

# Long-term functional outcomes and complications of robotic-assisted laparoscopic augmentation cystoplasty in adult patients with Neurogenic Lower Urinary Tract Dysfunction and Bladder Pain Syndrome/Interstitial Cystitis: a single-centre experience

Thomas Batard<sup>1</sup>, Benoit Mesnard<sup>1</sup>, Jérôme Rigaud<sup>1</sup>, Loïc Le Normand<sup>1</sup>, Amélie Levesque<sup>1</sup>, Brigitte Perrouin-Verbe<sup>2</sup>, Marie-Aimée Perrouin-Verbe<sup>1</sup>

1-Nantes Université, Department of Urology, Centre Hospitalier Universitaire de Nantes, Nantes, France

2-Nantes Université, Department of Physical Medicine and Rehabilitation, Centre Hospitalier Universitaire de Nantes, Nantes, France

Pôle Santé  
UFR Médecine  
Nantes Université

## Introduction

Augmentation cystoplasty (AC) with supra-trigonal cystectomy (SC) may be recommended in patients with neurogenic lower urinary tract dysfunction (NLUTD) who are able to self-catheterize, in case of refractory neurogenic detrusor overactivity (NDO), low bladder capacity or low bladder compliance, and after failure of conservative therapies(1).

AC with SC may also be considered as a last option in refractory Bladder Pain Syndrome/Interstitial Cystitis (BPS/IC), in some selected patients with reduced bladder capacity under general anesthesia, poor bladder compliance and Hunner's lesions(2).

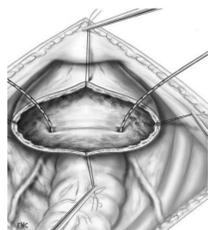
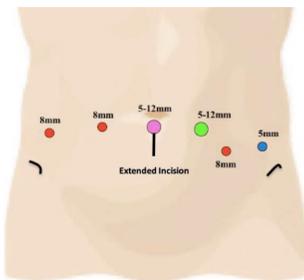
Robotic-assisted surgery overcomes the limitations of laparoscopy (3D vision, articulation, and precision of instruments), while preserving the advantages of minimally invasive surgery (shorter hospital stay, less postoperative pain, less scars).

Robotic-assisted laparoscopic approach for AC with SC has recently been reported with short-term outcomes (functional outcomes and complications) and in small cohorts only (3, 4).

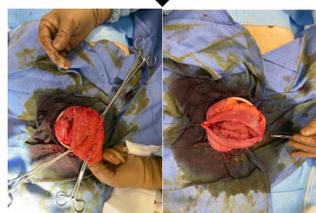
The aim of the current study was to report long-term functional outcomes, quality of life and complications of robotic-assisted SC with AC (RASCAC) in patients with NLUTD and BPS/IC.

## Methods and Materials

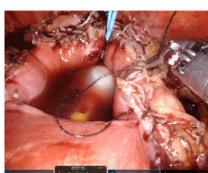
All consecutive patients with NLUTD or BPS/IC who underwent RASCAC between December 2012 and December 2020 were included. All patients who underwent a concomitant surgery (aponeurotic sling, artificial urinary sphincter, continent urinary diversion,...) were excluded.



The first step was a **supratrigonal cystectomy** (preserving the trigone, ureters and urethra), performed with a robotic-assisted laparoscopic approach



The cystectomy specimen was removed through the umbilical incision, which was enlarged to a maximum of 5 cm below the umbilicus. A 40 cm segment of bowel was detubularized to create the enteroplasty, and intestinal continuity was restored. A **Z-shape plasty** was performed (3).



The plasty was reinserted and sutured to the remaining bladder with 2 V-lock 3/0 running sutures starting at 6 o'clock on the posterior surface, then ascending to 12 o'clock on the anterior surface.

In both populations, baseline characteristics, pre-operative data, peri-operative data including early postoperative complications were reported. Late postoperative **complications and long-term functional outcomes** were also assessed (clinical data, bladder diary, upper urinary tract function and urodynamics).

