Hybrid Ureteroenteric Anastomosis Is Associated With Lower Stricture Rates in Ileal Conduit Urinary Diversion

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Abstract

Background Anatomic complications of the ureteroenteric anastomosis in ileal conduit (IC) cause significant morbidity in patients post-cystectomy and cystoprostatectomy. The Bricker technique has a perceived disadvantage of increased risk for stricture, whereas the Wallace technique runs the risk for ureteral malignancy affecting both ureteric ends, and bilateral ureteric obstruction from a stone lodged at the anastomosis. We aimed to evaluate the safety, efficacy, and stricture rate of a novel hybrid ureteroenteric anastomosis technique. We compared these outcomes to the Bricker and Wallace anastomosis techniques for IC urinary diversion (ICUD).

Methods We performed a retrospective chart review of patients who had undergone ICUD after cystectomy for bladder cancer from 2011 to 2016. Patients were categorized into groups undergoing the Bricker, Wallace, and hybrid ureteroanastomosic techniques. Strictures were identified during clinical follow-up or hospital presentations with complications.

Results We identified 68 patients suitable for inclusion. They were separated by Bricker, Wallace, and hybrid anastomosis techniques, with 19 (27.9%), 20 (29.4%), and 29 (42.6%) patients, respectively. Ureteroenteric anastomotic strictures occurred in 9 patients (5 Bricker, 3 Wallace, 1 hybrid). This difference in stricture rates for Bricker versus hybrid (26.3% vs. 3.4%; OR, 10 [95% CI, 1.1 to 121.1]; $P = 0.02$) was significant but was comparable for Wallace versus hybrid (15.0% vs. 3.4%; OR, 4.9 [0.7 to 66.0]; $P = 0.15$) and for Bricker versus Wallace (26.3% vs. 15.0%; OR, 2 [0.4 to 8.6]; $P = 0.87$). 15 patients (51%) in the hybrid group required oral antibiotics for a symptomatic urinary tract infection compared with 4 (21%) with Bricker and 8 (40%) with Wallace ($P = 0.10$). Median post-cystectomy follow-up and stricture formation time were 16 months (IQR, 4–36) and 9 months (7–32), respectively.

Conclusion The hybrid technique is a safe and efficacious alternative to the Bricker and Wallace anastomoses. It carries with it a risk for urinary tract infection that is eclipsed by substantially lowered rates of ureteric strictures requiring intervention while maintaining the advantage of separating the two ureters.

Introduction

Ileal conduit is the commonest form of urinary diversion after radical cystectomy[1,2]. It has acceptable complication rates and reasonable postoperative quality of life, and the technique is relatively accessible by many urologists[3–7]. Despite the lower rates of morbidity compared to alternative types of urinary diversion, complications do occur.

Key Words

Ileal conduit, urinary diversion, Bricker, Wallace, hybrid, stricture, retrospective

Competing Interests

None declared.

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Abbreviations

IV intravenous
UTI urinary tract infection

A source of morbidity in ileal urinary diversion is associated with anatomical complications of the ureteroenteric anastomosis[8–10].

In general, there are three types of refluxing anastomoses of the ureter to the ileal conduit used in contemporary practice[11,12]. The Bricker anastomosis is categorized when the distal end of each ureter is anastomosed to the anti-mesenteric side of the proximal ileal conduit[13]. Conversely, the Wallace anastomosis is performed by anastomosing both distal ureters together to form one ureteric plate, which is then anastomosed to the proximal luminal end of the ileal conduit[14]. The third is a hybrid technique, where the left ureter undergoes an end-to-end anastomosis akin to the Wallace technique but with a single ureter, and the right ureter is anastomosed to the side of the ileal conduit in a fashion consistent with the Bricker technique. The Wallace technique is thought to have a lower stricture rate compared to the Bricker technique[15]; however, it is criticized to have a risk for bilateral renal obstruction with recurrence of disease or an obstruction stone with a theoretical risk of spreading the urothelial cancer to the contralateral side[16,17]. The hybrid technique may retain the benefits of the lower stricture rates in the left ureter while eliminating the risks of joining the two ureters.

