Does Presence of a Median Lobe Affect Perioperative Complications, Oncological Outcomes and Urinary Continence Following Robotic-assisted Radical Prostatectomy?

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Purpose: To evaluate of the presence of a median lobe(ML) affect perioperative complications, positive surgical margins(PSM), biochemical recurrence(BCR) and urinary continence(UC) following robotic-assisted radical prostatectomy(RARP).

Materials and Methods: Data of 924 consecutive patients who underwent RARP for prostate cancer (PCa) and who have at least 1-year follow-up were evaluated retrospectively. All patients were divided into two groups: Group 1(n=252) included patients with ML and Group 2 (n=672) included patients without ML. The primary endpoint of this study was to compare complication rates between two groups. The secondary endpoints were to compare PSM, BCR and UC rates.

Result: Both groups were statistically similar in terms of demographics and variables about PCa. Mean prostate volume was higher in Group 1 vs. Group 2 (69 ± 31 vs. 56 ± 23 mL, $p < .001$). Total operative time was longer in Group 1 vs. Group 2 (144 ± 38 vs. 136 ± 44 min, $p = .01$). Biochemical recurrence, PSM, perioperative and post-operative complication rates of our population were 13.6%, 14.9%, 1.7% and 8.7%, respectively. There were no statistical differences in terms of perioperative complication, PSM and BCR rates between the groups($p > 0.05$). At the first month after RARP, total continence rate was statistically significant lower in Group 1 vs. Group 2 (49.2% and 56.5%, $p = .03$), respectively. However, there were no significant differences in terms of continence rates at 3rd month, 6th month and 1st-year follow-up.

Conclusion: Due to our experience, the presence of ML does not seem to affect perioperative complication, intra-operative blood loss, PSM and BCR following RARP. However, the presence of ML seems to be a disadvantage in gaining early UC following RARP.

Keywords: Clavien-Dindo; Complication; Median lobe; Robotic; Radical prostatectomy; Urinary incontinence

INTRODUCTION

Prostate cancer surgery is trending toward robotic-assisted radical prostatectomy (RARP) by developing technology. The main advantages of RARP compared to open radical prostatectomy are better magnification, filtering the tremors of the surgeon's hand and better ability of surgical instruments movement in narrow pelvic area. However, contrary to open surgery, there are some technical difficulties such as tactile sense absent and limited exposure angle in RARP procedures.

The presence of a ML is one of the most common challenge that frequently encountered during RARP. Sarle et al. firstly reported the difficulty of dissection in a patient who has large ML.[1] In patients with ML, the technical difficulty arises by poor exposure (due to laparoscopic camera view angle) during posterior vesico-prostatic junction incision and posterior prostate base dissection stages, especially from base to apex approaches. This difficulty can cause longer total operating time[2], higher blood loss[3], increased potential complication (like ureteral orifice injury)[4] and increased PSM rates[5] especially in base or posterior surgical margins of prostate. In addition, a wide excision of the bladder neck is needed during enlarged ML removing and it can lead to wide defect in bladder neck.

To date, the effect of the presence of ML during RARP on perioperative complication was discussed in a few articles and it was reported that the ML does not affect the complication rates.[2,3,6-8] However, the complications were compared without a standardized classification system in these previous studies. The modified Clavien classification system (MCCS) has been widely used for standardization of complications in surgical procedures after gaining popularity.[9] This is important, because, it may help us to evaluate the safety of surgery, to analyze learning curves of surgical techniques, to compare different approaches and different patient population based on standardized classification, there-

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Table 1. All demographics and comparison between groups.

