Orthotopic neobladder versus ileal conduit urinary diversion after cystectomy – a quality-of-life based comparison

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ABSTRACT

INTRODUCTION Radical cystectomy remains the gold standard in treatment of muscle invasive bladder cancer. Evolution of pathological guidelines has empowered centres to offer orthotopic substitution (OBS) to patients undergoing radical cystectomy. We compared health-related quality of life (HRQoL) between patients who underwent OBS or ileal conduit urinary diversion (ICD) following radical cystectomy.

PATIENTS AND METHODS A total of 57 patients who underwent cystectomy were assessed pre-operatively using Karnofsky performance scale (KPS). Of these, 52 patients (28 OBS and 24 ICD) who responded to a postal questionnaire consisting of SF-36 and a functional index questionnaire were included.

RESULTS Median age of patients was 70 years. Pre-operative KPS scores were similar. All eight HRQoL scales were favourable in both groups. OBS patients had significantly better physical functioning. In the cohort, 42% of men with OBS and 25% of diversions could maintain an erection to varying degrees. Of the OBS patients, 85% were continent with two patients reporting reduced QoL with pad usage. Of ICD patients, 63% felt less complete and 42% were embarrassed due to the stoma, with 58% apprehensive of stomal leakage. Of OBS patients, 96% had significant relationships and a more active life-style.

CONCLUSIONS In a similar age-group population, there was no significant difference in most QoL indices but body image issues persist in ICD patients. OBS patients had significantly better physical function, continuing to have a more active life-style. They attained urethral voiding with good continence. A detailed discussion of long-term functional outcome would engender a realistic expectation allowing better adaptation.

KEYWORDS

Radical cystectomy – Orthotopic neobladder – Ileal conduit diversion – Quality of life

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Over the last century, there has been an evolution of methods for lower urinary tract reconstruction following cystectomy, from being simple means of diverting urine to techniques allowing normal voiding pattern through the intact native urethra. Various methods for continent urinary diversion have been developed to provide such realistic options from simply diverting urine through a conduit to orthotopic reconstruction.^{1–5} These innovations in urinary diversions should allow patients to lead a near-normal life-style, eliminating the need for a urostomy. However, orthotopic bladder substitution (OBS) is not offered to a majority of patients undergoing cystectomy as the benefits of OBS over ileal conduit diversion (ICD) on quality-of-life parameters remain indeterminate.

Health-related quality of life (HRQoL) is a multifaceted and subjective concept taking into consideration the patient's physical and emotional status, general health, social interaction and mental health. Comparison of QoL parameters in patients who have had cystectomy has been difficult with variable results.^{6–9} This could be explained by the use of different questionnaires comparing a multitude of techniques. We compared HRQoL between patients who underwent OBS or ICD following cystectomy using a bladder cancer specific functional index questionnaire.

Patients and Methods

Over a 6.5 year period, 57 consecutive patients who underwent

either OBS or ICD for muscle invasive bladder cancer were contacted for this study. They had undergone radical cystectomy and either ileal conduit formation or orthotopic neobladder construction. All the OBS patients received the Studer pouch, an ileal low-pressure neobladder with an isoperistaltic afferent ileal limb. A 55-cm distal ileal segment is isolated, folded into a 'U' configuration. The proximal ileum remains intact as an afferent limb for a standard end-to-end uretero-ileal anastomosis. Button-hole urethro-enteric anastomosis is performed at the most dependent area of the reservoir. Fifty-two patients (28 OBS and 24 ICD) who replied to the questionnaire were included in the study.

The cystectomy and ileal conduit diversions were undertaken by two uro-oncologists and the orthotopic reconstruction by one dedicated reconstructive uro-oncologist. All patients undergoing cystectomy were counselled extensively by the surgeon as well as the uro-oncology nurse. The uro-oncology specialist nurses are involved in pre-operative counselling and postoperative care of the patients. They are also involved in the peri-operative support and follow-up. This includes stoma siting, pre-operative preparation and assessment of the optimum procedure.

Patients with compromised renal function, severe hepatic dysfunction, positive bladder neck resection margin, those with restricted movement, with poor motivation and tolerance to a disciplined approach are not suited for reconstructive techniques.

Clean, intermittent, self-catheterisation postoperatively is an essential component of functional outcome, so much so that our specialist nurses teach and assess patients pre-operatively regarding their ability to manage it. CISC requires a degree of hand-to-eye co-ordination and manual dexterity. Quadriplegics, patients with multiple sclerosis and advanced rheumatoid arthritis find this procedure unsuitable.

Patients suffering from intestinal disorders such as severe inflammatory bowel disease are also better served by other forms of diversion as it may not be possible to find the required length of disease-free bowel for reconstruction without compromising enteric function with attendant complications.

The OBS patients need initial, and sometimes a long, follow-up, clocked voiding, clean intermittent self-catheterisation and often early and sometimes lasting night-time incontinence.

