

Appendectomy with a single incision laparoscopic surgery port made from a plastic bottle

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ABSTRACT

Introduction: Although minimally invasive surgery offers great advantages to patients, it has certain disadvantages, such as dependence on technology, it is not always easily accessible, and greater expense. The aim of this study was to present a simple and inexpensive new technique for performing the minimally invasive surgery of a single-port laparoscopic appendectomy.

Materials and Methods: The data of 6 patients who underwent single-port laparoscopic appendectomy using the mouth of a plastic bottle and a glove between January and November 2017 were evaluated retrospectively.

Results: The mean age of the patients was 22.5±2.73 years (range: 19–27 years). Three patients were male (50%) and 3 patients were female (50%). The mean duration of the operation was 61.8±5.52 minutes (range: 53–68 minutes). Two patients (33.3%) needed an additional port because manipulation could not be achieved and a laparotomy was performed on 1 (16.6%) of these patients. There were no complications except for a wound site infection in 1 patient.

Conclusion: While minimally invasive single-port laparoscopic surgery is successfully performed, it is a method that has not yet become the gold standard, has a fairly long learning curve, and is difficult to access due to financial and technical reasons. Simpler and cheaper methods using the same principle can be applied successfully, provided that they are performed by experienced hands.

Keywords: Appendectomy; cheap single incision laparoscopic surgery port; laparoscopy.

Introduction

Surgical procedures are evolving in parallel with improvements in medicine and technology. One of the important elements of the changes is minimally invasive surgical procedures. Laparoscopy has completely changed some surgical approaches in this context. Since the first laparoscopic appendectomy was successfully performed about

thirty years ago, laparoscopy has become increasingly widespread and has begun to be used in many intra-abdominal surgeries. In fact it is now used as the gold standard in some surgeries.^[1,2]

With increasing gravitation to minimally invasive surgery in recent years, “Single Incision Laparoscopic Surgery” (SILS) has come into prominence.^[1-3] The fields of usage



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of this method have increased with the development of laparoscopic instruments. These laparoscopic instruments include the SILS port (Covidien, Norwalk, CN, USA), Uni-X (Pnavel Systems Inc., Morganville, NJ, USA), and X-Cone (KARL STORZ, Tuttlingen, Germany). However, the use of these special tools increases the cost.^[4] For this reason, in the recent past, many authors have defined the new and less costly single-port surgical methods that they have performed or developed.^[5] In this article we aimed to present the single-port laparoscopic appendectomies that we performed using a plastic bottle mouth and a glove.

Materials and Methods

The data of 6 patients who underwent single-port laparoscopic appendectomy that we performed with a plastic bottle mouth and a glove in our clinic between January and November 2017 were evaluated retrospectively. Patients' age, gender, duration of operation, indication for conversion to an open procedure, additional port requirement, complications and hospital stay duration were

evaluated. The duration of surgery was accepted as the time that passed from induction of anesthesia to extubation. The data were obtained from hospital records (patient files, operation notes, and discharge summaries).

The patients were laid in the supine position during appendectomy. In all patients, prophylactic antibiotic was administered, after which a 2 cm long skin incision was made so as to include the umbilicus. Upon reaching the fascia, the abdomen was entered with a transverse incision about 2.5 cm in length, and the tip of a plastic bottle that had been cut and prepared and left to wait in a solution was placed in the abdomen. A glove was placed on this port and one 10 mm and two 5 mm trocars were inserted through the fingers of the glove. To ensure the continuity of the pneumoperitoneum, the glove openings were tightly bound with a silk thread (Fig. 1).

Then, a pneumoperitoneum was formed by inflating the abdomen to a pressure of 13 mmHg by giving CO₂. Exploration was done by entering through the trocar with a thirty-degree angle 10 mm telescope (Fig. 2). During appen-

