Endless nightmare: a 6-hour journey inside the BPH dungeon

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Robotic-assisted simple prostatectomy for BPO surgical management in 2022

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Robotic Simple Prostatectomy

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Purpose: Minimally invasive approaches for large, symptomatic benign prostatic hyperplasia are replacing the gold standard open surgical approach, duplicating its results with lower morbidity. We describe our initial experience with robotic simple prostatectomy.

Materials and Methods: Since January 2007, robotic simple prostatectomy was performed via a transperitoneal approach in 7 patients with symptomatic significant prostatomegaly on transrectal ultrasound (mean 77.66 gm). Demographic, perioperative and outcome data were recorded and all procedures were performed by the same surgeon.

Results: Average patient age was 63.2 years (range 56 to 72) and estimated blood loss was 298 ml (range 60 to 800). Average operative time was 205 minutes (range 120 to 300). Average hospital stay was 1.4 days (range 1 to 2), average Foley catheter duration was 7 days (range 6 to 9) and drains were removed after an average of 3.75 days (range 3 to 4). Mean specimen weight on pathological examination was 50.48 gm (range 40 to 64.5). Transfusion was necessary in 1 patient. No complications were documented. Considerable improvement from baseline was noted in International Prostate Symptom Score (preoperative vs postoperative 22 vs 7.25) and maximum urine flow (preoperative vs postoperative 17.75 vs 55.5 ml per minute). Four patients were in acute urinary retention preoperatively.

Conclusions: Robotic simple prostatectomy is a feasible, reproducible procedure. Further publications are expected with larger series and larger prostatic adenomas.

Key Words: prostate, prostatic hyperplasia, prostatectomy, robotics, laparoscopy

TABLE 1. *Demographic data and results*

	Av	Range	SD
Age	64.66	56–72	5.35
Operative time (mins)	195	120–300	84.32
Blood loss (ml)	381.66	60–800	337.18
Catheterization (days)	7.5	6–10	1.64
Drainage (days)	3.5	3–4	0.54
Hospitalization (days)	1.33	1–2	0.51
Prostate specific antigen (ng/ml)	12.51	4.22–20.02	8.02

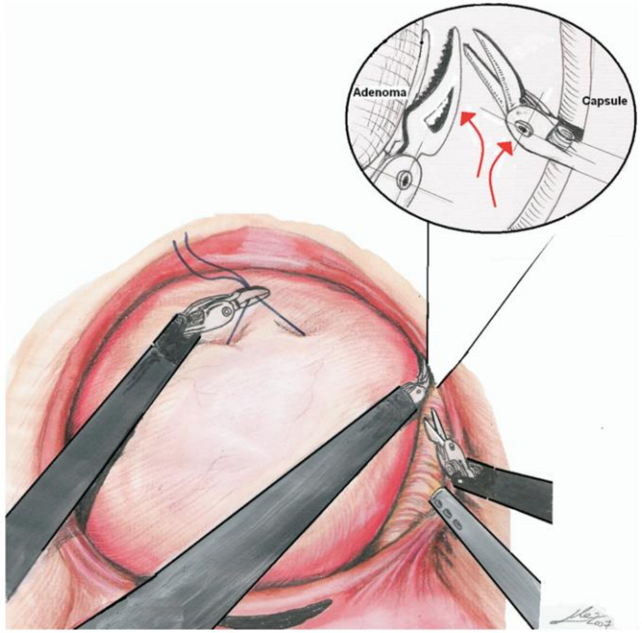

FIG. 2. Hand simulated joint of Endowrist instruments inside capsular plane provides meticulous and hemostatic dissection, and prevents capsular avulsion.

