LEARNING CURVE FOR SACROSPINOUS LIGAMENT FIXATION AND THE IMPACT OF A FELLOWSHIP PROGRAM ON SURGERY OUTCOME

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Hypothesis / aims of study

Identification of a learning curve for surgical procedures provides important information for surgeons wishing to implement new procedures in their practice and the establishment of minimum requirements for surgical training. The learning curve required for endoscopic pelvic organ prolapse (POP) surgery has been extensively studied [1-3] ,while scant evidence is available on vaginal POP surgery, especially on native-tissue repair (NTR). The aim of the study was to identify the learning curve for vaginal POP NTR using sacrospinous ligament fixation (SSLF), with and without hysterectomy, and to assess the impact of introduction of a fellowship program on surgery outcome.

Study design, materials and methods

Data was collected from hospital's electronic medical records of all patients who underwent POP surgery with SSLF for apical suspension between January 2012 and December 2023. Data collected included comorbidities, body mass index (BMI), smoking status, menopausal status, parity, previous pelvic floor surgery, and pelvic floor symptom history. Prolapse staging was carried out using the pelvic organ prolapse quantification system (POP-Q). The surgeries were performed by a single fellowship-trained pelvic floor surgeon during Period 1, by 2 fellowship-trained pelvic floor surgeons during Period 2 and by the two senior surgeons and 3 fellows during Period 3. Right SSLF was performed using either the Capio® device (Boston Scientific, Marlborough, MA, United States) with either 2 polyglactin-910 or 2 polypropylene sutures or the Digitex™ (Coloplast, Minneapolis, MN, United States) with 2 polydioxanone sutures. Concomitant procedures included vaginal hysterectomy, amputation of the uterine cervix, anterior and/or posterior colporrhaphy by native tissue repair and trans-obturator mid-urethral sling. Data on duration of surgery, intraoperative estimated blood loss (EBL), visual analogue scale (VAS) pain levels on post-operative day 1 (POD-1) and at the 3-weeks follow-up, duration of hospital stay, and perioperative complications were collected. For patients who returned for follow-up 6-18 months following surgery, data on subjective and objective outcome of surgery was collected.

Results and interpretation

Three-hundred and twenty-two women were included in final analyses:126 had surgery in period 1, 71 in period 2 and 125 in period 3. Median age was 66 (61-72), body mass index (BMI)=26.3 (23.9-29.4), 84 (26.1%) women had diabetes mellitus, 306 (95%) women were post-menopausal, median parity was 3 (0-13). Eighteen (5.6%) patients had previous POP surgery. During period 1, we identified a negative correlation between duration of surgery and years of experience, both in cases with hysterectomy (r=-03, p<0.001) and in those without (r=-0.4, p=0.015) (Figure 1). We did not observe this association during period 2 (r=-0.096, p=0.55; r=0.02, p=0.89), nor during period 3 (r=0.07, p=0.48; r=0.2, p=0.12).

Surgery duration was significantly longer in period 3 as compared to either period 1 (p<0.001), or period 2 (p=0.002), while no difference was observed between period 1 and period 2 (p=1.0) (Table 1).

We observed a significant lower rate of pain at POD-1 during period 1 as compared to period 2 and 3, as 56 (44.8%) women reported significant pain during period 1, 50 (72.5%) in period 2, and 97 (82.9%) during period 3 (p<0.001). We observed no difference in pain on POD-1 between period 2 and period 3 (p=0.24). Upon multivariable logistic regression, which included 2 blocks, we observed that after controlling for diabetes and suture type patients in period 2 tended to have higher probability for pain at POD-1 (OR: 2.03, 95%CI 0.96-4.32, p=0.066) and patients operated in period 3 had significantly higher probability of pain at POD-1 (OR: 3.32, 95%CI 1.53-7.22; p=0.002), both when compared to period 1.

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Results and interpretation, cont.