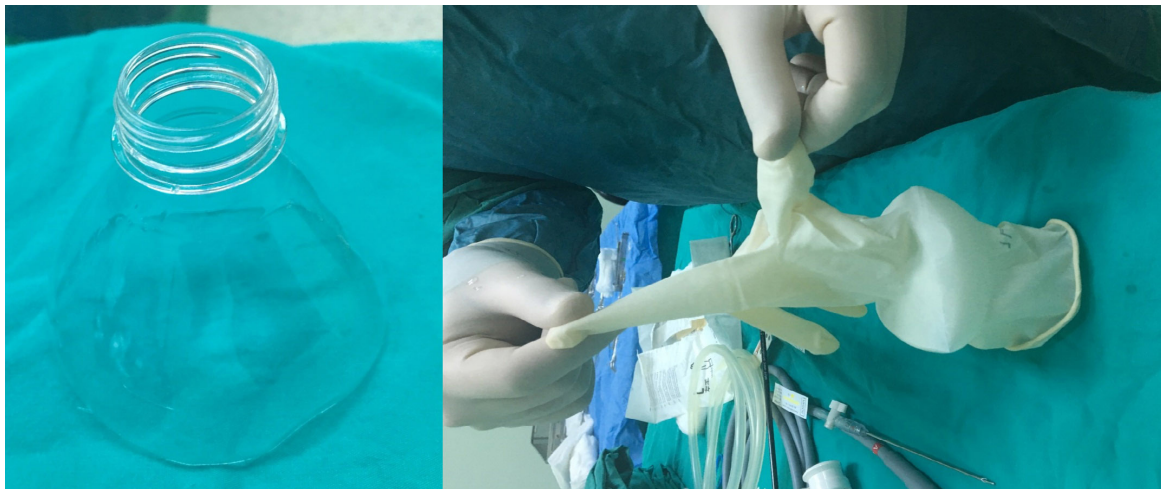


Figure 1. Plastic bottle with gloves on it.



Figure 2. A single port system in which pneumoperitoneum is created and ports are inserted.

Table 1. Patients characteristics

Patient no	Gender	Age	Duration of operation (minutes)	The necessity for additional ports	Conversion to open procedure	Complications stay (days)	Hospital
1	Male	22	62	+	–	Wound site infection	6
2	Male	19	53	–	–	–	1
3	Male	24	58	–	–	–	1
4	Female	27	68	–	–	–	2
5	Female	21	64	–	–	–	1
6	Female	22	66	+	+	–	3

dectomy, the mesodissection of the appendix was done with a LigaSure® device. The appendix root was ligated with a thread prepared outside. When an additional port was needed, one 5 mm trocar was inserted according to the surgeon's preference. In patients who needed to undergo laparotomy, the location of the incision was again chosen by preference.

Results

During the period that we examined, the data of 6 patients were analyzed. The mean age of the patients was 22.5 ± 2.73 years (19–27), and three patients were male (50%) and three patients were female (50%). The mean duration of operation was 61.8 ± 5.52 minutes (53–68). Two patients (33.3%) needed an additional port because manipulation could not be achieved and laparotomy (16.6%) was performed on one of these patients. One patient developed a wound site infection, which was treated with debridement, dressing, and antibiotherapy. This was the patient with the longest stay. Mean hospital stay was 2.3 ± 1.9 days. The characteristics of the patients are given in the Table 1.

Discussion

Appendectomy is the most common reason for emergency abdominal surgery. Open appendectomy is practiced as the gold standard in many clinics. Laparoscopic appendectomy is also a reliable alternative to open appendectomy when its applicability and results are considered. The first laparoscopic appendectomy surgery was performed by Kurt Semm in 1981 and published in 1983.^[6,7]

Performing a laparoscopic surgery by inserting the telescope and all surgical instruments through a single hole in the umbilicus is called “Single Incision Laparoscopic

Surgery” (SILS). In this method, surgery is performed through a single incision of 2–2.5 cm made through the umbilicus instead of the three or four 5 or 10 mm incisions used in laparoscopic operations. Appendectomy, splenectomy, gastrectomy, inguinal hernia repair, colorectal surgeries, and especially cholecystectomy can be performed with this method.^[8,9]

In the literature, the fact that laparoscopic appendectomy lasts longer than open appendectomy is considered to be a disadvantage of the method.^[10] Similarly, it has been reported that SILS appendectomy lasts longer than conventional laparoscopic appendectomy. However, as experience has grown, this difference has decreased. In the literature, this period is reported to be between 29–50 minutes on average, but in this study, the duration of operation is slightly above the average.^[11]

Standard laparoscopic instruments are used in conventional laparoscopic appendectomy. