







Comparison of Modified Single Incision Two Loop Technique and Classical Three Lobe Technique in HoLEP: Experience of 200 Cases of a Single Surgeon

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Abstract

Aim: We aimed to present our single incision two-lobe technique, which we developed in our own clinic and performed by a single surgeon and to compare the results of this technique with the results of Gilling's 3-lobe technique, which we applied before.

Methods: HOLEP was performed in 200 patients with medically resistant lower urinary tract symptoms (LUTS) and BPH, regardless of prostate size, between December 2018 and August 2022 in our urology clinic. All operations in the study were performed by a single surgeon who had completed the HoLEP learning curve, was well versed in endoscopic surgery, and had high experience. The classical Gilling 3-lobe method was preferred in the first hundred cases after the cases in the first fifty cases learning curve (Group 1, n=100). Due to some difficulties in the technique after the experience in the first hundred cases, the single incision two-lobe technique, which was created by referencing and modifying Scoffone's en bloc no touch technique, was used in the next hundred cases (Group 2, n=100).

Results: The average age of a total of 54 patients who underwent surgery due to a retroperitoneal mass was 53.8±10.0 years. While 15 (27.8%) of 54 patients with a retroperitoneal mass were diagnosed incidentally, 39 (72.2%) patients were diagnosed symptomatically. The final pathological outcome of all relapsed patients was liposarcoma. The average operation time was 178.7±85.4 minutes. The average length of stay of the patients was 6.2±3.1 days. Additionally, all of these patients had organ resection. In the Kaplan-Meier survival analysis, it was found that surgical margin had a statistically significant effect on average survival (p<0.001).

Conclusions: In our modified single-incision two-lobe technique, the enucleation time and probe residence time are shorter than the classical gilling method.


Keywords: HOLEP, Gilling's 3-lobe technique, the single incision two-lobe technique

1. Introduction

Holmium laser enucleation of the prostate (HoLEP) was first introduced by Fraundorfer and Gilling as an effective transurethral treatment option in the surgical treatment of BPH¹. In the light of literature data in the last two decades, HoLEP is considered to be a superior method to transurethral resection of the prostate (TUR-P), which is applied as a standard procedure, thanks to its advantages such as short catheterization time, short hospital stay, and less

intraoperative bleeding^{2,3}. In addition, the low cost of HoLEP is another advantage in terms of the results of cost analysis studies compared to other procedures^{4,5}. In studies examining urodynamic outcomes, short and long-term outcomes were found to be comparable or better than TUR-P and open prostatectomy (AP)⁶⁻⁸. However, the difficulty in the learning curve of HoLEP stands out as the biggest disadvantage of this method^{9,10-12}. In addition, the fact that incontinence rates after surgery are higher in some studies compared to TUR-P and AP can be considered as another important disadvantage^{6,7}. Especially due to the difficulty in the learning curve, some urologists prefer more invasive and costly options such as laparoscopic or robotic simple prostatectomy instead of HoLEP to treat their patients with large prostate volumes^{4,5}. After the definition of HoLEP, there have been various studies in terms of the development and differentiation of the technique. Due to some difficulties in the

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traditional three-lobed technique^{13,15} described by Gilling, necessity to develop and differentiate the technique has arisen. Especially when applying this technique, technical difficulties such as the emergence of different surgical planes due to the fact that the three incisions are sometimes not at the same depth, the risk of sphincteric injury that may occur as a result of the antegrade incision made at the twelve o'clock level, led to the need to improve the technique or to perform surgery with a different technique. In this study, we aimed to present our single incision two-lobe technique, which we developed in our own clinic and performed by a single surgeon, using Scoffone's en bloc no touch technique¹⁶ as a reference and modified, and to compare the results of this technique with the results of Gilling's 3-lobe technique, which we applied before.

