

Stoma and tube stoma: two sides of the same coin? A scoping review

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Abstract

Introduction: A stoma is a surgical opening in the abdomen that allows for the passage of feces and/or urine. It can be temporary or permanent, and the type of stoma depends on the affected section of the intestine or urinary tract. In neonates, a stoma may be necessary for various congenital or acquired pathologies. Stoma management in this age group requires specific skills and presents different challenges compared to adults.

Aim: The aim of this review is to compare the advantages and disadvantages of stoma and tube stoma in neonates, to identify the clinical and care strategy that guarantees a better quality of life for the child and their family.

Methods: A scoping review was conducted in the PubMed and CINAHL databases. The search included studies comparing the use of stoma and tube feeding in neonates with different pathologies.

Results: Data analysis showed that: stomas offer immediate access to the intestine for feeding and decompression, but can be associated with complications such as retraction, ischemia, and peristomal dermatitis. Tube stoma allows for controlled tissue expansion of the intestine and better management of short bowel syndrome but requires more complex management and greater training of healthcare personnel.

Conclusions: The choice between stoma and tube stoma in neonates should be individualized, considering the different clinical variables and the needs of the child and their family.

Keywords: Stoma, Tube Stoma, Neonate, Nursing Care, Neonatal Abdominal Surgery

Introduction

A stoma is a surgical opening in the abdomen that allows for the passage of feces and/or urine. It can be temporary or permanent, and the type of stoma depends on the affected section of the intestine or urinary tract.^{1,2}

The making and management of the stoma in the newborn requires specific skills with various aspects that differ from adults in terms of general characteristics related to gestational age, correct age, mobility; the characteristics of the skin, more permeable and susceptible to injury; the need for specific products; the supine position, which involves greater exposure of the skin to stomal effluents; weak abdominal muscles, requiring regular measurements of the growing stoma; mucous fistulas, in case of necrotizing enterocolitis, which require further differentiated treatment.³

The main complications of the stoma can concern the peristomal skin (rashes, redness) or the stoma itself (ischemia, retraction). Prevention is essential, with careful management and the use of appropriate products.^{1,3}

Despite the notable frequency of ostomies in newborns, specific research in this field is still lacking. Standardized protocols for neonatal stoma management are lacking, creating an information gap for healthcare professionals and families.

In newborns, intestinal stomas can be with an intestinal outlet on the abdominal surface (which we will define as "stoma"), or tubular (which we will define as "tube stoma"), with a catheter placed into the abdominal wall. They are designed to manage multiple conditions: congenital defects, anorectal malformations, intestinal atresia, cloacal exstrophy, familial polyposis, malrotation, gastroschisis, Hirschsprung's disease (1 birth in 5,000), imperforate anus, omphalocele and volvulus; intestinal diseases: necrotizing enterocolitis (mostly affects premature newborns < 1500 g, up to 10% in full-term newborns) and meconium ileus.³

Tube stoma was first proposed in 2006, in Manchester, by Dr. Bianchi and his team. It was born as a surgical strategy for Controlled Tissue Expansion (CTE) of the intestine and consequently for the management of neonatal short bowel syndrome (SBS).⁴

The tube stoma is mainly composed of two catheters, which are inserted proximally and distally into the intestine. Blocking the proximal catheter allows an increase in length and

circumferential diameter of the proximal intestine, while blocking the distal catheter allows for easy refeeding of intestinal contents from the proximal intestine to the distal intestine. The manual transfer of the collected effluent between these two catheters offers the unique opportunity to develop the dysfunctional distal intestine, stimulating: mucosal hyperplasia, increased absorption, reduction of losses of liquids, electrolytes, and nutrients.

Correct management of the tube stoma, including through manual refeeding, can make the difference when planning intestinal reconstruction surgery and/or stoma closure.⁴

Nursing care for newborns with a stoma requires specific training, which considers the characteristics of this age group.

With an appropriate approach and specialized management, neonatal stoma should not hinder the growth and development of the child.

The aim of this review is to highlight the advantageous aspects of the stoma and the tube stoma, to establish which of the two approaches promotes a better quality of life for the newborn and his family.

Methods

This study is a Scoping Review with the aim of identifying the advantages and disadvantages of the stoma and tube stoma in the newborn, to be able to highlight the clinical and care strategy that guarantees a better quality of life for the newborn and the family.

We defined the research question (Table 1) and carried out the review in the PubMed and Cinahl databases.

P	Newborn hospitalized in NICU
I	Tube stoma manufacturing
C	Stoma
O	Nursing assistance aimed at tube stoma

Table 1. PICO.

The search was carried out using specific queries, "stoma tube", "enterostomy", "neonates", "chyme reinfusion"); filters such as open access and non-open access articles, temporal filter, and inclusion criteria, i.e. articles in Italian and English and which referred to the newborn.

At first the search was set up with MESH terms, but it did not lead to relevant results, for this reason, in a second moment, only free terms were

used, combining the previously present keywords, and no Boolean operators were inserted.

After having conducted a search guided by free terms, the need emerged to define a time interval, a temporal filter to make the search as limited and updated as possible and the 2005-2024 filter was therefore set, considering a period of 19 years. A large time interval was necessary due to the limited availability of articles.

Finally, articles were selected based on the abstract and finally the full text.

There are a total of 11 articles remaining and used. They all come entirely from PubMed. Subsequently, a detailed analysis of the selected articles was carried out.

Results

To schematize the research path and the results, we have defined a flow chart, which summarizes the sequence of the research path carried out and highlights the article selection methodology (Figure 1). We summarized all selected articles in the data extraction table (Table 2), summarizing the main findings of each article.



Table 2. Data extraction table.

Discussion

In Zong et al (2016) we find a comparison between the stoma and the tube stoma (Table 2), which highlights their advantages and disadvantages.⁵

As regards the stoma, during the analysis of the study which reported the description of a colorectal operation, some advantages emerged in favor of it. It has been demonstrated that, in this type of operation, it is able to reduce anastomotic leakage (serious surgical complication after colorectal surgery) and the rate of re-operation; Furthermore, it reduces the incidence of sepsis or fistula in the event of leakage. Despite this, it is also characterized by several disadvantages, such as: significant morbidity, discomfort, peristomal inflammation, dehydration.⁶

To be closed, a stoma requires a second operation and exposes the patient to stress again.⁶ Furthermore, reworking a stoma can generate: high rate of small bowel obstruction (0-15%), wound infections (0-18.3%), loss of anastomosis (0-8%), enterocutaneous fistulas (0.5-7%). The stoma created at the time of making a stoma has a 19% risk of remaining permanent.^{7,8,9} The morbidity experienced by patients with this type of stoma is highly relevant and occurs following the presence of complications such as prolapse of the stoma, dehydration and peristomal inflammation.⁶ Patients with a stoma have a high risk of dehydration and hydro-electrolyte imbalance, which can lead to hospital admission for correction of fluids and electrolytes, thus lengthening the hospital stay if not generating a new one.⁵ A stoma has a huge negative impact on the patient's quality of life, both psychological and physical.⁹

A tube stoma placement has been recommended for both ileostomy and colostomy procedures. From a study conducted for 12 years and then reported in the literature, it emerged that 37 newborns, with pathologies linked to a defect in the abdominal wall, were managed thanks to a tube stoma.⁶

At the birth of these newborns the average weight recorded was 2123 g (1850-2735 g) with a gestational age between 32 and 35 weeks. All these patients underwent intestinal resections. Abdominal surgery and tube stoma placement were performed at 1 month of life or 4 months of life. The length of the proximal intestine averaged 25 cm from the ligament of Treitz. The proximal bowel diameter averaged 3 cm. The tubo stomies were kept in place for 5 months, until the proximal intestinal diameter was on average 5cm (increased by 72.8%), the distal intestine increased normally,

and no cases of atrophy occurred. Furthermore, there were no problems with obstruction and blocking of the tube.⁶

As regards complications, they were presented in only 3 patients (8.1%): 2 children (5.4%) required further surgery during the first 30 days due to an enterocutaneous fistula. 1 child (2.7%) required further intervention for intestinal stricture. No skin complications have been reported, such as erosive-ulcerative lesions of the peristomal skin, underlining the non-leakage of intestinal material.⁶

Finally, the tube stoma did not require a second reversal operation to be closed. The only disadvantage reported by the tube stoma refers to the dislocation of the tube itself.⁵

Subsequently, a further study was conducted in the literature in which the problem of tube displacement was investigated, in a first case of a newborn with SBS in which a reinsertion of the tube stoma was possible thanks to the guidance of radiological images.⁴

Finally, it should be underlined that closing the stoma is the only adequate procedure to control the problem of dehydration and electrolyte loss in patients with a stoma.

In patients with tube stoma, however, this problem does not occur. It is possible to "gain time" by applying the controlled tissue expansion program, through the chyme recirculation method, thanks to which the need for early and forced closure of the stoma is reduced. These patients will have a better developed distal bowel and a larger, safer anastomosis at closure.⁵

The advantages offered by the tube stoma are multiple: it does not expose the effluents to the external environment to the intestine, by doing this it eliminates the contact of irritating liquids with the skin, furthermore, it reduces losses and improves absorption by keeping the nutrients in contact with the internal mucosa of the proximal intestine.^{4,5}

Stoma	Tube stoma
<p><u>Advantages:</u></p> <ul style="list-style-type: none"> low rate of anastomotic leak and subsequent reoperation low incidence of sepsis or fistula 	<p><u>Advantages:</u></p> <ul style="list-style-type: none"> does not require inversion operation after tube removal. does not report complications related to the peristomal skin. greater development and hyperplasia of the intestinal mucosa less loss of fluids, electrolytes, and nutrients
<p><u>Disadvantages:</u></p> <ul style="list-style-type: none"> creates discomfort causes peristomal inflammation causes dehydration <p>It requires a further surgical operation to close the stoma, during which the following may occur:</p> <ul style="list-style-type: none"> high rate of small bowel obstruction wound infections loss of anastomosis after recanalization surgery enterocutaneous fistulas 	<p><u>Disadvantages:</u></p> <ul style="list-style-type: none"> risk of tube dislodgement

Table 2. Comparison between the stoma and the tube stoma

From this review the preparation of a stoma involves both physical and psychological consequences in the individual and in the people around him.⁹

Tube stoma has been identified as an effective and efficient method for providing a temporary stoma in patients who require one. This technique has already been used by several surgeons, becoming the main choice when making an ostomy, as we have seen in patients with certain pathologies, especially SBS.⁶

Tube stoma is much more tolerated than stoma⁵ and does not require a second closure operation, which can generate various complications.⁶

Furthermore, the possible reinsertion of the catheter in the event of dislodgement has been demonstrated, reported as the only relevant complication.⁴ Therefore, the tube stoma can be defined as a safe and effective technique if treated correctly.⁶

Patients with a stoma have a greater need to undergo reversal surgery with increased hospital stay until the stoma is definitively closed and have a high risk of loss of water and electrolytes; in fact, according to Coletta et al (2022), many of them had frequent hospital admissions for fluid and electrolyte correction due to diarrhea, dehydration, and acidosis.⁵

In patients with a tube stoma, however, a reversal

operation is not required and is characterized by a decrease in discomfort in the patients, both in the packaging and closing phases.⁶

However, problems related to tube dislocation, reflux, and leakage of stomal effluents, due to a poorly positioned tube, have been mentioned as solvable complications.¹⁰ This will happen when the techniques to be used in care and treatment are simplified, easy to use, cost-effective and above all standardized for the entire staff.¹⁰

Nursing care of a newborn with a stoma or tube stoma involves multidisciplinary work, which requires knowledge and skills that guarantee quality care.¹¹ It is important to adopt a family-centered care approach, which facilitates psychosocial adaptation to the stoma.

Regarding tubo stomies, the recognition of complications is complex and requires in-depth analysis of the specific management methods. No indications were found regarding the assistance necessary for their management in normal conditions.

Given the novelty of the topic and the advantages reported compared to the tube stoma, it is necessary to delve deeper into the topic, especially dealing with those areas that have not yet been investigated, such as the care practice for tube management.

Conclusions

The choice between stoma and tube stoma in newborns must be individualized, considering the specific characteristics of the newborn and the preferences of the family. Adequate psychological and informational support for the families involved is essential, and future research should focus on the development of standardized protocols and new management strategies to improve the quality of life of these children.