Parameters	Overall (n=924)	Without ML (n=672)	With ML (n=252)	*p* value
Age, year; Mean ± SD	62.2± 6.8	62± 6.8	62.7 ± 6.7	.18
BMI, kg/m^2; Mean ± SD	27.1 ± 2.7	27± 2.7	27.2±2.8	.37
Total PSA, ng/mL; Mean ± SD	9.6 ± 9.5	9.3 ± 9.6	10.3 ± 9.1	.17
Prostate volume at surgical specimen, gr; Mean ± SD	60 ± 26	56 ± 23	69 ± 31	< .001
Prior prostate surgery history, n (%)				.61
None	869 (94)	629 (93.6)	240 (95.2)	
Transurethral resection	49 (5.3)	38 (5.7)	11 (4.4)	
Transvesical prostatectomy	6 (0.7)	5 (0.7)	1 (0.4)	
Number of positive biopsy cores; Mean ± SD	3.5 ± 2.7	3.6 ± 2.6	3.3 ± 2.6	.12
Percent positive biopsy core; Mean ± SD	39.4 ± 24.7	39.7 ± 24.3	38.4 ± 25.6	.49
GS at biopsy, n (%)				.7
GS 3+2	4 (0.4)	3 (0.4)	1 (0.4)	
GS 3+3	584 (63.2)	422 (62.8)	162 (64.3)	
GS 3+4	149 (16.1)	107 (15.9)	42 (16.7)	
GS 4+3	80 (8.7)	63 (9.4)	17 (6.7)	
GS 3+5	12 (1.3)	11 (1.6)	1 (0.4)	
GS 4+4	64 (6.9)	46 (6.8)	18 (7.1)	
GS 4+5	17 (1.8)	11 (1.6)	6 (2.4)	
GS 5+4	10 (1.1)	7 (1)	3 (1.2)	
GS 5+5	4 (0.4)	2 (0.3)	2 (0.8)	
Clinical T stage				.69
T1a	6 (0.6)	5 (0.7)	1 (0.4)	
T1b	10 (1.1)	8 (1.2)	2 (0.8)	
T1c	640 (69.3)	471 (70.1)	169 (67.1)	
T2a	177 (19.2)	128 (19)	49 (19.4)	
T2b	14 (1.5)	9 (1.3)	5 (2)	
T2c	77 (8.3)	51 (7.6)	26 (10.3)	
ASA score, n (%)				<.001
ASA 1	310 (33.5)	194 (28.9)	116 (46)	
ASA 2	595 (64.4)	462 (68.8)	133 (52.8)	
ASA 3	19 (2.1)	16 (2.3)	3 (1.2)	
ASA 4	-	-	-	
ASA 5	-	-	-	

Abbreviations: ASA, American Society of Anesthesiologists; BMI, Body mass index; GS, Gleason score; ML, median lobe; PSA, Prostate specific antigen

by improving management and prevention.[10]

In this study, we aimed to compare perioperative complications between RARP patients with and without ML based on MCCS. To the best of our knowledge, the present study is the first to evaluate the applicability of the MCCS to compare complications between RARP patients with and without ML. Furthermore, we compared positive surgical margin (PSM), biochemical recurrence (BCR) and urinary continence (UC) rates.

MATERIALS AND METHODS

Ethical approval for this retrospective study was obtained from the Institutional Review Board (IRB Decision no: 95 Decision date: 14.04.2017).

Study population, inclusion and exclusion criteria: We evaluated the data of consecutive patients who underwent RARP at our institution between Feb 2009-Jan 2016 and who had at least 12 months follow up. Patients who had neoadjuvant androgen deprivation therapy and 5-alpha reductase inhibitor treatment history during the last 6 months were excluded.

In all patients, data regarding age, body mass index (BMI), ASA(American Society of Anesthesiologists) score, total pre-operative Prostate-specific antigen (PSA), prior prostate surgery history, Gleason score (GS) at biopsy, tumor involvement per core and number of positive cores at biopsy, clinical and pathological disease stage, total operation time (from last port insertion to prostatectomy specimen removal, min), estimated blood loss (EBL) volume (ml) during RARP, intra-operative and post-operative blood transfusion (unite), bladder neck and nerve sparing during RARP, hospital stay (day), drainage and urethral catheter removal time (day), GS at surgical specimen, prostate volume at surgical specimen, PSM, localization of PSM, Biochemical recurrence (BCR) and total continence rate were collected prospectively. All data were recorded prospectively during RARP. Complications within 30 days after surgery were classified based on MCCS.