2. Materials and methods

After our study was approved by the local ethics committee of our tertiary education and research hospital, HoLEP was performed in 200 patients with medically resistant lower urinary tract symptoms (LUTS) and BPH, regardless of prostate size, between December 2018 and August 2022 in our urology clinic. Those with urethral stricture, those with a neurogenic component in the urodynamic studies, those who had previous prostate surgery, those who were diagnosed with prostate cancer based on imaging studies and transrectal ultrasonographic (TRUS) biopsy results were excluded from the study. In addition, the first fifty cases in the learning curve of the surgeon who performed the cases were not included in the evaluation, considering that this may affect the results of the study.

All operations in the study were performed by a single surgeon who had completed the HoLEP learning curve, was well versed in endoscopic surgery, and had high experience. The classical Gilling 3-lobe method was preferred in the first hundred cases after the cases in the first fifty cases learning curve (Group 1). Due to some difficulties in the technique after the experience in the first hundred cases, the single incision two-lobe technique, which was created by referencing and modifying Scoffone's en bloc no touch technique, was used in the next hundred cases (Group 2). Preoperative hemogram, routine biochemistry, chest X-ray, Electrocardiogram (ECG), coagulation parameters, ELISA tests, urine culture, urinary USG, prostate specific antigen (PSA), uroflowmetry, postresidual urine volume (PMR), international prostate symptom score (IPSS) were all patients.) were viewed. Patients with elevated PSA levels were operated one month after TRUS-guided prostate biopsy.

Patients receiving antiplatelet and anticoagulant therapy were operated after their medications were discontinued and replaced with low molecular weight heparin. The operations were performed under general anesthesia or spinal anesthesia according to the preference of the patient and the anesthesia. Surgery was performed using a 120W Holmium: yttrium-aluminum-garnet (Versa Pulse Power Suite, Lumenis, Yokneam Israel) 26 F resectoscope suitable for HoLEP, a morcellator and display screen (Richard Wolf GmbH, Knittlingen, Germany). After the surgery was completed, all tissues taken were examined histologically. A 22F 3-way Foley catheter was attached to the patients and they were washed with continuous saline until the hematuria subsided.

Control hemogram was checked on the first postoperative day. The patient was discharged after the catheter was removed 2nd micturition was performed after the hematuria passed. The patients' active complaints (dysuria, filling phase symptoms, urinary incontinence, retrograde ejaculation) were recorded along with the results of PSA, uroflowmetry, IPSS, and PMR at the third month.

2.1. Surgical Technique

1. Classic Gilling's Three Lobe Technique (Group 1, n=100) The

operation begins following bilateral bladder neck incisions extending antegradely from the ureteral orifices to the verumontanum. These incisions are deepened to the level of the surgical capsule at the 5 and 7 o'clock positions. After the incisions are completed, they are connected together with a transverse incision just anterior to the verumontanum. Then, starting from the middle lobe verumontanum, enucleation is performed towards the bladder neck. The lobe is separated from the bladder neck and then placed in the bladder for morcellation. Each of the lateral lobes are enucleated in several different steps. The first bladder neck expands the incision area from 12 o'clock to inferolaterally and distally at 2 and 10 o'clock positions. In this way, the upper part of both lobes is released. A surgical plan is then created at the level of the verumontanum at the 5 o'clock position to locate the surgical plane and identify the apex. Then the apical incision is continued until 2 o'clock. The upper and lower incisions are joined at the apex. Similar to lateral and median lobe enucleation, it is enucleated in the capsular plane by progressing from the top to the lower incisions. The left lateral lobe is pushed into the bladder. A surgical plan is created in the right lobe at 7 o'clock and then the apical incision is continued until 10 o'clock. The upper and lower incisions are joined at the apex. After enucleation of the right lateral lobe is completed, it is sent into the bladder for morcellation. Thus, the enucleation process of the 3 lobes is completed.

