Modifier 22 on perioperative outcomes of robotic assisted laparoscopic prostatectomy

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Introduction: *Robotic assisted laparoscopic prostatectomy (RALP) is a mainstay in the treatment of prostate cancer. Current procedure terminology (CPT) identifies a case that requires substantially greater effort than usual by using the modifier 22 code (M22). Our objective was to identify the most common etiologies leading to M22 at our institution and determine the effect on perioperative outcomes.*

Materials and methods: *We retrospectively reviewed our prostatectomy database from 2009-2012 to identify patients who underwent RALP with and without M22. Reasons for M22 were determined by review of operative reports. Comparisons were made using Chi-square analysis and independent t-tests for continuous data.*

Results: *Of 579 patients identified from our database, 208 (36%) had a M22. Eighty-six (41%) patients had ≥ 2 documented reasons for M22. Adhesiolysis was the most common reason for M22 followed by large prostate and previous hernia mesh. Body mass index (BMI) (29.8 versus 28), prostate volume (53 g versus 44 g), operative time (259 minutes versus 234 minutes), and discharge from hospital with pelvic drain in place (6.7% versus 3%) were all significantly higher in the M22 group. Final pathological stage and positive margin rate were not increased in those with a M22. Complications were not different between those with and without M22.*

Conclusion: *The M22 code is associated with longer operative times, larger prostates, and higher BMI. Adverse effects on final pathological stage, margin status and complications were not found in those with M22. Many patients with a M22 have more than one reason documented as for the explanation of the modifier.*

Key Words: modifier 22, common procedural terminology, robotic prostatectomy

Introduction

Robotic assisted laparoscopic prostatectomy (RALP) is a well-established surgical treatment for clinically localized prostate cancer. At present, RALP is the most commonly utilized surgical treatment for prostate cancer, surpassing the conventional open approach.[1] Nonetheless, there are several patient related factors that are known to be associated with increased difficulty with this procedure, including previous surgical adhesions, large median prostate lobes, and previous inguinal or umbilical hernia mesh.[2-6] The current procedural terminology (CPT) coding system is used by physicians to bill insurance companies and Medicare. The modifier 22 code (M22) is a component of the CPT that is used to designate a surgical case that was particularly complicated or difficult requiring more than the usual effort by the surgeon. The ultimate goal of using this modifier is to obtain more reimbursement for the additional time and service devoted to these difficult cases. During RALP there are several potential factors which may lead to this designation. To our knowledge, no study has evaluated the frequency of this billing code strictly in the setting of RALP. Our goal is to identify the most common reasons for the use of M22 as well as its effect on perioperative and pathologic outcomes in those undergoing RALP for prostate cancer.

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Materials and methods

This study was approved by institutional review board. We retrospectively collected data on all patients whom underwent RALP from January 2009 through August 2012. After excluding those with incomplete data (n = 46) a total of 579 patients were evaluated as our study cohort. Demographic and perioperative outcomes, including estimated blood loss (EBL), operative time (OR), hospital length of stay (LOS), and prolonged use of pelvic drain (defined as discharge to home with drain), were collected for all patients. Additionally, pathologic outcomes, including tumor stage, Gleason score, positive surgical margins (PSM), nodal stage if applicable, and final prostate volume (in grams) were recorded. Use of M22 was identified through the billing department of the hospital. Operative reports were reviewed to identify the documented reason for using M22, as this is required in order to bill for reimbursement. Among the M22 cohort, subjects were further categorized as having one reason documented for the M22 or more than one documented reason. Intraoperative and postoperative complications were identified through review of operative reports, progress notes, and discharge summaries. Intraoperative complications, including injury to rectum, small bowel, or bladder were considered major as well. The Clavien-Dindo classification was used to categorize postoperative complications.[7]

Over this time interval, RALP using the 4-arm da Vinci Robot (Intuitive Surgical, Inc., Sunnyvale, CA, USA) was performed by three different surgeons. Surgical technique varied slightly among these surgeons as well as decisions regarding necessity and performance of bilateral or unilateral pelvic lymph node dissection. Lymph node dissection is typically performed in those patients with intermediate or high risk disease. The intraperitoneal approach with a six port set up was used in all cases. A surgical drain was placed in all patients regardless of whether or not they had a lymph node dissection or question of a tenuous vesicourethral anastomosis. The time of drain removal was at the discretion of the treating urologist based on a combination of drain output versus urine output.

Chi-square and independent t-tests analysis were used in univariate and bivariate analysis to compare frequencies and means between the two groups, respectively. Lastly, multivariate models using logistic regression analysis were constructed to determine which factors were associated with increased use of the M22 code. We considered a two tailed p value of < 0.05 to be clinically significant. SPSS-10 was used in the analysis.

Results

Of the 579 patients evaluated, a M22 was used in 208 cases (36%). Overall reasons for the M22 in this population included lysis of adhesions, large prostate with/without presence of median lobe, and presence of hernia mesh. In 86 (41%) cases with a M22 more than one reason for use of the modifier was documented in the surgeon dictated operative report. Table 1 demonstrates patient characteristics and perioperative data classified by M22 use. As shown in this Table those with the M22 had significant higher BMI, baseline PSA, higher Gleason sum, and higher risk disease based on D'Amico risk stratification.

Perioperative and pathologic outcomes are shown in Table 2. Mean operative time for M22 cohort was significantly longer than those without and EBL was higher as well. The length of hospitalization was slightly longer in those with a M22 but this was not significant (1.63 days versus 1.37 days). A statistically significant higher proportion in the M22 cohort were discharged home with a pelvic drain (6.7% versus 3%), ($p = 0.032$). No difference was seen between pathologic tumor stage, final Gleason sum, and no difference in the rates of positive surgical margins on final pathological report.

Among the entire cohort there were six intraoperative complications, including four rectal injuries (3 with M22 and 1 without M22), one enterotomy and one cystotomy (both in the control group). Postoperative complications occurred in 18 patients with Clavien-Dindo Grade I in 8, II in 4, III in 5, and IV in one. There were no postoperative deaths or Clavien-Dindo Grade V complications. The number of intraoperative and postoperative complications was not different between those with and without M22, Table 2.

When comparing those patients whom had more than one reason for M22 (n = 86) to those with only one documented reason, estimated blood loss (243 versus 164, $p = 0.002$), BMI (31 versus 29, $p = 0.039$), and operative time (269 versus 251, $p= 0.008$) were all significantly higher whereas the other variables evaluated were not.

Table 3 demonstrates the factors that were independently associated with the use of M22 on logistic regression analysis. Multivariate analysis showed several factors including clinical tumor stage, OR time, BMI, EBL, D'Amico risk group, and prostate volume were all independently associated with M22.

The M22 code resulted in increased payment to the hospital billing department in 78.7% of those with a documented M22 for RALP. For Medicare and Veterans Administration patients, M22 reimbursement

TABLE 1. **Demographic and clinical characteristics by modifier 22 usage**

Variable	Overall (%) n = 579	No M22 (%) n = 371	M22 (%) n = 208	p value
Age, years, (mean)	60.9	60.65 +/- 6.9	61.6 +/- 6.26	0.105
BMI, kg/m^2 (mean)	28.6	28 +/- 3.84	29.8 +/- 9.77	**< 0.0001**
Diagnostic PSA, ng/mL (mean)	7.34	5.96 +/- 3.5	9.8 +/- 4.7	**< 0.0001**
Clinical T stage				**< 0.0001**
T1c	478 (82.6)	343 (72)	135 (65)	
T2	99 (17)	28 (28)	71 (34)	
T3	2 (0.3)	0	2 (1)	
Biopsy Gleason sum				**< 0.0001**
5-6	329 (57)	260 (70)	69 (33)	
7	192 (33)	88 (24)	104 (50)	
8-10	58 (10)	23 (6)	35 (17)	
D'Amico risk category				**< 0.0001**
Low	298 (51)	248 (67)	50 (24)	
Intermediate	198 (34)	96 (26)	102 (49)	
High	83 (15)	27 (7)	56 (27)	