Surgical technique: All RARP procedures were performed by two experienced surgeons (AFA, AEC). A transperitoneal approach was used in the steep (30□) Trendelenburg position. Totally, 5 ports were placed, a 12-mm port for the camera, three 8-mm ports for the robotic arms, and a 12-mm port for bedside assistance. The procedure was started by making an incision on the anterior peritoneal covering of the Douglas pouch, approximately 1 cm proximal to its reflection on the rectum. Denonvilliers fascia was opened after vas deferentia and seminal vesicles dissection. Then, we incised the anterior peritoneum wall. Anterior attachments between the bladder and abdominal wall were taken down by monopolar scissors and the Retzius space was entered. After defatting, the endopelvic fascia was opened and levator ani muscle fibers were dissected off all the way along the lateral prostatic fascia. The dorsal venous complex was identified and suture tied distal to the apex of the prostate. Then, the detrusor apron overlying the prostate anteriorly was identified and dissected superiorly until the entrance of the urethra into the prostate at the bladder base was observed where its anterior bladder neck was incised. The posterior neck area was

Table 2. Comparison of pathological, perioperative and postoperative characteristics between patients with and without median lobe

Parameters	Overall (n=924)	Without ML (n=672)	With ML (n=252)	*p* value
Total operative time, minute; Mean ± SD	138 ± 43	136 ± 44	144 ± 38	.01
Estimated blood loss, mL; Mean ± SD	144 ± 138	142 ± 138	149 ± 136	.44
Intraoperative blood transfusion, n(%)				.43
No,	910 (98.5)	661 (98.4)	249 (98.8)	
1 unit	8 (0.9)	5 (0.7)	3 (0.2)	
2 unit	4 (0.4)	4 (0.6)	-	
3 unit	2 (0.2)	2 (0.3)	-	
Postoperative blood transfusion, n (%)				.72
No,	891 (96.5)	650 (96.7)	241 (95.6)	
1 unit	30 (3.2)	20 (3)	10 (4)	
2 unit	3 (0.3)	2 (0.3)	1 (0.4)	
Drainage catheter removal time, day; Mean ± SD	2.6 ± 1.5	2.6 ± 1.6	2.5 ± 1.4	.84
Hospital stay, day; Mean ± SD	4.8 ± 2.5	4.7 ± 2.5	4.9 ± 2.4	.16
Urethral catheter removal time, day; Mean ± SD	8.6 ± 3.9	8.7 ± 4.1	8.5 ± 3.4	.58
GS at surgical specimen, n (%)				.06
Not detected	17 (1.8)	15 (2.2)	2 (0.8)	
GS 3+3	417 (45.1)	289 (43)	128 (50.8)	
GS 3+4	239 (25.9)	181 (26.9)	58 (23)	
GS 4+3	126 (13.6)	92 (13.7)	34 (13.5)	
GS 3+5	22 (2.4)	15 (2.2)	7 (2.8)	
GS 4+4	38 (4.2)	34 (5.1)	4 (1.6)	
GS 4+5	32 (3.5)	25 (3.7)	7 (2.8)	
GS 5+4	28 (3)	19 (2.7)	9 (3.5)	
GS 5+5	5 (0.5)	2 (0.3)	3 (1.2)	
Pathological T stage, n (%)				.09
T0	17 (1.8)	15 (2.3)	2 (0.8)	
T2a	135 (14.6)	91 (13.5)	44 (17.5)	
T2b	64 (7)	49 (7.3)	15 (6)	
T2c	389 (42.1)	289 (43)	100 (39.7)	
T3a	217 (23.5)	162 (24.1)	55 (21.8)	
T3b	100 (10.8)	64 (9.5)	36 (14.2)	
T4a	2 (0.2)	2 (0.3)	-	
Lymphadenectomy during RARP, n (%)	682 (73.8)	498 (74.1)	184 (73)	.73
Presence of positive lymph node, n (%)	219 (23.7)	154 (22.9)	65 (25.7)	.36
Bladder neck sparing, n (%)	683 (73.9)	528 (78.6)	155 (61.5)	<.001
Nerve sparing approach, n (%)				.07
Non-nerve sparing	79 (8.5)	51 (7.6)	28 (11.1)	
Unilateral nerve sparing	81 (8.8)	43 (6.4)	38 (15.1)	
Bilateral nerve sparing	764 (82.7)	578 (86)	186 (73.8)	
PSM, n (%)	138 (14.9)	100 (14.9)	38 (15.1)	.9
Localization of PSM, n (%)				
Apex	81 (8.7)	58 (8.6)	23 (9.1)	.81
Base	66 (7.1)	50 (7.4)	16 (6.3)	.56
Lateral	25 (2.7)	21 (3.1)	4 (1.5)	.2
Posterior	58 (6.2)	37 (5.5)	21 (8.3)	.12
Anterior	25 (2.7)	21 (3.1)	4 (1.5)	.2
BCR, n (%)	126 (13.6)	94 (14)	32 (12.7)	.6
Receiving adjuvant radiotherapy, n (%)	248 (26.6)	184 (27.3)	64 (25.4)	.54
Receiving androgen deprivation therapy, n (%)	238 (25.7)	170 (25.2)	68 (26.9)	.8

