

Introduction

Prostate cancer (PCa) is the most common malignancy of the reproductive system in American men[1]. Prostate cancer PCa is one of the fastest growing malignancies in China, and by 2022, the incidence of prostate cancer in China is expected to be 0.58 times that of the United States USA, but the death rate is 1.62 times higher[2, 3]. Laparoscopic radical prostatectomy (LRP) and robot-assisted radical prostatectomy (RARP) are the standard surgical treatments for clinical localized prostate cancer (PCa). For RP, there are three main goals known as the “trifecta”: cancer control, urinary function and sexual function. Urinary incontinence (UI) is closely associated with patients’ quality of life after LRP. In one meta-analysis suggested that urinary incontinence (UI) at 3 months and 12 months after RARP were 14% to 35% and 4% to 31%, respectively, which defined continence as wearing no pad or one safety pad[4]. Although the physiology of and mechanisms of post-prostatectomy incontinence (PPI) are complex, there were a number of literatures several studies have reported that PPI may be related to age, body mass index (BMI), Charlson Comorbidity Index (CCI), D’Amico risk group, whether pelvic lymph node dissection, intravesical prostatic protrusion (IPP) or membranous urethral length (MUL)[5-7]. However, the impact of these variables on PPI was not fully reflected in these literatures studies, especially in the short or long term.

Thus, we prepare to include more data into studied that covering patient demographics, tumor characteristics and multiparametric magnetic resonance imaging (mpMRI) based anatomic measurements parameter in patients with PCa, and focused on short- and long-term their analysis of urinary continence (UC) on short or long term after laparoscopic radical prostatectomy LRP.

Discussion

Cancer control, preservation of erectile function and UC are the optimal “Trifecta” outcomes after RP[12]. The mechanism is unclear in the current literature regarding preoperative or intraoperative factors affecting continence UC after radical

prostatectomy RP are unclear in the literature, and controversy exists in surrounding them[13]. In our current study, marked by 3 and 12 months postoperatively, we have incorporated 17 parameters to for analyzing their relationship with short- and long-term UC post-LRP. Moreover, we found that MUL was the only significant predictor for long-term UC, short Short-term recovery of urinary function UC is was independently associated with MUL, prior TURP, lower clinical stage and ISUP grade group. For these results, we reveal several noteworthy findings.

First, compared to other open radical prostatectomy RP (ORP), or robot-assisted radical prostatectomy RARP, the functional results of short-term and long-term urinary control UC in our single center were similar to those of other studies [11, 14-17]. A previous study suggested that the difference in the rate of incontinent UI patients after LRP (17%) and RARP (6%) as well as in-time to continence UC did not reach the statistical significance whether at 3 months or 12 months. [18]. However, from Stolzenburg's multisurgeon and a multi-institutional randomized controlled trial (RCT) [17] displayed that showed better continence UC at 3 mo following after RALPRARP (54% vs 46%; $p = 0.027$), including no pads in 30% of patients compared to 17% in the LRP group ($p = 0.001$). he thought The authors suggested that the early recovery of continence UC was associated with better three-dimensional vision and greater dexterity, furthermore, and that LRP cohort was toward performed to by more-experienced higher operative experiencesurgeons, which further strengthens the validity of the continence UC outcome findings of this RCT. In contrast, ORP and RARP did not achieve similar results in for UC. A large, prospective, controlled, nonrandomised nonrandomized trial to evaluate outcomes of RALP in comparison with ORP showed that 366 men (21.3%) were incontinent after RALPRARP, as were 144 (20.2%) after RRP ORP at 12 months, and there was no statistically significant difference[16].

Second, in the present study, we found that prior TURP was associated with short-term (3 months) UC. Similarly, other studies[19, 20] also have shown that a longer mean time to UC recovery for patients with previous TURP, the The proposed hypothesis that previous TURP leads to worse outcomes in patients

undergoing RP is because of a difficult dissection resulting from obscured planes caused by peri-prostatic inflammation and fibrosis[19]. Conversely, several studies[21, 22] showed no impact on postoperative ~~continence-UC~~ outcome. It is believed that RP might ~~sometimes~~ be technically more difficult to perform, ~~but and the~~ outcome is not different from that in patients without a history of TURP[23].

