

# Novel Pouching Techniques for the Neonate With Fecal Ostomies

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# ABSTRACT

**BACKGROUND**: Neonatal ostomy management is challenging even under the best circumstances. When complex circumstances are encountered, creative pouching techniques must be employed.

CASES: This article describes management of 5 neonates with problematic ostomies.

**CONCLUSION**: Maintaining a neonatal pouch seal at times requires using modified adult pouching products; however, caution should always be used due to the fragility of this patient population.

KEYWORDS: Neonatal ostomy management, Neonatal pouching.

### INTRODUCTION

Infants and neonates may require fecal diversions for a variety of anatomical and functional problems including Hirschsprung's disease, meconium ileus, intestinal atresia, imperforate anus, and necrotizing enterocolitis (NEC).<sup>1,2</sup> These ostomies are typically difficult to manage and often require frequent pouch changes. Acceptable pouch wear time varies from 12 to 48 hours, but this goal is often not achieved.<sup>2,3</sup> At a large academic medical center in the Southeastern United States, which includes a children's hospital with a level III neonatal intensive care unit, the WOC nurses are frequently consulted to care for infants and neonates with ostomies. Management of these ostomies may be problematic because of the small size of the infant, suboptimal location or stoma construction, the presence of multiple stomas, peristomal hernias, peristomal tubes, and/or incisions. Further compounding these challenges, the infant's skin is fragile and more permeable than an adult's skin, which significantly reduces ostomy product options. Epidermal barrier function is often not fully developed, increasing transcutaneous absorption of chemicals found in skin sealants, adhesive removers, and barrier pastes, particularly in the premature or low-birth-weight neonate.<sup>2-4</sup> As a result of these factors, product selection must be approached thoughtfully, considering the level of epidermal maturation and other factors such as stomal construction and the peristomal plane.<sup>2,3</sup> The following case studies outline innovative, safe approaches that we found successful for the management of infants and neonates with complex ostomies.

#### Case 1

A 25-week-gestation male neonate was born and subsequently developed NEC; his birth weight was 805 g. Surgical management

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required resection of approximately 90% of his small bowel, creation of a jejunostomy and mucous fistula, with an incision between the 2 resulting in a rather depressed area as well as a parastomal hernia. He received total parenteral nutrition and refeeds of his jejunostomy output via his mucous fistula. Initial efforts at pouching with pediatric pouches (Little Ones, ConvaTec, Skillman, New Jersey) failed, resulting in multiple pouch changes per day. A WOC nurse consult was placed, who used the following approach for pouching. Narrow strips of a paste ring (Eakin, ConvaTec) were applied to fill the depression between the stomas as well as around each stoma, with minimal ostomy paste to fill any gaps. A 2-piece 21/4-inch cut to fit adult pouching system with an extended-wear barrier (Hollister New Image flange 14603, Hollister New Image pouch 18133, Hollister, Libertyville, Illinois) was required to allow for enough cutting surface to include both stomas in 1 pouch, as there was insufficient room to pouch separately. The barrier was modified by cutting off the tape border, leaving only the center barrier and flange, which reduced the barriers' adhesive footprint essentially to the size of a typical pediatric barrier. An oval hole was cut out of the barrier to accommodate both stomas. After applying the pouching system, a small hole was cut into the front of the pouch to insert the refeeding tube. The hole was then caulked with ostomy paste (Stomahesive paste, ConvaTec) and patched with clear film dressing (Tegaderm, 3M, St Paul, Minnesota) to stabilize the tube and prevent leakage at its insertion site. An adult ostomy belt (Adapt ostomy belt, Hollister) was sized to fit the infant's abdominal circumference and resewn with suture. The belt was applied snugly to help provide abdominal wall support due to the hernia. Using this approach, first-line nursing staff were able to maintain this pouching system for 2 to 3 days. No adverse events related to pouching occurred.

# Case 2

A 28-week-gestation male neonate with a birth weight of 1180 g was born with ileal atresia, necessitating ileostomy with mucous fistula at 3 weeks old. The ileostomy was located low in the righty lower quadrant of the abdomen. The mucous fistula was located superiorly at the lateral end of the incision with about 2 cm between them. Initially, this

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baby was pouched with a 1-piece neonatal pouching system (Little Ones, ConvaTec). This pouching system proved successful until the infant developed a parastomal hernia about 1 month after surgery. At that point, leakage became an issue. Assessment also revealed that his stoma was located so low that, when he brought his legs up, it was lifting the inferior edge of the pouch. The neonatal pouch was initially applied with the opening offset lower to move the pouching system up and away from his legs. This solution held for approximately 6 hours before leaking, resulting in multiple pouch changes per day. We then applied a 2-piece cut to fit 1<sup>3</sup>/<sub>4</sub>-inch pouching system, with an extended-wear barrier (Hollister New Image flange 14602, Hollister Pouchkin 3799) along with an ostomy belt that was modified to accommodate his size (slightly more than 5000 g or 5 lb). The tape border was cut off and the opening in the barrier was cut low to move the pouching system up. The starter hole was plugged with a piece of a 4-inch paste ring, and a narrow strip of the paste ring (Eakin, ConvaTec) was applied around the stoma. The pouch was applied to the flange and an adult ostomy belt was sized for this patient and resewn using suture material. This approach enabled a pouch wear time of approximately 2 days. Written instructions were provided to guide staff in pouch changes. No adverse events occurred related to the pouching approach, and the ostomy was reversed about 1 week later.

#### Case 3

A term female neonate born with cystic fibrosis was found to have meconium ileus and volvulus requiring ileostomy and mucous fistula. Her birth weight was 2380 g, but she weighed 2635 g at the time of surgery. Initially, pouching was routine, but after a week and a half of persistent leakage, first-line nursing staff requested pouching recommendations from the WOC nurse. Initial assessment revealed a budded, slightly oval, midline ileostomy, located at the medial aspect of her abdominal incision with a flush mucous fistula located approximately 1.5 cm away at the lateral end (Figure 1). In addition, her somewhat raised umbilicus was located just inferior and medial to the ileostomy and a peristomal hernia was noted with straining. Prior ostomy management included 1- and 2-piece pediatric pouches from 2 manufacturers (Littles Ones, ConvaTec; Pouchkins, Hollister), but she continued to require multiple pouch changes per day due to leakage. After cleaning and drying the peristomal skin, a thin bead of stoma paste (Stomahesive paste, ConvaTec) was applied around the



ileostomy, with a 10-cc syringe followed by a strip of a 4-inch paste ring (Eakin, ConvaTec) that was applied circumferentially (Figure 2). The tape border was cut from an adult extended-wear 13/4-inch flange (Hollister Flange) to reduce the adhesive footprint of the pouching system. The starter hole was modified slightly to make it more oval, and the template was left in the box of pouching supplies at the bedside. The pouching system was applied over the paste ring and the pediatric pouch was attached with a belt modified to fit the infant, as previously described (Figures 3 and 4). This pouching system remained intact for 6 days. It was removed for assessment and teaching of the patient's mother who had observed the first pouch change as earlier. The following day, it was intact but removed again for teaching for both parents. She was discharged home that day, with additional modified ostomy belts as well as instructions in how to make them if needed prior to reanastomosis scheduled about 6 months after discharge.

#### Case 4

A 33-week-gestation male neonate with a birth weight of 2335 g required an ileostomy with Hartmann's pouch due to NEC at 3 days of age. His retracted stoma, which measured approximately 1 mm  $\times$  5 mm; it located at the lateral end of his abdominal incision just above his umbilical stump. He was initially managed with our smallest neonatal pouch (NuHope 3000, NuHope, Pacoima, California) followed by the slightly larger neonatal pouches from 2 other manufacturers with ongoing leakage issues (Little Ones, ConvaTec; Hollister pouchkin 3796, Hollister). Approximately 3 weeks after surgery, pouching difficulties became more pronounced. His incision had healed, but he had a prominent umbilicus and his stoma was so low on his abdomen that the inferior aspect of the pouch system lifted with movement of his legs. He was



Figure 2. Case Study 2: Paste ring in place.

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Figure 3. Case study 2 with modified flange in place.

pouched with a 2-piece 1<sup>3</sup>/<sub>4</sub>-inch pouching system, with an extended-wear barrier whose tape border had been removed (Hollister New Image flange 14602, Hollister Pouchkin 3799, Hollister). A strip of a 4-inch paste ring was applied to protect



Figure 4. Case study with belted pouch in place.

the peristomal skin before placing the barrier and attaching the pouch. An ostomy belt was sized to fit the infant to maintain a flatter pouching surface and lend stability. His wear time was initially improved to about 2½ days. Five days later, a parastomal hernia was noted that slightly reduced the wear time to 1 to 2 days; unfortunately, the pouch began to leak, leading to extensive skin loss, with a superimposed polymicrobial skin infection that prohibited effective pouching (Figure 5). Various moisture barriers and compounded ointments (Critic Aid Clear, Coloplast, Minneapolis, Minnesota; Aquaphor & Karaya powder, Beiersdorf, Wilton, CT & Hollister) were

Karaya powder, Beiersdorf, Wilton, CT & Hollister) were used to treat skin loss until reanastomosis was performed. In this case, the retracted stoma and surrounding irregular topography compounded by severe skin loss overwhelmed all attempts at pouching. Surgical reanastomosis was performed approximately 2 weeks after these difficulties arose.