Satisfaction was also assessed in both populations using a **PGI-I questionnaire**.

Improvement was defined as a PGI-I score  $\geq 3$ .

## Results

**71 patients** were enrolled (n=41 NLUTD and n=30 BPS/IC). Median age was 39 years (+/- 24.5) and 63.5 years (+/-17.5) respectively. **Median follow-up was 4.8 years (+/-2.2).**

In patients with NLUTD, the underlying diseases were: **27 (65%) spinal cord injuries**, 6 (15%) spina bifida, 6 (15%) multiple sclerosis, 2 (6%) sacro-coccygeal teratoma surgeries. **All performed intermittent self-catheterization.**

**Median operative time** was 184 min (+/-49) for BPS/IC and 252.2 min (+/-34) for NLUTD (NS).

**Early complication rate was 35%:** 32% of Clavien  $\leq 2$  (n=25) and 4% of 3 (n=3). No deaths were reported.

3 severe late complications were observed: 1 bladder perforation at 1 year, and 2 bowel obstructions at 6 and 18 months.

In patients with NLUTD, all urodynamic parameters were significantly improved (Table 1).

At last follow-up, **90% of patients had a low-pressure bladder** and the **overall continence rate of 92%** (n = 38).

**Quality of life was improved in 72% of patients.**

Table 1. Functional outcomes in patients with NLUTD

NLUTD, n= 41	Baseline	Post-op		P-value
Cystometric capacity, mL (mean+/-SD)	198 (+/- 81)	452 (+/-87)	+ 128 %	<0.01
Low Bladder compliance (<20ml/cmH2O) (n,%)	<b>32 (85%)</b>	<b>1 (2%)</b>	-	<0.01
Detrusor overactivity (n,%)	<b>38 (92%)</b>	<b>1 (2%)</b>	-	<0.01
Creatinine clearance (mL/min)	102 (+/-11)	104 (+/- 9)	-	ns
maximum detrusor pressure (cmH2O)	46 (+/-14)	16 (+/- 4)	-	<0.01
Continence rate (%)	<b>20 (48%)</b>	<b>38 (92%)</b>	+ 90 %	<0.01

In patients with BPS/IC, pain (EN 7.8 vs 2.2; p<0.01), **increased daytime frequency** (n=30 vs. 19; p<0.01) and **voided volumes** (112mL vs 304mL; p<0.01) were **significantly improved** at last follow-up (Table 2). **37% (n=11) of patients required de novo intermittent self-catheterization.**

4 patients were considered failures: 2 underwent radical cystectomy with ileal conduit.

**Quality of life was improved in 73% of patients.**

Table 2. Functional outcomes in patients with BPS/IC

SDV/CI, n=30	Baseline	Post-op		P-value
Voided volume, mL (mean+/-SD)	<b>112 (+/- 39)</b>	<b>304 (+/-54)</b>	+ 171%	<0.01
Increased daytime frequency (>6/d; >1 per night)	30 (100%)	19 (63%)	-	<0.01
EN (mediane,IQR)	<b>7.8 (2)</b>	<b>2.2 (0,4)</b>	- 254%	<0.01
Incontinence rate	4 (13%)	2 (7%)	-	NS

## Discussion & Conclusions

This series is the **largest cohort study** to report robotic-assisted laparoscopic supra-trigonal cystectomy with augmentation cystoplasty (RASCAC) in adult patients with NLUTD and BPS/IC.

RASCAC appears to be **feasible, reproducible**, and with an **acceptable complication rate** in both populations.

This technique provides **satisfactory long-term functional results**, particularly a long-term low-pressure reservoir with **upper urinary tract protection** and marked **improvement in continence** in patients with NLUTD.

It also leads to **improvement in pain and daytime frequency** in patients with BPS/IC.

**Significant improvement in the quality of life** was reported in both populations.

## References

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