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Review Article

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Robot-Assisted Simple Prostatectomy *vs* Endoscopic Enucleation of the Prostate: A Systematic Review and Meta-analysis of Comparative Trials

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Abstract

Context: Robot-assisted simple prostatectomy (RASP) and endoscopic enucleation of the prostate (EEP) are two minimally invasive alternatives to simple prostatectomy, which is considered the standard treatment in large prostate glands. It remains unclear which of the two is superior in terms of outcome and complications.
Objective: To compare perioperative and functional outcomes of RASP *vs* EEP.
Evidence Acquisition: A systematic review and meta-analysis was conducted according to the recommendations of the Cochrane Collaboration and in line with the PRISMA criteria. The database search included clinicaltrials.gov, Medline (via PubMed), CINAHL, and Web of Science and was using the PICO criteria. All comparative trials were considered. Risk of bias was assessed with the revised ROBINS-I tool.
Evidence Synthesis: Seven hundred sixty studies were identified, 4 of which were eligible for qualitative and quantitative analysis, reporting on a total of 901 patients with follow-up up to 24 months. Hemoglobin drop (mean difference [MD] confidence interval [CI]: 0.34 g/dL [0.09–0.58]), the rate of blood transfusions (odds ratio [OR] [CI]: 5.01 [1.60–15.61]) catheterization time (MD [CI]: 3.26 days [1.30–5.23]), and length of hospital stay (LoS) (MD [CI]: 1.94 days [1.11–2.76]) were significantly lower in EEP. No significant differences were seen in operating time and enucleation weight. No significant differences were observed in the incidence of postoperative urinary retention, postoperative transient incontinence, and complications graded according to the Clavien-Dindo classification. Functional results were similar, with no significant differences in International Prostate Symptom Score and maximum urinary flow rate at follow-up.
Conclusion: Both EEP and RASP offer excellent improvement of symptoms due to prostatic hyperplasia. EEP has lower blood loss, shorter catheterization time, and LoS and should be the first choice if available. RASP remains an attractive alternative for extremely large glands, in concomitant diseases, or whenever EEP is not available.
Review Registration Number (PROSPERO): CRD42021226901

Keywords: robot-assisted simple prostatectomy, ThuLEP, HoLEP, EEP, prostatic hyperplasia, meta-analysis