Abbreviations: BCR, Biochemical recurrence; GS, Gleason score; ML, median lobe; PSM, Positive surgical margin; RARP, Robot-assisted radical prostatectomy

checked for the presence of the ML and the presence of a ML (yes or no) was confirmed by the operating surgeon. The ML is grasped and elevated out of the bladder by using the fourth robotic arm which was described by Patel et al.[11] Subsequently, high anterior release and neurovascular bundle (NVB) dissections were carried out. The procedure was completed after division of dorsal venous complex and vesicourethral anastomosis with the use of the van Velthoven technique with or without posterior Rocco construction. The prostate was extracted from the abdomen after the enlargement of the supra-umbilical port site following inclusion into the endobag. An abdominal drain was left in place.

Patients underwent follow-up visits at first month after urethral catheter removal, then every 3 months in the first year after RARP, then every 6 months in years 2 to 5 and annually thereafter. Total PSA values were recorded at every patient visit. BCR was defined by two consecutive PSA measurements of ≤ 0.2 ng/mL after RARP.[12] Total urinary continence was defined as the use of "0-1 pad". Total continence rates were recorded during 1st, 3rd, 6th and 12th months visits.

Statistical analysis: SPSS 16.0 (Chicago, Illinois, USA) was used for all statistical analysis. Data were presented as mean ± SD. Comparisons between groups were performed with Chi-square and T tests. Univariate and multivariate logistic regression analyses were conducted to identify variables predictive of GS upgrading. For statistical significance p value of < .05 was accepted.

RESULTS

Overall 924 patients included to this study. The mean age, BMI, total PSA and prostate volume of our population were 62.2 ± 6.8 year, 27.1 ± 2.7 kg/m^2, 9.6 ± 9.5 ng/ml and 60 ± 26 gr, respectively. The mean total operative time, EBL, drainage catheter removal, hospi-

Table 3. Univariate analysis for urinary incontinence.

Variables	Univariate analysis OR	95% CI	*p* value
Age (Advanced)	1.3	0.648-2.802	.61
Total PSA (Higher)	1.1	0.256-1.392	.7
BMI (Higher)	1.4	0.564-3.21	.33
Prostate volume (Higher)	1.2	0.43-5.148	.09
Gleason grade (≥ 8)	1.4	0.184-1.436	.07
Pathological stage (≥ T3a)	1.1	0.532-1.498	.3
Prior prostate surgery history (Yes)	2.2	1.028-3.13	.001
Presence of a median lobe(Yes)	3.9	2.134-4.918	.001
Total operative time (Longer)	1.5	0.768-1.898	.42
Urethral catheter removal time (Longer)	2.4	0.672-3.09	.85
Bladder neck preserving (No)	2.8	1.238-4.026	.001
Nerve sparing (No)	1.6	0.412-2.392	.5
Receiving adjuvant radiotherapy (Yes)	3	1.165-4.784	.01
Receiving androgen deprivation therapy (Yes)	1.1	0.754-1.856	.57

Abbreviations: BMI; Body mass index; OR, Odds ratio; CI, Confidence interval; PSA, Prostate-specific antigen