M22 = modifier 22; BMI = body mass index; PSA = prostate-specific antigen

TABLE 2. **Perioperative and pathological outcomes based on modifier 22 usage**

Variable	Overall (%) n = 579	No M22 (%) n = 371	M22 (%) n = 208	p value
Operative time, min (mean)	243	234 +/- 39.2	259 +/- 47.6	**< 0.0001**
EBL, mL (mean)	154	130 +/- 83.9	197 +/- 180	**< 0.0001**
Intraoperative complications	6 (< 1)	3 (< 1)	3 (< 1)	NS
Postoperative complications				NS
Grade 1	8 (1.3)	4 (< 1)	4 (< 1)	
Grade 2	4 (< 1)	3 (< 1)	1 (< 1)	
Grade 3	5 (< 1)	1 (< 1)	4 (< 1)	
Grade 4	1 (< 1)	1 (< 1)	0 (0)	
Prostate volume, gr (mean)	47	44 +/-14.7	53 +/- 20.3	**< 0.0001**
Pathological T stage				NS
< T2c	477 (82)	305 (82)	172 (83)	
T3a	67 (12)	46 (12)	21 (10)	
T3b	35 (6)	20 (6)	15 (7)	
Final Gleason sum				NS
6	242 (42)	158 (43)	84 (40)	
7	284 (49)	183 (49)	101 (49)	
8-10	53 (9)	30 (8)	23 (11)	
Positive surgical margins	97 (17)	57 (15)	40 (19)	NS
Hospital stay, days (mean)	1.47	1.37 +/- 0.77	1.63 +/- 1.2	NS
Prolonged pelvic drain	25 (4.3)	11 (3)	14 (6.7)	**0.032**

M22 = modifier 22; EBL = estimated blood loss

TABLE 3. **Multivariate analysis of factors associated with modifier 22 usage**

Variable	Odds ratio	95% CI	p value
Clinical stage	4.65	2.39-9.03	< 0.0001
Operative time	1.012	1.006-1.018	< 0.0001
Prostate volume	1.03	1.01-1.04	< 0.0001
Body mass index	1.08	1.02-1.14	0.003
D'Amico risk category	3.07	1.39-6.76	0.005
Estimated blood loss	1.003	1.0006-1.005	0.014

CI = confidence interval
All other variables were found to be not significant

was paid in 96% of those billed and only 67% in those with private HMO or PPO insurance companies.

Discussion

Robotic assisted laparoscopic prostatectomy has become the predominant surgical treatment approach for prostate cancer, largely replacing standard laparoscopic and open techniques in the United States. As urologic surgeons become increasingly comfortable using the robotic technology, they will inevitably be faced with more challenging cases that may require longer operative times and complex dissection. In such cases the modifier 22 billing code may be applied for reimbursement purposes to reflect the increased time and effort required.

While there is no universally agreed upon criteria for a modifier 22, it is implied that the service provided for the operation was either more complicated or took significantly longer time to complete. There are a variety of reasons that a M22 code may be utilized in robotic prostatectomy. In our experience, the most common reason was lysis of adhesions, followed by large prostates with/without median lobe, and presence of inguinal mesh. Of note, not all patients with mesh, extensive adhesions, and large prostates with median lobes were given a M22. Since there are a variety of reasons that a M22 code may be utilized in robotic prostatectomy, standardization amongst the surgeons was not possible. No case in the no modifier group was longer than 280 minutes while several cases in the M22 group lasted > 300 minutes. This shows that many patients in the M22 group were in the operating room in dorsal lithotomy position for at least 5 hours. This is nearly 2 hours longer than the average operative time in those without an M22. In addition, anatomic variations such as a narrow pelvis or obesity were present in about a third of cases and nearly half of the cohort has more than one documented reason for a M22.