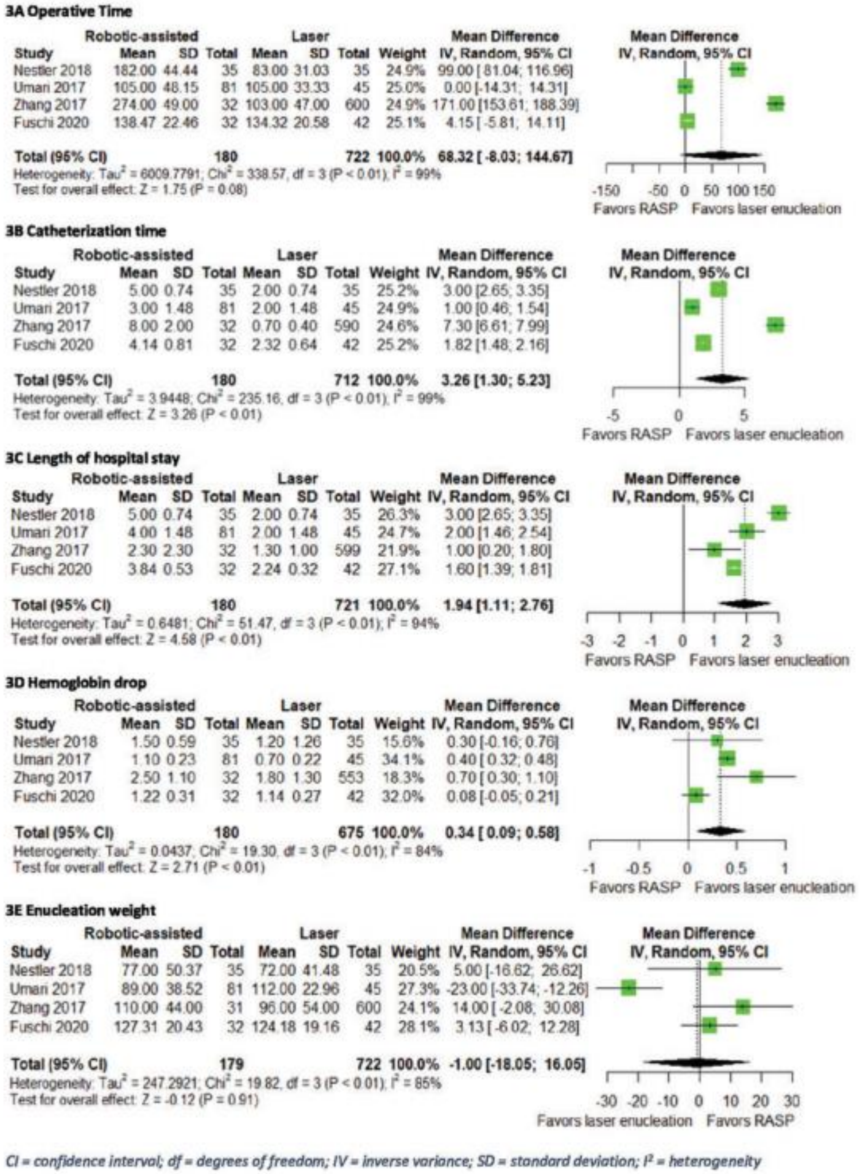

FIG. 3. Meta-analysis of perioperative parameters. RASP = robot-assisted simple prostatectomy. Color images are available online.

Guidelines

- AUA guideline

  Guideline Statement 29

  29. Open, laparoscopic, or robotic assisted prostatectomy should be considered as treatment options by clinicians, depending on their expertise with these techniques, **only** in patients with **large to very large prostates**. (Moderate Recommendation; Evidence Level: Grade C)

- EAU guideline

Summary of evidence	LE
Minimal invasive simple prostatectomy is feasible in men with prostate sizes > 80 mL needing surgical treatment; however, RCTs are needed.	2a

Guide

- AUA gui

Guideline

29. Oper ... considered as treatm ... hese techniqu ... te Recomm

- EAU gui

Summary

Minimal inva surgical trea

Discussion

Landmark studies done in the 1990s showed that the risk of complications (e.g., bleeding, transfusion, hyponatremia, TURP syndrome, death) following monopolar TURP using sorbitol, mannitol, glycine, or a combination or mixture of such solutions, increase with increasing prostate size and increased duration of resection.[234] These studies lead to recommended resection time limits of 60 or 90 minutes, and alternate therapies were employed for prostates that could not be adequately resected within that time frame.

Bipolar TURP technology using 0.9% NaCl solution has substantially improved the safety of TURP by virtually eliminating hyponatremia and significantly reducing the risk for TURP syndrome, bleeding, and transfusions, as discussed in Guideline Statement 28. As a result, bipolar TURP allows the resection of larger glands over longer periods of time without increasing the risks of the feared TURP complications.[229] The experience and skill of the surgeon determines how large of a prostate can be addressed with this technology, and for many this includes glands up to 100cc, or even larger.

Before the introduction of bipolar TURP, large and/or very large adenomas were enucleated via open simple prostatectomy (OSP) using the transvesical or retropubic (Millin) approaches. Three RCTs (n=433) compared OSP techniques to TURP.[235,236,252] Three trials used an open standard transvesical approach. Two trials reported significant differences in maximum urine flow at 12 months favoring OSP, while one trial found no difference between the groups. Need for blood transfusions were similar between groups (RR: 1.2; 95%CI: 0.4, 3.4). Need for reoperation as reported in 2 trials was lower in the OSP group compared to TURP (RR: 0.1; 95%CI: 0.01, 0.8). Long-term results for mean change in IPSS were not reported.

During widespread introduction of laparoscopic techniques into urologic surgery, approaches for laparoscopic simple prostatectomy/enucleation (LSP) were developed and favorable outcomes have been reported comparing LSP versus TURP[237] and LSP versus OSP.[238-243]

As with most other pure laparoscopic surgical techniques in urology, the LSP has nowadays been more or less replaced by robotic-assisted laparoscopic simple prostatectomy (RASP). A recent systematic review and meta-analysis of trials comparing minimally invasive simple prostatectomies versus OSP[244] found that RASP had similar efficacy in terms of symptom and flowrate improvement, but shorter catheterization time, length of stay, lower transfusion rates and lower complication rates overall. Independent.[245-247] Independent of specific technique, laparoscopic and robotic simple prostatectomy are effective and safe procedures for large to very large glands.[248]

Finally, the introduction of the single port I robot has prompted some to use this technology for simple prostatectomy as well. One study has shown that with this approach, efficacy is maintained, while postoperative narcotic use is reduced.[249]

How large is too large?