talization and urethral catheter removal time were 138 ± 43 min, 144 ± 138 mL, 2.6 ± 1.5 day, 4.8 ± 2.5 day and 8.6 ± 3.9 day, respectively. Bladder neck was sparred in 683 (73.9%) of all patients. PSM was detected in 138 (14.9 %) patients. PSM was detected in 81 (8.7 %) patients at apex side, in 66 (7.1 %) patients at base, in 25 (2.7 %) patients at lateral side, in 58 patients (6.2 %) at posterior side and in 25 (2.7 %) patients at anterior side of prostate. During the follow-up (median 51 months), BCR was observed in 126 (13.6 %) patients. Intraoperative and postoperative complications were observed in 16 (1.7 %) and 81 (8.7 %) of all patients, respectively. The continence rates at 1st, 3rd, 6th, and 12th months after RARP in all patients were 54.5%, 69.9%, 82.4% and 91.3%, respectively.
All patients were divided into two groups according to presence of ML during RARP. Group 1 (patients with ML) consist of 252 patients and Group 2 (patients without ML) consist of 672 patients. The mean prostate volume was statistically higher in patients with ML than patients without ML (69 ± 31 vs. 56 ± 23, $p < .001$). Patients with ML has lower ASA score than patients without ML. Other patient demographics and preoperative characteristics were comparable between two groups and all details were given in **table** 1.
There were no statistically significant differences in term of mean EBL, mean intraoperative and postoperative blood transfusion rates, mean drainage and urethral catheter removal time, mean hospitalization time, GS at surgical specimen, pathological T stage and PSM rates between two groups. However, the mean total operative time (144 ± 38 min vs. 136 ± 44 min, p=.01) was statistically longer in patients with ML than without ML. Bladder neck sparing (61.5% vs 78.6%, $p < .001$) rate was statistically higher in patients without ML than with ML. All perioperative and postoperative comparisons were detailed in **table 2**.
Logistic regression analyzes includes age, total PSA, BMI, prostate volume, prior prostate surgery history, presence of a ML, Gleason grade, pathological stage,

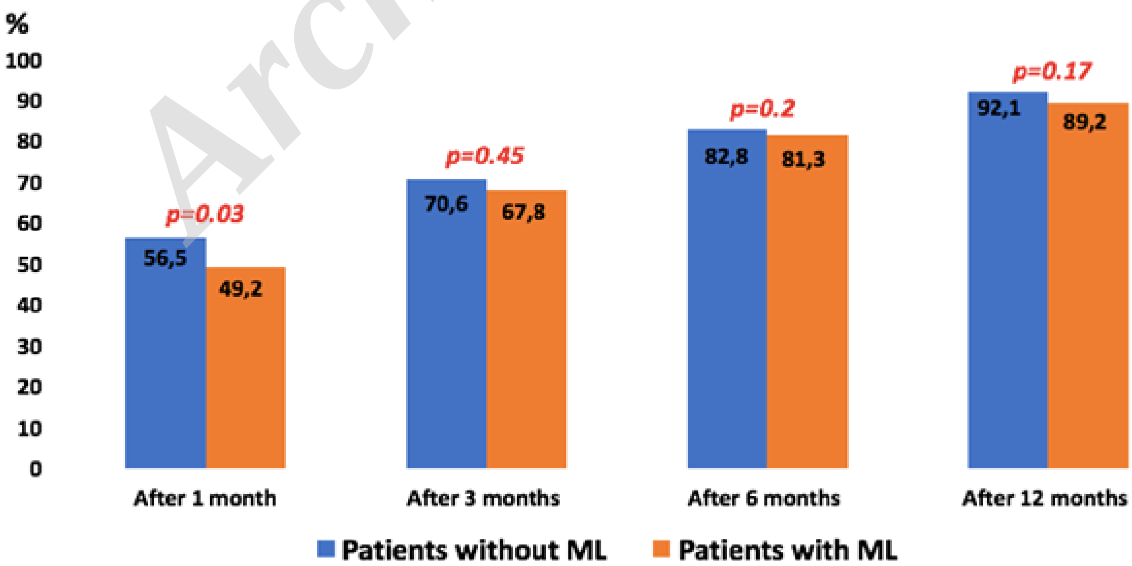

Figure 1. Continence rates in patients with and without median lobe

Table 4. Comparison of intraoperative and postoperative complications between patients with and without median lobe

