica M, et al. Recycling of Stoma Losses: A Good Practice for Neonates with High Output Stomas—Our Experience and Comparison with Literature. *Journal of Neonatology.* 2020;34(4):181-6. <https://doi.org/10.1177/0973217920977245>
3. Mansour F, Petersen D, De Coppi P, Eaton S. Effect of sodium deficiency on growth of surgical infants: a retrospective observational study. *Pediatr Surg Int.* 2014;30(12):1279-84. <https://doi.org/10.1007/s00383-014-3619-2>
4. Koike Y, Uchida K, Nagano Y, Matsushita K, Otake K, Inoue M, et al. Enteral refeeding is useful for promoting growth in neonates with enterostomy before stoma closure. *J Pediatr Surg.* 2016;51(3):390-4. <https://doi.org/10.1016/j.jpedsurg.2015.08.058>
5. Radbone L, Hoodbhoy S, Narayanan S, King MK. East of England Neonatal Network Enteral Feeding of Preterm Infants on the Neonatal Unit.