CANADIAN JOURNAL OF UROLOGY

Tech Science Press

Doi:10.32604/cju.2026.079335
HOW I DO IT

Button Cistostomy in pediatric population: a simplified mini-inivasive insertion technique

Giovanni Mosiello,[1] Martina Monti,[1,2*] Rebecca Pulvirenti,[1] Noemi Deanesi,[1,3] Antonio Maria Zaccara,[1] Chiara Pellegrino,[1] Maria Luisa Capitanucci,[1]

[1]Division of Neuro-Urology, Bambino Gesù Children's Hospital, IRCCS, ERN eUROGEN Affiliated Center, Piazza di Sant'Onofrio 4, Rome, Italy

[2]Department of Neurosciences, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health (DiNOGMI), School of Medicine, University of Genoa, Largo Paolo Daneo 3, Genoa, Italy

[3]Department of Urology, Campus Bio-Medico University of Rome, via Alvaro del Portillo 21, Rome, Italy

MOSIELLO G, MONTI M, PULVIRENTI R, DEANESI N, ZACCARA AM, PELLEGRINO C, CAPITANUCCI ML. Button Cistostomy in pediatric population: a simplified mini-inivasive insertion technique. *Can J Urol* 2026;33(4):795–798.

Pediatric patients with functional or anatomical lower urinary tract obstruction, including neurogenic bladder, require effective bladder drainage to maintain low intravesical pressures, prevent infections, and preserve renal function. Clean intermittent catheterization (CIC) is the standard approach, but it is not always feasible due to patient- or anatomy-related factors. In these cases, continent or non-continent urinary diversion techniques are considered. Among non-continent options, vesicostomy has traditionally been used but is associated with significant morbidity and long-term complications. The cystostomy button (CB), originally developed for enteral feeding, has emerged as a minimally invasive, catheterizable alternative for bladder drainage. Current evidence and clinical experience suggest that CB placement is well tolerated by patients and caregivers, easy to manage, and effective in maintaining reliable bladder emptying without compromising detrusor function. Furthermore, endoscopic placement techniques enhance procedural safety while reducing invasiveness. This study aims to describe our personal modified endoscopic technique used for CB placement, when CIC is not feasible.

Key Words: Neurogenic bladder, urinary diversion, button cystostomy, bladder management, urinary tract infection

Introduction

In paediatric patients with functional or anatomical obstruction of the lower urinary tract, including neurogenic bladder, the main therapeutic goals are to preserve renal function and maintain regular bladder function, with low-pressure bladder filling and emptying, complete urine drainage, preserving continence, and avoiding urinary tract infections (UTIs).[1,2]

Various bladder drainage techniques have been described in the literature over the years.[1] Clean intermittent catheterization (CIC) remains the treatment of choice; however, in cases where CIC is not feasible, urinary diversion procedures should be considered.[3,4] Urinary diversion techniques can be broadly categorized as continent or non-continent. Continent diversions include procedures such as the Mitrofanoff[5] and Monti[6] techniques. Non-continent methods mainly include vesicostomy and cystostomy button (CB) placement. The choice depends on the patient's clinical condition, underlying pathology, and level of mobility.

A CB is a silicone catheterizable device used as a gastrostomy button to administer enteral nutrition; it is an alternative to CIC, through the use of an extension set. The first description of the potential use of this device for bladder management was published in 1996 by de Badiola et al., when they used a gastrostomy kit to temporarily close a vesicostomy in children to enable urodynamic evaluations to be performed.[7] Later, Subramaniam et al.

Received date 20 January 2026
Accepted for publication 13 March 2026
Published online 21 August 2026

*Corresponding Author: Martina Monti.
Email: martinamonti3194@gmail.com

described an adapted technique for bladder drainage from the placement of the Mickey button for enteral nutrition.[8,9]

According to the current literature[10] and our experience, the use of the CB has shown good tolerability by both patients and caregivers. This easy-to-use device has minimal impact on the patient's daily activities. It reliably drains the bladder while minimizing the risk of complications associated with anatomical or functional abnormalities of the lower urinary tract without compromising detrusor function.

This feature makes it preferable to other surgical derivation procedures, such as vesicostomy, which can lead to significant short- and long-term complications, as stoma leakage, prolapse, stenosis and bleeding, which often lead to the need for reoperation and surgical revision.[5,11] The device can be implanted using either an open surgical approach or an endoscopic approach. The endoscopic technique offers advantages such as less-invasive procedures and the ability to perform placement under direct vision, which increases the safety of the procedure.

The objective of this study is to present the technique used at our center for CB placement using a modified endoscopic approach, with suggested tips and tricks to facilitate the procedure for improving the use of CB as an alternative to other common methods of urinary drainage.

Method and Technique

The technique is based on the modified Subramaniam method.[8,9] This is an endoscopic procedure performed with the patient in the lithotomy position. The technique is illustrated in detail in the attached video as supplementary material. The procedure begins introducing cystoscope into the bladder, which is then filled with a saline solution.

Then, the anterior wall of the bladder is anchored to the anterior abdominal wall using the Patkowski manoeuvre for hernia repair. This manoeuvre was first used in bladder surgery by Chrzan et al.[12] According to this modified standard technique, the bladder is perforated twice percutaneously with a 14 G Abbocath-T needle. A 2-0 polypropylene monofilament suture is then inserted into the needle to form an intravesical loop. This step is essential in order to pull the anterior wall of the bladder forward and facilitate safer operating conditions. As an alternative, the bladder can be anchored to the anterior abdominal wall using a 0 polypropylene monofilament suture.

A Cystofix® 10 Ch needle (B. Braun, Bethlehem, PA, USA) is then positioned approximately 1 cm below the traction point under endoscopic guidance. An alternative to using a Cystofix set is using a 5 cm trocar. A further modification is the use of a guide wire, which is inserted through the Cystofix® needle and extruded through the urethra using grasping forceps. This approach allows the guide wire to be kept taut at two points, ensuring a straight path that facilitates insertion, simplifies the procedure, and reduces intraoperative time.

The Cystofix cannula is then removed. Compared to the traditional endoscopic technique, a further modification involves using Amplatz (Cook) renal dilators to reduce the risk of complications, such as urine leakage. These dilatators are advanced progressively along the guidewire. The size is chosen based on the thickness of the patient's subcutaneous adipose tissue. Amplatz dilators, which are centimeter-marked, allow for precise determination of the correct CB length by measuring the thickness of the bladder and the abdominal wall. The choice of device diameter is mainly related to the patient's age and weight (12 Ch for patients under 20 kg or under 3 years old, 14 kg under 50 kg, and 16 Ch for adolescents or patients over 50 kg).

We start by using 10 Ch dilators until we reach a size four numbers larger than that of the chosen button (for instance, if the button is 12 Ch, we will calibrate up to 16 Ch).

The Mic-Key CB (Kimberly-Clark/Ballard, Roswell, GA, USA) is positioned on the Amplatz Indocurant dilator (Boston Scientific) and introduced into the bladder. At the end of the procedure, the balloon is filled with 5 mL of sterile saline solution and the guidewire and introducer are removed. Finally, a transurethral bladder catheter is placed. The entire procedure is performed under endoscopic vision.

Postoperative protocol

During the first seven days after surgery, the urinary catheter is kept open for continuous drainage of the bladder, and the button is kept closed, in order to allow proper healing without urine passing through. Subsequent to the initial week, the urinary catheter is removed and the CB is opened, either continuously or at regular intervals.

Cystostomy button maintenance

The CB must be replaced every two months. The first replacement is always performed under sedation to prevent edema or injury to the surrounding

area, especially to avoid dehiscence between the bladder and the abdominal wall, verify the absence of stenosis, and define the correct length for the related device's prescription. Subsequent replacements are performed on an outpatient basis, during which the caregiver and patient are trained to perform a self-replacement as soon as possible. If difficulties arise when inserting the CB on an outpatient basis due to edema or patient agitation, a suprapubic catheter of the same size or smaller than the button must be placed to keep the passageway open. Subsequently, the CB must be repositioned under sedation, and if necessary, calibrations or replacements on the guide wire can be performed.

