

Declining Use of Orthotopic Reconstruction Worldwide—What Went Wrong?



At pioneering centers up to 75% of patients with bladder cancer undergo orthotopic reconstruction. In 2009 Lowrance et al reported a significant trend toward the more liberal use of an ileum conduit at a high volume, U. S. tertiary care center,¹ which was confirmed recently in population based studies. Kosinski et al evaluated the performance of continent urinary diversion after robot-assisted and open radical cystectomy based on hospital volume and facility type using the National Cancer Database, and found that the performance of diversion decreased linearly over time with both procedures (6.9% in 2010 vs 4.7% in 2013).² Groeben et al analyzed nationwide German hospital billing data for 53,057 cases from 2006 to 2013, and the percentage of cases of continent urinary diversion decreased from 36.7% to 29.7%.³ Similarly, Farber et al reported a peak number of continent diversions based on data from the National Inpatient Sample in 2008 which subsequently declined every year thereafter.⁴ If this trend truly reflects current standard practice, then there appears to be an urgent need for a better understanding of the key drivers for such a shift in practice.

SURGICAL/HOSPITAL VOLUME

Waingankar et al queried the National Cancer Database for patients undergoing radical cystectomy and found a median hospital volume of 12.3 cases per year, with 33% of the procedures performed by surgeons with an average annual volume of less than 2 cases and 53% with an average volume of less than 5 cases per year.⁵ The fact that many practicing urologists who perform cystectomy only a few times a year are not used to performing more elaborate reconstructive surgery than an ileal conduit is a sad but true fact. In Germany the average number of cystectomies performed in the urology department is 20, and 88 departments perform more than 30 a year or 50% of all radical cystectomies, resulting in a nationwide orthotopic reconstruction rate in 2013 as high as 29.7%.³ The age old principle of “practice makes perfect” holds

true for surgeons performing radical cystectomy and continent urinary diversion.

IMPERFECT CONTINENCE

The ultimate success with orthotopic reconstruction depends on achievement of continence. Recent publications using objectively defined continence measurements have questioned the functional excellence reported by pioneering institutions. We reported 95.9% daytime and 74.9% nighttime continence rates based on pad use in 1999.⁶ Kretschmer et al, using the identical technique, reported 54% daytime and 36% nighttime continence rates using pad weight testing in a contemporary cohort.⁷ Similarly, Furrer et al, using the ileal bladder substitute (Studer), reported 92% daytime and 70% nighttime continence rates based on pad use.⁸ Using a modified Studer technique, Ahmadi et al reported continence in 22.3% of 47% of patients who wore pads during the day and 72% who wore pads at night using an orthotopic reconstruction specific questionnaire.⁹ Liedberg et al, using Studer's technique and attempted nerve sparing, reported continence in only 14% and 76% of patients who reported 0 gm daytime leakage, whereas 32% reported 0 gm nighttime leakage.¹⁰

This approximate 50% difference in continence rates between pioneering and nonpioneering, high volume institutions is concerning and a deterrent to future patients and their surgeons. There are several explanations for this shift. 1) Continence was defined heterogeneously across the studies, pooling pad-free and 1-pad continence rates. Furthermore, that pad number, pad size, pad wetness etc are inherent in assessing functional outcomes was not well defined. 2) Variations in surgical technique may also play a role. Studer tries to compensate his smaller reservoir (40 cm vs 60 cm for the ileal neobladder) by attempting nerve and apex sparing, which resulted in a 23% obstruction rate of the anastomosis with the subsequent need for a secondary procedure, a 2% prostate cancer rate and a 5% recurrent prostatic

adenoma rate.⁸ 3) The advantage of a larger reservoir is that no pressure change occurs during unfolding and before stretching of the reservoir. Attempts to simplify the technique have resulted in major violations of the original procedure in the last 2 decades. An example is the robotic reservoir, which has a small radius (2.4 cm), a geometric capacity of 180 to 271 cc and a pressure twice as high (fig. 1) compared to a standard orthotopic reconstruction with a radius of 4.8 cm and a geometric capacity of 1,085 cc (fig. 2).¹¹ As a result, robotic series must define continence differently (allowing diapers in continent patients) and report quality of life metrics instead of incontinence data. 4) It is a general belief that reservoir shape has no significance and that any type of reservoir will assume a globular shape once inside the pelvic cavity. Blute et al performed pressure flow urodynamic studies in human cadaveric ileal orthotopic reconstructions comparing the Studer pouch with a circular loop, W-pouch and U-pouch, and demonstrated major functional differences.¹² The W-pouch performed optimally and was recommended for in vivo application for additional validation. 5) For postoperative rehabilitation and management, the expertise of a nurse with specific knowledge of how to treat patients with an orthotopic reconstruction is of utmost importance.

