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Cervical Oesophagostomy in Newborns with Oesophageal Atresia: A Case Series of a Nursing-led Skin Management Approach

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Abstract

Introduction. Oesophageal atresia (OA) is a rare congenital anomaly resulting from abnormal development of the oesophagus. When primary anastomosis is not feasible, a cervical oesophagostomy may be created to divert salivary secretions; however, postoperative management can be challenging and may be associated with peristomal skin complications.

Methods. This case series describes the management of cervical oesophagostomy in two neonates with long-gap type A oesophageal atresia using a nursing-led adaptation of a one-piece, open-bottom enterostomy pouch. The device was introduced to improve secretion containment, protect the peristomal skin, and facilitate early oral stimulation.

Results. Following introduction of the enterostomy pouch, peristomal erythema improved and subsequently resolved, with no episodes of dermatitis, ulceration, maceration, or local infection observed during follow-up. The frequency of dressing changes was substantially reduced, supporting caregiver management at home. The pouching system also enabled early oral sensory stimulation while the infants awaited definitive oesophageal reconstruction.

Discussion and Conclusions. In these two cases, a one-piece, open-bottom enterostomy pouch provided a practical nursing strategy for cervical oesophagostomy management. The approach was associated with improved peristomal skin protection, fewer dressing changes, greater caregiver participation, and the feasibility of early oral stimulation.

Further prospective evaluation is needed before broader conclusions can be drawn.

Keyword: Oesophageal Atresia, Oesophagostomy, Skin Care, Wound Care, Skin Integrity, Nursing Care

Introduction

Oesophageal atresia (OA) is a rare congenital malformation caused by impaired oesophageal development during embryogenesis. It is the most common gastrointestinal atresia, with an estimated incidence of 1 in 3,500 live births (Garabedian et al., 2014). When primary repair is not possible due to the distance between the oesophageal stumps, a gastrostomy for nutritional purposes and a cervical oesophagostomy to allow drainage of salivary secretions are performed (Baird et al., 2019). The cervical oesophagostomy is a temporary solution while awaiting definitive surgery to restore oesophageal continuity (Shulman et al., 2002). Additionally, it allows oral feeding, which is invaluable for maintaining the suction reflex (Lemoine et al., 2016; Penikis et al., 2024). In terms of long-term outcomes, this practice facilitates the resumption of feeding once continuity of the digestive tract is restored. This can be achieved using oesophageal replacement techniques. Complications that may arise include airway obstruction, haemorrhage, cutaneous oesophageal fistulae, neck oedema, infection, peripheral nerve injury, or necrosis of cervicostomy flaps. Despite the clinical relevance of cervical oesophagostomy, evidence regarding standardized postoperative management and neonatal nursing care remains limited. Recent scoping reviews indicate that the available literature consists predominantly of isolated case reports and small single-centre series, with inconsistent reporting of functional outcomes and limited description of structured postoperative care pathways. In particular, nursing literature specifically addressing this topic is extremely scarce. To date, one of the few reports focused on the nursing management of an infant with oesophageal atresia and cervical oesophagostomy is Dixon's (1986) case report, which described a unique approach to care but did not provide standardized or updated guidance applicable to contemporary clinical practice (Bondzi-Simpson et al., 2025). This case series was prepared in accordance with the CARE (CAse REport) guidelines (Gagnier et al., 2016).

Clinical presentation

This case series describes two term neonates with prenatal suspicion of long-gap type A oesophageal atresia (OA), subsequently confirmed after birth. One patient had a congenital syndrome (DiGeorge syndrome) associated with severe cardiopathy and palatoschisis, while the other had no associated syndrome. The gap between the oesophageal stumps was 2-3 vertebral bodies in one patient and more than 4 in the other. Both patients subsequently underwent Foker's technique for extra-thoracic thoracoscopic-assisted elongation of the oesophageal stumps (Baird et al., 2019; Reddy et al., 2024). An attempt at deferred oesophageal anastomosis performed 10 days after the initial procedure was unsuccessful. Given the clinical and surgical scenario, a left cervical oesophagostomy was fashioned in both patients.