The pathophysiology of benign strictures is thought to be due to periureteral fibrosis secondary to ischemia or urine leakage at the anastomotic site[18]. Ureteric stricture is more common in the left ureter, thought to be due to the additional mobilization and tension of the left ureter[16–18]. The incidence of strictures is quite variable, ranging from 1.9%[19] to as high as 25.3%[15], with the median time to diagnosis anywhere from 7 to 25 months[18]. It is plausible that differences in rates for strictures exist between anastomotic techniques due to variation in distal ureteric vascular supply and anastomotic tension.

In this study, we aim to evaluate the safety, efficacy, and stricture rate for the hybrid method compared to the Bricker and Wallace methods performed at the institution. It is important to evaluate the incidence of stricture formation, as there is significant morbidity attached to the management of strictures.

Materials and Methods

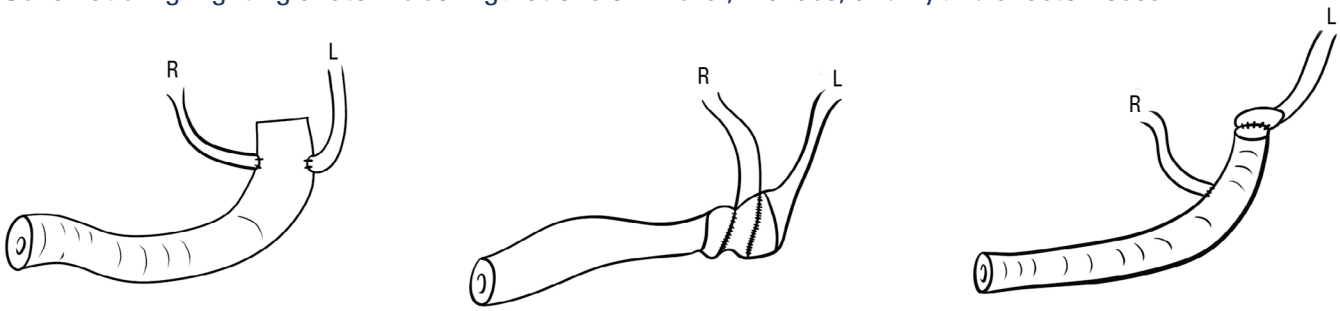
After institutional ethical approval, we performed a retrospective study where data was collected through a retrospective chart review. We identified patients who had undergone ileal conduit urinary diversion after radical cystectomy and radical cystoprostatectomy for bladder cancer from 2011 to 2016. By Australian standards, our institution is considered a moderate-volume tertiary center, performing approximately 15 radical cystectomies per year. At our institution, cystectomy is performed primarily by five consultant urological surgeons, with a fellow or a senior level resident as first assistant. Urinary diversion may be completed by a consultant, fellow, or senior registrar under supervision. In general, most of the ileal conduit formations are performed by fellows or senior registrars in training.

In our series, the decision of which anastomotic technique (Bricker, Wallace, or hybrid) to use was based on surgeon preference. A schematic highlighting the anatomic differences between the Bricker, Wallace, and hybrid techniques are highlighted in **Figure 1**. Prior to the formation of the ureteroenteric anastomosis, the segment of terminal ileum and ureteric mobilization techniques were standard irrespective of the anastomotic technique. The distal ureters were tension free, well vascularized, and generously spatulated at a minimum of 1.5 cm. For the Bricker anastomosis, two small enterotomies were created on the proximal segment of the ileal conduit, free from the mesentery[13]. Anastomosis was performed with two continuous absorbable sutures, typically 5–0 Monocryl or 5–0 PDS (Ethicon, Raritan, New Jersey, USA). For the Wallace anastomoses, the medial borders of the left and right spatulated ureter were sutured adjacently with absorbable suture[14]. Anastomosis with the two ureters and the proximal lumen of the ileal conduit was performed with absorbable suture as above. Finally, for the hybrid technique, the ileum was selected and isolated the same way as for the other two methods. The proximal lumen of the ileal conduit was opened in its entire diameter. The left ureter was mobilized in the usual fashion and tunnelled through the retro-mesocolon space created. It was spatulated to match the diameter of the ileum and anastomosed end to end with the proximal lumen of the ileal conduit using continuous absorbable sutures. All anastomoses were performed using the reconstructive principals in addition to ureteral stents and peri-conduit surgical drains. If concern existed over excessive tension or the viability of the distal ureter or conduit—this was addressed intraoperatively based on surgeon discretion. Postoperative management was based on surgeon discretion.

