



ORIGINAL RESEARCH ARTICLE

Survival of intestinal continent or incontinent vesical stomas after transection of the vascular pedicle: a case series

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ABSTRACT

Objective: Intestinal segments are commonly used in reconstructive urology to create continent or incontinent urinary channels. Initially, the viability of these segments depends on the integrity of the vascular pedicle. We report three patients with catheterizable, or incontinent channels constructed using the spiral Monti technique or incontinent ileovesicostomy all of whom developed postoperative complications involving the vascular pedicle.

Material and methods: Patients with documented vascular pedicle injury to a continent or incontinent ileovesicostomy in New Children's Hospital, Helsinki University Hospital and in Riley Children's Hospital, Indiana School of Medicine were retrospectively identified and reviewed.

Results: In all three cases, the vascular pedicle was transected either electively or during emergency surgery for intestinal volvulus or obstruction, 17 months to 5 years after reconstructive surgery. Despite pedicle loss, all patients retained viable functional channels, supported by collateral blood supply. Follow-up ranging from several months to 19 years confirmed sustained channel viability.

Conclusions: These cases suggest that, in select situations, collateral vascularization may be sufficient to preserve the function of a continent stoma despite loss of its primary vascular pedicle.

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Introduction

Techniques for creating alternative routes of urinary egress from the bladder have proven invaluable in providing safe urine storage and achieving urinary continence [1, 2]. These procedures often involve bowel segments, and while complications such as stenosis and channel tortuosity are well recognized, structural issues related to the vascular supply are less commonly reported.

In reconstructive surgery, bowel segments are frequently transposed with preservation of their native vascular pedicle. This approach is used in a variety of settings, including esophageal replacement, enterocystoplasty, and in the construction of catheterizable channels. Initially, the viability of the transposed segment relies on its vascular pedicle, however, over time, collateral vascular supply may develop and maintain tissue perfusion even in the event of pedicle disruption. This phenomenon has been described in gastrointestinal and head and neck reconstructions [3, 4], but has not, to our knowledge, been reported in urological reconstructions involving continent or incontinent channels or bladder augmentations or neobladders. We describe three patients in whom the vascular pedicle of a spiral Monti catheterizable channel or incontinent ileovesicostomy was transected due to volvulus of intestine around the vascular pedicle, yet the channel remained functional due to presumed collateral perfusion.

Material and methods

This study was conducted with the approval of the institutional review board (HUS/615/2025 and IRB#1605024102). Due to the retrospective nature of the study, written informed consent was waived.

Patients with documented vascular pedicle injury to a continent or incontinent ileovesicostomy in New Children's Hospital, Helsinki University Hospital and in Riley Children's Hospital, Indiana School of Medicine were retrospectively identified and reviewed.

Results

Patient 1

A male adolescent with neurogenic bladder managed with anticholinergic medication and clean intermittent catheterization (CIC) underwent formation of a spiral Monti catheterizable channel at age 16 in Helsinki University Hospital due to difficulties catheterizing while in a wheelchair. Previously, he had undergone an antegrade continence enema (ACE) operation. Four months postoperatively, he required surgery for intestinal obstruction. Two years later, he was operated on at another center for intestinal volvulus around the vascular pedicle of the

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catheterizable channel. Due to risk of recurrence, he was referred back to the pediatric hospital. The family expressed worry and asked for a solution to the problem, even if the continent stoma had to be removed. During surgery, 3y8mo after creation of continent stoma, no workable solution was found to preserve vascular pedicle and prevent new intestinal volvulus around the vascular pedicle. The location of the spiral Monti was completely retroperitoneal. As no definitive surgical strategy was feasible, the vascular pedicle was electively transected, and the channel was left in situ with reliance on collateral circulation. At 2-year follow-up, the spiral Monti tube remained viable and functional for CIC in cystoscopy for Botox injection. However, the skin junction was somewhat tight, necessitating a small incision.

Patient 2

A 10-year-old female patient with neurogenic bladder underwent the creation of a spiral Monti catheterizable channel with the cutaneous stoma positioned in the lower right abdomen in Helsinki University Hospital. The channel was positioned retroperitoneally, with the vascular pedicle remaining intraperitoneal. Seventeen months postoperatively, she presented to the emergency department because of 2 days of vomiting and abdominal pain. Abdominal X-ray suggested intestinal obstruction, and emergency laparotomy was performed because of suspected intestinal volvulus. The small bowel was herniated through a small opening beneath the vascular pedicle of the channel. Reduction was not possible without division of the vascular pedicle. A 65 cm segment of necrotic ileum was resected, and a primary anastomosis was performed. Despite the loss of the vascular pedicle, the catheterizable channel remained intact and functional. At 13-month follow-up, CIC was still working properly according to the phone call.

Patient 3

A 4-year-old male patient with imperforate anus, prior closure of lipomyelomeningocele and neurogenic bladder underwent the creation of an incontinent ileovesicostomy in Riley Hospital for Children, Indiana, due to elevated bladder pressures, progressive hydronephrosis, and poor compliance with CIC. Five years later, at age nine, he presented with symptoms of small bowel obstruction. Intraoperatively, the obstruction was found to be caused by bowel rotation around the mesentery of the ileal segment used for the channel. Vascular clamps were placed on the pedicle. After 15 min, no change in perfusion was apparent, the chimney-channel remained pink, and the mesentery was divided, leaving the ileal segment in situ and relying on collateral circulation. The segment remained viable and continued to function effectively. Follow-up was clinical. At the most recent follow-up, 19 years post-ileovesicostomy, the channel remains in use with stable renal function and no episodes of pyelonephritis. Urine was flowing freely from the ileovesicostomy, and the kidney ultrasound findings remain stable.

Discussion

When conservative management fails to control high bladder pressures in children or adults with neurologic or structural dysfunction, surgical reconstruction is often necessary to protect renal function and achieve continence [5, 6]. Bowel segments are frequently used to create alternate routes of urinary egress. While complications such as stenosis and tortuosity are well recognized, issues related to the vascular supply of the transposed segment are less commonly reported. We present a less common, but equally challenging set of complications that involve the vascular pedicle of the efferent limb.

Patients undergoing reconstruction involving transposed intestinal segments often present with complex clinical histories and are at risk for disease- or surgery-related complications. These complications may lead to repeated surgery, and repeated surgery in difficult circumstances may predispose the intestinal segment or its pedicle to danger. Previous reports describing the outcomes of free jejunal grafts in esophageal and head and neck reconstructions offer insights into the significance of vascular pedicle integrity. In a review by Yoon et al. [4], four free jejunal grafts with delayed occlusion (arterial, venous or both) survived despite vascular compromise occurring between 37 and 70 days postoperatively. In contrast, early venous occlusion (days 3–11) led to graft failure. Similarly, Yegin et al. [7] reported on 15 patients undergoing pharyngoesophageal reconstruction with free jejunal or ileocolonic flaps. In that cohort, delayed venous pedicle division at 3–12 months was tolerated without reanastomosis, whereas arterial division required immediate reanastomosis. An experimental canine study by Cordeiro et al. [8] demonstrated increasing survival rates of free jejunal graft over time following pedicle transection; no graft survived if the vascular pedicle was divided 1 week postoperatively; but survival was 60% after 2 weeks, 83% after 3 weeks and 100% after 4 weeks. Although most studies on vascular pedicle damage and experiences with collateral circulation involve free intestinal grafts, the underlying principle of developing collateral vascularization may also apply to transposed segments such as catheterizable or incontinent diversions or even intestinal neobladders. In a clinical setting, perfusion of the graft can be perhaps ascertained with the use of fluorescein or indocyanine green (ICG) during surgery [9, 10]. Given the retrospective nature and small number of patients, the generalizability of our findings remains limited.

Conclusion

In rare cases, the vascular pedicle of the continent catheterizable or incontinent channel can lead to life-threatening intestinal volvulus. Our experience suggests that if sufficient time has elapsed since the original surgery, collateral blood supply may be sufficient for continued function of the channel even if the vascular pedicle must be transected.

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