Nursing skin management approach

Our approach to managing the cervical oesophagostomy initially involved applying dry, sterile gauze, changed frequently and held in place by an elastic bandage. The gauze was changed frequently to keep the peristomal area dry and to ensure optimal healing of the surgical wound. According to unit protocol, the peristomal skin was routinely assessed using the Neonatal Skin Condition Score (NSCS). During the early postoperative period, the peristomal skin developed erythema due to contact with saliva and wet gauze, and progressive increase in the diameter of the irritated area. As the skin condition worsened, including extension to adjacent areas, the hospital's stoma therapist was consulted. A one-piece enterostomy pouching system, the "Little Ones - Open-bottom bag with adhesive attachment technology" by Convatec (Figure 1). The two patients were managed identically.

The proposed approach was adapted from nursing principles used in small-bowel enterostomy care. Given the absence of clear guidance for nursing management of cervical oesophagostomies, the same core principles of effluent containment and peristomal skin protection were applied. The cervicostomy was

therefore managed with a transparent, one-piece, open-bottom, cut-to-fit pouch. To minimise skin exposure to salivary secretions and reduce the risk of peristomal dermatitis and ulceration, the hydrocolloid opening was tailored closely to the stoma. Saliva and orally administered milk were collected within the pouch, which was emptied through the open bottom using an enteral syringe connected to a cannula.



Figure 1. Open-bottomed one-piece transparent cut-to-fit pouch.

In addition to supporting peristomal skin management, the pouch enabled more accurate collection of secretions for fluid-balance monitoring, which was particularly relevant because one patient had a severe congenital cardiac malformation. Device selection was guided by the anatomical challenges of a neonatal cervical stoma. The selected system required a flexible, skin-friendly hydrocolloid barrier capable of conforming to the neck contours, a fully customisable cut-to-fit opening, and a transparent open-bottom design to permit continuous skin observation and easy drainage. A one-piece transparent cut-to-fit enterostomy pouch with an adhesive hydrocolloid plate ("Little Ones - Open-bottom bag with adhesive attachment technology", Convatec) was therefore used. The hydrocolloid plate was cut approximately 1–2 mm larger than the stoma. Skin preparation consisted of gentle cleansing with sterile water or 0.9% normal saline followed by careful drying; no additional barrier films, pastes, or powders were used. The pouching system was replaced every 48–72 hours, or earlier in the event of leakage or loss of adhesive integrity, and was routinely emptied through the open bottom using an enteral syringe connected to a cannula. The pouching system also facilitated early oral feeding. A speech and language therapy programme was implemented to support swallowing competence and sensory exposure to taste through small amounts of milk administered by bottle.

Follow-up and outcome

Clinical outcomes were assessed from creation of the cervical oesophagostomy through a total follow-up period of four months, including inpatient monitoring and scheduled outpatient follow-up after discharge. Before introduction of the pouching system, sterile gauze dressings required replacement more than 5–6 times per day because of rapid saturation with salivary secretions. After introduction of the pouch, replacement was required approximately every 48–72 hours, depending on secretion volume and adhesive integrity. Peristomal erythema improved within 72 hours in both patients and resolved completely within 7 days. No episodes of local infection, ulceration, maceration, or device-related skin breakdown were observed during the subsequent four-month follow-up. No additional topical treatments were required beyond routine cleansing and scheduled device replacement. Skin condition was assessed clinically each day during hospitalisation and at scheduled outpatient visits after discharge (Figure 2).



Figure 2. Peristomal skin condition four months after creation of the cervical oesophagostomy.

Parents' perspective

Parents reported greater confidence in home

Table 1. Wound care timeline.