Brief discussion of the results

In patients with functional or anatomical abnormalities of the lower urinary tract, it is essential to maintain low bladder pressures to ensure complete urinary drainage, thereby reducing the risk of UTIs that could cause irreversible damage to the bladder and renal function.[1,2] The most common treatment is CIC, but it is associated with a high frequency of UTIs and increased urethral sensitivity.[3] For this reason, and due to anatomical limitations such as urethral stricture, alternative methods of bladder drainage are often necessary.

The CB has already been demonstrated to be effective for urinary diversion in the literature.[11,13,14] It is a well-tolerated device appreciated by patients and caregivers for its ease of use. It is preferred over vesicostomy because it is less likely to result in postoperative complications and allows adequate drainage without compromising bladder function. Furthermore, the CB is more stable than suprapubic catheters, making it particularly suitable for pediatric patients and long-term use. Additionally, it is associated with a low rate of postoperative complications.[13]

It can be positioned through either open surgery or endoscopy. The open approach is used when the endoscopic approach is not technically feasible or when difficulties arise during the endoscopic procedure and it involves a mini-Pfannenstiel incision.[14] The Subramaniam technique is an endoscopic approach that reduces the invasiveness of the procedure.[8,9] It allows the entire operation to be performed under endoscopic vision and offers the operator greater safety by minimizing intraoperative risks. The time required for endoscopic placement is also reduced compared to the open technique, aiding in decreasing the length of anesthesia, particularly in vulnerable patients with elevated anesthetic risk. Additionally, the endoscopic technique reduces the risk of urinary leakage, as well as scars and wound dehiscence, thereby decreasing the risk of infection.[14]

The most important modification made to Subramaniam's original method in our centre is the anchoring of the anterior bladder wall to the abdominal wall, as described in Patkowski's procedure. This step pulls the anterior bladder wall forward and prevents the introducer from sliding into the subcutaneous layer during puncture, which could complicate device insertion. Subsequent to puncturing the bladder and inserting a Cystofix-type epicystostomy catheter, a guide wire is passed through the catheter and brought out through the urethra using grasping forceps, keeping the guide wire under tension and simplifying the procedure thanks to a straight path for inserting the device. Lastly, the stoma is dilated with an Amplatz dilator before inserting the CB, in order to reduce urinary leakage, due to the appropriate choice of CB size.

As described previously by Galati et al.,[15] 93.9% of participants reported satisfaction with home management of CB compared to CIC, indicating general satisfaction with the placement and use of CB.

Although evidence based on validated quality-of-life questionnaires remains limited, our clinical experience and the findings reported in the literature suggest that CB improves patients' daily functioning and quality of life. This enables activities such as participating in water sports and wearing normal underwear instead of diapers.

Complications that occur during surgery include urinary ascitis which is when the bladder is not properly attached to the abdominal wall. Other possible complications that may occur after surgery include peristomal leakage, skin infections or granulomas, UTIs, and bladder stones.[13] Despite these possible complications, our proposed technique aims to simplify CB placement, reducing procedural complexity, operating times, and intraoperative complications.

Conclusions

In pediatric patients with functional or anatomical obstruction of the lower urinary tract, including neurogenic bladder, the use of a CB represents a valid alternative for bladder drainage when CIC is not feasible. This drainage method has been embraced by both patients and healthcare professionals due to its manageability, effectively mitigating the social discomforts associated with CIC or suprapubic cystostomy, and well preserving renal and bladder function Consequently, CB has been used successfully in most cases as a definitive treatment on a

temporary basis before to accept CIC or as a transition to definitive bladder drainage via appendicostomy. Further studies are needed to determine the most effective treatment for these patients and the optimal bladder drainage methods.

Acknowledgement

None.

Funding Statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author Contributions

The authors express their gratitude to Giovanni Mosiello, Martina Monti, and Rebecca Pulvirenti, contributed to designing the study, collecting and analysing the data and drafting the manuscript, and Noemi Deanesi, Antonio Maria Zaccara, Chiara Pellegrino, and Maria Luisa Capitanucci, for the internal revision of the manuscript. All authors reviewed and approved the final version of the manuscript.

Availability of Data and Materials

The data and materials used are based on standard clinical practice.

Ethics Approval

Written informed consent was obtained from the parents. Ethical approval was waived by the Ethics Committee of Bambino Gesù Children's Hospital and all the procedures being performed were part of the routine care.

Conflicts of Interest

The authors declare no conflicts of interest.

Supplementary Materials

The supplementary material is available online at https://www.techscience.com/doi/10.32604/cju.2026.079335/s1.

References

1. Lacreuse I, Moog R, Borruto F et al. Button cystostomy for bladder drainage: which children can benefit from this device? *J Pediatr Surg* 2012;47:612–616. doi:10.1016/j.jpedsurg.2011.11.053.
2. Proesmans W. The neurogenic bladder: introducing four contributions. *Pediatr Nephrol* 2008;23:537–540. doi:10.1007/s00467-008-0768-3.
3. Nijman RJM, van Laecke E, Mosiello G. Neurogenic LUT symptoms in children with rare diseases. In: Liao L, Madersbacher H, editors. *Handbook of neurourology: theory and practice*. Singapore: Springer Nature; 2023. p. 777–788. doi:10.1007/978-981-99-1659-7_80.
4. Stein R, Bogaert G, Dogan HS et al. EAU/ESPU guidelines on the management of neurogenic bladder in children and adolescent part I diagnostics and conservative treatment. *Neurourol Urodyn* 2020;39:45–57. doi:10.1016/s2666-1683(20)33813-1.
5. Weis S, Pierucci UM, Planchamp T et al. Laparoscopic Mitrofanoff procedure in children: feasibility and outcome analysis over 18 years in a single centre. *J Pediatr Urol* 2026;22(2):105630. doi:10.1016/j.jpurol.2025.09.036.
6. Griffin YM, Misseri R, Roth JD et al. Use and disuse of catheterizable channels as the primary method of emptying the neuropathic bladder: a single institutional cohort study. *J Urol* March 2025;213(3):361–369. doi:10.1097/JU.0000000000004313.
7. De Badiola FI, Denes ED, Ruiz E et al. New application of the gastrostomy button for clinical and urodynamic evaluation before vesicostomy closure. *J Urol* 1996;156(2S):618–620. doi:10.1097/00005392-199608001-00011.
8. Haider N, Subramaniam R. Endoscopic insertion of cystostomy button for bladder drainage in children. *J Pediatr Urol* 2008;4:457–459. doi:10.1016/j.jpurol.2008.07.002.
9. Milliken I, Munro NP, Subramaniam R. Cystostomy button for bladder drainage in children. *J Urol* 2007;178:2604–2606. doi:10.1016/j.juro.2007.08.031.
10. Varik RS, Geoghegan N, De Caluwe D, Rahman N, Farrugia MK. Suprapubic vesicostomy buttons: indications, complications and bladder outcomes. *J Pediatr Urol* 2025;21(1):101–107. doi:10.1016/j.jpurol.2024.10.025.
11. Jeng G, Misseri R, King SJ et al. Cutaneous vesicostomy: effects on future bladder outcomes in patients with spinabifida. *J Pediatr Urol* 2025;21(6):1700–1706. doi:10.1016/j.jpurol.2025.07.023.
12. Chrzan R, Klijn AJ, Dik P et al. U2B-dry: preliminary results of a new vesicoscopic technique for bladder neck repair in children. *J Laparoendosc Adv Surg Tech A* 2010;20(3):293–296. doi:10.1089/lap.2009.0185.
13. Mosiello G, Lopes Mendes AL, Capitanucci ML, Zaccara AM, De Gennaro M. Button cystostomy: is it really a safe and effective therapeutic option in pediatric patients with neurogenic bladder? *Urology* 2017;101:73–79. doi:10.1016/j.urology.2016.09.025.
14. Nast KJ, Chiang G, Marietti S. Vesicostomy button: how is it placed, in whom, and how is quality of life affected? *Int Braz J Urol* 2019;45(4):807–814. doi:10.1590/s1677-5538.ibju.2018.0686.
15. Galati M, Pulvirenti R, Barretta I et al. Button cystostomy in children with neurogenic bladder: outcomes from a single center. *J Clin Med* 2025;14(15):5532. doi:10.3390/jcm14155532.