


Dérivations cutanées continentales Par voie coelioscopique ROBOT



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Why Continent Cutaneous urinary diversion?

Intermittent self catheterization is the gold standard in neuro-urological patients

Continent Cutaneous Urinary diversion (CCUD) may be proposed in patients with tetraplegia, in case of **inability to perform intermittent self-catheterization (ISC) through the native urethra**

- **Difficulties to find or to reach the urethra (>>women)**
 - Upper limb disability (depending on the level)
 - Body habitus (Overweight, abdominal wall)
 - Constraints /difficulty in transferring or undressing oneself (e.g. active women+)
- **Urethral destruction, urethral strictures**
 - Lesion of indwelling catheter, urethro-cutaneous fistulae (pressure sores)
- **+/- isolated or associated refractory incontinence**
- **Specific situations**



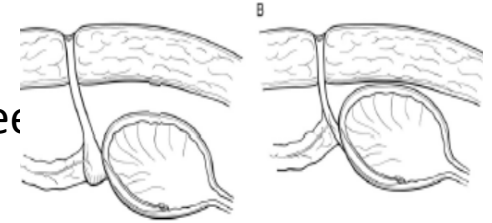
-Wyndaele et al, *Surgical management of the neurogenic bladder after spinal Cord injury*, WJU 2018

-Urologic management of the spinal cord injured patient SIU ICUD-2016

-Groen et al, *Summary of European Association of Urology (EAU) Guidelines on Neuro-Urology*. Eur Urol. 2016

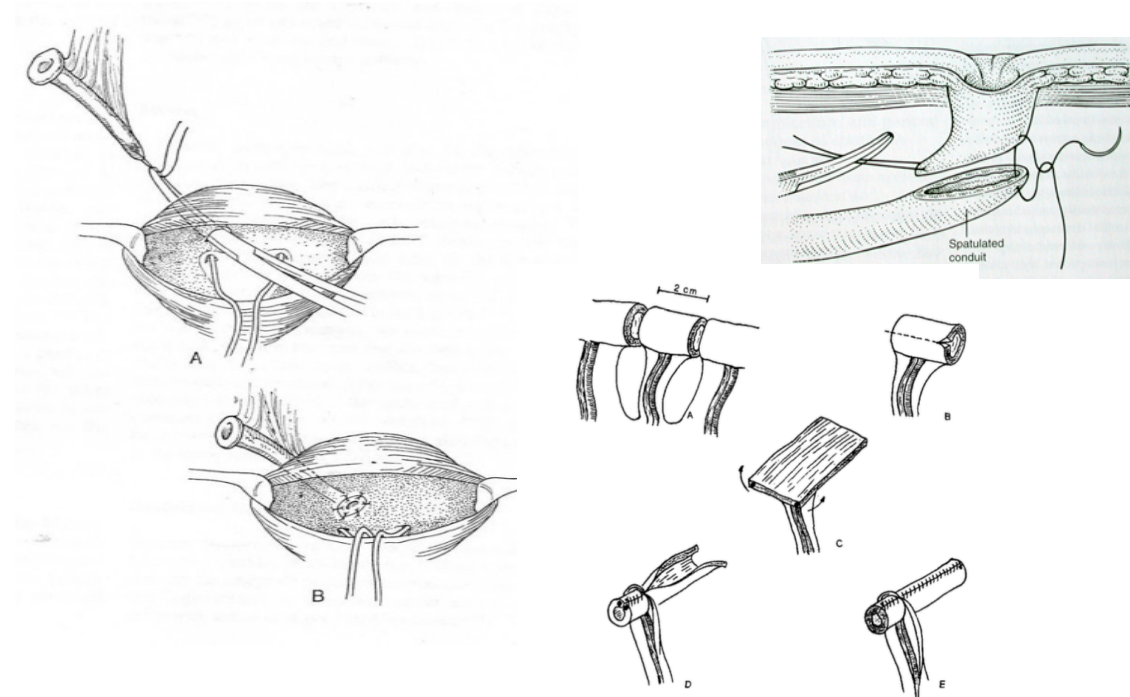
Continent Cutaneous Urinary Diversion: principles

- To create a **catheterizable tube/stoma** between the native bladder / reservoir and the skin (umbilical or right iliac fossa position location) to enable bladder emptying without leakage between the catheterizations (continence)



- This tube must be
 - **Easy to reach**
 - **Easy to cath**
 - **Perfectly continent (antireflux system)**

- Objectives/goals
 - **Autonomy (ISC)**
 - **Continence (urethra and stoma)**
 - **Low pressure reservoir**

