

North Pacific Surgical Association

Rigid vs articulating instrumentation for task completion in single-port surgery



Geoffrey Chow, M.D.^a, Chieh Jack Chiu, M.D.^a, Bin Zheng, M.D., Ph.D.^b,
Ormond Neely Panton, M.B.B.S.^a, Adam T. Meneghetti, M.D., M.H.Sc.^{a,*}

^aDepartment of Surgery, Division of General Surgery, University of British Columbia, 2775 Laurel Street, Vancouver, British Columbia, V5Z 1M9, Canada; ^bDepartment of Surgery, University of Alberta, Edmonton, Alberta, Canada

KEYWORDS:

Articulating instrumentation;
Single-port access surgery;
Performance assessment;
Surgical education;
Simulation

Abstract

BACKGROUND: Single-port access surgery (SPA) may provide benefits but there is a steep learning curve. We compare traditional in-line instruments with articulating instruments.

METHODS: Fundamentals of laparoscopic surgery peg transfer task was performed using a 3-port approach or SPA device. Standard rigid instrumentation was compared with articulating instrumentation.

RESULTS: Twenty surgeons completed all tasks. Average time using a conventional approach was shorter than SPA (144 ± 54 vs 198 ± 74 seconds, $P < .001$). Articulating instruments required longer procedural time than rigid instrumentation (201 ± 66 vs 141 ± 58 seconds, $P < .001$). In the conventional model, task time was lower with rigid instruments than with articulating instruments (108 vs 179 seconds, $P < .001$). Task time in the SPA model was lower with rigid instruments (173 vs 223 seconds, $P = .013$).

CONCLUSIONS: All tasks required longer time to complete in SPA when compared with a conventional approach. Articulating instruments have an increased benefit in SPA surgery.

© 2016 Elsevier Inc. All rights reserved.

In conventional laparoscopic procedures, numerous ports are placed throughout the abdomen to optimize access and triangulation for exposure and to perform an operation. Single-site surgery is carried out through 1 access site on the abdominal cavity, which poses different challenges to the surgeon as the ability to triangulate is limited. Recently, single-port access (SPA) has gained

interest with some proponents advocating fewer scars, shorter recovery time, but some series have shown higher pain scores and rates of hernia formation.¹⁻³ In addition, the operative time for single incision procedures is longer than operative times for multiport (MP) approaches in the published series.^{4,5} Nonetheless, some patients may prefer this surgical approach because of concerns of surgical trauma and cosmetic considerations.^{2,3} At short to medium follow-up, there are mixed report for cosmesis, as some report that surgical approaches with less port sites than those with traditional MP placement have improved outcomes, whereas in some analyses there are no differences over the same time course.³⁻⁵ However, surgeons experience greater difficulty in performing an SPA operation compared with conventional laparoscopic surgery.⁴⁻⁹

There were no relevant financial relationships or any sources of support in the form of grants, equipment, or drugs.

The authors declare no conflicts of interest.

* Corresponding author. Tel.: +1-604-875-4498; fax: +1-604-875-5588.

E-mail address: adam.meneghetti@vch.ca

Manuscript received November 5, 2015; revised manuscript January 18, 2016

The difficulties with SPA operations results largely from inline placement of multiple instruments through the single port.^{1,8,9} The limited range of motion between the 2 operating hands during an SPA procedure makes bimanual manipulation of tissue more challenging than in a conventional MP approach. Unlike conventional laparoscopy where triangulation is created with multiple ports, the coaxial position of the laparoscope and the instruments can impede visualization.

One solution to increase range of motion between the operating instruments is for the surgeon to cross either their hands or instruments, which results in more freedom in tissue manipulation. The downside of this approach is either un-natural hand movement with crossed hands or crossing of instruments and an associated increase in operative complexity. To overcome this issue, newer instruments with curves in the shaft and articulating shafts or tips may provide more freedom of movement while maintaining normal hand position.¹⁰

Methods

Ethical approval for human subject participation in this study was obtained from the Clinic Ethical Review Board of the University of British Columbia. Resident and

attending surgeons in the Department of Surgery were recruited for this study.

