



Operative Technique

Use of a Heineke-Mikulicz like stricturoplasty for intractable skin level anal strictures following anoplasty in children with anorectal malformations

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ABSTRACT

Introduction: We introduced a modification of the Heineke-Mikulicz technique to treat intractable skin level anal strictures post posterior sagittal anorectoplasty (PSARP). The aim of this article is to describe the technique and outcome in a series of patients.

Methods: This was a retrospective evaluation of patients who had Heineke-Mikulicz like stricturoplasty performed for a post PSARP skin level stricture over a one-year period.

Results: Five patients who were operated using the technique were reviewed. All had severe anal strictures that could admit Hegar dilator sizes 6 to 9 at 16 months to 5 years after PSARP. All underwent routine dilatations, which became increasingly painful. As an alternative to continued dilatations, an operative procedure was offered. The surgery was done as a day case and lasted 10 to 30 min. The anus at the end of the procedure could comfortably accept a Hegar dilator size 14 to 17. None of the patients had a colostomy after the procedure and there were no complications.

Conclusions: The Heineke-Mikulicz like stricturoplasty is a simple surgical procedure that can be done in an ambulatory setting to treat children with intractable skin level anal stricture if this develops following definitive surgery for anorectal malformations.

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The goals of definitive surgery in children with anorectal malformations include creating an adequately sized anal opening placed within the limits of the sphincter muscles that maximize the potential for fecal control [1]. This involves mobilization of the distal rectum and making a circumferential anastomosis to the skin of the perineum as popularized by the posterior sagittal approach [2]. The neo-anal skin anastomosis is thus surrounded by muscles and is, because of the circumferential connection of mucosa to skin, prone to stricture formation. A regimen of anal dilatations is recommended [1] after the definitive surgery to prevent this complication.

When a stricture develops and becomes intractable, further attempts at anal dilatations, often done under general anesthesia, may result in more anal tears that heal by fibrosis [3] and create a cycle that continues in perpetuity. The patient's quality of life can be severely impaired and lead to dissatisfaction with care. Surgery in such a case may be a more viable option.

Previous attempts to deal with this situation have modified techniques that are described for anal surgery in adults and include S-shaped flaps, used for hemorrhoidectomy [4], Y-V plasty adapted from the surgical treatment of ureteropelvic junction obstruction [3,5] and

the diamond flap anoplasty in which two flaps are raised at the 3 o'clock and 9 o'clock positions with the apex of the diamonds at the points of the anal stenosis [6,7]. The major disadvantages of the flap-based anoplasties include flap retraction out of the anus and recurrence of the stricture [3,5], which has stimulated the search for other techniques such as the double diamond anoplasty [6].

We recently adopted a simple procedure, a Heineke-Mikulicz like stricturoplasty, for the treatment of intractable skin level anal stricture following anorectoplasty in children. The aim of this article is to describe the technique and evaluate the outcome of management in our patients who needed treatment for this situation.

1. Materials and methods

The records of 19 patients who were referred to our center with intractable anal strictures and had surgery over a one-year period were reviewed. The anal strictures were considered intractable having persisted in spite of anal dilatations under anesthesia. Five patients aged 2 to 5 years with strictures at the skin level who had Heineke-Mikulicz like stricturoplasty were included in the study. Fifteen patients had extensive strictures, hence needed a formal redo posterior sagittal anorectoplasty (PSARP) and were excluded. Also excluded were any patient with mild strictures that were amenable to anal dilatations. Information was obtained on the demographic details, the treatment

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the patients underwent previously for anorectal malformation, symptoms and signs attributable to the stricture, and treatment of the stricture up to that point. The patients had evaluations that included contrast enemas and an examination under anesthesia (EUA). The EUA was done to inspect the perineum, assess the severity of the stricture and sequelae such as anal tears and fibrosis, and to ensure that the patient had a well-located anoplasty within the sphincter complex. Strictures greater than 3 mm in depth were excluded and are the subject of another report, which describes the need in such cases for a formal, redo PSARP to manage these more extensive strictures. We describe here the surgical technique used for those with only a skin level stricture.