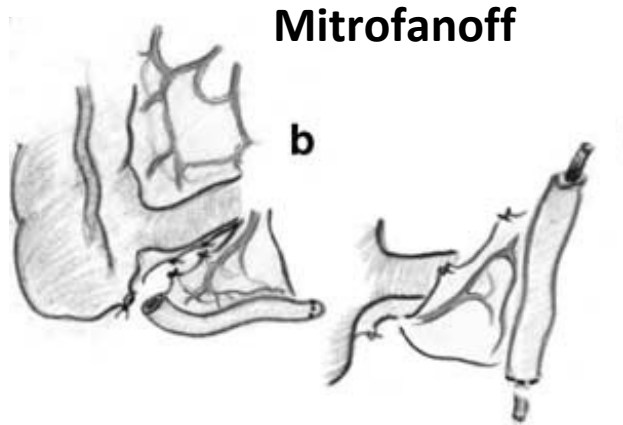


-Mitrofanoff P. *Cystostomie continente transappendiculaire dans le traitement des vessie neurologiques. [Trans-appendicular continent cystostomy in the management of the neurogenic bladder.] Chir Pediatr 1980; 21: 297–305.*

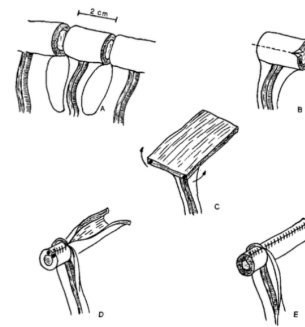
-Monti PR, Lara RC, Dutra MA, et al. *New techniques for construction of efferent conduits based on the Mitrofanoff principle. Urology. 1997;49:112–11*

How to perform Continent Cutaneous Urinary Diversion?

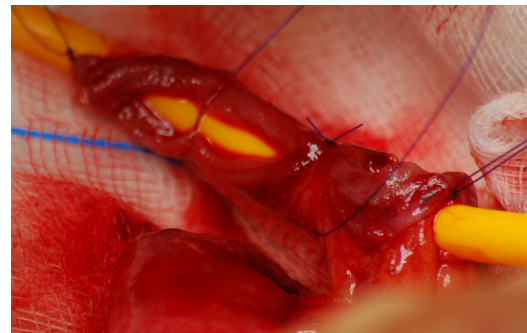
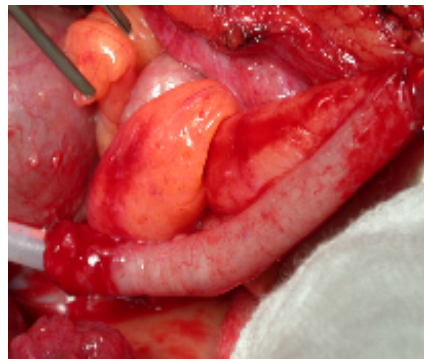
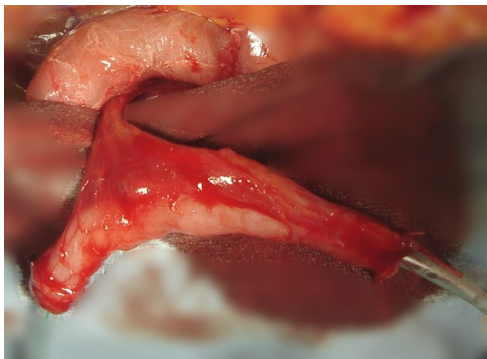
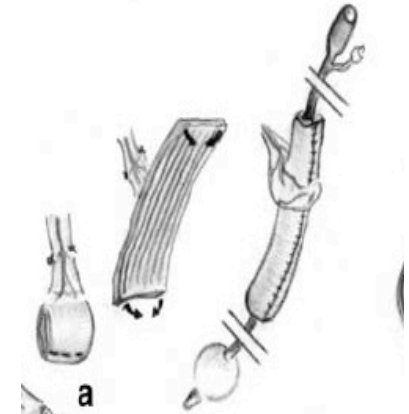
The efferent Tube/Channel: Which tube?



OR



Yang-Monti
2cm length



-Mitrofanoff P. Trans-appendix continent vesicostomy in treatment of neurogenic bladder in children. *Chir Pediatr.* 1980;21: 297–305

-Monti PR et al. New techniques for construction of efferent conduits based on the Mitrofanoff principle. *Urology.* 1997;49:112–11