## Case 5

A 37.5-week-gestation female neonate weighing 2693 g at birth was prenatally diagnosed with gastroschisis necessitating early induction of labor. She required an ileostomy and a mucous fistula at about 1 week old. She was managed with a neonatal pouching system to the ileostomy (Hollister Pouchkin 3796) and gauze to the mucous fistula. However, leakage became an issue due to significant prolapse of both stomas that occurred approximately 2 weeks postoperatively (Figure 6). At that point, a 1-piece flat flexible adult drainable pouch with an extended-wear barrier with no tape border (Coloplast MIO 10481) was applied after an opening was cut for each stoma. Strips of a 4-inch paste ring were applied to protect the skin around each stoma, and minimal ostomy paste (Stomahesive paste, ConvaTec) was applied via a 10-cc syringe to fill any gaps between the edge of the paste strips and the stomas (Figure 7). The pouch was applied sideways to better accommodate the infant's abdomen and stomal configuration; this arrangement also eased pouch emptying for the nursing staff. This pouching system achieved 4 to 5 days of wear time but, as the degree of prolapse worsened, pouching became more difficult and scattered intact, reddened areas were developed in the peristomal skin. A silicone-based barrier cream (Cavilon durable barrier cream, 3M, St Paul, Minnesota) that allowed taping was applied before repouching in the same manner. Four days later, the peristomal skin loss had resolved and the pouch wear time increased to 5 to 7 days. As the stomas further prolapsed, pouching was modified again by cutting to the outermost line



Figure 5. Case study 5 with extensive skin loss.

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Figure 6. Case study 5 with prolapsed ileostomy and mucous fistula.

of the barrier of the 1-piece adult drainable pouch to ease placement over both stomas (Figure 8). Strips of the 4-inch paste ring were cut and applied circumferentially around both stomas so that they essentially functioned as the pouch barrier. The silicone barrier cream was used for skin irritation with 3 to 5 days wear time at that point. The nursery staff and patient's mother had been instructed in the pouch change with plans to discharge the infant however; due to ongoing worsening of the prolapse, surgical reanastomosis was performed 1 month later and she was discharged without an ostomy.

#### DISCUSSION

We searched the literature to locate recent publications related to the care of infant and neonatal ostomy care. CINAHL, SCOPUS, and PubMed were searched using the key terms "neonates," "infants," "ostomies," and "pediatric ostomy care." In addition, references from articles reviewed were examined for further sources. The Wound, Ostomy and Continence Nurse Society Web page was searched for pertinent best practice documents. Foreign language articles and those not specific to neonatal ostomy management were excluded. Due to the paucity of literature published over the last 5 years, the search was expanded to the last 15 years, which yielded only 13 relevant articles, most of which identified the need for further work in this area.

Several studies discussed conditions requiring an ostomy and the prevalence of complications, but none addressed spe-



Figure 7. Case study 5 with paste ring and paste in place.



Figure 8. Case study 5 pouched with an adult extended wear pouch.

cifics of ostomy management.<sup>2,5,6</sup> A 2012 publication by van Zoonen and colleagues<sup>7</sup> retrospectively examined neonates who underwent laparoscopy between 2000 and 2010 for acute abdomen related to NEC, spontaneous intestinal perforation, intestinal atresia, and malrotation. They reviewed records of 155 infants with a median gestational age of 33 weeks and median birth weight of 1926 g and reported that 67 (43%) required an ostomy.<sup>7</sup> Of those patients who required an ostomy, 34% experienced ostomy complications, the most frequently were stomal necrosis (20%) or high-volume output of fecal effluent (29%).<sup>7</sup> High output was significantly problematic for fluid and electrolyte abnormalities as well as contributing to pouching issues.