Other series have noted that RALP can safely be performed in the setting of previous abdominal operations with no increased risk of complications.[8] Siddiqui and colleagues compared those with prior surgery to patients with no prior surgeries in a prospective cohort of almost 4000 patients and found no difference in operating times or complications. In a similar comparison Ginzburg and colleagues found no difference in complications, operative time, and positive margin rates between those with versus without prior surgery undergoing RALP.[9] However, it should be mentioned that in both of these series, patients were compared based on presence of prior surgeries and not necessarily on lysis of adhesions, as in the former study only 24% of the surgery cohort actually required adhesiolysis.

Larger prostates with or without associated median lobes were also a common reason for use of M22 in our patient population. Patients with M22 had larger prostates as measured at time of pathologic evaluation and prostate volume itself was an independent predictor of using a M22. The impact of prostate weight has been previously evaluated in patients undergoing RALP with larger prostates associated with longer operative times, hospital length of stay, and urinary leakage rates.[10] Prominent median lobes can especially pose a technical challenge during RALP during both dissection and bladder neck anastomosis. There often results a large bladder neck defect that necessitates reconstruction prior to anastomosis. These modifications will clearly result in longer operative times. Bladder neck reconstruction potentially prolongs usage of pelvic drains post-operatively as our extended pelvic drain use was more related to vesicourethral leakage than affected by lymph node dissection.

Presence of prior inguinal hernia mesh was also a common reason for use of M22 in our cohort. Prosthetic mesh is frequently used in both laparoscopic and open inguinal hernia repairs and can obliterate tissue planes particularly making the exposure of the pelvic lymph nodes and mobilization of the bladder difficult. While previous reports have demonstrated no adverse outcomes in performing RALP in setting of inguinal mesh, prior herniorraphy may require additional time and effort in order to safely expose the external iliac vessels and can distort the usual anatomic landmarks.[3,11,12]

We have shown that the M22 code is a reliable indicator of case complexity; as those patients had significantly longer operative times. Furthermore, the length of time increased when more than one reason for M22 was documented. Of importance, M22 was not found to be associated with higher complication rates or positive surgical margins. The lack of higher positive surgical margins is of particular importance as the M22 group had clinically higher risk disease according to the D'Amico risk classification. This represents that a good oncological outcome, which is the primary goal, can be obtained in those patients that may be more complicated intraoperatively.

Our reimbursement rate for the M22 was quite high among patients with Medicare and private insurance. This is very promising for physicians in that appropriate documentation in operative reports can result in increased reimbursement over contracted amounts. This is a strength in our population that the reimbursement for the M22 was between 67%-96%. This indicates very appropriate documentation can lead to increased reimbursement for these complex cases that require longer and more involved dissections and time.

Our study is not without limitations. This is a single institution experience from a tertiary referral center. As such, our patient population may not be representative of patients undergoing RALP at other centers around the world. There are several community hospitals now performing RALP for prostate cancer and the usage of M22 at our institution is likely higher than most of these practices because of the referral of more complex cases to larger academic institutions. Also, data was collected in a retrospective fashion and M22 designation was identified through billing records. It is possible that some cases may have been misclassified if they were not billed as M22 during the period in which data were collected. However, it is likely that the reported results would be larger instead of smaller in that event. Another potential limitation is in the classification of the reasons for M22. Since the physician must clearly document the reason for using this code in the operative report, he/she may be prone to give more than one reason when in actuality only one factor played a role in adding to the operative time and complexity or give only one reason although there were many contributing factors.

Conclusion

In our experience use of the M22 was found to be associated with longer operative times, hospital stay, blood loss, and prolonged pelvic drain requirement but there was no adverse effect on complication rate or surgical margins. Need for extensive adhesiolysis, large prostates with/without median lobe, and hernia mesh were the most common causes attributed to documentation of M22. Those with larger prostate volumes, high risk disease, and higher BMI were more likely to have M22 used. □

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