We collected data pertaining to age, gender, staging of the disease, and history of chemotherapy, radiotherapy, and neoadjuvant chemotherapy. All of our cases were discussed at a multidisciplinary team meeting involving senior urologists, medical oncologists, and

FIGURE 1.

Schematic highlighting anatomic configurations of Bricker, Wallace, and hybrid anastomoses.



Bricker anastomosis
End-to-end anastomosis of each individual ureter to the ileal conduit.

Wallace anastomosis
End-to-end anastomosis of a joint uretic plate to ileal conduit.

Hybrid anastomosis
End-to-end anastomosis of the left ureter, end-to-side anastomosis of the right ureter to the ileal conduit.

radiation oncologists at our institution. Cisplatin-based neoadjuvant chemotherapy was the standard of practice; patients with contraindications or personal choices against this regimen could receive gemcitabine and carboplatin instead, or no neoadjuvant chemotherapy. Patients with a solitary kidney were excluded. All men had a radical cystoprostatectomy, and all women had a radical cystectomy.

We recorded the following perioperative, intraoperative, and postoperative factors: operative time, estimated blood loss (EBL), postoperative transfusion rate, length of stay (LOS), postoperative complications, and the characteristic of ureteric strictures that required intervention. Patients were monitored in the outpatient clinic or in hospital if they required readmission. Ureteroenteric stricture was diagnosed in routine follow-up in outpatient clinics, which included a CT intravenous pyelogram at 3 months, then every 6 months after that for the first 2 years and yearly until the fifth year or at hospital if requiring admission. Patients were excluded from subsequent analysis if key demographic information or outcome measures were missing, or if there was a history of or required postoperative salvage radiotherapy to the abdomen or pelvis. For missing data, the related data was removed.

Statistical analysis

Categorical variables were displayed as frequency (percentage) and compared using the chi-square test. When three-group chi-square yielded a P-value ≤ 0.10, a post-hoc Bonferroni correction was performed to compare individual subgroups using the Fisher exact test. Continuous variables were treated as non-parametric (due to the small sample size), displayed as median (interquartile range [IQR]), and compared using the Kruskal-Wallis test. The Kaplan-Meier method was used to assess anastomotic stricture incidence after surgery; time-to-event curves were compared using the log-rank test. Analysis was performed using GraphPad Prism v9.0 (La Jolla, California, USA) and StataBE v17.0 (College Station, Texas, USA). P-values < 0.05 were considered statistically significant.

Results

Between 2011 and 2016, a total of 71 patients had radical cystectomy (or cystoprostatectomy) and ileal conduit diversion for bladder cancer. Three patients had a solitary kidney and, thus, underwent a single Bricker anastomosis, and therefore were excluded. Of the remaining 68 patients, 19 patients (28%) underwent a Bricker anastomosis, 20 (29%) underwent a Wallace anastomosis, and 29 (42%) underwent the hybrid anastomosis. The demographics of the 68 patients are shown in Table 1. Overall cohorts were comparable with respect to age, gender, and tumor staging between patients receiving Bricker, Wallace, or hybrid anastomosis. In the Wallace subgroup of 20 patients, 2 (10%) had a history of radiotherapy to the head and neck and breast while the other subgroups had none.

Most early postoperative complications did not differ between the groups. There were no significant differences in EBL, LOS, transfusion rate, ileus, electrolyte disturbance, acute kidney injury, or readmission within 30 days between the Bricker, Wallace, and hybrid techniques (Table 2). The incidence of symptomatic urinary tract infection (UTI) requiring oral antibiotics was higher in the hybrid group compared to Bricker (52% vs. 21%; OR, 4.0 [1.0 to 12.9]; $P = 0.04$) but similar compared to Wallace (52% vs. 40%; $P = 0.56$). In comparison, there was no statistically significant difference in the 8 patients who developed urosepsis requiring intravenous (IV) antibiotics, of whom 1/19 was in the Bricker group (5%), 4/20 in the Wallace group (20%), and 3/29 in the hybrid group (10%) ($P = 0.34$) (Table 3).

