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## Short communication

## Two-port laparoscopic ovarian cystectomy using 3-mm instruments



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## ABSTRACT

**Objective:** The present study describes the initial experience with incorporating needlescopic instruments in the performance of two-port laparoscopic ovarian cystectomy and discusses the feasibility, safety, and potential benefits of the method.

**Materials and methods:** We evaluated the records of 46 patients who underwent two-port laparoscopic ovarian cystectomy using 3-mm instruments between January 2012 and December 2013.

**Results:** Cases consisted of 25 teratomas, 13 endometriomas, and eight cystadenomas. The mean cyst size and operative time were 6.5 cm (range, 3–11 cm) and 74 minutes (range, 35–120 minutes), respectively. Blood loss was 8.8 mL (range, 5–10 mL). All but one procedure were performed successfully using the needlescopic approach. One patient who underwent ovarian cystectomy for dermoid cyst required a change from a 3-mm to a 5-mm port, but there were no conversions to conventional multiport laparoscopy or open surgery. There were no perioperative complications.

**Conclusion:** Two-port laparoscopic ovarian cystectomy using 3-mm instruments is a feasible and safe approach by which surgeons expert in conventional multiport laparoscopy achieve minimally invasive surgery with low morbidity and a low rate of conversion to the conventional approach.

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## Introduction

In general, needlescopic surgery is a term used to describe laparoscopic surgery with needlescopic instruments with an external diameter of 3 mm or less compared with the standard sizes of 5 mm or 10 mm used in the conventional laparoscopic procedures. Gagner and Garcia-Ruiz<sup>1</sup> have defined needlescopic instruments as those that have a diameter of less than 3 mm. To achieve minimally invasive surgery, the use of single-incision laparoscopic surgery (SILS) for abdominal procedures has spread rapidly since 2007. In most SILS procedures, needlescopic instruments are used to ensure safety, shorten the operation time, and minimize the degree of trauma to the abdominal wall. Therefore, needlescopic instruments have become important tools for expanding the indications for SILS.

The initial reports of needlescopic surgery appearing in the gynecologic literature were limited to diagnostic procedures, second-look procedures, or minor therapeutic maneuvers such as tubal occlusion, minor adhesiolysis, tubal gamete or embryo transfers, and coagulation of endometriotic implants.<sup>2,3</sup> In recent years, the list of surgical operations that can be performed safely with smaller ports has expanded incessantly to cover a wide range of procedures across many surgical specialties. Although gynecologists pioneered this field, the limited case series in the literature are published.<sup>4,5</sup>

The present study describes the initial experience with two-port laparoscopic ovarian cystectomy using 3-mm instruments and discusses the feasibility, safety, and potential benefits of the method.

## Materials and methods

In this study, 46 patients underwent two-port laparoscopic ovarian cystectomy using 3-mm instruments at Tokyo Medical and Dental University Hospital between January 2012 and December 2013. Patient age and body mass index ranged from 21 years to 41 years (mean, 32 years) and from 16.1 kg/m<sup>2</sup> to 30.2 kg/m<sup>2</sup> (mean,

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20.3 kg/m<sup>2</sup>), respectively (Table 1). This study was approved by our institutional review board. All patients were informed about the intervention technique and provided written informed consent.

### Surgical techniques

Once the patient was anesthetized, she was placed in the lithotomy position, and the abdomen and vagina were thoroughly sterilized and draped. After creation of a 1-cm intraumbilical vertical skin incision, an adequate fasciotomy was made with the open technique. A 5-mm trocar was then introduced. After the pneumoperitoneum was created, a 5-mm flexible videoscope was introduced. In the steep Trendelenburg position, the pelvic cavity was inspected. A 3-mm working port was made in the left inguinal region. A 3-mm laparoscope was then inserted through the 3-mm inguinal trocar, and another 5-mm trocar was inserted caudal to the 5-mm trocar while monitoring the umbilical region with a 3-mm laparoscope. Two 5-mm trocars were inserted through the same umbilical incision so that they were positioned vertically (Figure 1). The operator manipulated several 5-mm instruments through the umbilical port and a 3-mm grasper through the inguinal port (Figure 2). Needleoscopic ovarian cystectomy was performed in the same fashion as the conventional two-port laparoscopic procedure.<sup>6</sup> After two 5-mm trocars were replaced by a 12-mm trocar, an EndoPouch (Ethicon Endo-Surgery, Cincinnati, OH, USA) was inserted transumbilically. With use of a 3-mm laparoscope through the inguinal trocar, ovarian cysts were retrieved in an EndoPouch and extracted transumbilically. At the end of the procedure, suture was used to close an umbilical incision, whereas the inguinal wound was approximated with Steri-Strips.

### Results

Forty-six patients had two-port laparoscopic ovarian cystectomy using 3-mm instruments performed during the study period. Table 1 presents the operative outcomes. Cases consisted of 25 teratomas, 13 endometriomas, and eight cystadenomas. The mean cyst size and operative time were 6.5 cm (range, 3–11 cm) and 74 minutes (range, 35–120 minutes), respectively. Blood loss was 8.8 mL (range, 5–10 mL). All but one procedure were performed successfully using the needleoscopic approach. One patient who underwent ovarian cystectomy for dermoid cyst required a change from a 3-mm to a 5-mm port, but there were no conversions to conventional multiport laparoscopy or open surgery. Histologic findings were as follows: mature cystic teratoma ( $n = 25$ ), endometrioma ( $n = 13$ ), serous cystadenoma ( $n = 6$ ), and mucinous cystadenoma ( $n = 2$ ). The postoperative course was uneventful in all patients. No postoperative complications were observed at follow-up in the outpatient clinic 1 month after surgery.