- Prostate volume

  Large ≥80gm; Very large ≥100gm;

  Huge ≥200gm; Giant ≥500gm

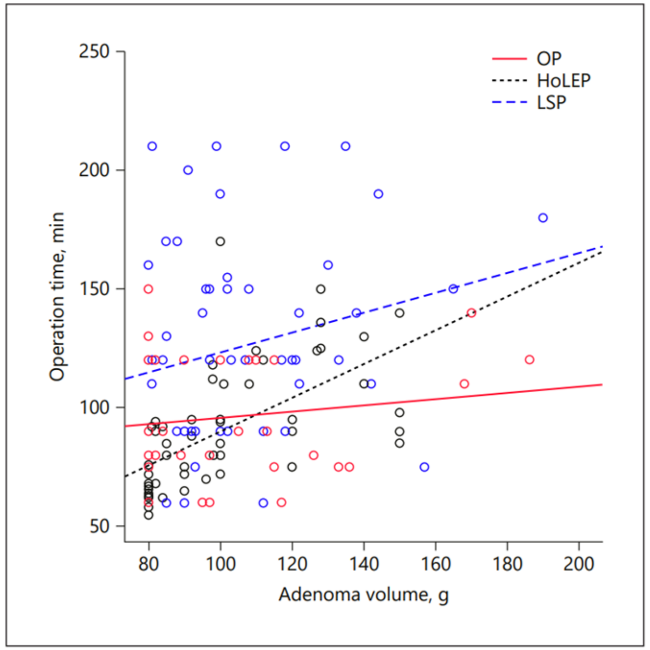

Fig. 1. The correlation analyses between HoLEP, LSP, and OP groups. HoLEP, holmium laser enucleation of the prostate; LSP, laparoscopic simple prostatectomy; OP, open prostatectomy.

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[Holmium laser enucleation of the prostate (HOLEP) for small, large and giant prostatic hyperplasia. Practice guidelines. Experience of more than 450 surgeries]

[Article in Russian]
D V Enikeev [1 2], P V Glybochko [1 2], Yu G Alyaev [1 2], L M Rapoport [1 2], M E Enikeev [1 2], D G Tsarichenko [1 2], N I Sorokin [1 2], R B Sukhanov [1 2], A M Dimov [1 2], O Kh Khamraev [1 2], D S Davydov [1 2], M S Taratkin [1 2], R R Simberdeev [1 2]

Affiliations + expand

PMID: 28247728

Abstract

Introduction: and objectives. Most of modern endoscopic procedures (e.g., TURP) are only confined to small and medium-sized glands (up to 80 cm3), but not HoLEP, which allows to enucleate large and extremely large prostates (200 cm3). The aim of the study was to compare the efficiency of HoLEP for prostates of different sizes.

Method: s. A total of 459 patients were divided into three groups: Group 1 included 278 patients (prostate volume <100 cm3); mean prostate volume, 70.8+/-16.1 cm3; IPSS, 18.7+/-5.5; QoL, 4.1+/-0.5; Qmax, 6.2+/-1.5 mL/s; post-voided residual volume, 64.2+/-30.5 mL. Group 2 included 169 patients (prostate volume 100-200 cm3); mean prostate volume, 148.1+/-25.2 cm3; IPSS, 19.7+/-3.3; QoL, 4.2+/-0.7; Qmax, 5.9+/-0.7 mL/s; post-voided residual volume, 70.9+/-20.1 mL. Group 3 included 12 patients (prostate volume >200 cm3); mean prostate volume, 230.1+/-18.1 cm3; IPSS, 19.5+/-4.5; QoL, 4.1+/-0.3; Qmax, 4.7+/-0.9 mL/s; post-voided residual volume, 72.3+/-10.9 mL. All the patients underwent HoLEP from 2013 to 2015. For the prostate to be enucleated, a 100-W laser system, 550-micron end-fire fiber, and a morcellator for tissue evacuation were used.