Reconstructive surgery was the preferred option in obese individuals because of the potential difficulty of siting the stoma and maintaining the appliance. In our series, obese individuals had thicker and bulkier mesenteries but this did not hinder detubularisation and creation of a tension-free anastomosis.

Increased experience with neobladder reconstruction (especially in women) has enabled us to have fewer restrictions on patient selection. All patients were counselled pre-

operatively regarding the feasibility of the procedure and the possibility of conversion to a conduit.

Postoperative care included regular review at 6 weeks, 3 months and 3-monthly thereafter. Patients also had direct telephone access to the specialist nurses as well as to district nurses.

A postal questionnaire pack consisting of the Short Form-36 (SF-36)¹⁰ and a functional index questionnaire was sent to these patients. The SF-36 contains 36 questions assessing eight aspects of HRQoL, including physical functioning (PF), role – physical functioning (RLPH), role – emotional functioning (RLE), vitality (VT), mental health (MH), social functioning (SF), bodily pain (BP) and general health (GH). Demographic parameters such as race, relationship, education and occupation were also assessed. Individual questions merited a score of 0–100 and a mean score obtained for each domain (range, 0–100). The higher the score, the better the result.¹¹

The functional index questionnaire was modelled on the UCLA prostate cancer index,¹² modified (urinary function domain) for assessing bladder cancer patients. All the validated UCLA parameters remained the same except for the urinary function domain.

This questionnaire gauged six domains – urinary, sexual, bowel functions and the distress associated with these various functions such as urinary continence and frequency. The functional domains were analysed separately for both groups of patients. A patient was said to be continent if they did not need any protection, used a pad for safety reasons or only had occasional spotting.¹⁵ Bowel questions assessed rectal urgency, diarrhoea, lower abdominal pain distress and bother. Sexual function questions assessed sexual desire, ability and quality of erections, sexual activity and extent of dysfunction, if any. The ileal conduit patients on the other hand were also assessed on body image issues such as embarrassment, feeling less complete due to the stoma and fear of stomal leakage.

Pre-operative assessment was done by the clinician using the Karnofsky performance scale (KPS).¹⁴ This was used to measure the patients' functional status on a scale 0–100; zero inferring critical morbidity and 100 referring to a patient with neither complaints nor evidence of disease and able to carry on normal activity. The Divisional Ethics Review Board was involved in setting up this study.

Statistical analysis was performed using standard statistical software. The two-tailed *t*-test was used to analyse the differences among patients. For all comparisons, *P* < 0.05 was considered statistically significant.

Results

Fifty-two (91%) patients replied to the postal questionnaire. Of the OBS patients, three were women while nine were

Figure 1 Comparison of SF-36 scores (orthotopic neobladder versus ileal conduit).

women in the ICD group. Median age was 65.5 years (range, 50–79 years) in the OBS group and 73.5 years (range, 52–85 years). Median follow-up for the OBS patients was 15 months (range, 3–39 months) and 12 months (range, 3–75 months) for the ICD group (Table 1). All but 13 patients (neobladder group) had follow-up less than 1 year. There

was no significant difference within groups of patients based on follow-up duration. Both groups had similar pre-operative KPS scores (mean, OBS 82, ICD 80).

All eight HRQoL scales were favourable (> 60) in both groups (Table 2). OBS patients had higher mean scores when compared to the ICD group in all HRQoL scales, except marginally lower scores (difference in mean < 3.1) in vitality, social functioning and bodily pain. Though role limitation due to physical health problems scored lowest in both groups, almost 60% of the patients scored favourably. OBS patients had significantly better physical functioning ($P = 0.037$). Overall, 96% of OBS patients as opposed to only 68% of ICD patients had significant relationships and a more active life-style. QoL comparisons between groups based on gender showed no significant differences.

OBS patients reported a better desire for sex – 47% (9 of 19) compared to 21% (3 of 14) of the diversions (Fig. 2): 42% (11/26) of men with OBS and 25% (5/19) of diversions could maintain an adequate erection. Frequency of erections was equal, ranging from 13% in the ICD group to 17% in the OBS patients. However, both groups reported very low satisfactory sexual intercourse (5–8%). Both groups of patients had varying degrees of satisfactory sexual function (27% OBS, 26% ICD). Sexual function scores were higher in the OBS group but 43% of the OBS patients found sexual dysfunction a significant problem (Fig. 3).

