

# COMPARISON OF ILEAL CONDUIT AND TUUC: A 4 YEARS STUDY

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## ABSTRACT

**Objective:** This study aims to compare 4 years of experience of IC and TUUC in the same period and among similar experienced surgeons. **Material & Methods:** Between January 2016 and August 2019, 44 radical cystectomies were performed, but 4 patients were excluded due to incomplete data or who underwent neo-bladder procedures. The primary endpoint was 30 days of complication rate and intraoperative complications. Bowel movement, ambulation, and length of stay (LOS) postoperatively were followed-up over a period of 30-day postoperatively. **Results:** 12 male patients underwent TUUC and 24 male patients IC, while only 4 female patients underwent IC. The mean of LOS of IC was  $12.72 \pm 8.6$  and  $10.8 \pm 3.5$  for TUUC; there were no significant differences between arms. However, TUUC had lower intra-operatively bleeding ( $779.17 \pm 441.15$  ml) compared to IC ( $1328.57 \pm 810.40$  ml). There was no difference in early complications between arms. **Conclusion:** Our results suggest that TUU with UC diversion may be used as a viable option of urinary diversion in radical cystectomy. This technique provides similar safety both surgically and oncologically.

**Keywords:** Ileal conduit, transureteroureterostomy with ureterocutaneostomy (TUUC), intra-operative complications, post-operative follow-up.

## ABSTRAK

**Tujuan:** Penelitian ini bertujuan untuk membandingkan 4 tahun pengalaman IC dan TUUC di waktu yang sama dan diantara ahli bedah yang berpengalaman serupa. **Bahan & Cara:** Antara Januari 2016 dan Agustus 2019, 44 sistektomi radikal dilakukan, tetapi 4 pasien dikeluarkan karena data yang tidak lengkap atau yang menjalani prosedur neo-kandung kemih. Titik akhir primer adalah 30 hari tingkat komplikasi dan komplikasi intraoperatif. Pergerakan usus, ambulasi, dan (LOS) pasca operasi ditindaklanjuti selama 30 hari pasca operasi. **Hasil:** 12 pasien laki-laki menjalani TUUC dan 24 pasien laki-laki IC, sedangkan hanya 4 pasien perempuan menjalani IC. Rerata LOS IC adalah  $12.72 \pm 8.6$  dan  $10.08 \pm 3.5$  untuk TUUC; tidak ada perbedaan yang signifikan antara lengan. Namun, TUUC memiliki perdarahan intra-operatif yang lebih rendah ( $779.17 \pm 441.15$  ml) dibandingkan dengan IC ( $1328.57 \pm 810.40$  ml). Tidak ada perbedaan dalam komplikasi awal antara lengan. **Simpulan:** Hasil kami menunjukkan bahwa TUU dengan pengalihan UC dapat digunakan sebagai pilihan pengalihan urin yang layak pada sistektomi radikal. Teknik ini memberikan keamanan yang serupa baik secara pembedahan maupun onkologis.

**Kata Kunci:** Saluran ileum, TUUC, komplikasi intra-operatif, tindak lanjut pasca-operasi.

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## INTRODUCTION

Bladder cancer (BC) is reported as the 7th most common cancer worldwide and is more common in men compared to women.<sup>1,2</sup> While not reported as the most common cancer, BC treatment cost is the highest compared to all other cancers.<sup>3</sup> Predominance occurs in low socioeconomic areas of the world, with rural dwellings and patients who have limited insurance coverage.<sup>4</sup> These patients often present in advanced stages of the disease and

are often lost to follow-up. These circumstances portend the worse outcomes for BC both surgically and oncologically.

Radical cystectomy has emerged as the standard of management of high-grade BC for more than 30 years, in which high-grade tumors progressively invade surrounding tissues and there is high incidence of metastases.<sup>5,6</sup> Transureteroureterostomy with ureterocutaneostomy (TUUC) is described as a simplified form of diversion after advanced malignancy in bladder ultimately for unfit

patients and has shown no significant differences both in early and long-term complications in comparison with ileal-conduit (IC).<sup>7-8</sup>

## OBJECTIVE

This study aimed to evaluate this technique using the same surgical technique and during a similar time interval.

## MATERIAL & METHODS

Data were collected retrospectively from consecutive patients who underwent radical cystectomy between January 2016 and September 2019. We included patients who underwent radical cystectomy and urinary diversion by 2 similar experienced surgeons over 4 years. All the patients who underwent radical cystectomy in the last 4 years were included. This study was approved by The Medical and Health Research Ethics Committee of Faculty of Medicine, Gadjah Mada University with

approval number: (KE/0976/08/2019)

All categorical variables were analyzed using either Pearson chi-square or Fisher exact tests. Length of Stay (LOS), intra-operative bleeding, operative time, and mobility were validated using bootstrapping, a non-parametric method that involves repeating analysis 1000 times after random selection of cases. All the analysis were performed using SPSS version 21.00 (IBM Corp., Chicago, USA).