TABLE 1.

Summary of patient demographics

Characteristics	Total	Bricker	Wallace	Hybrid
Sample size (%)	68 (100)	19 (27.9)	20 (29.4)	29 (42.6)
Age (IQR)	68 (62–73)	67 (63–74)	67.5 (61.5–71)	69 (61–73)
Male	55 (80.9)	18 (94.7)	13 (65)	24 (82.8)
Staging, pT (%)				
Tx	3 (4.4)	0 (0)	1 (5.0)	2 (6.9)
T0	9 (13.20	1 (5.3)	1 (5.0)	7 (24.1)
Tcis	5 (7)	1 (5.3)	1 (5.0)	3 (10.3)
T1	8 (11.8)	2 (10.5)	4 (20.0)	2 (6.9)
T2	17 (25)	8 (42.1)	3 (15.0)	6 (20.7)
T3	19 (27.9)	5 (26.3)	7 (35.0)	7 (24.1)
T4	7 (10.3)	2 (10.5)	3 (15.0)	2 (6.9)
History of radiotherapy not involving the abdomen and pelvis (%)	0 (0)	0 (0)	2 (10.0)	0 (0)
Neoadjuvant chemotherapy (%)	7 (10.3)	1 (5.2)	2 (10.0)	4 (13.8)

The Clavien-Dindo classification demonstrated that the rate of grade 2 complications was higher in the hybrid group compared to Bricker and Wallace (62% vs. 31% vs. 50%, respectively); however, the hybrid group had less grade 3a and 3b complications (10% vs. 21% vs. 15%, respectively). Grade 4a complications were found only in the Bricker subgroup (10%). There were only grade 4a complications in the Bricker subgroup (10%)—there were no grade 4b or 5 complications. (Table 4)

Overall, ureteral stricture needing intervention developed in 9 patients (13%). No patients developed bilateral ureteric stricture. In patients undergoing Bricker anastomosis, ureteral stricture developed in 5/19 patients (28%); 3 strictures in the left and 2 in the right. With the Wallace anastomosis, 3/20 patients (15%) developed stricture; all in the left ureter. Of the 29 patients who had the hybrid anastomosis, 1 patient (3%) developed stricture in the right ureter (chi square, $P = 0.07$). Median post-cystectomy follow-up and stricture formation time were 16 months (IQR, 4 to36) and 9 months (7 to 32), respectively.

Using the Kaplan-Meier method, the estimated stricture-free survival in the hybrid group at 1, 3, and 5 years was 100%, 100%, and 80%, respectively (Figure 2). In the Bricker subgroup, the estimated 1-, 3-, and 5-year stricture-free survival rate was 100%, 75%, and 20%, respectively. For the Wallace subgroup, the estimated 1-, 3-, and 5-year stricture-free survival rate was 92.5, 82%, and 65%, respectively. Estimated stricture-free survival differed significantly across anastomotic technique (log-rank test, $P = 0.02$). Strictures were predominantly located in the left ureter (66.7%; $P = 0.32$). All of the 9 patients with strictures underwent successful endoscopic treatment, 7 as retrograde stent with dilation and 2 as anterograde stent with dilation. None of the patients underwent open repair or conservative treatment.

No significant differences in stricture rates were identified when stratified by patient age and T staging status. The difference in stricture rates for Bricker versus hybrid (26.3% vs. 3.4%; OR, 10 [95% CI 1.1 to 121.1]; $P = 0.02$) was significant but were comparable for Wallace versus hybrid (15.0% vs. 3.4%; OR, 4.9 [0.7 to 66.0]; $P = 0.15$) and for Bricker versus Wallace (26.3% vs. 15.0%; OR, 2 [0.4 to8.6]; $P = 0.87$). The median time to diagnosis was 15 (IQR, 8 to 37) months for the 5 patients in the Bricker subgroup, 7 (7 to 8) months in the Wallace group, and 32 months for the 1 patient in the hybrid subgroup.