A commercially available training box (Laparoscopic Trainer, 3-D Technical Services, Franklin, OH) was used to create a standardized working environment for all procedures. The standard box measures 23" long, 11.5" wide, and 13.5" high, including a 10" LCD color monitor, and a centrally mounted video camera (Fig. 1). The trainer has 2 10-mm standard ports at equidistance from the camera, which were used in the conventional MP setting. In the SPAs setting, a central port on the side wall of the box was created using a SILS Port (Covidien, Mansfield, MA) to perform SPAs tasks (Fig. 1). The SILS port accommodates 3 instruments including a laparoscopic camera and 2 instruments.

Participants in this study were required to perform a laparoscopic transport task. This surgical task was selected and modified from the peg transport included in the fundamentals of laparoscopic surgery program.¹¹ For this study, participants were instructed to pick up each object with the nondominant hand, transfer it to the dominant hand in the air above the pegs, and then place the object on a peg on the other side of the field. After all objects were transferred in this manner, the process was reversed. The participants then picked up each object with the dominant hand, passed it in the air to the nondominant hand, and then placed it on a peg on the opposite side. This transport

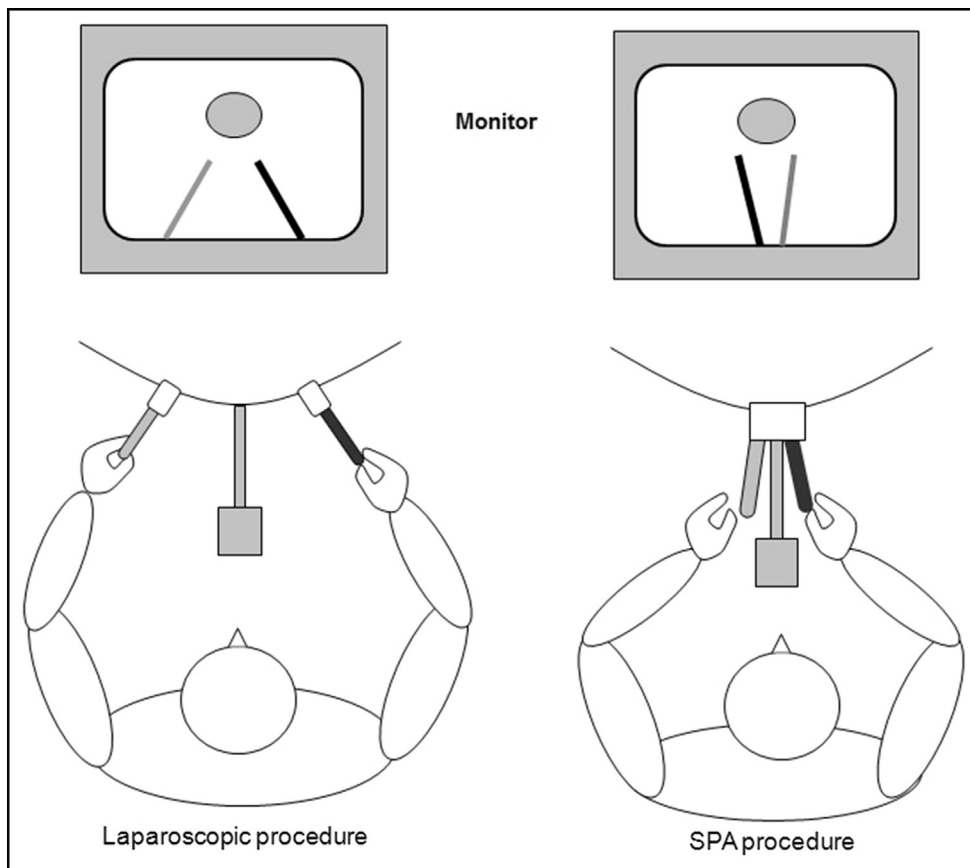


Figure 1 Setup and port placement.

Download English Version:

<https://daneshyari.com/en/article/6250574>

Download Persian Version:

<https://daneshyari.com/article/6250574>

[Daneshyari.com](https://daneshyari.com)