#343 The learning Curve for Transurethral enucleation with Bipolar using spatula loop: A single-Surgeon Experience

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Background

Transurethral enucleation with bipolar (TUEB) using spatula loop is one of endoscopic enucleation methods for the surgical treatment of benign prostatic hyperplasia (BPH), and has more advantages in intraoperative hemostasis and specimen removal after enucleation.
However, there is a lack of studies on the learning curve of TUEB compared to HoLEP. So, We evaluated the learning curve and efficacy of the enucleation based on a single-surgeon experience.

Method and Meterials

We retrospectively analyzed the medical records of 517 patients who underwent TUEB due to BPH with lower urinary tract symptoms (LUTS) between August 2018 and March 2022 at our institution.
The TUEB technique in the present study was based on the technique which was described previously[1] with several modifications toward en-bloc enucleation technique with early apical release.
To evaluate the learning curve of TUEB, perioperative parameters including TUEB efficiency (enucleated tissue weight/operation time), enucleation efficiency (enucleated tissue weight/enucleation time), and morcellation efficiency (enucleated tissue weight/morcellation time) were analyzed.
The preoperative and postoperative functional outcomes and postoperative complications of all patients were also assessed, including the International Prostate Symptom Score (IPSS), quality-of-life score (QoLs) and uroflowmetry. The patients were followed up at 1 week, 1 month, 3 and 6 months postoperatively.
Normality was determined with the Kolmogorov–Smirnov test. Categorical variables were compared using the chi-square test or Fisher's exact test, while continuous variables were evaluated using the Mann-Whitney U-test. All reported P-values are two-sided, and statistical significance was considered at P<0.05. For post-hoc analyses among the three consecutive groups, statistical significance was considered when the Bonferroni adjusted P-value was <0.017 (=0.05/3)

Table 1. Baseline clinical and perioperative characteristics of patients

	Mean ± SD (range)
Age (years)	71.96±8.16 (41-92)
Preoperative PSA (ng/mL)	7.51±15.60 (<0.01-200.35)
Evaluated prostate volume (mL)	72.22±34.52 (19.0-241.0)
Operation time (min)	115.74±46.75 (40-395)
Enucleation time (min)	47.62±18.18 (10-120)
Morcellation time (min)	26.88±17.48 (3-160)
Enucleation weight (g)	27.78±19.47 (1.8-127.0)
Enucleation ratio (g/mL)	0.37±0.15 (0.06-1.02)
Enucleation efficacy (g/min)	0.56±0.29 (0.12-2.18)
Enucleation ratio efficacy (g/mL/min)	0.008±0.004 (0.001-0.028)
Morcelleation efficacy (g/min)	1.24±0.81 (0.07-6.53)
Catheterization duration (day)	4.8±2.6 (2-41)
Hospital stay (day)	3.3±1.6 (2-14)

Table 2. Comparison of perioperative outcomes of TUEB among three consecutive groups

Variable	Group 1 (1st 70 cases)	Group 2 (2nd 70 cases)	Group 3 (reminders)	*p*-value
Estimated prostate volume (mL)	69.7±29.3 (31.2-167.0)	76.9±33.8 (20.4-200.0)	71.8±35.5 (19.0-241.0)	0.426
Operation time (min)	115.1±42.0 (60-250)	117.4±49.9 (45-280)	115.5±47.1 (40-395)	0.810
Enucleation time (min)	51.6±17.5 (15-100)	48.4±16.1 (20-90)	46.7±18.6 (10-120)	0.081
Morcellation time (min)	25.5±18.1 (5-100)	28.8±22.8 (3-160)	26.8±16.2 (5-120)	0.306
Enucleation weight (g)	23.2±18.6 (4.5-127.0)	28.6±17.5 (5.5-87.0)	28.5±19.9 (1.8-117.0)	G1 vs G2 0.012 G1 vs G3 0.022 G2 vs G3 0.577
Enucleation ratio (g/mL)	0.32±0.14 (0.06-0.85)	0.37±0.15 (0.10-0.80)	0.38±0.15 (0.08-1.02)	**G1 vs G2 0.021** G1 vs G3 0.001 **G2 vs G3 0.743**
Enucleation efficacy (g/min)	0.43±0.27 (0.15-1.59)	0.58±0.32 (0.19-2.18)	0.58±0.28 (0.12-2.00)	**G1 vs G2<0.001** G1 vs G3<0.001 **G2 vs G3 0.798**
Enucleation ratio efficacy (g/mL/min)	0.006±0.003 (0.002-0.017)	0.008±0.004 (0.003-0.022)	0.009±0.004 (0.001-0.028)	**G1 vs G2 0.005** G1 vs G3<0.001 **G2 vs G3 0.084**
Morcellation efficacy (g/min)	1.05±0.56 (0.14-2.80)	1.21±0.85 (0.22-6.53)	1.29±0.83 (0.07-4.83)	**G1 vs G2 0.194** G1 vs G3 0.022 **G2 vs G3 0.254**
Morcellation ratio efficacy (g/mL/min)	0.017±0.012 (0.002-0.065)	0.018±0.014 (0.003-0.085)	0.019±0.123 (0.002-0.095)	0.412

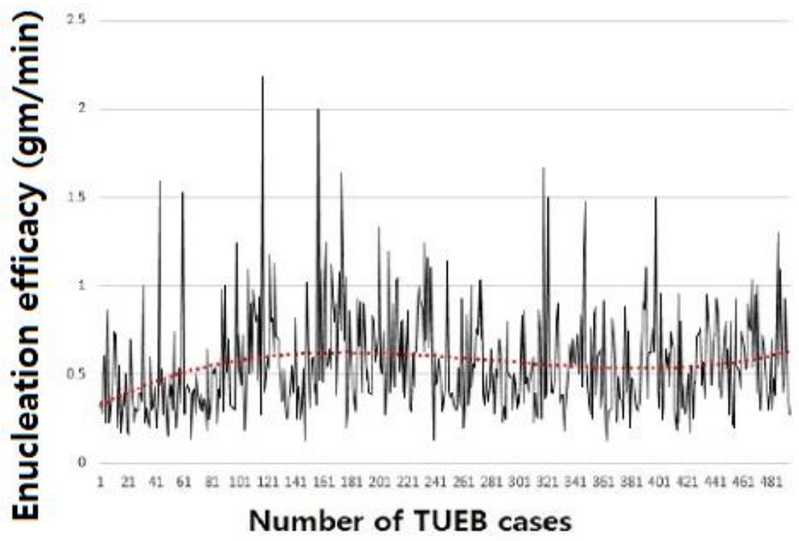

Chart 1. Changes in enucleation efficacy related to learning curve in order of the number of consecutive TUEB cases

