

# Continent catheterizable conduit for urinary diversion in children: Applicability and acceptability

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## ABSTRACT

**Background:** Continent catheterizable conduit (CCC) has made clean intermittent catheterization (CIC) painless and easy. It is applicable in diverse clinical conditions. Nonetheless, convincing the parents for the need of conduit procedure is still difficult.

**Materials and Methods:** A prospective study, included children who underwent CCC procedure from March 2008 to February 2013. The data were assessed for; diagnosis, type of conduit, number of preoperative counselling sessions before acceptance, role of “self-help group” in decision making, parental concern and satisfaction for the procedure. **Results:** Twenty-nine patients (males; 24, females; 5) underwent CCC procedure for various clinical conditions. The multiple preoperative counselling sessions and creation of “self-help groups” were helped them for decision making. The main concerns among parents were: (1) Impact of procedure on future fertility and sexual life. (2) Patency of native urethral channel. (3) Permanent urinary stoma over the abdomen. **Conclusion:** CCC procedures are applicable to a wide array of clinical situations with a good outcome. The acceptability of the CCC procedure improves with preoperative counselling of parent/child, initiation of preoperative per urethral CIC and creation of self-help groups.

**Key words:** Appendicovesicostomy, continent catheterizable conduit, self-help group, spiral monti technique, preoperative counselling

## INTRODUCTION

Lapides introduced per urethral clean intermittent catheterization (CIC) in 1972, later Mitrofanoff revolutionized the concept by describing appendicovesicostomy for CIC in 1980.<sup>[1,2]</sup> Since then,

many modifications of appendicovesicostomy and other alternatives for appendix have been reported.<sup>[3-5]</sup> These procedures are used in a variety of clinical conditions leading to urinary incontinence and/or high-pressure systems threatening the upper urinary tract. The commitment for lifelong CIC and creation of permanent urinary stoma over the abdomen has made the acceptability difficult for the parents. Herein, we analysed our experience with this procedure, we assessed its applicability and parent’s concerns for acceptance of the procedure.

## MATERIALS AND METHODS

It was a prospective study conducted in our institute after clearance from the ethical board committee. The children underwent the continent catheterizable conduit (CCC) procedure from March 2008 to February 2013 included in this study. The data were analysed for; diagnosis, type of conduit, number of preoperative counselling session before acceptance, role of the self-help group in decision making, parental concern and satisfaction for the procedure. Parent’s satisfaction was assessed by three parameters:

1. Child remains dry in between the CIC.
2. Able to attend school and being acceptable in peer groups.
3. Able to attend social gathering and participating in sports activity.

Parents were considered satisfied when there was a positive response for all three parameters. The child was considered a continent if there was no urinary leakage from per urethral site or from the conduit stoma site in between the CIC (3 hourly).

## RESULTS

A total of 29 children (males; 24, females; 5) was included in the study. The mean age at operation was 6.3 years (range 1-14 years). The clinical details of children at

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the time of presentation have been shown in Table 1. The types of conduit procedures were performed; Appendicovesicostomy (83%), ureteric conduit (10%) and spiral monti ileal tube (SMIT) (7%). The follow-up period was ranged from 8 months to 5 years. The surgical interventions performed, and their results have been shown in Table 2. The overall outcome was good in our study; all (100%) children were using conduit for CIC and continence was achieved in 97% of children.

The main concerns among parents were:

1. Future fertility and sexual life.
2. Patency of native urethral channel.
3. Permanent urinary stoma over the abdomen.

The other parental issues were; possibility to reverse the procedure, cost for the CIC, need for special care after procedure and long-term outcome of the procedure. Preoperatively, parents were required 3 (median) counselling sessions (range 2-4) before accepting the procedure. Parents who were performing per urethral CIC accept the procedure effortlessly.

Creation of “self-help group” had helped them to clear their concerns about the procedure. It helped them in decision making and made more receptive for the procedure. All parents were satisfied (except one) with the procedure and were doing CIC regularly.

## DISCUSSION

The conduit procedures provide a channel that is a continent, easily accessible and painless for CIC. The indications for constructing a continent urinary diversion are incontinence, unsafe filling pressure that leads to renal damage and irreparably damaged or deformed native urethra.

In our study, the major clinical groups were bladder exstrophy and neurogenic bladder, which were similar as mentioned in the literature.<sup>[6]</sup> Three children had unusual indications:

1. Chronic kidney disease causing polyuria led to night time incontinence.
2. Urethral duplication with failed buccal mucosal graft urethroplasty resulted in severe perineal scarring.
3. Prune belly syndrome along with urethral atresia and patent urachus.