2. Our Single Incision Bilobe Modified Technique (Group 2, n=100) The operation begins with a mucosal incision just lateral to the verumontanum at the 5 o'clock position. Here, with the advantage of not having much adenoma tissue, the plane between the adenoma and the capsule can be easily entered. After expanding the surgical plan, the prostate is enucleated in the apical region from the left edge of the verumontanum along the surgical capsule to the 12 o'clock position. The urethral mucosa, which remains at the 2-12 o'clock position, is cut 1 cm away from the external sphincter by decreasing the energy. Thus, the external sphincter is freed from the prostate apex and the first part of the operation is completed. By coming back to the left side of the verumontanum, our 5 o'clock incision is advanced retrogradely to the bladder neck. Prostate tissue is enucleated from the capsule from the apex to the bladder neck at the 12 o'clock position, taking the capsule as a reference in the surgical plan. After the left lobe of the prostate is completely enucleated, enucleation is advanced antegradely from the bladder neck to the apex by passing to the right lobe of the prostate from 12 o'clock to 9 o'clock. The left lobe, which is completely enucleated from the capsule, is cut at 12 o'clock and sent into the bladder. It comes back to the verumontanum and a mucosal incision is made from the front of the verumontanum at the 5 o'clock position to the 7 o'clock position, and a surgical plane is created by entering between the prostate adenoma and the capsule. By accepting the capsule as a reference, prostate tissue is enucleated in the apical region between 7-12 o'clock, and the urethral mucosa is cut between 10-12 o'clock, 1 cm away from the external sphincter, and the sphincter and the right lobe of the prostate are freed from each other. Then, the right prostate lobe and median lobe are enucleated retrogradely from the 5 and 9 o'clock positions to the bladder neck, completely freed from the capsule and enucleation is completed.

2.2. Statistical Analysis

Statistical analysis of the data was created using SPSS (Statistical Package for the Social Sciences) 23.0 package program. Categorical measurements were determined by number and percentage, and continuous measurements were determined as mean and standard deviation (median and minimum-maximum where necessary). Categorical expressions were analyzed using the chi-square test. Shapiro-Wilk test was used to determine whether the parameters in the study showed normal distribution. Independent Student's t-test

was used for normally distributed parameters and Mann Whitney u test was used for non-normally distributed parameters. Statistical significance level was taken as 0.05 in all tests.

3. Results

The mean age of the patients was 65.5±6.8 in group 1, while it was 63.8±6.4 in group 2. There was no difference between the two groups in terms of perioperative PSA value and prostate volume. Perioperative and postoperative Hct, Qmax and IPSS scores were similar in both groups. While there was no significant difference between the morcellation time and the amount of tissue removed, the enucleation time was statistically significantly shorter in the modified technique ($p<0.001$). Probe residence time was significantly shorter in the modified technique compared to the classical Gilling method ($p=0.003$). There was no significant difference between the two techniques in terms of retrograde ejaculation and incontinence rates, which are the most important postoperative complications (Table I).

Table 1
Patients' characteristics, preoperative and postoperative datas and continence status

	Group 1 (n=100)	Group 2 (n=100)	p
Mean Age (year)	65,5±6,8	63,8±6,4	0,193 ^a
Mean PSA (ng/ml)	3,59 (0,6-37)	3,15 (0,3-20)	0,586 ^b
Mean Prostate Volume (ml)	89 (40-240)	90 (40-260)	0,804 ^b
Enucleation time (min)	100 (45-240)	70 (35-200)	<0,001 ^b
Morcelation time (min)	20 (15-30)	20 (10-40)	0,280 ^b
Amount of removed tissue (gr)	72,5 (30-180)	67,5 (25-220)	0,874 ^b
Preoperative Hct	42,3 (28-53,4)	42,2 (31,4-46,8)	0,972 ^b
Postoperative Hct	38,4 (25,4-51,7)	39 (29-45,6)	0,785 ^b
Length of catheter (h)	40 (20-120)	30 (16-90)	0,003 ^b
Length of hospitalization (day)	2 (2-7)	2 (1-5)	0,061 ^b
Preoperative Qmax	8,9 (4,5-16,4)	8,4 (3,7-16,4)	0,322 ^b
Postoperative Qmax	24,3 (18,4-43,2)	26,2 (18,4-45,2)	0,777 ^b
Preoperative IPSS	29 (22-35)	29 (21-35)	0,770 ^b
Postoperative IPSS	5 (1-8)	5 (2-8)	0,620 ^b
Retrograde ejaculation			
No	32	38	0,529 ^c
Yes	68	62	0,654 ^c
Incontinence status			
1	68	78	0,171 ^b
2	26	18	0,061 ^b
3	6	4	0,643 ^b
4	2	0	0,447 ^b

