

Neo-Bladder after Cystectomy

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Abstract

When total cystectomy is required in the treatment of bladder tumors or failed bladder exstrophy repair, several methods have been used, all aiming to obtain, at least, socially acceptable urinary continence and avoidance of urinary infection. We present a technique utilizing the lower part of the Colon and rectum. The technique we are about to describe, in which the pulled-through colon, coming from behind, inspired in Nedelec (1898), penetrates the rectum just below the peritoneal reflection, proceeds in a submucosal pathway, to come out through a separate orifice, just behind the anal opening in double fashion, thus maintaining continence but avoiding mixing of urine and faeces.

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Introduction and Objectives

Total cystectomy is mainly required in the treatment of bladder tumors or even exceptional cases of failed bladder exstrophy repair. Several methods have been used, all aiming to obtain socially acceptable urinary continence and avoidance of urinary infection. They all show problems [1,2].

Most of them show severe problems, particularly concerning the mixing of feces and urine and continence. That has led us to try and improve on the classical used methods of repair [3,4].

Surgical Technique

Abdominal Approach

The patient is placed lying on his back and ready to be changed to the lithotomy position for the perineal approach that will be associated later.

In Exstrophy the remaining of the bladder muscles is retained to reinforce the anterior abdominal wall, after the ureters have been sectioned at their lower ends. In the case of a bladder tumor, a Pfannenstiel type of skin incision is followed by a midline vertical, infra-umbilical laparotomy, the ureters being sectioned as low as possible.

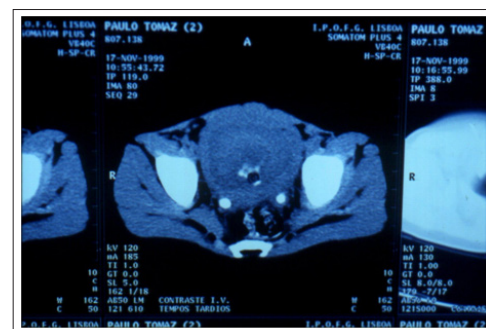


Figure 1: CTScan - Rhabdomyosarcoma, filling the bladder and causing bladder outlet Obstruction



Figure 2: Bladder filled with tumor, freeing the lower end of the ureters



Figure 3: Preparing the neobladder (scheme) (recto-sigmoid)

After sectioning the colon at mid sigmoid (so that the distal part of the gut will become the new bladder) the intestine is opened at its antimesenteric border, reaching till the level of the muscular complex, below the peritoneal reflection. Long (2 to 3 cms) submucous tunnels are made on the recto-sigmoid, at the level of the tenia, as a nipple (for dilated ureters, in order to minimize reflux). The ureters are then catheterized, the catheters coming out later through the primitive anus (that, at the end of the operation, will become the urinary meatus). The proximal portion of the recto-sigmoid is then turned down as a flap, reaching the lower part of the anti-mesenteric colonic incision (at the level of the muscular complex) and the two borders are sutured by a continuous suture of absorbable material, thus closing what will become the neobladder [5,6].

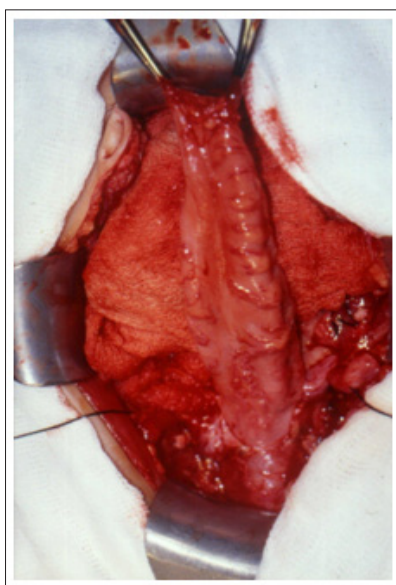


Figure 4: Long submucosal tunnels being made in recto sigmoid, for re-implantation of the ureters

The proximal portion of the sigmoid is then pulled through, submucosal, within the rectum, till reaching the perineum just behind the anus, after the posterior rectal wall muscle has been

split, at the upper level of the muscular complex (levators). One must take care that the opening at that site accommodates easily the pulled-through proximal sigmoid, in order to avoid eventual later stenosis at that level. The perineal incision is just a semicircular incision made parallel to the anal orifice, about 1 cm behind it and reaching the sub-mucosal rectal tunnel, thus remaining within all the sphincter mechanism (muscular complex and external sphincter), with total independence of urine and feces.

Care should be taken to maintain what has now become a uro-rectal septum (anus and pulled-through sigmoid) because if too short it can go up into the rectum and allow mixing of urine and feces (one of the 2 main things the technique aims at avoiding). If in doubt it is safer to leave the tip of the pulled-through sigmoid slightly protruding anteriorly, to be trimmed later, if needed. The final appearance of the perineum is almost normal, with the 2 adjoining orifices (in a double barrel gun fashion).

Discussion

When total cystectomy is required in the treatment of bladder tumors or failed bladder exstrophy repair, several methods have been used, all aiming to obtain, at least, socially acceptable urinary continence and avoidance of urinary infection.

Most of them fall into 6 main categories, each with its own problems and drawbacks. Some, allowing the dangerous mixing of feces and urine, with infection and renal failure, others involving the severe handicap of the use of a collecting bag or the performance of intermittent catheterization.

1. Ureterosigmoidostomy - in which continuity of the bowel is maintained, implanting the ureters in the sigmoid (as in the old and classical Coffey's fashion, with the dangerous mixing of faeces and urine, ending in pyelonephritis, kidney stones and early renal failure, even after Leadbetter popularized the submucosal tunnel technique, to prevent reflux and minimize kidney damage). Further, uretero-sigmoid anastomotic obstruction is not infrequent, sometimes occurring rather late and there is an increased risk of the development of adenocarcinoma at the site of the anastomoses. Finally, because the lower colon is highly absorptive, electrolyte disturbance is a common postoperative complication, leading to hyperchloremic acidosis with potassium depletion. Even the 2 stage procedure (first the formation of a non-refluxing sigmoid conduit, with subsequent anastomoses of the conduit to the intact sigmoid colon proposed by Hendren), does not preclude these complications.
2. Cutaneous ureterostomy – Cutaneous diversions are used particularly when the ureters are grossly dilated and require the use of a collecting bag. Eventually they represent definitive therapy. The main points to consider are the site and construction of the stoma. The stoma should not be near any scar, the umbilicus or bone structures, so that the collecting bag can fit a flat surface and is not easily displaced with the abdominal movements. To create the stoma, a little cylinder of abdominal wall is excised and the ureteric tip sutured in a nipple fashion.
3. Draining the ureters into an isolated ileal loop, brought out as a stoma (the "ileal conduit") - requiring also the use of a collecting bag (like in the classical Bricker's technique), has progressively been abandoned, due to frequent complications, namely cutaneous stoma and ureter/ileal stenosis, or reflux, leading to chronic pyelonephritis.
4. Draining the ureters into a non-refluxing colon conduit, as

the ureters are placed in long submucosal tunnels along the tenia. But still requiring a permanent collecting bag.

5. Constructing an isolated pouch, like Koch's or Indiana pouches, (with the use of intestine) or using bladder and intestine (as in bladder augmentation procedures), with an abdominal outlet, (usually the appendix, as proposed by Mitrofanoff, with the distal portion implanted into the bladder wall, in an anti-reflux manner and using the proximal end as the enterostomy in the right iliac fossa). That allows for continence and no collecting bag, but requires essential and cumbersome, intermittent catheterization, and is also not free from complications (like kinking of the connecting channel or its stenosis at the skin junction).
6. The isolated rectum as a neobladder, a old technique, was first proposed by Gersuny in 1898, Subsequent modifications, like our own (although fundamental for a successful outcome), have basically been alterations in the relationship between the recto-sigmoid pouch (that constitutes the neobladder), the pulled through sigmoid, the internal sphincter (muscular complex) and the external sphincter.