In our study, appendicovesicostomy (83%) was the most common conduit procedure done and in the absence/nonavailability of appendix, our preference was an SMIT (Monti-Yang-Casale technique).<sup>[4]</sup> Ureter was used as a conduit channel for three cases in which nephrectomy (as indicated) was planned; two children of posterior urethral valve with posterior urethral valve,

**Table 1: Clinical details of children at the time of presentation**

Diagnosis (number of patients)	Associated conditions (number of patients)	Previous interventions (number of patients)	Indications of CCC
B.E.(9)	B/L VUR (2)	Primary bladder closure (7) Nil (first visit) (2)	SBC + incontinence SBP
N.B.(7)	B/L VUR (2) Left VUR (1)	MMC repair (6) B/L ureterostomy (1)	Incontinence
ARM (5)	SK (1), NFK (1) sacral agenesis (2), MRKH (2)	Abdominoperineal PSARP (3)	Incontinence
PUV (4)	VURD (2), SK (1)	Valve incision (3), vesicostomy (1)	SBC + significant PVR + incontinence
Prune belly syndrome (2)	B/L VUR (1), urethral atresia with patent urachus (1)	Exomphalos repair (1)	Incontinence (1) Urethral atresia (1)
CKD (1)	SK	Nil	Polyuria + significant PVR
Urethral duplication (1)	Recto urethral fistula	Urethral reconstruction with buccal mucosa	Failed urethral reconstruction with severe perineal scarring

B.E: Bladder exstrophy; PUV: Posterior urethral valve; CKD: Chronic kidney disease; N.B: Neurogenic bladder; ARM: Anorectal malformation; B/L: Bilateral; MRKH: Mayer-Rokitansky-Küster-Hauser syndrome; VURD: Posterior urethral valve, unilateral vesicoureteral reflux and renal dysplasia syndrome; VUR: Vesicoureteric reflux; PSARP: Posterior sagittal anorectoplasty; NFK: Nonfunctioning kidney; SK: Solitary kidney; MCDK: Multicystic dysplastic kidney; SBC: Small bladder capacity; SBP: The Small bladder plate; MMC: Meningomyelocele; CCC: Continent catheterizable conduit

**Table 2: Type of conduit procedure and additional surgical interventions**

Type of conduit	Augmentation done	MACE done	BNR/ BNC	Complications	Surgical procedure for complication
Appendix (24)	Yes (9)	Yes (3)	BNR (6) BNC (2)	Leak from suture liner* (1) Stenosis of appendicular conduit** (1) Leak from closed bladder neck*** (1)	Excision of the native bladder plate* (1) Revision of mitrofanoff with SMIT** (1) Under follow-up*** (1)
Ureteric (3)	Yes (1)	Yes (1)	Nil	Nil	Nil
SMIT (2)	Yes (1)	Yes (1)	BNC (1)	Nil	Nil

BNR: Bladder neck repair; BNC: Bladder neck closure; MACE: Malone antegrade colonic enema; SMIT: Spiral monti ileal tube

unilateral vesicoureteral reflux and renal dysplasia syndrome and one child of anorectal malformation with one side nonfunctioning kidney.

Most of the published series with long-term follow-up shows continence rate >90%.<sup>[7]</sup> Narayanaswamy *et al.* reported their result with 94 Mitrofanoff procedures with similar continence rates.<sup>[8]</sup> In our study, 28 out of 29 children (97%) were achieved continence, unfortunately in one child, there was per urethral leak after bladder neck closure (BNC) procedure. This child is under follow-up and may require a redo BNC procedure. Castellan *et al.* reported 7% stomal incontinence; fortunately, in our study no one child had stomal incontinence.<sup>[9]</sup>

All parents and children (when appropriate) were counselled pre-operatively by concern surgeon regarding the procedure, the need for lifelong CIC and they were introduced into “self-help groups” in a dedicated urology follow-up clinic. We started per urethral CIC (where indicated) in the preoperative period. All parents/children were interviewed (by operating surgeon) in the post-operative period (after 6 months) regarding their satisfaction for the procedure and changes noticed in the lifestyle of the child compared to the preoperative period.

The commitment for lifelong CIC, abdominal, urinary stoma and also low educational status of the patients was the factors for poor acceptance. We performed the procedure only in patients in whom parents/child understood the seriousness and necessity for lifelong CIC, which was achieved by multiple preoperative counselling sessions.

The major problems of parents/patients, which were addressed by CCC procedure: Incontinence (wet and stinky child), unable to attend school and social isolation. The majority of parents were concerned for fertility and sexual life. We also found that the children, who underwent BNC procedure along with CCC procedure required more number of preoperative counselling sessions. The patency of native urethral channel was considered an important factor from parent’s perspective and for decision making. Parents were held back the procedure for patent native urethra, as remote future possibility for further intervention to restore the normal anatomy.

The dedicated urology follow-up clinic was the ideal place for the creation of “self-help groups” (similar patients/parents group), and that was an important factor contributed in the decision-making process. It provided an opportunity for parents/child to learn the practical aspect of conduit care and to share their experiences/problems. This interaction cleared their doubts and reduced apprehension. The information’s sharing between “self-help groups” made them more confident and more comfortable for the patient care.

## CONCLUSION

Continent catheterizable conduit procedures are applicable to a wide array of clinical situations with a good outcome. The acceptability of the CCC procedure improves with preoperative counselling of parent/child, initiation of preoperative per urethral CIC and creation of “self-help groups.”

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