Table 1 Patient demographics

	Surgical procedure	
	Orthotopic neobladder ($n = 28$)	Ileal conduit ($n = 24$)
Gender	Male ($n = 25$), female ($n = 3$)	Male ($n = 15$), female ($n = 9$)
Median age at surgery in years (range)	65.5 (50–79)	73.5 (32–85)
Mean pre-operative Karnofsky performance score (range)	82 (70–90)	80 (60–90)
Median follow-up in months (range)	15 (3–39)	12 (3–75)

Table 2 SF-36 scores (orthotopic neobladder versus ileal conduit diversion)

Surgical procedure	Mean scores (1 SD) for each domain							
	PF	RLPH	RLE	VT	MH	SF	BP	GH
Orthotopic neobladder	77.4 (19)	68.5 (23)	84.3 (22)	61.0 (19)	86.5 (13)	79.2 (23)	78.3 (25)	73.8 (20)
Ileal conduit diversion	61.8 (30)	59.8 (30)	79.0 (22)	62.5 (20)	79.5 (17)	79.7 (27)	81.4 (24)	68.2 (22)
<i>P</i> -value	0.04	0.23	0.41	0.80	0.13	0.9	0.66	0.36

PF, physical functioning; RLPH, role – physical functioning; RLE, role – emotional functioning; VT, vitality; MH, mental health; SF, social functioning; BP, bodily pain; and GH, general health.

Of the OBS patients, 85% were continent with only two patients reporting a reduced QoL with pad usage. Three patients performed CISC once daily for significant residual urine. OBS patients had lower bowel function scores but also less bothersome symptoms. Almost all OBS patients were satisfied with their outcome. OBS patients required few adaptive measures such as clocked voiding, pelvic floor exercises, self catheterisation and keeping bladder records. ICD patients felt that their options were limited and many were not offered the neobladder option in view of the excluding factors mentioned in methods. Of ICD patients, 63% felt less complete and 42% were embarrassed due to the stoma, with 58% apprehensive of stomal leakage.

Discussion

Radical cystectomy remains the treatment of choice for patients with muscle invasive bladder cancer. Improvement in surgical technique and better peri-operative care has enabled surgeons to perform radical cystectomy and OBS

with minimal morbidity and mortality comparable to ICD. This coupled with urethral voiding and the absence of cutaneous stoma has lead to an increased patient acceptance of cystectomy early in the course of the disease with significantly improved survival rate.¹⁵

With an improved understanding of the pathology of invasive bladder cancer, the majority of patients without prostatic involvement (bladder neck in females) can now be offered OBS without compromising cancer control. However, OBS is not routinely offered to patients, partly because the urological community remains unconvinced regarding the QoL benefits of OBS over ICD.

Cystectomy with any type of diversion is associated with significant co-morbidity. This article assessed the variation in postoperative patient opined quality of life. Studies have already looked at different types of urinary diversion and long-term outcome, including by Nieuwenhuijzen *et al.*¹⁶ who reported no significant association between tumour stage, ASA, age, pre-operative radiotherapy, gender, and diversion-related complication rates. They suggested that a high ASA score was the only significant association with early complications, with more late complications in the orthotopic diversions compared to the cutaneous diversions. This study comparatively analysed the outcome domains from a patient's perspective.

This study with similar age group population showed favourable HRQoL in both groups in all assessed domains with significantly better physical functioning in OBS patients. OBS patients had marginally lower scores in vitality, social functioning and bodily pain scales in comparison to the ICD group. We suggest this to be probably due to a more active life-style and consequent higher physical demands of OBS patients.

Patients were instructed regarding timed voiding and the need to 'hold on' for progressively increasing intervals against a closed external sphincter even if leakage occurs, to enable the pouch to gradually expand. They were also instructed to self-catheterise initially to check residual urinary volumes. It may be that the patients in this study tend to have a normal voiding function in contrast to other studies.^{17,18}

ICD patients have marked body image problems, with almost half the patients being embarrassed of the stoma and change of external body image.¹⁹ Apprehension of leakage and sub-optimal appreciation of body image meant these patients tend to be less active and restricted in their social environment.

This study included only 12 women. We felt that separate analysis would not be meaningful or significant with this cohort. Granberg *et al.*²⁰ reported comparable outcome following OBS reconstruction in women as in men. Therefore, the cohort was studied without gender de-differentiation. The follow-up period was short in only a few OBS patients (less than 6 months). Overall, the median follow-up was 15

months. Surprisingly, the OBS patients with shorter follow-up did not necessarily have worse scores. In fact, all except one patient with a follow-up period less than 6 months scored sexual function favourably in the OBS group.

Postoperative quality of life and satisfaction is cardinally dependent on patients' expectations. Motivated patients also tend to do better. Pre-operative counselling, strict selection criteria and psychosocial assessment would enable patients being recommended the most appropriate procedure for their clinical and social setting. A detailed discussion of postoperative requirements and likely outcome, supplemented with an opportunity to meet patients with different forms of urinary diversion, tends to engender a more realistic outlook with positive results.

Conclusions

All eight HRQoL scales were favourable in both groups. OBS patients had significantly better physical function. There was no significant difference among the other HRQoL indices between the two groups of patients but body image issues persist in ICD patients. OBS attained near normal urethral voiding with good continence. A detailed discussion of long-term expected functional outcome after either OBS or ICD should engender a realistic expectation by patients allowing better adaptation to their choice of procedure. Our results demonstrate a better quality of life and a more active life-style among OBS patients compared to ICD patients in a similar age-group population.

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