Clinical Event / Milestone	Case 1	Case 2
Birth (Diagnosis of Long-Gap OA)	08/04/2023	17/04/2023
Foker's Technique (Stump Elongation)	13/07/2023	17/07/2023
Attempted Anastomosis & Cervical Oesophagostomy	20/07/2023	21/07/2023
Introduction of Oral Stimulation	21/07/2023	22/07/2023
Onset of Peristomal Skin Breakdown	22/07/2023	25/07/2023
Application of Ostomy Pouching Device	28/07/2023	28/07/2023
Follow-Up Assessment	27/09/2023	27/09/2023

management and less stress related to dressing changes after structured caregiver training before discharge. These observations were collected during routine clinical follow-up interviews and documented in the medical record; no formal validated questionnaire was administered. Successful home management required caregiver engagement and adequate support from community healthcare services. Home care included nursing supervision, management of suction equipment, gastrostomy feeding, and training in basic cardiopulmonary resuscitation. Caregiver education focused on practical skills necessary for safe home management and continuity of care after discharge. Early oral feeding and swallowing stimulation were incorporated into the care pathway under multidisciplinary supervision, with the aim of supporting functional oral adaptation during the recovery period (O'Brien et al., 2018; Stewart et al., 2022; Tollne et al., 2024).

Ethical Consideration

Ethical approval was not required for this case series in accordance with institutional policies. Written informed consent was obtained from the patients' parents for publication of this case series and accompanying images.

Discussion

The postoperative management of a cervical oesophagostomy in neonates presents specific nursing challenges. Published sources include case-based descriptions of nursing care for infants with cervical oesophagostomies (Dixon, 1986), whereas contemporary consensus recommendations address the broader perioperative, surgical, and long-term management of long-gap oesophageal atresia (Dingemann et al., 2021). Practical neonatal ostomy publications describe techniques for abdominal enterostomies, whose application to the cervical region requires adaptation to local anatomy and patterns of secretion exposure (Brunette, 2017).

The inadequacy of traditional absorbent gauze and adhesive plaster quickly became evident in our clinical experience, resulting in severely compromised skin integrity that extended well into the dependent interscapular zone. This presentation was consistent with moisture-associated skin damage (MASD), including peristomal moisture-associated dermatitis (PMAD) (Colwell et al., 2011; Gray et al., 2011). A cervical oesophagostomy exposes the surrounding skin to saliva, which is a recognised source of moisture-associated skin injury when contact is prolonged (Gray et al., 2011). Infant skin differs from adult skin in its structure and water-handling properties, and its barrier function continues to mature after birth (Stamatas et al., 2011). Prolonged contact with saturated gauze can promote maceration and increase susceptibility to friction-related epidermal damage (Gray et al., 2011). In our clinical experience, gravity-driven runoff of secretions down the neck extended exposure to the interscapular region. Such barrier disruption can contribute to discomfort and increase susceptibility to secondary cutaneous infection (Colwell et al., 2011).

To address PMAD, we translated core paediatric enterostomy care principles—secure containment, moisture diversion, and skin barrier protection—to the cervical region (Brunette, 2017; Colwell et al., 2011). The use of a flexible, one-piece paediatric enterostomy pouch offered a practical alternative

to passive absorption by enabling collection of secretions. An effective seal, fitted to the stoma and surrounding skin contours, is central to limiting effluent contact with the peristomal skin (Colwell et al., 2011). In the cervical region, skin folds and movement during head turning provided the clinical rationale for selecting a flexible, cut-to-fit hydrocolloid barrier. By transitioning from gauze to a closed, drainable pouching system, we limited direct contact between saliva and the peristomal or interscapular skin, creating conditions that supported healing of the affected area. This represents an adaptation of enterostomy care principles and an observation from the present case series, rather than evidence of the superiority of a specific product or pouching system.