Gersuny made the sigmoid enter the rectal pouch anteriorly and open within the distal rectum. Duhamel, in 1956, proposed to approach the rectum from behind (as is done in his technique for Hirschsprung's disease). Monereo, in 1974, made the sigmoid pass, posteriorly, through the lower sphincters but coming out within a single anal orifice. Nedelec, in 1967, proposed almost the same, but with the entrance of the pull-through sigmoid, entering the rectum, just above the external sphincter. Finally we propose the technique we have described above, in which the pulled-through colon, coming from behind, penetrates the rectum just below the peritoneal reflection, proceeds in a submucosal pathway, to come out through a separate orifice, just behind the anal opening in double fashion [7,8].

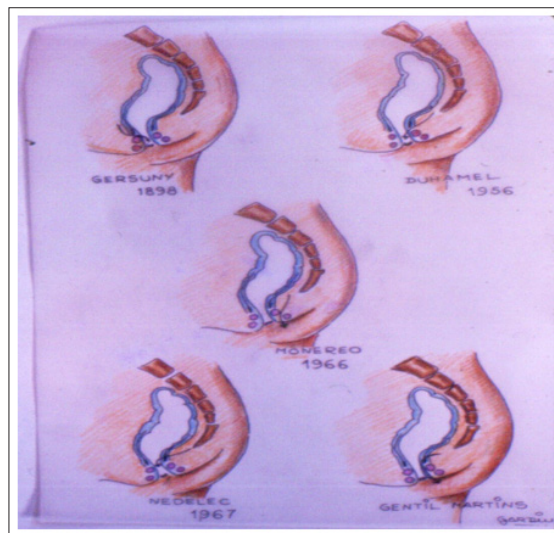


Figure 6: Evolution of the rectal neo-bladder Procedures, till our own



Figure 7: Final appearance of perineum a few weeks later (almost normal looking)



Figure 5: Semicircular perianal, posterior incision



Figure 8: Schematic view at the end of the operation: ureteric reimplantation, proximal sigmoid pulled-through within a rectal sub-mucosal tunnel, thus fully within the sphincter mechanism, neo-meatus (primitive anal opening) and neo-anus, side by side.

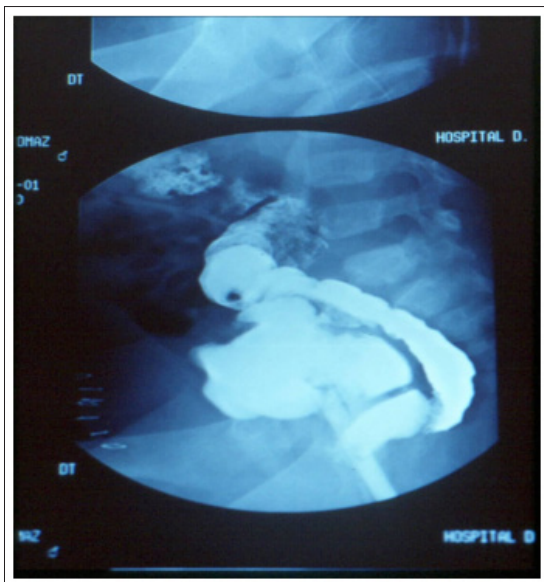


Figure 9: Simultaneous cystography and barium enema to show the relationship between neo-bladder and neo-rectum

Conclusions

Before deciding on the use of this technique one must be sure of the quality of rectal continence, as that is essential for the success of the method. The patients will defecate and urinate sitting down (what is certainly no problem for girls), but can be continent. Then they do not need to use collecting bags or to perform intermittent catheterization. In exstrophy of the bladder (if the epispadias has been repaired) and in bladder tumors (if the posterior urethra has not been removed), a normal ejaculation can be expected.

Overall quality of life is improved, by having “normal, urinary and fecal continence and the threat of urinary infection and consequent kidney failure is minimized.

Compliance with Ethical Standards

Disclaimer: The paper is a single author piece and presents no conflict of interests

Funding: No funding was received

Conflict of Interest: No conflict of interest

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Ethical approval: This article is not a study

Informed consent: Informed consent was obtained from all individual participants included in the study. No patient can be identified

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