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Author, Year	Title	Contents
Zhi Hong Ni, Sheng Ding, Jin Hua Wu, Fang Wang 2022	"Family caregiver's experiences of caring for neonates undergoing enterostomy in China: a qualitative study."	Nursing experiences and care needs of family members caring for infants with enterostomy in China.
Riccardo Coletta, Andrea Zulli, Kathryn O'Shea, Elisa Mussi, Adrian Bianchi, Antonino Morabito 2022	"Minimizing Enterostomy Complication in Neonates, Lessons Learnt from Three European Tertiary Centres"	Safety and usefulness of the tube stoma as an alternative to the conventional enterostomy in the neonatal population
Mohammed Elifranji, Ashley Robinson, Saleem Mammoo, Abdalla Zarroug, Basem A. Khalil 2019	"Radiologic Image-Guided Tube Stoma Insertion in Neonatal Short Bowel Syndrome: First Case Report in the Literature"	Description of a new radiological technique used in CTE to manage reinsertion of the proximal catheter into a tube stoma.
Zhen Zong, Taicheng Zhou, Zhipeng Jiang, Yingru Li, Bin Yang, Zehui Hou, Fanghai Han, Shuang Chen 2016	"Temporary tube stoma versus conventional loop stoma for the protection of a low anastomosis in colorectal surgery: a systematic review and meta-analysis"	Evaluation and comparison: efficacy and safety of tube stoma and stoma for the protection of low anastomosis in colorectal cancer.
Louise Forest-Lalande 2023	"Best practice guidelines for ostomy care in neonates, children and adolescents: an executive summary"	Executive summary of the best guidelines for stoma care in infants, children, and adolescents.
Holly Kirkland-Kyhn, Sanaz Martin, Sunniva Zaratkiewicz, Morgan Whitmore, Heather M. Young 2018	"Ostomy care at home"	Information that nurses can share with the patient and their caregivers for proper stoma management at home.
Michael F. McGee 2015	"Stomas"	It summarizes the various necessary notions regarding the packaging and management of the stoma.
Sameer Bhat, Nelle-Rose Cameron, Puja Sharma, Ian P. Bissett, Greg O'Grady 2020	"Chyme recycling in the management of small bowel double enterostomy in pediatric and neonatal populations: A systematic review"	Benefits of chyme recirculation as an alternative therapy to NP in pediatric and neonatal populations.
Andre Chow, Henry S. Tilney, Paraskevas Paraskeva, Santhini Jeyarajah, Emmanouil Zacharakis, Sanjay Purkayastha 2009	"The morbidity surrounding reversal of defunctioning ileostomies: a systematic review of 48 studies including 6,107 cases"	Ileostomy reversal surgery - morbidity and mortality.
Orit Kaidar-Person, Benjamin Person, Steven D Wexner 2005	"Complications of construction and closure of temporary loop ileostomy"	Review of the main complications related to temporary loop ileostomy closure.
Aazam Dabirian, Farideh Yaghmaei, Maryam Rassouli, Mansoureh Zasherri Tafreshi 2010	"Quality of life in ostomy patients: a qualitative study"	Quality of life of the patient with stoma

	Results	Outcomes	String
	Growing experience. Feelings of inadequacy, anxiety, uncertainty. Desire for professional support	Understanding family members' difficulties and needs - healthcare professionals can help the family properly care for their child.	"Enterostomy in neonates"
	Neonates subjected to the study - complications related to tubostomies limited to three patients (8.1%).	Tube stoma - avoided some of the complications that are commonly seen. Need for further prospective studies to recommend this technique as a superior modality.	"Stoma tube in neonates".
	Proximal tube stoma catheter insertion guided by radiological images - effective technique, without complications.	Radiologically guided tube stoma reinsertion in a child with SBS, a promising technique, for use in CTE programs.	"Stoma tube in neonates"
	Tube stoma VS stoma: significantly lower complications directly related to the stoma, significantly shorter operation times, stoma closure and hospital stay.	Tube stoma - feasible and effective procedure, prevents a second operation to close the stoma. Alternative to stoma.	"Temporary stoma tube"
	13 guidelines that address different aspects regarding the stoma (pathologies, family, types of stoma, stoma products and accessories, ...)	Targeted, evidence-based and consensus-based resource to inform about proper stoma care.	"Neonatal ostomy care"
	Indications for the care of every aspect regarding the stoma: caregiver involvement, stoma evaluation, complications, emptying and replacement, medications, activities, diet.	The nurse seeks the involvement of the patient and caregiver, which is necessary for good overall stoma care.	"Ostomy care at home"
	Indications for stoma care: types of stoma, stoma appliances, preparation for surgery and care after surgery.	It highlights correct assistance to best manage a stoma and prevent any complications.	"Jama Network Stomas"
	Clinical benefits (reduction or cessation of NP, weight gain, normalization of fluid balance, improvement in functional tests, maturation of the distal intestine).	Chyme recirculation - demonstrated to be an effective therapeutic intervention.	"Enterostomy in neonates"
	48 studies from 18 different countries - 6,107 patients analyzed.	Consequences of stoma reversal are often underestimated. Adopt a selective ileostomy strategy.	"Temporary stoma tube"
	Main complications in closure of temporary loop ileostomy.	Predisposing factors for complications should be considered when planning the preparation of a stoma. The surgeon should remember and discuss before surgery that a stoma may become permanent. This highlights the importance of preoperative counseling of the stoma site.	"Temporary stoma tube"
	9 main themes - physical problems related to colostomy, impact of colostomy on psychological functioning, social and family relationships, travel, nutrition, physical activity and sexual function, religious and economic issues.	Use of the 9 themes identified to investigate and promote a better quality of life for the ostomy patient.	"Temporary stoma tube"

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