2. Description of operative technique

The patients were operated on an elective basis, without a colostomy, and in an ambulatory surgical setting. Each patient was admitted on the morning of surgery and general anesthesia administered. No bowel preparation was done but all patients were on a regular bowel regimen with enemas or laxatives and thus were not impacted. The patients were placed in the prone position and the operative field draped appropriately. The stricture was confirmed to be at the skin level (Fig. 1). Four traction stitches of 4-0 silk were placed circumferentially at the anal opening, in quadrants, at four positions (Fig. 2). Adjacent sutures were elevated on artery forceps and then incisions made across the strictured anocutaneous junction consecutively at the 12, 3, 6 and 9 o'clock positions (Figs. 2 & 3). Each incision was made radially to extend through the stricture, and immediately after each cut the anocutaneous junction was seen to become a rhombus at the point of the incision (Fig. 3). The incision was then closed concentric to the anal opening using 4-0 Vicryl® sutures (Fig. 4). The same step was repeated at the three other positions. The size of the resulting neanus was measured with a Hegar dilator.

Following surgery, the patients were commenced on regular diets once fully recovered from anesthesia and discharged home the same day. They were placed on laxative postoperatively to keep the stools loose. Those on enemas were restarted once the anoplasty was healed.



Fig. 1. Appearance of the skin level anal stricture.

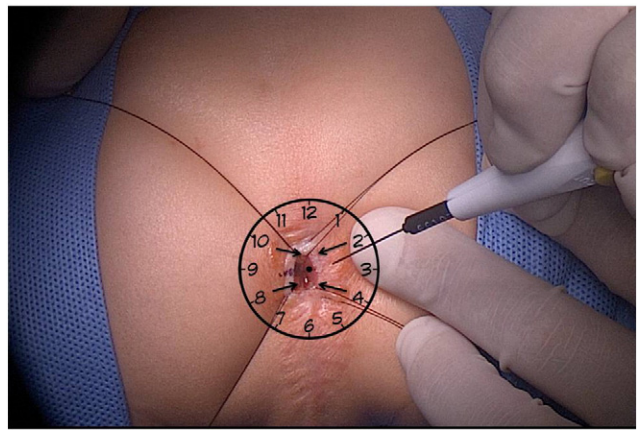


Fig. 2. Traction stitches are placed in quadrants and radial incisions made across the anocutaneous junction at four points.

3. Results

The Heineke-Mikulicz like stricturoplasty was used to treat five children who had severe anal stricture during the study period. They were aged 2 to 5 years (median of 3 years); all were boys. The patients were referred at a median interval of 22 months (range of 16 to 60 months) after PSARP.

All five had narrowing of the anoplasty, and postoperatively had undergone dilatations that became progressively more difficult. The contrast enemas done showed a distended rectum and sigmoid colon filled with feces. While under anesthesia for evaluation, the diameter of the anal opening ranged from Hegar dilator size 6 to 9.

All five patients were admitted on the day of surgery and the surgery lasted 10 to 30 min. The Hegar dilator size that could be comfortably inserted into the rectum after the procedure was 14 to 17. None of the patients required a colostomy after the surgery. There were no complications and there has been no recurrence at a median follow up period of 3 months (range of 4 weeks to 9 months).

4. Discussion

The treatment of children with anorectal malformations has improved tremendously since the advent of the PSARP. A key aspect of this new surgical technique was not only to provide a better anatomic reconstruction but also to ensure better functional results and a good quality of life [1]. Two types of strictures are seen after definitive anorectoplasty; the first type consists of a skin level stricture that seems to be related to inadequate dilatations, and the second is a severe stricture with a fibrotic ring of greater than 2–3 mm depth. Skin level

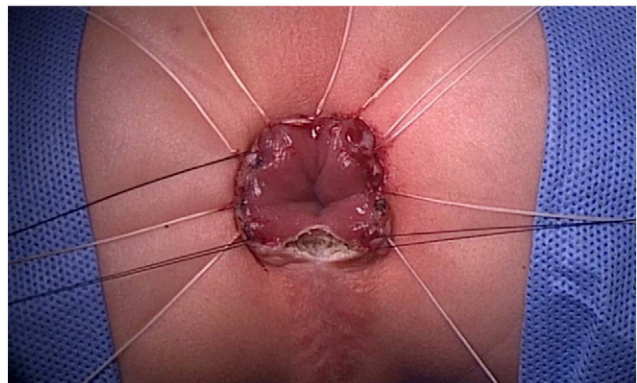


Fig. 3. The shape of the incision changes to a rhomboid configuration by pulling on adjacent traction sutures.