Discussion

The Bricker and Wallace techniques are the two most common forms of ureteroenteric anastomosis for urinary diversion post-radical cystectomy[19]. The choice between these two techniques is based mostly on surgeon preference. Both have their perceived disadvantages, which are cumulatively listed as increased

FIGURE 2.

Anastomotic stricture formation

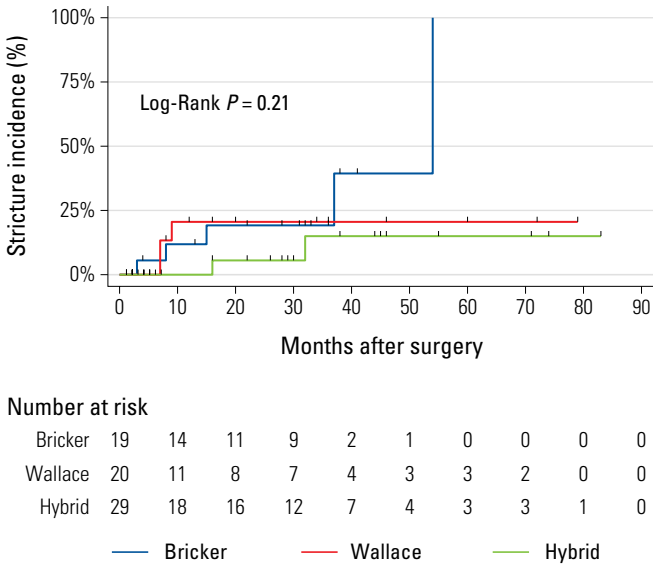


TABLE 2.

Reteroenteric stricture details

Outcome	Total	Bricker	Wallace	Hybrid	*P*-value
Sample size (%)	68 (100)	19 (27.9)	20 (29.4)	29 (42.6)	
Number of ureteric strictures requiring intervention	9	5 (26.3)	3 (15.0)	1 (3.4)	0.07* B vs. W: 0.87 B vs. H: 0.02 W vs. H: 0.15
Time from cystectomy to stricture formation (months), median (IQR)	9 (7–32)	15 (5.5–45.5)	7 (7–9)	32	0.46
Left:Right	6:3	3:2	3:0	0:1	
Type of interventions					
Nephrostomy/Antegrade stent/Dilatation	2	1	1	0	
Retrograde stent/dilatation	7	4	2	1	
Indication					
Infected obstructed kidney	1	1	0	0	
AKI	1	0	1	0	
Worsening hydronephrosis	4	2	2	0	
Recurrent UTI	1	0	0	1	
Ureteric stone	1	1	0	0	

*AKI; acute kidney disease; UTI, urinary tract infection. *Chi-square test P-value ≤ 0.10, Bonferroni correction performed with Fisher exact test.*

stricture rates, chance for bilateral renal obstruction due to kidney stones or recurrence of disease, and theoretical risk for transfer of urothelial carcinoma to the contralateral side[11]. Here we report the rates of a hybrid technique that aims to eliminate some of the risks while retaining the benefits from both techniques. Our hybrid technique maintains distance between the ureteric orifice, eliminating the risk for bilateral renal obstruction due to kidney stones or disease, and theoretically retains the reduced risk in stricture formation. In addition, it is easier to discriminate the two ureters with retrograde conduitoscopy, as the right ureter is an end-to-side anastomosis and the left ureter is an end-to-end anastomosis, which also facilitates easier endoscopic access for surveillance. The practice of anastomosing a spatulated left ureter to the end of the conduit may have been performed in some institutions across the world; however, this is the first study to evaluate the safety and stricture rates of such an approach.

The overall stricture rate in our series was 13.2% and showed a propensity for the left ureter (66.7%; $P = 0.32$). This is comparable to the literature where the reported incidence of strictures ranges from 1.9% to 25.3%[15,19] and corroborates the tendency for strictures to form in the left ureter[12,16,18]. At our institution, there was a notable difference in stricture formation between all three techniques. Overall, it appeared that the hybrid anastomosis had substantially lower rates of stricture formation when compared to the Bricker and Wallace anastomoses performed at this site, with Bricker being the highest. The review only included four studies due to a paucity of studies in the literature, and as such, it is difficult to comment on the true rate of stricture formation with the Bricker or the Wallace anastomosis. This is illustrated by Cristoph et al.[15] in their analysis of 137 patients, with reported stricture rates of 25.3% of patients (roughly 12.9% of ureters) with the Bricker technique and 7.7% of patients (roughly 3.9% of ureters) with the Wallace technique, highlighting the variability in

TABLE 3.

Summary of perioperative outcomes

Perioperative outcomes	Total	Bricker	Wallace	Hybrid	*P*-value
Sample size (%)	68 (100)	19 (27.9)	20 (29.4)	29 (42.6)	
Operative time (min), median (IQR)	317.5 (270–390)	390 (330–420)	315 (300–360)	300 (270–360)	0.01
Blood lost (mL), median (IQR)	700 (500–1100)	500 (375–950)	900 (725–1750)	700 (400–1000)	0.55
Length of stay (days), median (IQR)	13.1 (9.0–16.9)	13.9 (10.2–15.75)	12.6 (9.1–15.4)	13.1 (7.4–19.1)	0.62
Postoperative complications (%)					
Ileus	35	11 (57.9)	11 (55.0)	13 (44.8)	0.63
Electrolyte disturbance	25	6 (31.6)	8 (40.0)	11(37.9)	0.85
Acute kidney injury	18	7 (36.8)	4 (20.0)	7 (24.1)	0.46
UTI	27	4 (21.0)	8 (40.0)	15 (51.7)	0.10* B vs. W: 0.30 B vs. H: 0.04 W vs. H: 0.56
Urosepsis	8	1 (5.3)	4 (20.0)	3 (10.3)	0.34
Pelvic collection	9	1 (5.3)	5 (25.0)	3 (10.3)	0.16
Urine leak	5	0 (0)	3 (15.0)	2 (7.0)	0.20
Postoperative transfusion	36 (100)	8 (22.2)	12 (33.3)	16 (44.4)	0.51
Readmission within 30 days	13 (100)	4 (30.8)	4 (30.8)	5 (17.2)	0.94
Reoperation within 30 days	1 (100)	0	0	1 (100)	0.51
Post-cystectomy follow-up (months), median (IQR)	16 (4–36)	19 (4–33.8)	12 (6.3–36)	26 (3–41)	0.99

**Chi-square test P-value ≤ 0.10, Bonferroni correction performed with Fisher exact test.*

incidence of stricture formation. In a study by Large et al.[20], the stricture rate per ureter was 8.5% and 12.7% in the interrupted and running anastomosis groups, respectively. Perhaps our stricture rates can be further improved by switching from running to interrupted suturing.

The left ureter has a higher risk of developing a stricture in the Bricker and Wallace techniques, most likely due to ischemia from mobilizing it more than the right side in order to create a "tunnel" through the retrosigmoid mesocolon. We believe that the hybrid technique has a lower risk of developing a stricture in the left ureter,

TABLE 4.

Outcomes classified by Clavien-Dindo classification and comprehensive complication index

Clavien-Dindo Classification	Bricker	Wallace	Hybrid
Grade 1	3	1	3
Grade 2	6	10	18
Grade 3a	1	0	0
Grade 3b	3	3	3
Grade 4a	2	0	0
Grade 4b	0	0	0
Grade 5	0	0	0
Comprehensive complication index			
0–20	3	1	3
20–40	10	12	19
40–60	2	1	1
60+	0	0	1

as there is less mobilization required to make an end-to-end anastomosis as compared to the Bricker technique, and also with the Wallace technique a ureteric plate is required to be made between the two ureters. The right ureter undergoes a side-to-end anastomosis and is thought to be less susceptible to stricture formation, as it must travel less and undergoes less mechanical compression compared to the left ureter[18]. The anastomosis of the right ureter in our technique is essentially a Bricker end-to-side refluxing anastomosis, therefore the stricture formation rates should be comparable to the rates found with Bricker anastomosis with the right ureter.