	Overall (n=924)	Without ML (n=672)	With ML (n=252)	*p* value
Intraoperative complications, n(%)	16 (1.7)	12 (1.7)	4 (1.6)	.27
Rectal injury	3	2	1	
Bladder perforation	9	7	2	
Ileum injury	1	1	-	
Ureteral orifice injury	3	2	1	
Postoperative complications, n(%)	81 (8.7)	54 (8)	27 (10.7)	.2
MCCS Grade I	28 (3)	17 (25)	11 (4.4)	.14
Postoperative pain (managed by nonopioid analgesics)	3	2	1	
Postoperative fever (>38.0 °C) (managed by observation without antibiotics)	9	6	3	
Urine leakage (managed by watchful waiting)	4	1	3	
Ileus (spontaneously resolved)	6	3	3	
Wound infection (managed by observation without antibiotics)	4	3	1	
Intraabdominal fluid collection (managed by observation)	2	2	-	
MCCS Grade II	32 (3.5)	21 (3.1)	11 (4.3)	.78
Symptomatic UTI (managed with antibiotics)	7	5	2	
Postoperative fever (>38.0 □C) managed with antibiotics	2	2	-	
Arrhythmia	1	-	1	
Bleeding requiring blood transfusion	150	10	5	
Epileptic seizure (managed by anticonvulsant)	1	1	-	
Positional vertigo attack (managed by medical drug)	1	1	-	
Ileus (managed by nasogastric decompression)	2	1	1	
Wound infection (managed by antibiotics)	3	1	2	
MCCS Grade IIIa	7 (0.7)	5 (0.7)	2 (0.8)	.93
Intraabdominal abscess or urine collection (requiring percutaneous drainage)	3	2	1	
Intraabdominal fluid/ lymphocele collection (requiring percutaneous drainage)	4	3	1	
MCCS Grade IIIb	9 (1)	7 (1.1)	2 (0.8)	.73
Wound evisceration (requiring primary closure under GA)	3			
Ileus (requiring laparotomy)	1	1	-	
Bleeding (requiring laparotomy)	1	1	-	
Necrosis of glans penis (requiring grafting)	1	1	-	
Urethro-vesical anastomosis leakage (repeat urethral catheterization under GA)	3	2	1	
MCCS Grade IVa	5 (0.5)	4 (0.6)	1 (0.4)	.7
Acute renal failure (requiring ICU management)	1	-	1	
Acute myocardial infarction (requiring ICU management)	1	1	-	
Cerebrovascular accident	1	1	-	
Pulmonary thromboembolism	1	1	-	
Hyposaturation requiring ICU management				

Abbreviations: GA, General anesthesia; ICU, intensive care unit; MCCS, modified Clavien classification system; ML, Median lobe; UTI, urinary tract infection

total operative time, urethral catheter removal time, bladder neck sparing, nerve sparing, adjuvant radiotherapy and androgen deprivation therapy variables were performed to determine factors associated with urinary incontinence. Presence of prior prostate surgery history, presence of a ML, bladder neck preserving and receiving adjuvant radiotherapy were found to be associated with increased risk of GS upgrading in univariate analysis. Outcomes of univariate analysis are summarized in table 3. Multivariate analysis was performed to determine the independent predictors of urinary incontinence. Presence of a ML (OR: 4.1, 95% CI: 2.804-5.14, $p < .001$), non-preserving of bladder neck (OR: 2.2, 95% CI: 1.014-4.138, $p = .001$) and receiving adjuvant radiotherapy (OR:3, 95% CI: 1.413-5.458, $p < .001$) were found to be significant predictors of urinary incontinence.

Intraoperative and postoperative complications were developed in 14 (1.5 %) and 81 (8.7 %) of all patients. As intraoperative complication; Rectal injury, bladder perforation, ileum injury and ureteral orifice injury were developed in 3 (0.3 %), 9 (% 1), 1 (0.1 %) and 3 (0.3 %) of all patients, respectively. Postoperative complications were classified based on MCCS and grade I, grade II, grade IIIa, grade IIIb and grade IVa complication were developed in 28 (3 %), 32 (3.5 %), 7 (0.7 %), 9 (1 %) and 5 (0.5 %) patients, respectively. There were no statistically significant differences in terms of intraoperative and postoperative complication rates between two groups. All complications and comparisons of complications were shown in **table 4**.

The continence rates at 1, 3, 6, and 12 months after RARP in patients with ML were 49.2%, 67.8%, 81.3% and 89.2 respectively. At the same postoperative intervals, the continence rates in the group without ML were 56.5%, 70.6%, 82.8% and 92.1%, respectively. At first visit (1 month after RARP), continence rate was statistically significant higher in patients without ML than with ML (56.5% vs. 49.2%, $p = .03$). At subsequent patient visits, there were no statistically significant differences on continence rates between two groups. All continence rates and comparisons were detailed in **figure 1**.