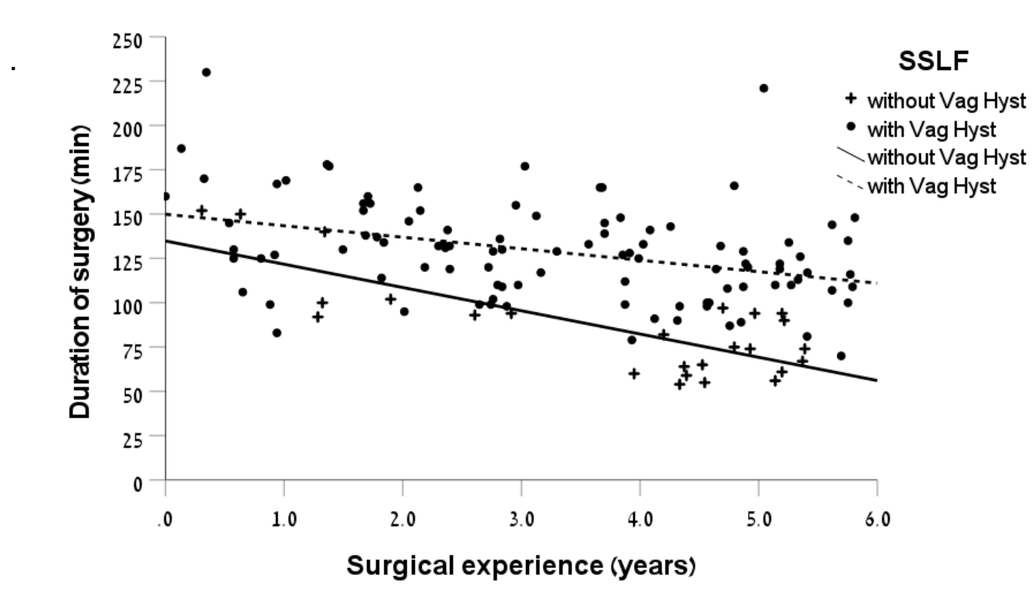

Figure 1:Change in duration of surgery from implementation of native-tissue repair with SSLF, with and without vaginal hysterectomy, by a single surgeon

Perioperative outcome	Period 1 (2013-2018) n=126	Period 2 (2018-2020) N=71	Period 3 (2021-2023) n=125	P-value
Surgery duration (min)	(98-41) 120	(120-145) 91	(107-163) 142	0.001>
ebl (ml)	(50-100) 80	(50-100) 90	(50-100) 100	0.581
Early post-op complications	(16.7%) 21	(11.3%) 8	(12.8%) 16	0.513
Pain on POd-1	(44.8%) 56	(72.5%) 50	(82.9%) 97	0.001>
Hospital stay duration (days)	(2-2) 2	(2-2) 2	(2-2) 2	
Pain at 3 weeks	(28.7%) 35	(32.8%) 22	(38.3%) 46	0.281
Anatomical failure (level 2)	(27.5%) 30	(41.3%) 26	(40.4%) 36	0.86
Anatomical failure (apex)	(2.8%) 3	(3.2%) 2	(0.0%) 0	0.253
Subjective failure	(5.5%) 6	(3.2%) 2	(3.4%) 3	0.732

Table 1: Perioperative outcome measures according to surgery period

Conclusions

During the 6 initial years since implementation of the SSLF technique, when a single fellowship-trained surgeon carried out all procedures, we have identified a gradual decrease in surgery duration. Surgery duration stayed similar after an additional fellowship-trained surgeon joined the first surgeon. After initiation of a fellowship program, operative time significantly increased, as compared to the previous periods. Moreover, we observed a significantly higher rate of immediate postoperative pain in patients operated during the fellowship program, in comparison with the first two periods. This difference remained significant after controlling for suture type and for diabetes.

Concluding Message

Despite SSLF being a minimally invasive and relatively short procedure, a significant gradual decrease in duration of surgery is expected during up to 6 years from implementation of the technique. Training of new surgeons has a significant impact on both operative time and immediate postoperative pain.

References

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