Intraoperative and perioperative outcomes were a prime consideration in our study. We found that there was no statistically significant difference in perioperative morbidity between the subgroups, excluding operation time and urinary tract infections not requiring IV antibiotics. The hybrid group had a lower operation time ($P < 0.01$); however, it posed an additional risk for urinary tract infections requiring only oral antibiotics in our cohort ($P < 0.04$). While lower operation times will inevitably have a positive effect on patient outcomes, it is hard to quantify this against recent studies in the literature, as only robotic studies comparing Bricker and Wallace anastomoses recorded their operating time, which were invariably longer than the open approach[21,22]. The increased incidence of urinary tract infection is of concern with the hybrid approach. The expected incidence is not reported in the literature, but when compared to the other two approaches at our institution, it was clear that more patients with the hybrid approach developed a urinary tract infection. We are unsure of the exact reason why there were more episodes of acute UTI in the hybrid group. One speculation is that the proximal end of the ileal conduit potentially can migrate through the retro-mesocolon space. As the retro-mesocolon space is usually narrow, it might cause urine trapping in the proximal ileal conduit and increase the risk for UTI due to urine stasis. If this is the culprit, making the retro-mesocolon space larger may prevent urine trapping. Fortunately, these urinary tract infections were treated with oral antibiotics only, and as such, it appears favorable to undergo the Hybrid technique despite the risk. This is further supported by other perioperative outcomes, as it is apparent that there are no statistically significant differences between each technique, including the incidence of urosepsis requiring IV antibiotics. Thereby, it can be said that the Hybrid technique appears to be as safe and efficacious as the other two techniques, with the benefit of lower stricture rates that required intervention.

Postoperative follow-up in this cohort is believed to be adequate to detect most events of strictures in our patients; however, patients were not followed up for a uniform length. The median time to stricture formation in our cohort was 9 months (IQR 7 to 32), with 2 cases who presented at 32 and 37 months, postoperatively. This is mostly in line with the current literature where most strictures are thought to present within the first 2 years after surgery, though strictures have been reported at up to 40 months postoperatively[18]. Reporting the time to stricture formation is paramount in evaluating the extent of strictures in this cohort of patients, as the assumed stricture rate could be falsely lower than the actual rate. A criticism of Davis' meta-analysis[19] is that 3 of the 4 studies had a follow-up duration of less than 2 years. Despite most of the strictures presenting before then, a more complete view of time to stricture duration is obtained from longer follow-up.

Our study being retrospective and single center implies that it is susceptible to selection bias. As the operations were performed at a tertiary referring public teaching hospital, cases were performed by one of five

consultant surgeons supervising urology fellows and trainees. The decision on the choice of the three techniques was based on individual surgeon or fellow preferences. We were not able to ascertain the degree of involvement each consultant had intraoperatively based on chart review. Therefore, this study isn't able to separate surgeon technique from anastomotic technique, which could impact the results. It is worth mentioning that that the Hybrid technique was started by the most junior urologist on the team, hence it is unlikely, though possible, that lack of experience alone has contributed to the difference in outcomes including an increase in urinary tract infections. This study is also limited by the small sample size for all three techniques, which is a potential reflection of the findings being due to chance. A further larger prospective study would help address the limitations in this current study. There were no significant differences between patient demographics besides an obvious predilection for male patients across all subgroups that mirrors the incidence of bladder cancer in the population[23].

Conclusion

In our single-center, retrospective, cohort study, it appears that the hybrid technique is a potentially safe and efficacious alternative to the Bricker and Wallace anastomoses. It carries with it a risk for urinary tract infection that is eclipsed by the substantially lowered rates of ureteric strictures requiring intervention while also maintaining the advantage of keeping the two ureters separate. This technique could lower the morbidity attached to stricture formation post–urinary diversion for many patients post-radical cystectomy; however, its role will need to be established by further prospective studies comparing the Bricker, Wallace, and hybrid anastomotic techniques.

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