## RESULTS

In this study, the mean ages of IC groups were ( $60.03 \pm 9.2$ ) and TUU with UC was ( $61.58 \pm 8.22$ ). Male patients were predominant in both groups. There were 24 males (85.7%) out of IC patients and all 12 (100%) of the TUU with UC group. 53.57% of patients of the IC group were diagnosed  $< T2$ , while for TUU patients it was 16.7%. There was no statistical difference in TMN staging between groups (Table 1). Patients who

**Table 1.** Data Demographic.

	Ileal-Conduit	TUUC	P value
Sex			
Male	24	12	
Female	4		
Ages*	$60.03 \pm 9.26$	$61.58 \pm 8.22$	0.602
BMI kg/M <sup>2</sup> *	$17.76 \pm 1.84$	$17.91 \pm 1.12$	0.73
Clinical Stage			0.071
<T2	15 (53.57%)	2 (16.67%)	
>T2	13 (46.43%)	10 (83.33%)	
Comorbidities			
○ Hypo albumin**	6 (21.4%)	8 (66.7%)	0.010
○ Anemia**	6 (21.4%)	4 (33.3%)	0.498
○ T2DM**	2 (7.1%)	1 (8.3%)	0.912
○ Renal insufficiency **	6 (21.4%)	4 (33.3%)	0.504
○ Intestinal tumor	0	1 (8.3%)	0.266
○ Sepsis	1 (3.6%)	0	

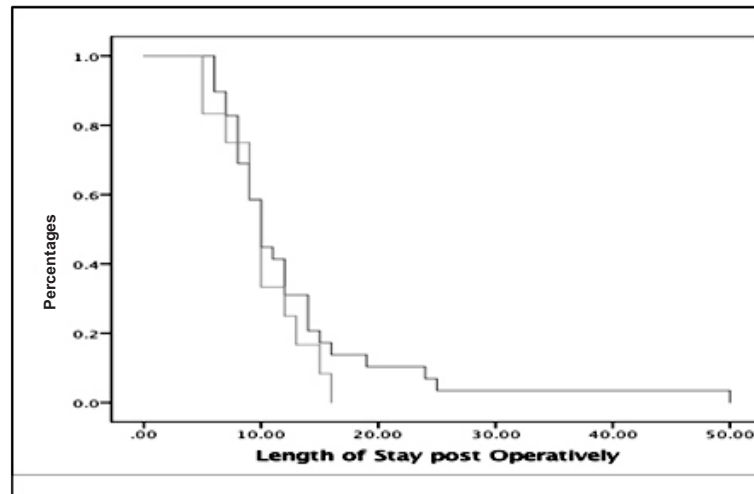
**Supplementary Table 1.** Range of p value in comparison of LOS after surgery levels between Ileal-conduit and TUUC.

	Mean of difference	Original P value	P value after bootstrapping
LOS post operatively		0.17	0.18
• Ileal-conduit	- 0.599 – 6.57		
• TUUC			
○ Seat (hours)	1.2 – 0.3	0.33	0.46
○ Standing (hours)	-1.8 – 0.7	0.37	0.14
○ Walk (hours)	-1.6 – 1.2	0.82	0.74
Bleeding Post operative (Hours)	134.4 – 935.4	0.008	0.008
Time Operative (Hours)	0.8 – 3.0	0.001	0.004

underwent TUUC had significantly higher proportion of hypo-albumin compared IC.

Assessment of the early complications found similarities between groups; the mean of standing and walking for patients was found to be similar in this study ( $p > 0.05$ ). The Length of Stay (LOS) after the operation was found higher on the IC group with  $12.72 \pm 8.6$  days compared to TUUC ( $10.08 \pm 3.5$ ) days, but the results were considered statistically insignificant ( $p > 0.05$ ), the p value was

similar after bootstrapping (see supplemental Table 1). Among IC patients there were 5 patients with longer LOS, with 4 patients diagnosed with sepsis post-operatively and who needed prolonged intensive care, and 1 patient diagnosed with nosocomial pneumonia (Figure 1). Additionally, TUU with UC patients were observed to have significantly lower intraoperative bleeding ( $779.17 \pm 441.15$  cc) compared to the IC group ( $779.17 \pm 441.15$  cc,  $p < 0.05$ ).