DISCUSSION

The first comparison between patients with and without ML was reported by Jenkins et al[7]. They emphasized in their small sample (totally 58 patients) sized study that there was no significant difference in term of total operative time in patients with and without ML.[7] In Jenkins et al.'s[7] study, the mean total operative times were 289 min and 274 min in patients with and without ML, respectively. Although approximately 15 min difference was observed between the two groups, this difference was not statistically significant ($p = .61$). These outcomes may depend on small number of patient. Contrary to Jenkins et al.'s study, it was observed that total surgery time is longer in patients with ML than patients without ML in many studies with high number of patients.[2,3,6]. Meeks et al.[2] reported that approximately 70 min additional time required in patients with ML compared to patients without ML. They emphasized that this additional time required for posterior bladder neck and seminal vesicle dissection and as well as for bladder neck reconstruction.[2] Our outcomes supported these previous studies[2,3,6] in term of total operation time and we observed statistically significant longer total operation time (approximately 8 min) in patients with ML. Our additional required time in patients with ML is shorter than that of Meeks et al.'s (8 vs. 70 min). Meeks et al.[2] performed RARP in this order: incision and dissection of the anterior bladder neck, identifying of the ML (if presence), incision and dissection of the posterior bladder neck, dissection of the seminal vesicles and posterior surface of the prostate dissection. We think, the seminal vesicles dissection can be difficult and time consuming at Meeks at al.'s dissection directions in patients with ML. Differently from Meeks et al.'s RARP technique, the seminal vesicles dissection is performed at the beginning of the RARP procedure. After dissection of the seminal vesicles and posterior surface or the prostate, we dissected and incised the anterior bladder neck.

Jenkins et al.[7] compared EBL volume between patients with and without ML and they reported that there was no statistically significant difference (296 ml in patients without ML and 304 ml in patients with ML, $p = .46$). Coelho et al.[6] also reported similar outcomes in term of EBL (100 vs. 100 ml, $p = .15$). We observed statistically similar mean EBL volumes, intraoperative and postoperative blood transfusion rates for our both groups. Conversely, it has been reported that statistically significant lower EBL volume was observed in patients without ML compared to patients with ML by Meeks et al.[2](380 vs. 464 ml, $p = .05$), Huang et al.[3] (236 vs. 193 ml, $p = .002$) and Jung et al.[8] (the rate of >300 mL bleeding, 8.4% vs. 4.2%, $p = .004$). The main point of interest of these studies[2,3,8] is that the definition and dissection of plane between the posterior bladder neck and prostate basis can be difficult in patients with large ML and this condition can lead excessive bleeding during dissection.

In our population, PSM rates (14.9% vs. 15.1% $p = .9$) were comparable between two groups. Similarly, it has been reported that PSM rates were comparable between patients with and without ML in the majority of previous studies.[2,3,6,7] In a small sample sized study, Jenkins et al. reported PSM rates as 10% and 21% in patients with and without ML.[7] Although PSM rate is twice as high in the patients without ML compared the patients with ML, there was no statistically significant difference ($p = .47$). Similarly, statistically similar PSM rates were reported by Coelho et al.[6] (9.7% vs. 10.2%, $p = .884$), Huang et al.[3] (9.5% vs. 13.6%, $p = .45$) and Meeks et al.[2] (11% vs. 10%, $p = .89$). Meeks et al.[2] emphasized that the presence of the ML appears to affect PSM around seminal vesicle and posterior bladder neck localization, however, positive surgical margins occur at the apex of prostate in the majority of PCa patients, as known. Strangely, Jung et al.[8] observed statistically significant lower PSM rates (16% vs. 24%, p=.044) in patients with ML compared to patients without ML. When they compared the PSM rates at different localization of the prostate, they observed that the patients with ML were less likely to have positive margins at posterior side of prostate (21% vs. 47%, $p = .034$).[8] They explained this finding that the surgeon provided more exposure during posterior prostate dissection when the surgeon retracts the ML to more anteriorly which described by Patel and coworkers[11].

