

Neonatal Postoperative Nutrition after Surgical Treatment of Digestive Atresia: Realities in Madagascar

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ABSTRACT

Background: Digestive malformations are associated to a poor nutritional status in neonates. Postoperative fasting requirement is recommended to protect the anastomotic site. These can alter the quality of the postoperative healing; optimal nutritional support is then necessary. In Madagascar, adequate inputs for perioperative neonatal nutrition are failing. The aim of the study was to analyze the nutritional management of newborns operated for digestive atresias in Antananarivo.

Methods: A 24-month retrospective study (January 2015 to December 2016) of Malagasy neonates admitted in surgical intensive care unit of CHUA J.R. Andrianaivalona (Antananarivo-Madagascar), for operated digestive atresia was carried out. The Spearman correlation test was used (XLSTAT®) to assess correlation between postoperative nutrition and localization of the atresia, the length of stay and the neonatal outcome.

Results: Sixteen newborns, 4 (1-11) days old, mostly boys, weighing 2210 (1400-3030) g were retained. Among them, 11 patients received enteral breast milk with an administration time of 3 (1-5) days. It was correlated with the localization of the digestive atresia but not correlated with reoperation, length of stay and outcome. Nine neonates died, the length of stay was 7 (2-38) days.

Conclusion: Enteral breast milk can be interesting in postoperative nutritional management of digestive atresia in neonate, in Madagascar; especially since early enteral nutrition and breast milk have many benefits.

Keywords

Digestive system abnormalities, Enteral nutrition, Human milk, Postoperative period.

Introduction

Digestive surgical procedures are mostly performed in malnourished neonates who need adequate nutritional support [1]. Due to non-functionality of digestive tube, digestive malformations are associated to a poor nutritional status in which surgical procedures of neonatal digestive malformations are often performed; this can alter the quality of the postoperative healing [2]. Moreover some digestive surgeries require postoperative fasting in order to protect the anastomotic site from the stress of oral fluids and diet, and

to restore intestinal motility to a normal state [1]. Cessation of feeding in neonates leads to some deleterious consequences [2]. So, an optimal nutritional support is necessary to ensure a favorable postoperative outcome [1]. In Madagascar, congenital digestive malformations represent 6% of admissions and digestive atresia are the most frequent of those pathologies [3]. The purpose of this study was to analyze the nutritional management of newborns operated for their digestive system abnormalities.

Methods

We carried out a 24-month retrospective study (January 2015 to December 2016) of Malagasy neonates admitted in surgical intensive care unit of CHUA J.R. Andrianaivalona (Antananarivo-

Madagascar), for digestive atresia (esophageal, duodenal, jejunal, ileal atresia).

Other digestive abnormalities (laparoschisis, omphalocele) and the patients who presented digestive atresias, but who haven't been operated were excluded. We retained operated digestive atresia. The demographic criteria, the type of the digestive atresia, the characteristics of the nutritional support (parenteral nutrition and enteral nutrition (EN)), as well as the outcome of the patient were analyzed.

Results were expressed as median with extremes. The Spearman correlation test was used (XLSTAT®) to assess correlation between postoperative nutrition and localization of the atresia, the length of stay and the neonatal outcome. A p-value under 0.05 was significant.

Results

Of the 40 newborns admitted in surgical intensive care unit, during the study period, 16 were retained (Table 1). Median age was 4 (1-11) days old. Neonates were mainly boys. Birth weight was 2210 (1400-3030)g. The most observed and operated digestive malformations were esophageal and duodenal atresia (10 cases). Intervention time was 1 (0-16) days after hospital admission.

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Gender	Male	10
	Female	6
Digestive atresia	Esophageal atresia	5
	Duodenal atresia	5
	Jejunal atresia	2
	Ileal atresia	4
Associated malformations	Cardiac malformations	4
	Trisomy	2
	Limb and ano-rectal malformation	1
Postoperative nutrition	Parenteral nutrition	8
	Enteral breast milk	11

Table 1: Characteristics of the population.

Administration time of postoperative enteral breast milk (EBM) was 3 (1-5) days for 11 newborns. A parenteral admixture of amino-acids (Celemin® manufactured by CLARIS LIFESCIENCES Ltd) was given in eight patients (Figure 1). Enteral breast milk administration was correlated with the site of atresia ($p=0.006$; Figure 2). Reoperation was necessary for four patients because of the release of the sutures of the anastomosis. The correlation between reoperation and presence and administration of EBM was not significant ($p>0.05$). The length of stay was 7 (2-38) days. In survival newborns, even if a soon administration time of enteral breast milk was associated to a short length of stay, the correlation was not significant ($p=0.321$, Figure 3). The postoperative outcome was not also correlated with the enteral administration of breast milk ($p=0.0918$).

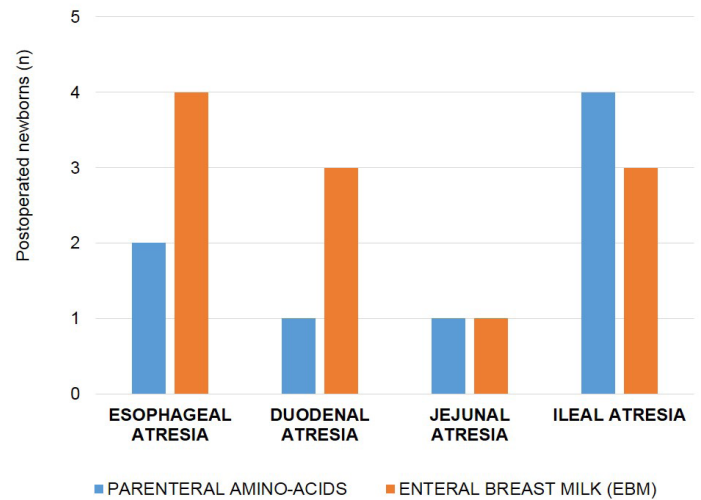


Figure 1: Postoperative nutrition after surgical treatment of digestive atresia of the newborns.

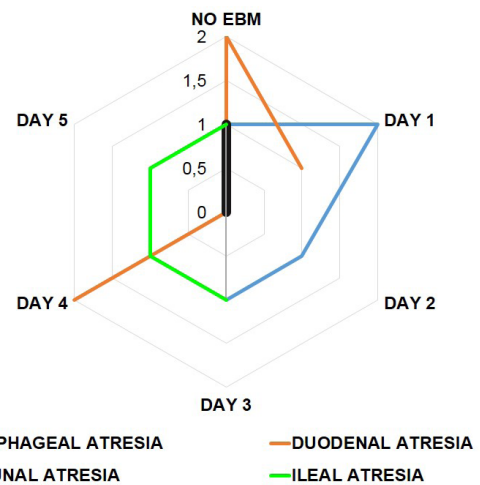


Figure 2: Administration time of enteral breast milk (EBM).

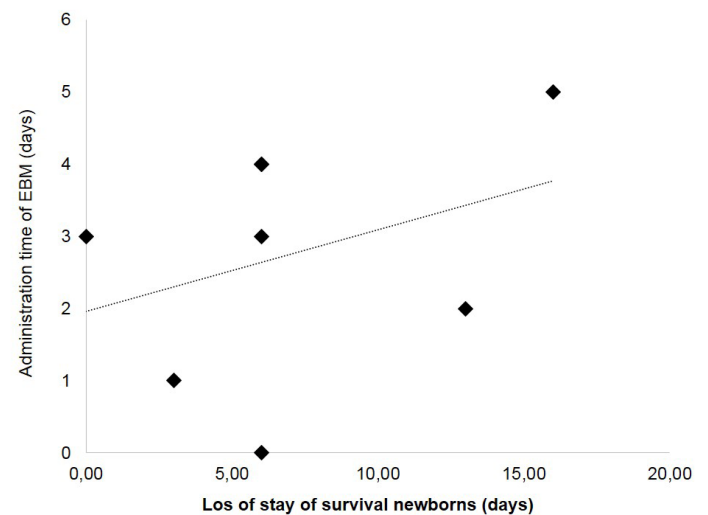


Figure 3: Length of stay of survival newborns and enteral breast milk (EBM).