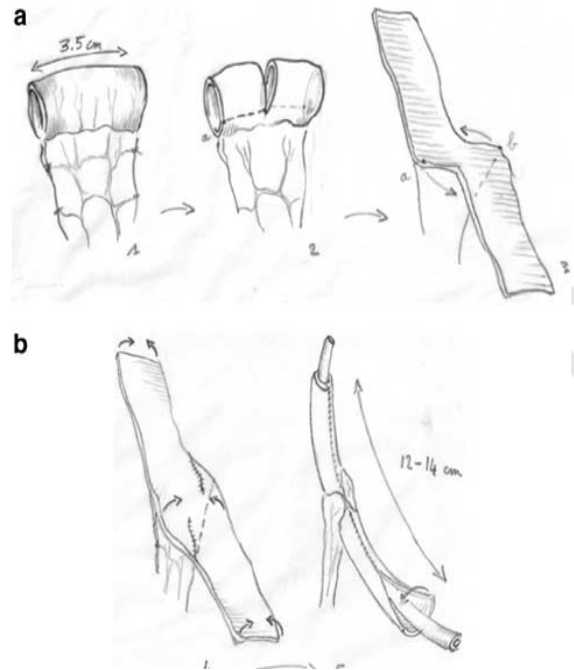
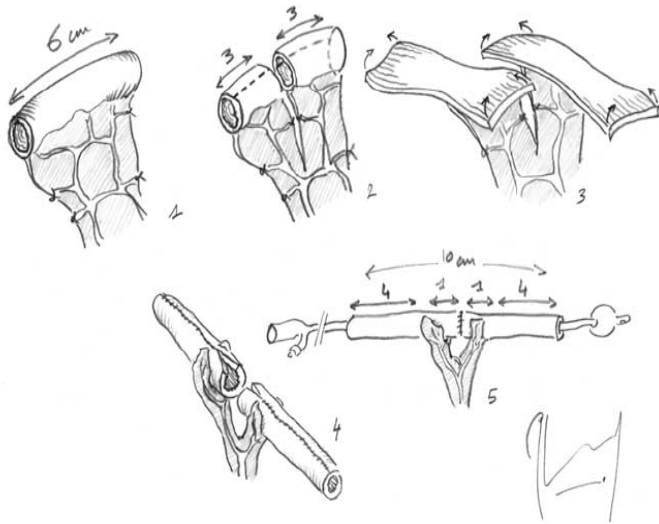
-Karsenty G et al. A novel technique to achieve cutaneous continent urinary diversion in spinal cord-injured patients unable to catheterize through native urethra. *Spinal Cord* 2008;46:305–10.

How to perform Continent Cutaneous Urinary Diversion?

The efferent Tube/Channel: Not enough length?

(e.g. obesity, long distance between bladder and umbilicus)

Double Monti



Casale



- Monti PR et al. New techniques for construction of efferent conduits based on the Mitrofanoff principle. *Urology*. 1997;49:112-11
- Casale A J. A long continent ileovesicostomy using a single piece of bowel. *J Urol*. 1999;162:1743-1745
- Karsenty G et al. A novel technique to achieve cutaneous continent urinary diversion in spinal cord-injured patients unable to catheterize through native urethra. *Spinal Cord* 2008;46:305-10.

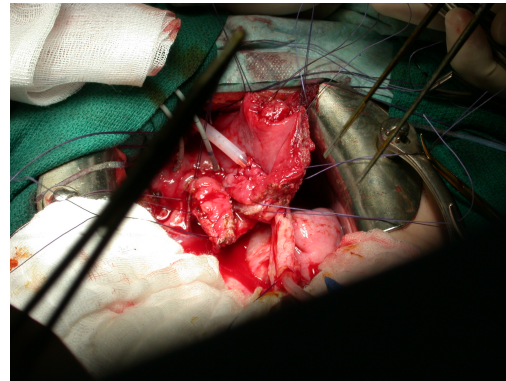
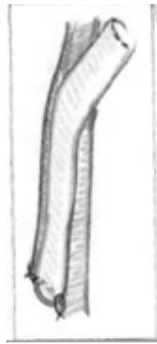
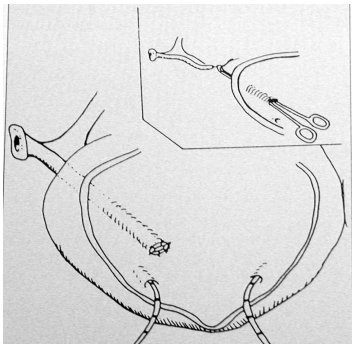
How to perform Continent Cutaneous Urinary Diversion?

The efferent Tube/Channel: bladder implantation

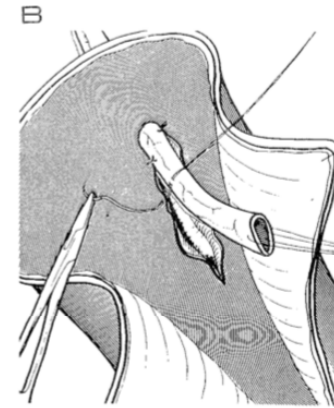
Antireflux system+++

Ensure continence during the filling phase

- **Native bladder, the ideal situation++**
 - Lich-Gregoire or Politano-Leadbetter