Previous studies[3,6-8] demonstrated that the presence of a ML does not affect complication rates. Huang et al.[3] reported statistically similar anastomosis stricture ($p = .78$), rectal injury ($p = .12$), inadvertent cystotomy ($p = .27$), urine leakage ($p = .64$), ureteral injury ($p = .95$) and urinary tract infection ($p = .72$) rates for patients with and without ML. The similar overall complication rates were also reported by Jenkins et al.[7] (10.3% vs. 13.7%, $p > .05$) and Coelho et al.[6] (5.3% vs. 4.6%, $p = .719$). Differently, Jung et al.[8] grouped complications as intraoperative and postoperative and they observed statistically similar intraoperative (2.5% vs. 3.3%, $p = .66$) and postoperative complication (11.6% vs. 7.5%, $p = .36$) rates between patients with and without ML. Similarly to previous studies[3,6-8], the overall complication rates were comparable between patients with and without ML in our patients. The main difference of our study from previous studies is that we compared the complications objectively based on MCCS. In previous studies, the complications were compared according to number and percentage of complicated patients without standardized classification system. Recently, European Association of Urology (EAU) guidelines panel emphasized the importance of standardized, systematic and objective classification system like MCCS using to evaluate of complications.[13] Because, it allows more accurate definition of complication of various surgical approach, earlier recognition of the complication's pattern, for comparing the surgical outcomes between institutions or individual surgeons, and for comparing techniques in case randomized trials are either lacking or difficult to perform.

In our population, intraoperative and postoperative complications rates were 1.7% and 8.7%. Recently, The Pasadena Consensus Panel considered patients with a large ML as one of the challenging cases and it was emphasized that RARP procedures in patients with ML should be performed by experienced surgeons which are doing at least 40 cases per year.[14] Also, it was supported by some authors that experience of the surgeon can significantly affect functional, oncologic outcomes, complication rates and the incidence of urethro-vesical junction anastomosis leakage after RP, especially in patients with a challenging anatomy, such as the presence of a ML.[6,15] Our institution is one of the referral centers in our region and our surgeons perform about 100 cases per year and we think that low complication rates depend on the surgeon' experience.

In previous studies[3,6,7], there was no difference in term of UC rates between patients with and without ML. Huang et al.[3] reported their mid and long term (up to 24th months) UC rates. They reported that there were no statistically significant differences in term of mid and long term UC rates between patients with and without ML (at 5th month $p = .48$, at 12th month p=.58 and at 24th month $p = .12$). Similarly, Jenkins et al.[7] compared UC between patients with and without ML. They recorded the mean interval to recovery of full continence to evaluate UC. Their mean interval to recovery of full continence 183 and 128 days in patients with and without ML, respectively.[7] Although there was 55 days of difference between two groups, this difference was not statistically significant ($p = .36$).[7] Moreover, their bladder neck reconstruction rate was statistically significant higher in patients with ML compared to patients without ML (55% vs. 3%, $p < .001$). In Coelho et al.'s[6] study, early and late UC rates were comparable between patients with and without ML (at 4 week 42.3% vs. 48%, at 24 week 91.5% vs. 94.1%, for all comparisons $p > .05$). Similarly to Jenkins et al.'s study, in Coelho et al.'s[6] study, the bladder neck reconstruction rate was statistically higher in patients with ML than without ML (93% vs. 65%, $p < .001$).

In our series, total urinary continence was defined as the use of 0-1 pad. The continence rate of our population at early term after RARP (at first month visit) was statistically significant lower in patients with ML compared to patients without ML (49.2%, vs. 56.5%, $p = .03$) while no statistically significant difference was found at subsequent follow-up periods. We also observed patients with ML had lower bladder neck sparing rate (61% vs. 78%, $p < .001$). We think that the difference of early UC rates between our groups may depend on lower bladder neck preservation rate during RARP in patients with ML. The impact of bladder neck sparing and reconstruction on recovery of urinary continence after RP is still unclear. Srougi and coworkers concluded that preservation of the bladder neck does not significantly affect recovery of urinary continence after RRP.(16) However, many authors considered that the patients who bladder neck preserved regained UC earlier compare to patients who bladder neck unpreserved despite similar long term UC rates.[17,18]

Our study has several limitations. First, our study is retrospective. Second, the presence of ML during RARP was evaluate subjectively and it considered based on surgeon perspective. We could use radiological imaging technique (like preoperative magnetic resonance imaging or ultrasound of prostate) for objective evaluation of presence of ML. Third, time to urinary continence was not assessed in this study and we did not use objective asking forms for evaluation of UC. Finally, we do not have data about patient symptoms before RARP such as voiding or obstructive lower urinary tract symptoms. We could exclude symptomatic patients. This may affect our urinary continence rates.

CONCLUSIONS

The presence of a ML does not seem to affect perioperative complication, intraoperative blood loss, PSM and BCR following RARP especially in experienced hands. However, the presence of a ML seems to be a disadvantage in gaining early UC following RARP.

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CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

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