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Editorial

Powerful hemostatic tools and natural orifice transluminal endoscopic surgery (NOTES)

Vaginal approach is one of the least invasive procedures in the management of women with various kinds of diseases [1–3], partly because of easy approach and rapid healing and partly because of natural orifice without further establishment of new incision wound or relatively painless incision wound [4–6]. In fact, many vaginal surgeries could be finished without assistance of image systems (endoscopy), and tension free anti-stress urinary incontinence surgery, dilation and curettage, conization, and anterior and posterior colporrhaphy might be some of best examples [1,7]. Sometimes, endoscopy should be needed, since endoscopy could provide a better operative vision field and clear identification of the lesion and surrounding normal and abnormal tissues or organs [8]. Natural orifice transluminal endoscopic surgery (NOTES) is one of the best examples to perform vaginal surgery under the assistance of endoscopy [6]. Many publications have reported that NOTES is the easier approach to the uterine vessels at the level of isthmus, resulting in quickly and safely secured cutting uterine vessels and also provides a better vision to perform the adnexal surgery and definite and secured ligation or coagulation of the infundibulo-pelvic vessels [6,9,10]. As shown in our comment before [11], the powerful hemostatic devices are one of the milestones for minimally invasive surgery. The powerful hemostatic devices include LigaSure™ Tissue Fusion System (Valleylab, Boulder, CO), Harmonic Scalpel (Ethicon Endosurgery, Cincinnatic, OH), and Gyrus PlasmaKinetics [PK] cutting forceps or Sealer (Gyrus Medical, Maple Grove, MN) [11,12]. Therefore, it is not surprising to get the results from the Lee's article published in the 2019 January Issue of the *Taiwanese Journal of Obstetrics and Gynecology*, which investigated the efficacy and effectiveness of applying LigaSure™ Tissue Fusion System in hysterectomy via transvaginal NOTES in comparison with using the conventional bipolar device and [13]. In addition, in the same issue of the *Taiwanese Journal of Obstetrics and Gynecology*, Dr. Tu also focused on the similar topic to investigate the feasibility and effectiveness of PK sealer system in the management of vaginal step of laparoscopically assisted vaginal hysterectomy (LAVH) compared to conventional suture techniques [14].

Dr. Lee's group enrolled 86 patients and randomized 80 patients and obtained 38 patients treated with LigSure™ Tissue Fusion System and 39 patients treated with conventional bipolar system, and found that patients treated with LigaSure had significantly reduced operative time, and of most importance, none of patients in the LigaSure group needed conversions, but four patients in the convention bipolar group needed the assistance of LigaSure Tissue Fusion System ($n = 3$) and converted to conventional laparoscopic surgery ($n = 1$), suggesting the feasibility and effectiveness of LigaSure in hysterectomy via transvaginal NOTES [13]. We congratulated the successful publication of Dr. Lee's group [13]. Dr. Tu's group enrolled 101 patients who underwent the LAVH for non-malignant uterine diseases respectively to separate them into two groups: one with PK sealer ($n = 61$) and the other with conventional suture ($n = 41$) [14]. The conclusion of Dr. Tu's article is predictable to show that PK sealing device provides a safe and effective alternative in reducing blood loss in the vaginal steps of LAVH because the authors found that near 35% reduction (76 ml versus 117 ml) in the blood loss in the PK sealing group compared with that in the conventional suture group [14]. After adjusting for confounding factors, the PK sealing device still exhibited a significantly lower in intraoperative blood loss with odd ratio of 0.477 than the convention suture did [14].

There are some comments for both articles. First, as comments from us before [11], the gold standard to minimize surgery-related complication is a delicate operation, which needs the assistance of more effective and powerful surgical instruments and gentle techniques and we believed that the LigaSure Tissue Fusion System might fulfill with the above-mentioned criteria [15]; however, it is wondering why the patients in the LigaSure group had a significantly higher postoperative pain scores than those in the conventional bipolar group as shown by authors with mean ± standard deviation of 3.9 ± 2.3 versus 2.5 ± 1.9 ($p = 0.006$) on the postoperative 24-h evaluation and 2.8 ± 1.9 versus 1.4 ± 1.4 ($p = 0.002$) on the postoperative 36-h evaluation [13]. Although the authors did not explain it, we believed that time or speed of the application of LigaSure in achieving hemostasis compared to that of conventional bipolar instruments, based on the higher average weight of tissue removal (465 gm versus 444 gm) and less operative time (86 min versus 100 min) in the LigaSure group [13].

Second, as shown by authors, many physicians involved the current study and it is relatively confusing what is the decision making done by physicians when the patients should terminate their original randomization (3 patients in the bipolar group switched to the LigaSure group and one patient in the bipolar group switched to the conventional laparoscopic surgery), although the above-mentioned findings further supported the feasibility and effectiveness of the application of LigaSure in hysterectomy via transvaginal NOTES.

Competing interests

The authors declare that they have no competing interests.

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