- **Augmentation enterocystoplasty**
 - Leduc Camey implantation

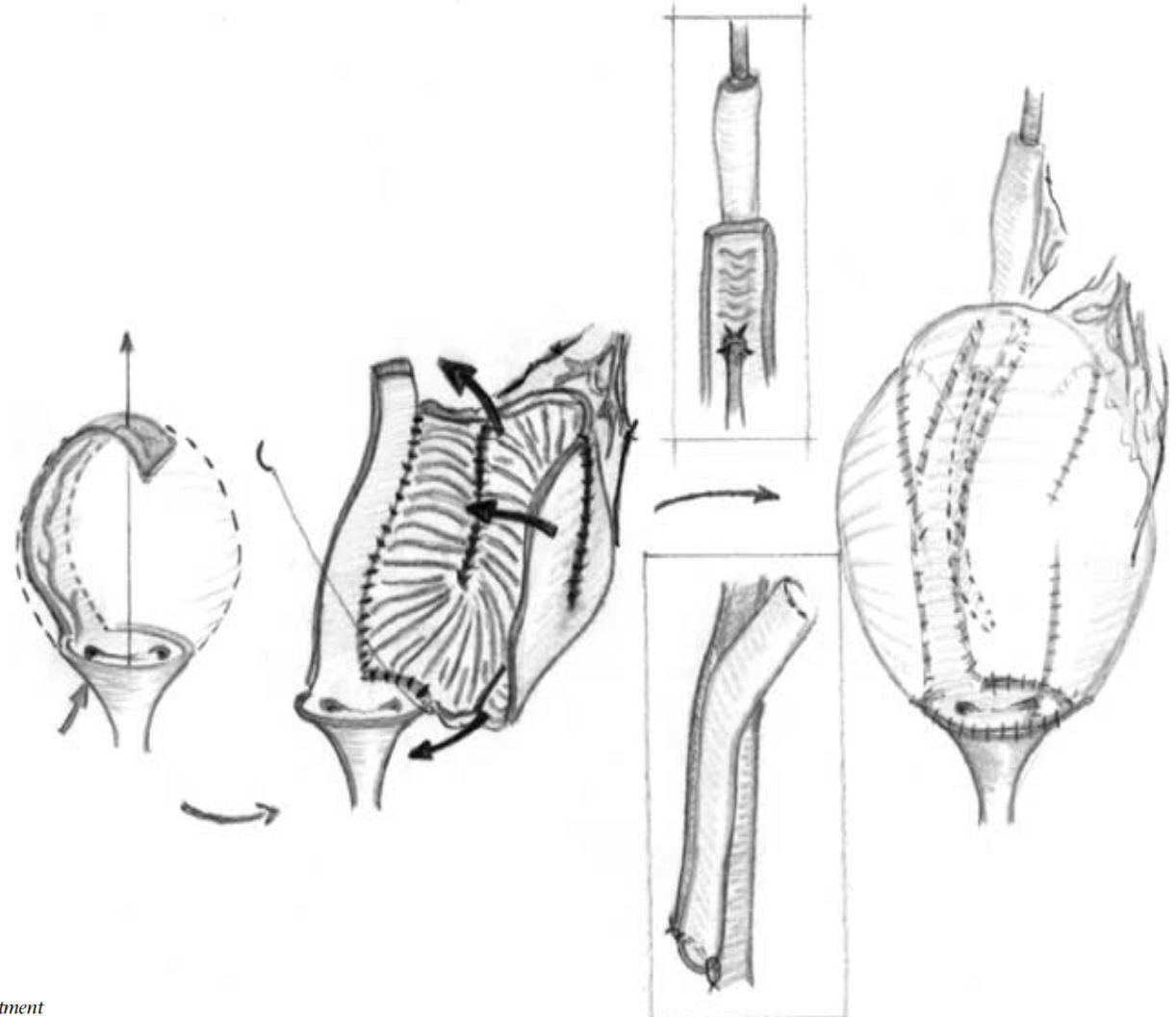
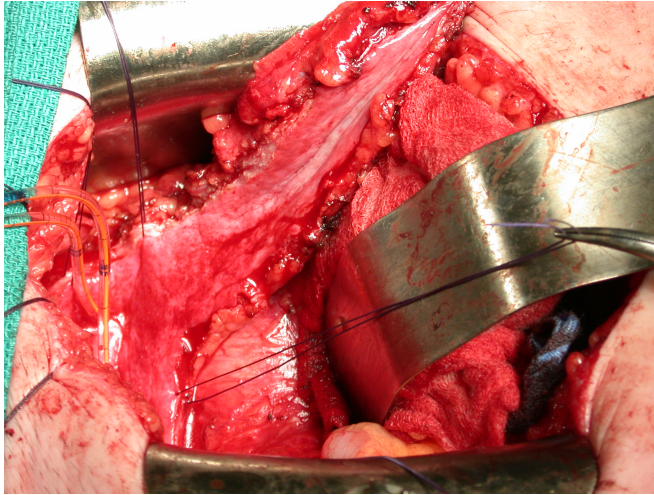


Remerciement Prof E.Chartier-Kastler

-Leduc A, Camey M and Teillac P, An original antireflux ureteroileal implantation technique: long-term follow-up. J Urol 1987; 137:1156-8

-Politano V.A. and Leadbetter W. , An operative technique for the correction of vesicoureteral reflux . J Urol 2002; 167:1055-61

Artifice de montage du "tube" lambeau vésical natif (Spinal Cord 2007)



ORIGINAL ARTICLE

A novel technique to achieve cutaneous continent urinary diversion in spinal cord-injured patients unable to catheterize through native urethra

G Karsenty¹, E Chartier-Kastler¹, P Mozer¹, A Even-Schneider², P Denys² and F Richard¹

¹Department of Urology, Pitié-Salpêtrière Hospital, Pierre et Marie Curie School of Medicine (Paris VI), Paris, France and ²Department of Physical Medicine and Rehabilitation, Garches Hospital, Paris Ouest School of Medicine (University Versailles Saint Quentin-en-Yvelines), Boulogne, France

