

Expansion of clinical application of laparoscopic single-site surgery through natural orifice transluminal endoscopic surgery

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This study by Su *et al.* is on minimally invasive surgery (MIS) which is a hot topic these days. MIS has the advantage of reducing morbidity, speeding up patient recovery, and minimizing scarring (1). As the advantages of MIS are well known and as technology develops, laparoscopic surgery has replaced open surgery. Also, MIS is progressing to laparoendoscopic single-site (LESS) surgery and natural orifice transluminal endoscopic surgery (NOTES) (2). In the urological field, Rane *et al.* first reported that they performed nephrectomy using LESS surgery (3). After laparoscopic, surgery was first introduced by Clayman (4). LESS is a surgical procedure method that can improve the esthetic outcome of conventional laparoscopic surgery. There have been articles published from many studies about the safety, feasibility, and effectiveness of LESS surgery for benign and malignant disorders of the adrenal glands, ureter, bladder, prostate, and testis (5). Also, international multicenter study reported the use of LESS for managing a wide range of major urological procedures, including pyeloplasty, simple nephrectomy, donor nephrectomy, radical nephrectomy, simple prostatectomy, partial nephrectomy, nephroureterectomy, renal cyst decortication, adrenalectomy, varicocelectomy, and ureterolithotomy (6).

LESS can be applied to general patients adapted to conventional laparoscopic surgery if performed by a skilled surgeon (7). On the other hand, NOTES is a method of operation using a body orifice such as urethra or vagina.

This means a leap in MIS and is a surgical procedure for avoiding wound morbidity and surgical footprints while showing the outcome of conventional laparoscopic surgery (8). In the urological field, however, many clinical studies on NOTES have not been carried out, and it is also a challenge in the current era. In this study, Su *et al.* performed radical prostatectomy and cystectomy through LESS surgery and facilitated the operation through the natural orifice of the urethra. As a result, the stability and feasibility of gastric surgery were proved. LESS prostatectomy and cystectomy were not easy due to the struggling of instruments which is a technical limit of LESS, weakness of flexible laparoscopic instruments, and the limitation of physical distance of transumbilical port and target organ (9). To overcome these limitations, Su *et al.* added the insert NOTES through the urethra with the 'Zhu's port' they developed, and finally they successfully performed a radical cystectomy and a prostatectomy. They reported that the operation was facilitated because of improved sight by air and fluid suction through the 'Zhu's port,' being able to use and insert an ultrasonic scalpel by this port, and assistance provided for urethral anastomosis. It seems to have overcome the difficulties of vesicourethral anastomosis, which is the biggest limitation announced in previous LESS prostatectomy studies, by adding NOTES. This study is thought to be a very wise procedure to overcome the disadvantage of LESS surgery with NOTES

and is considered to be future direction for MIS.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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