Third, the membranous urethra (~~MU~~) is located between the apex of the prostate and the bulbar ~~of the~~ urethra, which is surrounded by the external urethral sphincter ~~of the urethra, it and~~ constitutes one of the three parts of the anatomical upper urethral stricture. Studies[24, 25] have proven that longer MUL sparing has been recommended to achieve better functional urethral length and shown to improve ~~continenceUC~~[24, 25]. MUL was preoperatively measured by mpMRI. ~~The longer~~ MUL ~~means~~ may ~~have lead to~~ more functional urethral retention during ~~operationsurgery~~, which helps to control urine flow[26]. In addition, urethral sphincter protection is the ~~most~~ key factor in urinary control, ~~the~~ The longer MUL increased the safe distance between the prostatic apex and urethral sphincter, and ~~further avoided the~~ damage of the urethral sphincter[27, 28]. In the present study, MUL was significantly ~~corintensively related~~ with UC after LRP at the four time points (~~all p < 0.05~~), ~~it which~~ means that MUL is an independent predictor for UC post-LRP, and patients with longer MUL ~~cause the patients'~~ will have earlier recovery of short- or long-term UC, ~~whether it's short or long term~~. Similarly, ~~Hannab~~ Lamberg *et al.*[29] included 586 PCa patients and demonstrated that longer coronal ~~membranous urethra length (MUL)~~ improved the odds of post-RP ~~continence-UC~~ at 3, 6 and 12 months (~~OR per 1 mm: 0.86 [95% CI: 0.80, 0.93], P < 0.001; 0.86 [95% CI: 0.78, 0.95], P = 0.003; and 0.79 [95% CI: 0.67, 0.91], P = 0.002, respectively~~). We also measured MUL by ~~the~~ coronal ~~image of~~ mpMRI, because most studies are measured at this level. Furthermore, ~~in~~ a recent meta-analysis[30] suggested that the measurement method (sagittal, coronal, or both/averaged) did not influence the results, ~~the and~~ pooled ~~analyses analysis~~ showed that greater ~~membranous urethra length (MUL)~~ was prognostic for regaining UC at 3 months (~~OR 1.23, 95% CI 1.16-1.31~~) and 12 months (~~OR 1.19, 95% CI 1.10-1.29~~).

Consequently, there is no doubt that MUL will improve the recovery of UC post-LRP.

In ~~addition, in~~ the present study, age and IPP were not ~~the~~ significant predictors for UC, which ~~different-differed~~ from prior studies[31-34]. We ~~hold think the opinion~~ that PCa patients in China are seen at ~~a higher an older~~ age ~~at surgical for surgery~~ than in ~~other Western western~~ countries, ~~the~~ The mean age was 68 ± 6.3 years in ~~this our~~ study, ~~there were and~~ 72.9% of patients ~~whose age exceeded were~~ > 65 years, ~~which is older these figures are much higher~~ than the ages of patients included in a ~~another previous~~ study[35]. The reason why IPP ~~is was~~ not significant in our study ~~is was~~ that the sample size ~~of included patients i was~~ small and IPP is generally related to benign prostatic hyperplasia, and these patients will undergo TURP before RP, which further reduces the number of patients with IPP. In contrast, ~~Chan Ho~~ Lee *et al.*[11] observed that non-significant IPP (~~IPP~~ < 5 mm) markedly improved UC compared with significant IPP (~~IPP~~ > 5 mm) at 1, 3, 6 and 12 mo postoperatively.

Finally, our study ~~has had~~ some limitations. First ~~of all~~, the sample size ~~of these data is was~~ small and may ~~be a bit different from not reflect~~ the real world situation, ~~and~~ this may ~~have something to do with explain why the fact that we didn't did not get find~~ more significant variables. The data were collected retrospectively, which can lead to recall bias. Secondly, although these ~~surgeries operations~~ were performed by the same surgeon, the heterogeneity of different ~~surgeons' surgeons'~~ experiences and skills need not be considered, and patients' postoperative recovery ~~is also related to the experiences and skills of the surgeon~~.

Conclusion

This study ~~once again~~ confirmed the importance of preoperative MUL for postoperative UC recovery. Whether ~~on~~ short- or long-term UC, MUL is an independent predictor, with longer MUL ~~means indicating~~ earlier recovery of UC. ~~Then, p~~ Prior TURP may be negatively associated with short-term UC, but larger, higher-quality studies are required. Now that RARP has become a trend, we still analyzed the risk factors ~~of for~~ UC post-LRP, which ~~can provide our single-center~~

experience could be useful for ~~those~~ hospitals or academic institutions that are not qualified to perform RARP.