Remerciement Prof E.Chartier-Kastler

Results: efficacy

Mean follow up : 1.8-8.7 years

Ability to perform ISC through the CCUD $\geq 84\%$ (58.3-100%) except in one study (58.3%)

Vrijens et al, Ned Tijdschr Voor Urol 2010

Continence rate at stoma $>75\%$ (75-100%)

Rare evaluation of QOL

only 4 studies

No data comparing pre and post QOL

*Pazooki, Spinal Cord 2006; Touma, Urology 2007;
Vian , Prog Urol 2009*



DOI 10.1002/nuu.23213

REVIEW ARTICLE

WILEY    

Continent catheterizable tubes/stomas in adult neuro-urological patients: A systematic review

Véronique Phé¹ | Romain Boissier² | Bertil F. M. Blok³ | Giulio Del Popolo⁴ |
Stefania Musco⁴ | David Castro-Diaz⁵ | Bárbara Padilla Fernández⁵ | Jan Groen³ |
Rizwan Hamid⁶ | Lisette 't Hoen³ | Hazel Ecclestone⁶ | Thomas M. Kessler⁷ |
Tobias Gross⁸ | Marc P. Schneider^{7,9,10} | Jürgen Pannek¹¹ | Gilles Karsenty²

Phe et al, Review, Neuro Urol 2017

Results: Complications

Neurourology and Urodynamics

2015

Long-Term Complications of Continent Cutaneous Urinary Diversion in Adult Spinal Cord Injured Patients

U
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N
D
U

Marie-Aimée Perrouin-Verbe,¹ Emmanuel Chartier-Kastler,¹ Alexia Even,² Pierre Denys,² Morgan Rouprêt,¹ and Véronique Phé^{1*}

Median FU: 55 months (12-138)
High rate of continent and catheterizable tube: 100%
Initial False passage: 1 (3%)

Stenosis rate (tube and/or skin : 2 (7%))

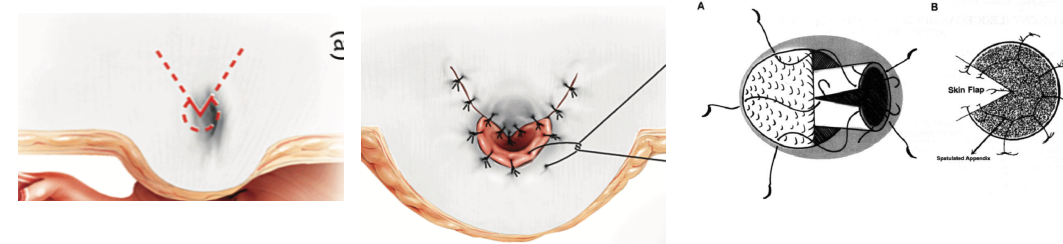
Lower than other series (20-30%)

*Rouache et al, Prog Urol 2012 Welk, J Urol 2008;
Blaivas et al, J Urol 2005; Phe et al Neuro Urol 2017*

Management with dilation in most of cases++

29 SCI patients (7M, 22F)
Median age 35 years (26-46)
17 tetraplegic patients (59%)
2 previous surgical rehabilitation of the upper limb
All underwent augmentation enterocystoplasty
Umbilical position 97%

Impact of the V flap?



*Karsenty et al, Prog Urol 2007; Karsenty et al Spinal Cord 2008
Phe et al, Eur Urol 2017; Skinner et al, Curr Opin 2015*

Pourquoi la voie robotique?

- In the 2000s, first CUD done by laparoscopy and then robotic-assisted laparoscopy
- The aims are
 - To minimize **harms of open surgery**
 - To decrease the length of hospital stay
 - To Maintain good continence rate
- Only few studies in adult patient

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DOI: 10.1097/01.ju.0000116066.72132.9a

LAPAROSCOPIC APPENDICOVESICOSTOMY (MITROFANOFF PROCEDURE) IN A CHILD USING THE DA VINCI ROBOTIC SYSTEM

ROBERTO PEDRAZA, ADAM WEISER AND ISRAEL FRANCO

From the Department of Pediatric Urology, New York Medical College, Valhalla, New York

BJUI
BJU International

Laparoscopic and robot-assisted continent urinary diversions (Mitrofanoff and Yang-Monti conduits) in a consecutive series of 15 adult patients: the Saint Augustin technique

Denis Rey*, Elie Helou*†, Marco Oderda*‡, Jacopo Robbiani*, Laurent Lopez* and Pierre-Thierry Piechaud*

**Department of Urology, Clinique Saint Augustin, Bordeaux, France, †Saint Joseph University, Beirut, Lebanon and ‡Department of Urology, University of Turin, Turin, Italy*