**Figure 1 .** The length of stay post-operative (days) Ileal Conduit (blue) and TUUC (green).

**Table 2.** Early Outcome of Ileal Conduit and TUUC.

	Mean	P value
Seat (hours)		
• Ileal-conduit	$2.45 \pm 1.12$	0.332
• TUUC	$2.83 \pm 1.19$	
Standing (hours)		
• Ileal-conduit	$4.17 \pm 1.28$	0.366
• TUUC	$4.67 \pm 2.14$	
Walk (hours)		
• Ileal-conduit	$5.24 \pm 1.50$	0.820
• TUUC	$5.41 \pm 2.42$	
LOS post operatively (days)		
• Ileal-conduit	$12.72 \pm 8.6$	0.17
• TUUC	$10.08 \pm 3.5$	
Bleeding intraoperative (ml)		
• Ileal-conduit	$1328.57 \pm 810.40$	0.008
• TUUC	$779.17 \pm 441.15$	
Time operative (hours)		
• Ileal-conduit	$5.90 \pm 1.45$	0.001
• TUUC	$3.92 \pm 1.56$	

**Table 3.** 30-days complication of ileal conduit and TUUC.

	Urinary Diversion		P value	Odds Ratio
	Ileal-Conduit	TUUC		
Post Operative Ileus			0.69	0.53
• No	20	10		
• Yes	8	2		
Leakage			0.53	
• No	24	11		
• Yes	4	1		
Readmission			0.53	
• No	22	9		
• Yes	6	3		
Intensive care			0.53	
• No	24	11		
• Yes	4	1		
Wound Dehiscence			0.62	
• No	25	10		
• Yes	3	2		

On this, we defined Post Operative Ileus (POI) as absences of flatus and/or intolerance of intake 72 hours after the operation and confirmed small and/or large intestinal dilatation on abdomen X-ray examination. We observed that the proportion of POI was higher in IC group compared to TUUC, but statistical analysis showed no difference (P 0.56).

## DISCUSSION

Radical cystectomy has evolved for the last 30 years to become the most common therapeutic strategy for muscle-invasive bladder cancer, with overall 5 years disease free reported to vary from 48-69%.<sup>9</sup> Several techniques may be options for urinary diversion after radical cystectomy such as ileal-conduit (IC), continent cutaneous diversion and orthotopic neobladder.<sup>10</sup> IC has been described as the gold standard of treatment for bladder cancer patients who underwent RC because IC is simpler and has relatively lower complications compared to continent and orthotopic neobladder procedures.

TUUC has been known as the most viable alternative for patients who are not amenable to do radical cystectomy and with high-risk of bowel metastases.<sup>11</sup> Recently TUUC with the tubeless technique was reported to have fewer complications and was more time efficient compared to IC.<sup>12</sup> In this study, patients who underwent TUUC had significant higher proportion of hypoalbumin

compared to IC. Most patients with unfavorable conditions were advised to undergo TUUC, and those who agreed then underwent TUUC. IC procedure in our center is recommended in collaboration with the digestive division, while patients who refuse to wait for their scheduled operation will be advised to undergo TUUC. In addition, we found that time operation and bleeding intraoperative were significantly lower in the TUUC group ( $p < 0.005$ ), and a similar result has been reported by Liu et al.<sup>12</sup>

The use of ureter stoma has the advantage of avoiding certain complications, such as metabolic complications, hydronephrosis, prolonged ileus, and strictures on uretero-ileal muscles.<sup>13</sup> However, this study found that the early complications were similar in both groups.<sup>14</sup> There were no patients reported who died within the 1<sup>st</sup> month post-operatively, but 1 patient died due to severe sepsis and Hospital Acquired Pneumonia (HAP) on the 50<sup>th</sup> day. Our early complication postoperative rate was observed in 25% of cases for TUUC and 27.5% for IC. These results are consistent with previous studies<sup>15-18</sup>, where the most common early complications that occurred in our study was urinary leakage, POI, and wound dehiscence. The proportion of wound dehiscence in the TUUC group (16.7%) was higher compared to the IC group (10.7%), and this may have occurred because most of the patients who underwent TUUC had more comorbidities such as hypoalbumin.

The LOS of TUUC patients was lower compared to the IC group, however, further analysis found no statistical differences (OR 0.53,  $p=0.69$ ). The previous study showed that TUU with UC has significant reduction in LOS and operating time compared to standard IC.<sup>8</sup> Because the nature of IC involves bowel manipulation, meanwhile, TUUC does not require manipulating the bowel aggressively, and this resulted in longer LOS in IC groups. The insignificant findings were validated by the bootstrapping methods<sup>19</sup>; however, we suggest further evaluation is needed regarding LOS between these groups. In our study, most TUUC patients had delayed discharge issues mostly due to a lack of improvement in several laboratory parameters.

Our findings suggest that TUUC diversion can have no additional early complications, shorter intraoperative time, and less bleeding compared to standard IC, despite the major debate regarding patients' quality of life. TUUC can be a viable alternative for urinary diversion techniques in patients who underwent radical cystectomy due to invasive bladder cancer.

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