



Advanced technology offers a safer and better laparoscopic surgery

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Minimally invasive surgery (MIS), laparoscopic surgery as an example, is one of the far-advanced techniques in surgery, which takes several advantages, including a smaller incision wound, a reduction in postoperative pain, shortening of hospital stay, a rapid recovery, and a better cosmetic result, over the conventional exploratory laparotomy in dealing with various gynecologic organ-related diseases.¹⁻³ Pelvic organ prolapse (POP) affects more than 30% of women during their lifetime and is associated with a significantly negative impact on daily activities, sexual function, exercise, and quality of life, resulting in a major burden for the public health system, and MIS becomes much more popular and shows the trend in place of conventional surgery.⁴⁻⁶

Hysterectomy is considered as a main procedure during POP surgery in the routine clinical practice,⁴ but there is no evidence to support the need of hysterectomy for POP surgery. No specific benefits of adding hysterectomy procedure during POP surgery have been found. There are many newer types of MIS to achieve uterus preservation without compromising the therapeutic effect of POP surgery, gaining their popularity for the therapy of women with POP.⁴ In addition, psychological, physiological, and emotional consideration of women with POP further promotes this uterine-preserving MIS.⁷ The uterus has been believed to function as the regulator and controller of important physiological functions, a sexual organ, a source of energy and vitality, and a maintainer of youth and attractiveness.⁷ As shown above, some new technologies can help to achieve the uterine-preserving POP surgery. Among these, mesh insertion might be one of the best choices, based on the significantly lower failure rates. However, the limitations or mesh-related complications for the use of mesh should be well informed, including pain, dyspareunia, mesh contraction, exposure, and some life-threatening catastrophic situations.⁸

We are happy to introduce the study of Dr. Tsai et al,⁹ which has been published in the May issue of the *Journal of the Chinese Medical Association*. The authors investigated the therapeutic outcome of POP in women who underwent a suture-less laparoscopic sacral hysteropexy using polypropylene Y-mesh grafts and fibrin sealant spray. They performed a prospective comparative study to evaluate the feasibility of the use of fibrin sealant spray in place of the conventional suture technique to minimize the suture bites during the laparoscopic sacral hysteropexy and found the similar anatomic success rate at the end of 1-year follow-up in both groups, suggesting that the use of fibrin sealant spray can be successful in decreasing suture bites to fix the mesh on the anatomic site.⁹ Based on the results, we believed that the strength of fixation by fibrin sealant spray with less suture bites was not inferior to the strength of fixation with more suture bites for the adhesion between the mesh and vaginal cuff at the following different postoperative follow-up periods, including at immediate state, short-term and even long-term follow-ups postoperatively, respectively. The study is interesting and worthy of discussion.

First, all we know is that laparoscopic surgery is still a highly technologic and difficult procedure, which needs a much longer learning curve.¹⁰ In addition, laparoscopic surgery may be associated with some rare but urgent complications, which unusually occur in exploratory laparotomy.^{11,12} Any instruments or tools in the aid of laparoscopic surgery are welcomed.^{10,13} In several cases, surgeons involved in laparoscopic surgery are not proficient in suture technique; thus, the assistance of many tools or agents in cases of suture techniques is often required.¹⁰ For example, the powerful hemostatic devices, such as LigaSure Tissue Fusion System (Valleylab, Boulder, CO), Harmonic Scalpel (Ethicon Endosurgery, Cincinnati, OH), and Gyrus PlasmaKinetics (PK) cutting forceps or sealer (Gyrus Medical, Maple Grove, MN) can be used to dissect and seal the tissues and vessels to minimize the use of laparoscopic suture technique.¹³ In addition, when suture is not avoidable, the classical strategy of suture placement for the repair of injury or occlusion of bleeding depends on the surgeon's experience and presents several problems, such as the high risk of leakage and the possibility of incomplete recovery of function. Although there is no doubt that extensive lesions and large injury should be treated by trained laparoscopists, there seems to be substantial evidence that may support the use of alternative techniques for the handling of small, confined lesions.¹⁴ In fact, with the aids of these powerful hemostatic instruments, blood loss was significantly decreased and operation time was also significantly decreased, making the laparoscopic surgery to be performed more safely and effectively while these tools are applied appropriately.^{10,13}

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Second, the comparison between the classical method of suture placement and the utilization of the fibrin sealant for the repair of POP with mesh has not been widely investigated in the literature, although scarce evidence supported that the combination of the two methods might be promising, as shown by the current Dr. Tsai's study.⁹ The fibrin sealant (also called as fibrin glues, a mixture of sealing protein), consisting of aprotinin, coagulation factor XIII and fibrinogen, and a thrombin solution, may simulate the last steps of the coagulation cascade.¹⁴ The detailed interaction between the fibrin sealant and the injured tissue is involved in the typical wound healing process,^{15,16} but timing course may be changed. The detailed fibrin sealant action includes an initiation step by production of fibrin monomers, which are converted from the fibrinogen by thrombin; the formation of fibrin thrombus by the interaction of coagulation factor XIII and fibrin monomers; and the final stabilization of fibrin thrombus, mediated by antidegradation under the assistance of aprotinin.¹⁴ Fibrin thrombus is a typical product that appears in the hemostasis/inflammation phase, suggesting that the added fibrin sealant might prolong the hemostasis/inflammation phase. If the aforementioned hypothesis is on setup, does it influence the healing process? By contrast, suturing itself is a foreign body, leading to extensive formation of granulation tissue with low collagen deposition and impairment of angiogenesis process, which is associated with a disrupted healing process.¹⁴ It can explain the rationale of Dr. Tsai's study because they would like to use a suture-less approach in place of the original classical standard suture approach in the management of women with POP.⁹ In addition, this combination approach also escapes the lacking evidence concerning the therapeutic adequacy of fibrin sealants as monotherapy of confined fixation of mesh to the targeted site.

Taken together, surgeons involved in laparoscopic surgery who are not proficient in certain types of surgical techniques might benefit with the current continuous and developed technology. Of course, the experienced surgeons are also enjoying the aforementioned technology because the assistance of these new technologies can prolong the career of surgeons and provide a much safer and better therapeutic outcome.

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