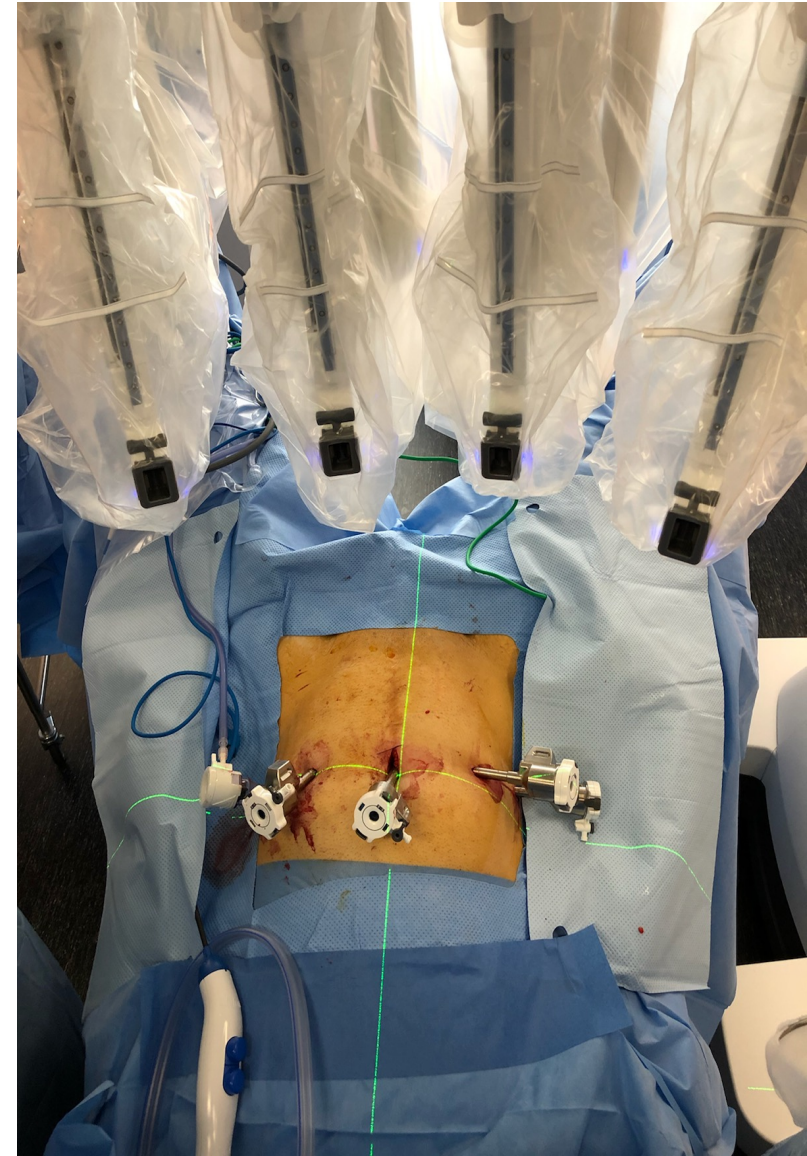
Study design, materials and methods

- A monocentric Study From **2017 to 2022**
- Inclusion criteria:
 - Patients who underwent robot-assisted laparoscopic continent cutaneous urinary diversion (RALCCUD) were prospectively included
- Pre-operative assessment (MDT)
 - Ability, Motivation and acceptance
 - Urodynamic evaluation++ and Urethral continence
 - CT scan to avoid urinary stones
 - MRI to ensure the absence of syringomyelia (CI for laparoscopy)



Study design, materials and methods

- Primary outcome:
 - Continence rate defined as no leakage at the last follow-up (1st June 2023)
- Secondary outcomes:
 - Complications rates
 - Revision rate of the stoma
- Surgical technique:
 - Da Vinci Xi by Intuitive Surgical



Results

Case number	Age, yr	Sex	Diagnosis	Type CUD	Concomitant procedures	Follow-up, mo
1	22	Female	NB and bladder pain syndrome	Monti	Supra-trigonal cystectomy and bladder augmentation	34
2	17	Female	Spina bifida L2	Mitrofanoff	Supra-trigonal cystectomy and bladder augmentation	61
3	51	Female	NB due to spinal cord lesions C5	Casale	Supra-trigonal cystectomy and bladder augmentation	54
4	67	Female	NB due to spinal cord lesions T10	Monti	Artificial urinary sphincter	46
5	52	Female	NB due to spinal cord lesions T9	Casale	-	44
6	16	Female	NB due to spinal cord lesions C6	Mitrofanoff	-	5
7	20	Female	NB due to spinal cord lesions C3	Mitrofanoff	-	38
8	73	Female	NB due to spinal cord lesions T4	Casale	-	38
9	67	Female	NB due to spinal cord lesions C7	Monti	-	29
10	55	Male	NB due to spinal cord lesions T12	Monti	-	27
11	43	Female	NB due to spinal cord lesions C7	Casale	-	24
12	17	Female	NB due to spinal cord lesions C5	Mitrofanoff	-	8
Median Value (Min; Max)	36.2 (5; 61)					36,1 (5;61.2)

4 patients underwent concomitant procedure:
 3 Supra-trigonal Cystectomy (SP) with BA (Bladder Augmentation)
 1 Artificial Urinary Sphincter (AUS) for one female with stress urinary incontinence.