Discussion

In Madagascar, pharmacological inputs for adequate enteral and parenteral nutrition for newborns are still failing. Thus, the use of human milk seems to be a good alternative especially in postoperative management of digestive atresia.

Digestive surgical procedures need protection of the anastomotic site [1]. However, prolonged starvation may cause immune deficiency, bacterial translocation and can lead to infections and adverse effect on tissue regeneration [2]. Moreover, longer fasting period for parenteral nutrition leads to requirement of longer hospitalization and most expensive costs [1]. Finding a balance of appropriate nutritional intake to meet metabolic demands is frequently difficult during the perioperative period [4].

Enteral nutrition can be started early in postoperative period in neonates. Wu et al. [5] initiated enteral feeding, on postoperative day 1 or 2, through needle catheter jejunostomy, in surgical neonates. The duration of this enteral feeding was 5 to 61 days. [5] Ghorbani et al. [6] performed postoperative early enteral feeding after surgical management of esophageal atresia. This early feeding is followed by significant weight gain, 48 hours after surgery to one month after discharge. Jiang et al. [1] initiated early jejunal feeding in digestive surgeries (duodenal and jejunal atresia) at 48-72 hours postoperative period. Ozturk H et al. [7] performed early enteral feeding through transanastomotic tube in 4 on 51 neonates with intestinal atresia. Suri et al. [8] start enteral nutrition by feeding jejunostomy, by postoperative day 2. The period of feeding is from 3 to 20 days [8].

Not only early enteral nutrition increases nutrition indices 14 days postoperative but it is also associated with lower rate of positive blood cultures, lower percentage of days of inotropes and lower mortality [1,9]. Early enteral nutrition and administration of breast milk can prevent weight loss through reducing the period of fasting and increases weight gain [6].

Enteral nutrition can be performed with human milk or commercial formulas. Human milk has many advantages over commercial formulas [10]. The American Academy of Pediatrics recommends exclusive breast milk / breastfeeding for the first 4 to 6 months of age [11]. Indeed, ingestion of human milk allows for the acquisition of passive immunity via the transfer of both immunoglobulins and lymphocytes from the mother. The immunologic advantages of breast milk include the transmission of both humoral and cellular factors to the neonate [10,12].

However, during enteral nutrition, some complications can occur such as mechanical problems (perigastrostomy leakage in the transanastomotic tube, blockade of the digestive lumen by the transanastomotic tube which can cause an inability to feed, dislodgment of the tube, ...) or digestive complications leading to the interruption of enteral nutrition (bilious vomiting, abdominal distension, intestinal perforation) [5,8,13].

So EBM could be interesting in neonatal postoperative digestive

management in front of its benefits (decreased level of septic morbidity and lower cost) and is superior to total parenteral nutrition in malnourished patients [1,4,14]. It accelerates intestinal transit, leads to faster recovery of bowel function and contribute to shorter hospital stay [1,2]. Plus, EBM allows to a better tolerance of future oral feeding, and diminishes aspiration pneumonia [1,15]. The EN with human milk is also associated with higher survival and is associated with shorter discharge and diminish hospital length of stay without major complications [1,8,9].

Conclusion

To introduce early enteral nutrition has several benefits. Breast milk is recommended for infants under 4-6 months. The neonatal postoperative nutrition in Madagascar is still precarious; enteral and parenteral nutrition inputs adapted to the newborn should be available. However, the latter being expensive, the alternative in a low-income country like Madagascar would be the enteral administration of human milk, as soon as conditions permit it, with close clinical and biological monitoring.

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