4. Discussions

HoLEP is accepted as a new standard treatment in the surgical treatment of BPH, regardless of prostate size^{7,17,18}. Although its functional results are equivalent to TUR-P and open prostate according to guidelines, and even superior to the results of recent studies in many ways, it still does not take place sufficiently in the surgical treatment of BPH¹⁹. The most important reason for this is the challenging learning curve of HoLEP. In addition, it is a fact that surgeons are intimidated by the high rates of early postoperative incontinence. Because in studies on this subject, the prevalence of stress urinary incontinence (4.9%-12.5%) after HoLEP was found to be quite high compared to open prostatectomy and conventional TUR-

P^{6,7,20,21}. However, the high rates of incontinence in HoLEP led surgeons, who have great interest in HoLEP, to seek various new techniques and modifications based on the classical gilling method.

Although many physicians apply different techniques or modifications from the classical gilling technique, a standard technique has not yet been accepted²²⁻²⁵. Gong et al. reported that they reduced the rate of transient incontinence up to 2% in their external sphincter-preserving modified bilateral technique²⁵. Shigemura et al. found the rates of incontinence to be less than 10% in the series of 497 patients who underwent HoLEP²⁶. Endo et al. described anterior-posterior dissection in their modified technique and compared 31 HoLEP patients performed with the classical gilling method and 37 HoLEP patients performed with their own technique in terms of incontinence, and reported that incontinence rates, which were 25% in the classical method, decreased to 2% in their own technique²⁷. In our study, although there was no statistically significant difference between the modified bipolar technique and the classical technique in our incontinence rates, the results were proportionally better in our modified bipolar technique. We think that in the two-lobe technique, the connection between the external sphincter and the apical prostate is cut in the first stage of the operation and the damage of the sphincter due to stretching is reduced during enucleation of the prostate, and that the antegrade incision made at 12 o'clock in the classical technique extends to the sphincter and the risk of thermal damage is not present in the modified two-lobe technique.

One of the most important criteria in modifying techniques is how the new technique affects the operation time. In this respect, the time of inoculation is important. However, the number of studies comparing operation times among HoLEP techniques is limited in the literature. Endo et al. compared the anterior-posterior dissection technique they defined with the classical gilling technique and found similar enucleation times for prostates of similar size²⁷. Tokatli et al. compared the enucleation times between two-lobe, three-lobe and en-block methods. They found the enucleation times were significantly shorter in the two-lobe technique compared to the others²⁸. In our study, the enucleation time was statistically significantly shorter in favor of our modified bilateral technique ($p=0.003$). We think that the reason for this is the use of three incisions in the classical 3-lobe method and the difference in depth between these incisions, which is related to the prolongation of enucleation time.

The study has some limitations. First, our study is a retrospective study. Second, the study results reflect the experience of a single surgeon. Therefore, the results may have been affected by this situation. We think that our data can be more secure with multicenter studies with more patients.

5. Conclusions

In our modified single-incision two-lobe technique, the enucleation time and probe residence time are shorter than the classical gilling method. However, only two parameters do not lead to the conclusion that our technique is superior to the classical technique. Therefore, the surgeon should choose whichever technique he or she feels more successful and safe with for the HoLEP operation.

Statement of ethics

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and was approved by Health Sciences University, Adana City T&R Hospital Ethics Committee. (2023)

Conflict of interest statement

Author declare that they have no financial conflict of interest with

regard to the content of this report.

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