Type of conduit:
 4 Mitrofanoff conduits
 4 Yang-Monti ileal conduits
 4 Casale ileal conduits

Results

Case number	Age, yr	Sex	Diagnosis	Type CUD	Concomitant procedures	Follow-up, mo	Immediate postoperative complications/Clavien grade	Stomal complications/Clavien grade
1	22	Female	NB and bladder pain syndrome	Monti	Supra-trigonal cystectomy and bladder augmentation	34	-	-
2	17	Female	Spina bifida L2	Mitrofanoff	Supra-trigonal cystectomy and bladder augmentation	61	-	Stomal stenosis/3
3	51	Female	NB due to spinal cord lesions C5	Casale	Supra-trigonal cystectomy and bladder augmentation	54	wound dehiscence/1	-
4	67	Female	NB due to spinal cord lesions T10	Monti	Artificial urinary sphincter	46	wound abcess/2	-
5	52	Female	NB due to spinal cord lesions T9	Casale	-	44	-	-
6	16	Female	NB due to spinal cord lesions C6	Mitrofanoff	-	5	pre-vesical abcess/2	-
7	20	Female	NB due to spinal cord lesions C3	Mitrofanoff	-	38	pre-vesical abcess/2	-
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Median Value (Min; Max)	36.2 (5; 61)					36,1 (5;61.2)		

Patient demographics and outcomes of all RALCCUD cases

- 4 patients underwent concomitant procedure:

- 3 Supra-trigonal Cystectomy (SP) with BA (Bladder Augmentation)
- 1 Artificial Urinary Sphincter (AUS) for one female with stress urinary incontinence.

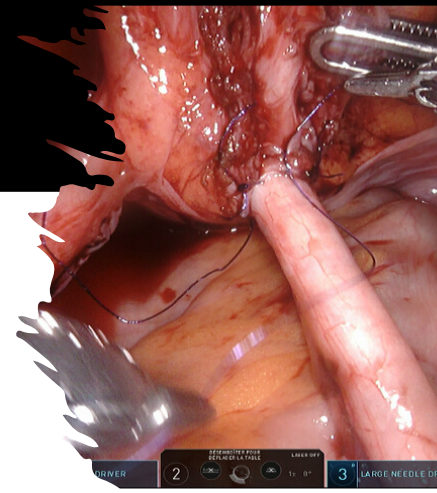
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Peri-operatives

-
- **No conversions to open surgery**
- **Median operating time:**
 - 313 min (224 ;643)
- For patients who underwent isolated CCUD, median operative time was 322 min (224-300)
- The median hospital duration was 8 days (7;16).



Functionals results and complications

- Median follow-up of **36.2 months** (5-61.5)

Case number	Stomal complication	Clavien grade	Timing according to follow-up in months	Treatment
2	Stomal stenosis and false route	3	35	Endoscopic dilatation
8	Stomal incontinence	3	10	polydimethylsiloxane endoscopic injection twice in anastomosis between the stoma and the bladder
8	Urethral incontinence	3	10	Pro ACT Balloons

- 100% continence rate (urethral and stomal)
- 100% using their CUD to catheterise

Interpretation of results

Strength

continence rate was excellent (100%)

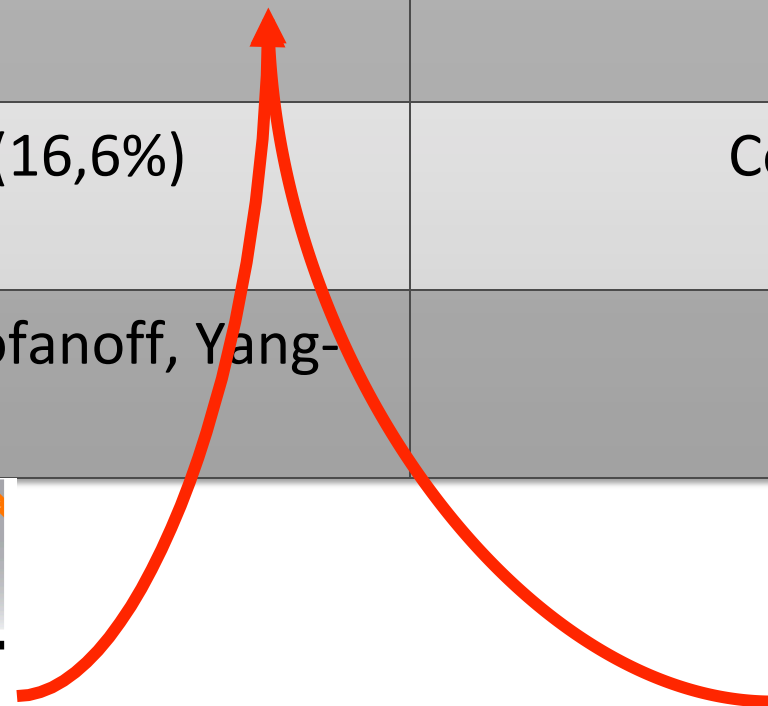
complication rate is low (16,6%)

Different types of CUD (Mitrofanoff, Yang-Monti & Casale)

Limit

Short median follow up : 36 months

Concomitant procedures



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journal homepage: www.europeanurology.com