Although ostomy creation is necessitated by a number of reasons, one of the most common conditions resulting in an ostomy is NEC. Necrotizing enterocolitis was initially reported in 1823 by Billard. It occurs most commonly in premature infants, although 15% of cases occurred in term or nearly term infants.<sup>6</sup> According to Aquayo and associates,<sup>8</sup> approximately half of infants with NEC will require surgery, which often results in at least 1 stoma. In a retrospective review of patients with NEC requiring surgical intervention with an ostomy over a 10-year span from 1999 to 2008, they found that 73 patients had a 42% rate of ostomy complications including retraction, skin loss, prolapse, necrosis, stricture, and peristomal hernia. They attributed these issues to less-than-ideal skin integrity, questionable bowel viability, and generalized illness. Interestingly, Aquayo and associates<sup>8</sup> also commented that the fairly low rate of skin loss could be attributed to the involvement of the ostomy nurses in their facility. They also identified a statistically significant inverse association between gestational age and the likelihood of ostomy complications (P = .003).

Pouching neonates and infants with ostomies routinely challenges even the most experienced WOC and pediatric nurses and creates additional angst for the infant's parents. The product formulary at our institution includes several neonatal and pediatric options from multiple manufacturers for both fecal and urinary diversions. On an ideal neonatal or pediatric patient, these pouching systems generally enable a 24-hour wear time. Nevertheless, we have found that the pouch wear time in patients with multiple stomas, prolapsed stomas, or nearby tubes, incisions, or peristomal hernias is often shorter. Our experience indicates that multiple pouch changes per day are often required due to leakage and the resultant skin loss,

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Figure 9. Example of instructions and examples left at bedside.

which further complicates pouching. In these situations, innovative pouching techniques are required.

Our literature search yielded few publications describing specific options to assist with challenging neonatal pouching. Many factors need to be considered in ostomy management for this vulnerable population including minimizing adhesives and potential transdermal absorption from components of a pouching system or accessory products such as alcohol and solvents, and achieving at least 24-hour pouch wear time.<sup>3,9</sup> If adhesives or adhesive removers are deemed necessary, silicone-based products are recommended.<sup>4,5,9</sup> Silicone is recommended because it is inert, leaves no residue, and has been found to provide longer barrier function compared to similar products containing alcohol.<sup>10,11</sup> Alcohol-based stoma paste is not routinely recommended. If used, it should be applied to the barrier using a syringe to obtain a fine bead and allow time for evaporation.<sup>3,9,12</sup> An alternative to alcohol-containing pastes is alcohol-free paste rings and strips. These can be used to protect the peristomal skin as well as to build up any irregular terrain.

A paucity of studies was found that examined the quality of nursing care for pediatric ostomy patients and proposed protocols to ensure good bedside care involving parents to promote independence with care<sup>1</sup>. We found a best practice document from the WOCN Society to guide clinicians through various ostomy complications encountered in these special patients.<sup>13</sup> In caring for the neonatal population, "less is more" was described as an appropriate maxim. However, when pouching products specifically designed for this population are insufficient, we recommend employing cautious creativity, paired with frequent follow-up to gauge success and monitor for untoward outcomes. Written instructions and templates should be left at bedside to help guide ostomy care (Figure 9).<sup>12</sup> Staff and parental involvement are key to ensuring consistency of approach, support their role as caregivers, and reduce potential complications.<sup>5</sup> At our institution, WOC nurses arrange family meetings for teaching to ensure competence, as pediatric home care is not an option for most of our patients due to unavailability and few outpatient clinics will see neonates and infants with ostomies.

#### **SUMMARY**

Neonatal pouching is challenging and frequently requires carefully crafted and innovative approaches to achieve acceptable wear time and improve the comfort and quality of life of the patients along with their parents and/or caregivers.<sup>1</sup> When presented with a neonatal pouching conundrum, we sometimes recommend use of products that are typically employed when pouching adults. We further recommend that use of these products should be minimal and judicious, based on careful consideration of the clinical presentation and challenges when dealing with a particular neonate or infant.<sup>2,3,9</sup> When considering the use of products not in the pediatric formulary, the potential risk must be weighed carefully against the risk of allowing ongoing leakage, the resultant skin loss and impact

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on comfort, quality of life, and potential bonding issues in distressed parents. Although no adverse skin reaction or skin loss related to any product used in the management techniques described in the case studies was noted, additional research is needed to evaluate pouching product usage in this delicate population.

# **KEY POINTS**

- Ostomy products should be selected that minimize or avoid alcohol and solvents.
- Belted pouching systems have utility in stabilizing the irregular infant/neonatal abdomen.
- Paste rings and adult extended-wear barriers may be helpful in managing challenging neonatal stomas.

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