THE ROBOT

Because it is more technically challenging and time-consuming with a steep learning curve, the adoption of intracorporeal orthotopic reconstruction has remained slow and is confined to high volume academic institutions. To elucidate whether a robot-assisted approach to radical cystectomy actually deprived patients of continent urinary diversion, only high volume institutions using both approaches should be analyzed. From 2002 to 2015 at the University of Southern California 711 patients underwent radical cystectomy, of whom 348 ultimately underwent orthotopic reconstruction.¹³ Organ confined disease, lower ASA[®] score and an open approach predicated the choice for orthotopic reconstruction (open 80% vs robot 20%). At robotic centers the performance rate of orthotopic reconstruction was low (8%) but remained stable during a 10-year period.¹⁴ For locally advanced bladder cancer the orthotopic reconstruction rate is just 3% vs 12% for organ confined disease after robotic cystectomy.

Undoubtedly, the robot and surgeon's preference have affected the choice of ileum conduit over continent urinary diversion. There are multiple contributing factors to the declining use of orthotopic reconstruction. Among them are increasing age and comorbidity of the patients, increasing use of trimodal therapy and costs.

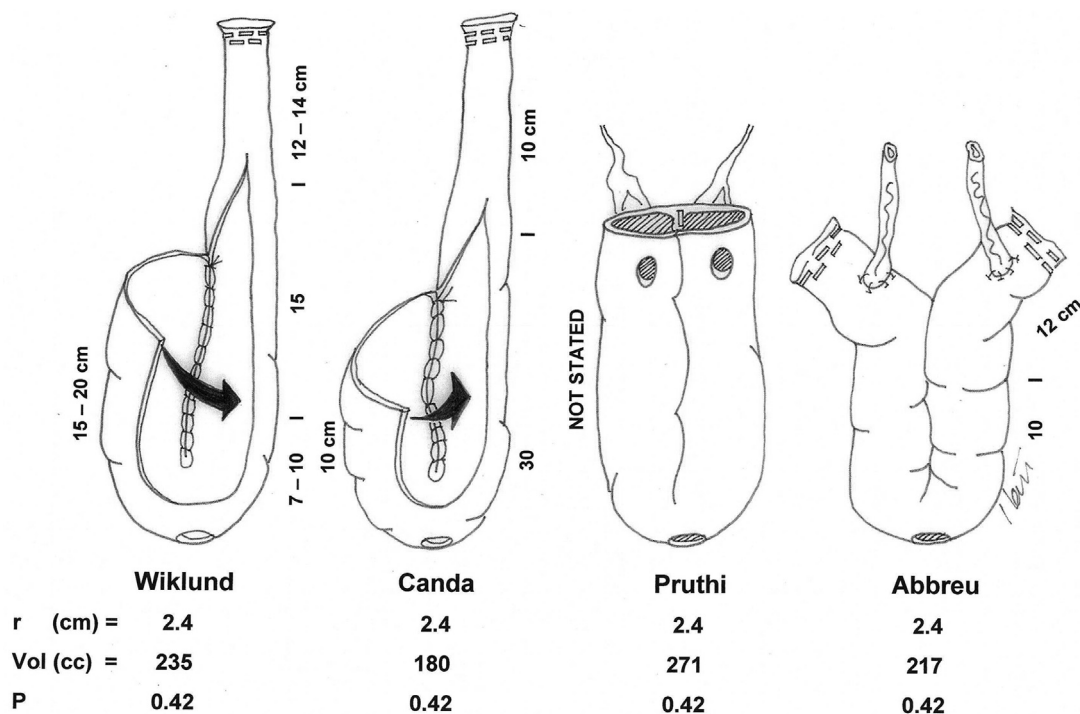


Figure 1. Reservoir types of intracorporeal orthotopic reconstruction following robot-assisted radical cystectomy constructed from too short (less than 40 cm) and partly undetubularized segments with no/pseudo-cross folding, U-shape only and nonglobular shape.

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