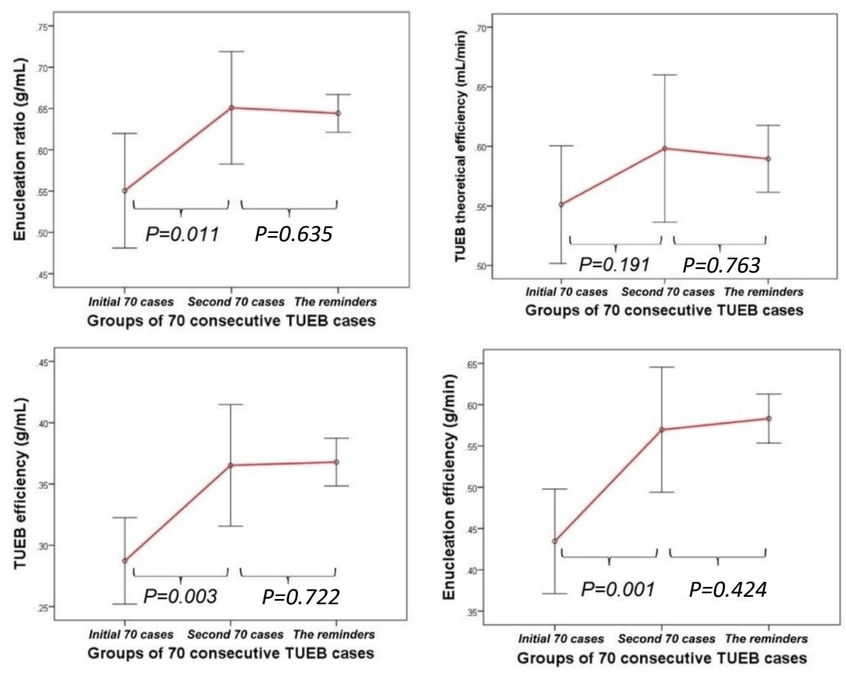

Chart 2. Comparison of perioperative outcomes of TUEB among three consecutive groups

Results

Baseline characteristics and perioperative outcomes from our study are demonstrated in Table 1.
From 20-case average method (red lines), after approximately 70-80 consecutive cases, enucleation ratio, TUEB efficiency and enucleation efficiency showed a tendency to reach a plateau status in chart 1.
The perioperative parameters were compared according to three groups (Table 2): group 1 (initial 70 patients), group 2 (second 70 patients), and group 3 (reminders). In post-hoc analysis among the three groups, median enucleation ratio, TUEB efficiency and enucleation efficiency improved substantially after initial 70 consecutive cases, but showing no significant differences between Group 2 and the Group 3.
There was no significant changes in incidence rates complications according to number of consecutive TUEB cases. However, as TUEB cases accumulated, gross hematuria requiring intervention decreased. (5.7% vs. 4.3% vs. 0.8%; P=0.011).
Maximal urinary flow rate (Qmax), post-void residual volume (PVR), IPSS total score, and IPSS-QoLs at 1 month, 3 months and 6 months after TUEB improved significantly from baseline (all P<0.001). When comparing baseline and postoperative urinary functional outcomes over time among the three groups, there were no significant differences in functional outcomes according to number of consecutive TUEB cases (all Bonferroni adjusted P>0.017;).

Conclusions

Our results suggest that TUEB could be an effective and safe surgical treatment option for BPH. Within 70 consecutive procedures, the surgical efficiency of TUEB reached stability. Further analyses on the learning curve may be necessary to explore long-term outcomes or rates of complication.

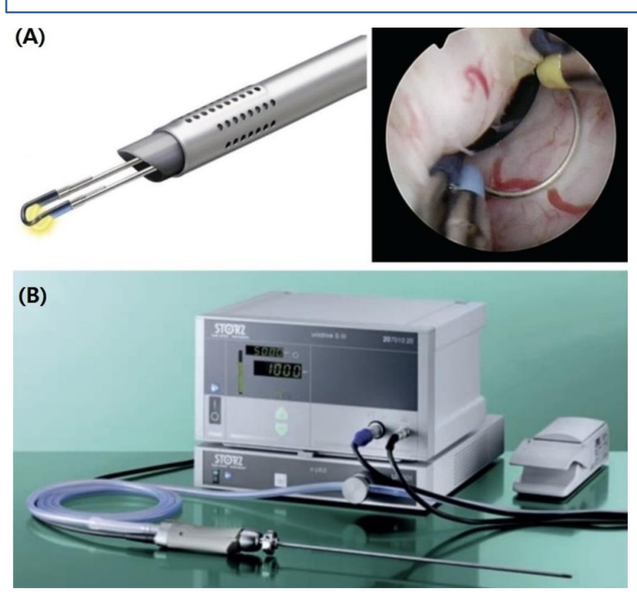

Figure 1. Transurethral enucleation of prostate with bipolar equipment in seoul national Bundang hospital
(A)PLASMA enucleation electrode with spatula for prostate enucleation[2]
(B)DrillcuteTM mocellator system for prostate morcellation[3]

References

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