Beyond skin integrity, a critical challenge of prolonged oesophagostomy management is the deprivation of normal oral-sensory experiences. Oral feeding requires the development and coordination of sucking, swallowing, and breathing (Lau, 2016). In children with oesophageal atresia, feeding difficulties and oral aversion are multifactorial; prolonged tube feeding and adverse oral experiences may contribute alongside anatomical and functional abnormalities (Mahoney & Rosen, 2017). Evidence from preterm infants suggests that non-nutritive sucking may facilitate the transition to oral feeding, although the certainty of the evidence is low or very low (Foster et al., 2016). Evidence for additional oral-stimulation interventions also remains uncertain (Greene et al., 2023). In long-gap oesophageal atresia, expert consensus supports early oral stimulation and sham feeding (Dingemann et al., 2021). A small clinical series described the feasibility of sham feeding before delayed oesophageal repair using continuous upper-pouch suction; these findings do not directly establish its effectiveness in infants with cervical oesophagostomies (Golonka & Hayashi, 2008). In the present care pathway, small oral volumes of breast milk, subsequently diverted through the oesophagostomy, were intended to preserve oral-sensory experience. This approach may support later feeding rehabilitation, but its effects on subsequent oral feeding and long-term tube dependency require further evaluation.

The clinical, nursing, and family implications of this adapted care pathway are potentially relevant across several domains. Clinically, the one-piece pouching system contained salivary secretions and reduced direct exposure of the surrounding skin. The drainable pouch also permitted measurement of collected secretions, which may support fluid-balance monitoring, while early oral stimulation provided continued oral-sensory experience. These observations should not be interpreted as evidence of reduced length of stay or healthcare costs, as these outcomes were not formally assessed. From a nursing perspective, replacing repeated daily gauze changes with a pouch that remained in place for longer intervals reduced the frequency of local care. The transparent system also allowed visual monitoring of the stoma and surrounding skin without repeated dressing removal and enabled more objective quantification of collected secretions. From the family perspective, structured teaching on stoma assessment, pouch application, removal, and emptying may support caregiver confidence before discharge. This approach is consistent with consensus recommendations that parental involvement and training form an integral part of care for long-gap oesophageal atresia (Dingemann et al., 2021). Allowing the mother to feed the infant via a breast milk bottle provided a more normalised parenting experience. Its potential contribution to infant–parent interaction is a clinical interpretation, consistent with the emphasis on feeding relationships and family support in the oesophageal atresia literature (Ramsay & Birnbaum, 2013). The reduced frequency of dressing changes may also lessen the practical and emotional burden of home management; however, parental anxiety and quality of life were not measured with validated instruments in this case series.

Limitations

This case series is limited by its descriptive design and the inclusion of only two patients, which substantially restricts generalisability. The absence of comparator or control cases precludes any direct assessment of effectiveness or superiority over alternative dressing strategies. In addition, although the Neonatal Skin Condition Score was used routinely during care, no validated assessment tool specific to cervical stomas was available, and caregiver experiences were documented during routine follow-up rather than measured with a validated questionnaire. Outcomes related to length of stay, healthcare costs, swallowing function, oral aversion, and parental quality of life were not formally evaluated. Nevertheless, the cases illustrate a feasible nursing strategy that may warrant further

prospective study in comparable clinical settings.

Clinical implications

- A transparent, one-piece, open-bottom pouching system may provide a practical alternative to frequently changed gauze dressings for selected neonates with cervical oesophagostomy.
- Close containment of salivary secretions may support peristomal skin protection, visual monitoring, and more accurate measurement of fluid losses.
- Structured caregiver education and multidisciplinary oral stimulation may facilitate continuity of care and caregiver participation after discharge.

Conclusions

In this two-case series, use of a one-piece, open-bottom enterostomy pouch was associated with resolution of peristomal erythema, a marked reduction in the frequency of dressing changes, improved containment of salivary secretions, and feasibility of early oral stimulation. The approach may offer a practical nursing option when cervical oesophagostomy care is complicated by persistent moisture exposure. Because the evidence is limited to two cases, the findings should be interpreted cautiously. Larger prospective studies are needed to assess safety, skin outcomes, caregiver-reported outcomes, swallowing development, oral aversion, and the longer-term feasibility of cervical pouching systems.

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