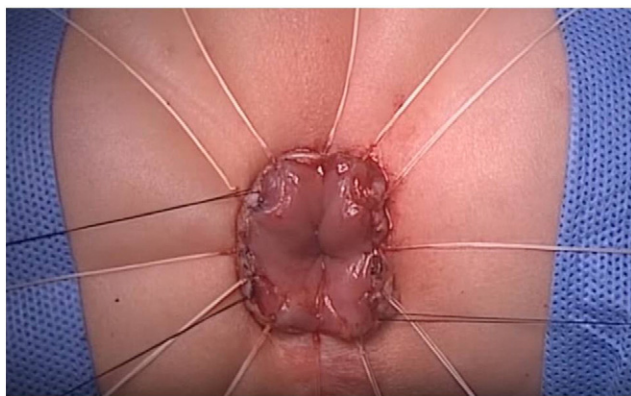


Fig. 4. The wound is closed with 4-0 Vicryl® sutures.

anal strictures are, largely preventable after PSARP by following a protocol of dilatations [1] whereas more extensive and severe strictures relate to tension and blood supply of the mobilized rectum [8]. Post PSARP gentle dilatations gradually stretch the neo-anus (consisting of the anal canal and mucocutaneous junction) over a period of time, until the anal size appropriate for the age of the child is reached [1]. The decision to follow this daily regimen done by the parents at home is to ensure that fibrosis is not allowed to occur between dilatations. When this regimen is not followed or dilatation is forceful with inappropriate dilators or sizes used, tearing of the anocutaneous junction that may extend deeper to the muscle layer leads to replacement with fibrotic tissue [3]. Often, caregivers are not enlightened adequately about the dilatations, hence, they are improperly done with a significant proportion of patients in this group requiring reoperations [9]. Poor compliance because the process is difficult is likely a contributing factor. Some have suggested that dilatations are not necessary after PSARP [10] but this has never been prospectively studied. The actual incidence of rectal strictures complicating PSARP is difficult to know, since a wide spectrum exists, but is in addition to irregular or improper dilatations likely compounded by bowel ischemia and performing the anoplasty under tension [9]. The reported rates are likely to be far below the incidence since the strictures in most patients improve with dilatations alone [9,11] and are never reported. It seems that a handful of patients fail to respond to this non-operative approach and are candidates for surgical treatment.

All five patients in our series who had surgery had, before referral, undergone serial dilatations that did not improve their symptoms. Anal strictures that are unresponsive to simple dilatations or that require dilatations under general anesthesia are not only distressing to children but also require repeated visits to the hospital and interrupt daily activities of the family. The anxiety and pain associated with distressing attempts to dilate a densely fibrotic anocutaneous junction make it quite challenging to evaluate the children fully in the outpatient clinic, hence they needed examinations under anesthesia.

Walter Heineke, a German surgeon and Johannes Mikulicz, a Polish surgeon in 1888 described a surgical technique for pyloroplasty in which a longitudinal incision is made from the stomach, across the pylorus and into the duodenum and closed transversely [12]. The procedure has been adopted for use in the treatment of patients with intestinal strictures in Crohn's disease [13], ureteropelvic junction obstruction [14,15], urethral strictures [16] and adult patients with inflammatory rectal structures [17]. We chose to adopt the technique because it is easy to reproduce, can be done in an ambulatory setting, and leads to immediate improvement of symptoms. The surgery does not involve

the raising of flaps, which may lead to unevenness, precariousness of the blood supply to the distal rectum, injury to the anal canal, and recurrence of the stricture, as can occur with the use of S and Y-V plasty for anal strictures post PSARP [3,5]. The diamond flap anastomosis has also been found useful in this instance with the creation of two islands of skin that has been raised on inferiorly located robust pedicles. Incising the rectal mucosa vertically is followed by placing the apex of the diamond inside the rectum and the sides of the diamond at the mucocutaneous junction, widening it and reducing the tendency to re-stricturing [6].

The outcome in our patients, although with only a short follow up period, thus far has been encouraging. It is important to remember that patients with more extensive strictures will not benefit from this approach and require formal reoperations. A major limitation of this study is the short period of follow up so far, but the improvement in symptoms and positive influence on the quality of life of our patients suggests that this would be sustained in the long term.

5. Conclusion

The Heineke-Mikulicz like stricturoplasty is a simple surgical procedure that can be done in ambulatory setting to treat children with intractable skin level anal stricture after definitive surgery for anorectal malformations.

Disclosures

The authors have no commercial or proprietary conflict of interest to declare.

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