EAU
European Association of Urology

Surgery in Motion

Continent Cutaneous Catheterizable Channels in Pediatric Patients: A Decade of Experience with Open and Robotic Approaches in a Single Center

Logan Galansky[†], *Ciro Andolfi^{1,*}, Brittany Adamic, Mohan S. Gundeti*

Pediatric Urology, Section of Urology, Department of Surgery, UCMC and Comer Children's Hospital, The University of Chicago Biological Sciences Division and Pritzker School of Medicine, Chicago, IL, USA

World Journal of Urology
<https://doi.org/10.1007/s00345-020-03361-2>

ORIGINAL ARTICLE



Robot-assisted continent urinary diversion according to the Mitrofanoff principle: results of a bicentric study

Pierre Lecoanet¹ · Guillaume Pascal¹ · Abderrahmane Khaddad² · Nicolas Hubert¹ · Jean-Louis Lemelle³ · Nicolas Berte³ · Grégoire Capon²

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La dérivation continente en robotique

Peu de publications

Petites séries chez l'adulte

Laparoscopic and robot-assisted continent urinary diversions (Mitrofanoff and Yang-Monti conduits) in a consecutive series of 15 adult patients: the Saint Augustin technique

Denis Rey*, Elie Helou*[†], Marco Oderda*[‡], Jacopo Robbiani*, Laurent Lopez* and Pierre-Thierry Piechaud*

*Department of Urology, Clinique Saint Augustin, Bordeaux, France, [†]Saint Joseph University, Beirut, Lebanon and [‡]Department of Urology, University of Turin, Turin, Italy

2013

N=15 (4 robotic)

FU 22 mois

Pas de fuites, tous cathétérissables

Continence Outcomes in Patients Undergoing Robotic Assisted Laparoscopic Mitrofanoff Appendicovesicostomy

Mark A. Wille,* Gregory P. Zagaja, Arie L. Shalhav and Mohan S. Gundeti

From the Department of Surgery, Section of Urology, University of Chicago Pritzker School of Medicine, Chicago, Illinois

2011

N=11

FU 20 mois

1 fuite stomiale, 3 révisions (sténose stomiale)

World Journal of Urology
<https://doi.org/10.1007/s00345-020-03361-2>

ORIGINAL ARTICLE



Robot-assisted continent urinary diversion according to the Mitrofanoff principle: results of a bicentric study

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2019

N=10

FU 21 mois

2 fuite stomiale, 2 sténose stomiale) (révisions)

Plus grandes séries chez l'enfant



Surgery in Motion

Continent Cutaneous Catheterizable Channels in Pediatric Patients: A Decade of Experience with Open and Robotic Approaches in a Single Center

Logan Galansky[†], Ciro Andolfi^{†,*}, Brittany Adamic, Mohan S. Gundeti

Pediatric Urology, Section of Urology, Department of Surgery, UCMC and Comer Children's Hospital, The University of Chicago Biological Sciences Division and Pritzker School of Medicine, Chicago, IL, USA

Objective: We aimed to describe our progressive advancement from open to robotic construction of CCCs, reporting outcomes and comparing the two approaches.

Design, setting, and participants: We retrospectively reviewed electronic medical records of pediatric patients who underwent construction of CCCs between 2008 and 2019. The inclusion criteria were age ≤ 18 yr, and CCCs with or without bladder augmentation or bladder neck surgery. We compared open versus robotic approaches for demographics, and intra- and postoperative outcomes; operative time was calculated as incision-to-closure time.

Results and limitations: A total of 69 patients were included in the study, with 35 open and 34 robotic procedures. The robotic approach showed a significant decrease in length of hospital stay (LOS) compared with the open approach. Six primary subfascial revisions were performed in five patients—three Monti, two ACE, and one APV. Continence rates were 91.4% and 91.2% for open and robotic approaches, respectively.

With five (11.4%) revisions, four in the open group (two Monti, one ACE, and one Monti + ACE) and one (2.9%) in the robotic group (APV), no difference was found.

Follow up 75 mois

Surgery in Motion

**Robot-assisted Laparoscopic Mitrofanoff Appendicovesicostomy
Technique and Outcomes of Extravesical and Intravesical
Approaches**

*Olufenwa J. Famakinwa, Alexandre M. Rosen, Mohan S. Gundeti**

Section of Urology, The University of Chicago Medicine and Biological Sciences, Comer Children's Hospital, Chicago, IL, USA

18 patients

FU 24 mois

Continence stomiale 94,4%

2 revisions for stomial stenosis and parastomal hernia

Results and limitations: The entire cohort included 18 patients (10 IV, 8 EV). The mean overall operative time was 494.1 min. The mean overall length of hospitalization was 5.2 d. There were five immediate, postoperative complications (all Clavien grade 1): three postoperative ilea, one stomal site infection, and one clogged suprapubic catheter. Median follow-up was 24.2 mo. The overall stomal continence rate was 94.4%.

Conclusion

- RALLCUD with or without bladder augmentation in adult patient seems:
 - Safe
 - Reproducible
 - Good continence rate and low complication rate