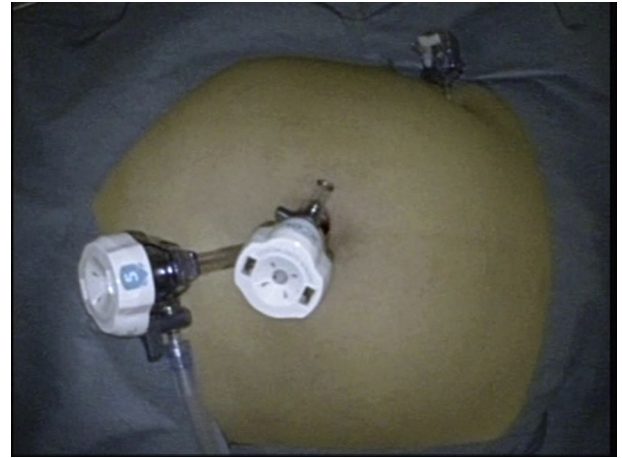
**Table 1**

Patient characteristics and operative outcomes ( $n = 46$ ).

Variable	Value
Age (y)	32 (21–41)
BMI (kg/m <sup>2</sup> )	20.3 (16.1–30.2)
Cyst size (cm)	6.5 (3–11)
Operative time (min)	74 (35–120)
Blood loss (mL)	8.8 (5–10)
Histology	
Mature cystic teratoma	25
Endometrioma	13
Serous cystadenoma	6
Mucinous cystadenoma	2

Data are presented as mean (range) or  $n$ .

BMI = body mass index.

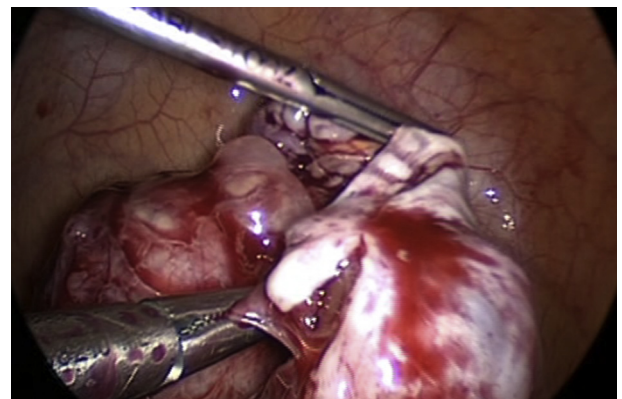


**Figure 1.** Trocar placement for two-port laparoscopic ovarian cystectomy using 3-mm instruments.

### Discussion

Over the past two decades, minimally invasive surgery has ushered in a number of fairly significant and widespread changes in general surgery that have resulted in marked reductions in the size and the number of surgical incisions as well as overall patient trauma. Needleoscopic instruments and techniques are being reconsidered in view of the rapid development of SILS. However, several important issues remain to be resolved. With the currently available technology, needleoscopic instrumentation has several restrictions related with surgical optics and manipulability.

However, needleoscopic surgery has been regarded as a further refinement in laparoscopic technology that, used appropriately, offers potential advantages compared with conventional laparoscopy. One of the most obvious major advantages to the use of needleoscopic instruments is the reduction in the size of the abdominal incisions, which results in minimal scarring and better cosmesis. In randomized trials comparing needleoscopic and conventional laparoscopic techniques in general surgery, both patients and blinded observers scored microlaparoscopic wounds significantly better with regard to cosmetic appearance.<sup>7,8</sup> Although the clinical relevance of differential scarring after smaller incisions can be questionable, even a small cosmetic benefit may be psychologically important, especially to relatively young women undergoing



**Figure 2.** Laparoscopic view in needleoscopic ovarian cystectomy. The operator manipulates several 5-mm instruments through the umbilical port and a 3-mm grasper through the inguinal port.

ovarian cystectomy. In the second place, decreased incisional pain is a well-established benefit of laparoscopic surgery, and several investigators in prospective randomized studies have demonstrated that using smaller incisions significantly reduces post-operative pain scores and analgesic requirements.<sup>8–10</sup> Furthermore, the use of needlescopic instruments has the potential to reduce the risk of herniation and port-related injuries.

Needlescopic surgery has raised safety issues similar to those surrounding the introduction of laparoscopy a quarter century ago. In particular, weaker grasping capability and lack of tensile strength are noted. In this study, only one patient required a change from a 3-mm to a 5-mm port. The one procedure we converted was an ovarian cystectomy for an 11-cm dermoid cyst where ovarian tissue was markedly necrotic and therefore difficult to handle with the small jaws of a 3-mm grasper. The smaller size of needlescopic graspers can make manipulation of substantial tissues and heavy organs particularly cumbersome. In this circumstance, the conversion merely entails an upsizing port, avoiding futile and possibly unsafe attempts to complete the procedure with a miniport.

In conclusion, ports can be safely reduced in size without a negative impact on the surgeon's ability to perform two-port laparoscopic ovarian cystectomy. Further study is necessary to better define surgical outcomes obtained from needlescopic ovarian cystectomy and to assess the relative benefits of this surgical approach compared with other minimally invasive approaches.

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