Results: The average duration of surgery in Group 1 was 56.5+/-10.7 min; in group 2, 96.4+/-24.9 min; in Group 3, 120.9+/-35 min. The average duration of morcellation in Group 1 was 37.5+/-7.3 min; in Group 2, 63.3+/-11.2 min; in Group 3, 84.0+/-25.6 min. The efficiency of enucleation in Group 3 (1.70 g/min) was significantly higher ($p < 0.05$) than in Group 1 (1.05 g/min) and Group 2 (1.23 g/min). Similar results were obtained for the efficiency of morcellation. It was lower in Group 1 and Group 2 (1.58 and 1.87 g/min, respectively) than in Group 3 (2.45 g/min) ($p<0.05$). In order to compare the long-term results of HoLEP for prostates of different sizes, all the 459 patients were followed up for 18 months. IPSS, Qmax, QoL, and post-voided residual volumes were measured. There were no significant differences ($p>0.05$) in the postoperative outcomes for 1, 3, 6, 12, and 18 months after surgery.

Conclusions: It follows from our two years experience that HoLEP is a safe, highly efficacious and a size-independent procedure, which is why it has become a new gold standard for treatment of extremely large prostatic hyperplasia in our clinic.

LEARNING CURVE

Table 1. Summary of holmium laser enucleation of the prostate learning curve studies

Study	Type of Study	Outcome Measures	Study Period	Number of Patients	Learning Curve
El-Hakim and Elhilali[11]	Prospective, single center	Operative time, enucleation time and morcellation time	July-August 2001	27	15-20
Seki et al[12]	Retrospective, single surgeon	Enucleation efficiency, morcellation efficiency, Hb and Na percentage decrease, Qmax, postvoid residual urine volume, I-PSS score and QOL index	April 2000-May 2002	70	50
Shah et al[13]	Prospective, single surgeon	Enucleation efficiency and morcellation efficiency	June 2003-June 2005	162	50
Elzayat and Elhilali 2007[16]	Retrospective, single center	Qmax, Postvoid residual urine volume, I-PSS score, QOL index, enucleation time, morcellation time, hospital stay	March 1998-February 2001	118	20-30
Bae et al[17]	Retrospective, single center	Enucleation ratio, enucleation efficiency, morcellation efficiency, perioperative complication	July 2008-September 2009	161	20-30
Jeong et al[18]	Retrospective, single surgeon	Enucleation efficacy, eucleation ratio efficacy, Qmax, postvoid residual urine volume, I-PSS score, QOL index	July 2008-July 2010	140	25
Robert et al[19]	Prospective, multicentre	Operative time, complications, lasing time, hospital stay	March 2012-July 2013	100	Exceeding 20

I-PSS, International Prostate Symptom Score; QOL, quality of life.

30-50 cases for HoLEP

Table 1 Learning curve studies on RALP.

Study*	No. of participating surgeons	Previous experience	Outcome measures	Statistical analysis	Learning curve No. of cases: outcome measure
Herrell and Smith 2005 [1]	1	>2500 RRPs	OT, EBL, LOS, TR, continence, potency, PSM		250
Gumus et al. 2011 [8]	1	Laparoscopically naïve	OT, EBL, LOS, PSM, EC, potency		80–120
O'Malley et al. 2006 [9]	2	Laparoscopically naïve	OT, VUAT, PSM		40: OT, 10: VUAT, 200: PSM
Gyomber et al. 2010 (A) [10]			OT, EBL, TR, PSM, CR, C		50: OT, 150: PSM
Sooriakumaran *P* et al. 2011 (A) [11]	3		OT, PSM rate		750: OT, 1600: PSM
Doumerc et al. 2010 [12]	1		OT, PSM, C, EC	One-sample *t*-test, joinpoint regression, chi-squared with Yates correction, ANOVA	110 : OT; 140 : PSM (pT2);170: PSM (pT3); 200: EC
Tabata et al. 2011 (A) [13]	1		OT, PSM, C		100: PSM; >200: OT
Kim et al. 2010 (A) [14]			OT, LOS, EBL, pad free continence rate, potency		<200: LOS, OT, EBL, PSM, pad-free continence rate; >200: potency
Gyomber et al. 2010 (A) [15]			OT, EBL, PSM, LOS, early postoperative complications		50: PSM (pT2)
Gyomber et al. 2011 (A) [16]	13		PSM	Logistic regression and weighted means	50: PSM
Sanchez-Salas et al. 2011 (A) [17]	3	>300 LRPs	PSM		100: PSM (pT2)
Jung et al. 2010 (A) [18]	8	Laparoscopic surgeons	PSM		200
Chang et al. 2011 (A) [19]	8	Four robotic surgeons, four laparoscopic surgeons	PSM	Chi-squared test, multivariate analysis	Individual laparoscopic surgeons = robotic surgeons at 40 cases. laparoscopic surgeons group = robotic surgeons after 300 cases
Yen-Chuan Ou et al. 2011 [20]	1		OT, console time, EBL, TR, PSM, node positive rate, C	Mann–Whitney *U*-test, Fisher's exact test, Yates correction	150
Sharma et al. 2011 [21]	2	Extensive open and laparoscopic experience	OT, EBL, PSM, C, potency	Multivariable logistic regression, multivariable linear regression, chi-squared test	>500
Giberti C et al. 2010 (A) [22]			OT, TR, CR, CRT, PSM, EC, potency		200
Linn et al. 2010 (A) [23]	1		OT, EBL, LOS, TR, PSM, CR		>20

**The procedure setting for all studies was real patients. (A), abstract; VUAT, vesico-urethral anastomosis time; C, complications; TR, transfusion rate; EC, early continence; CR, conversion rate; LOS, length of stay; CRT, catheter removal time; PSM, positive surgical margin rate; EBL, estimated blood loss.*

40 cases for RALP

Learning verve for robot-assisted simple prostatectomy in surgeons familiar with robotic surgery

- 10–12 cases for RASP for experienced robotic surgeons
- teaching hospitals, hospitals with medium and high bed volume, high operative volume and surgeons that had graduated within 15 years of surgery

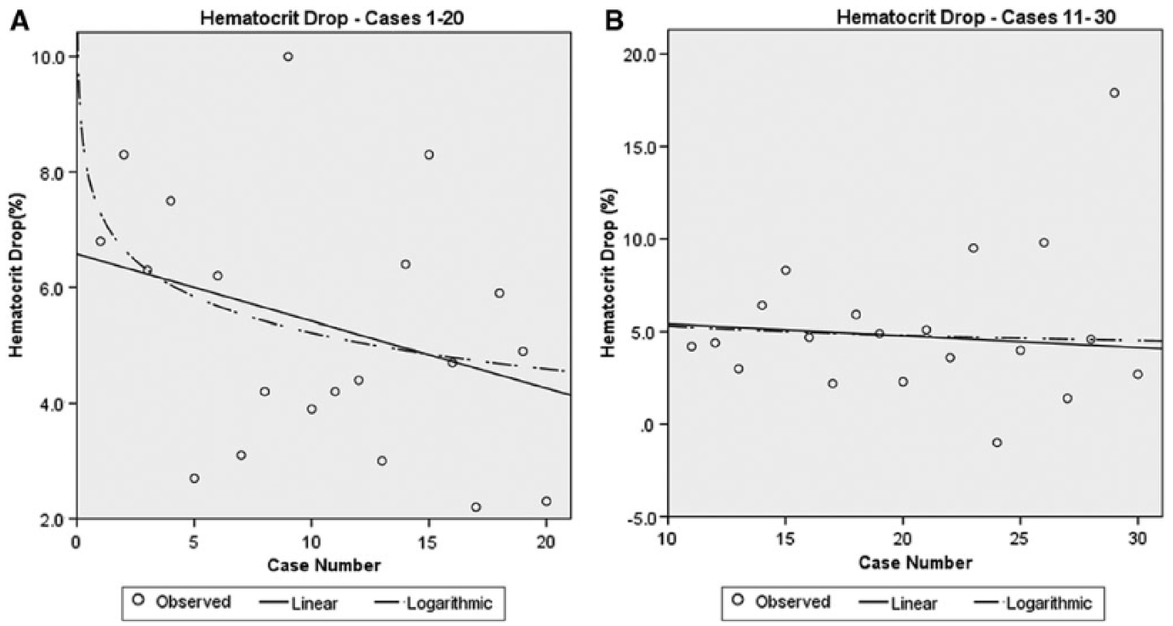

FIG. 1. Linear and logarithmic best-fit calculations for hematocrit drop (surgeon 2). **(A)** Cases 1 to 20 (R^2: linear: 0.08, logarithmic: 0.11). **(B)** Cases 11 to 30 (R^2: linear: 0.02, logarithmic: 0.01). After 10 cases, the linear fit has higher R^2 than logarithmic.

Thank you for your attention.

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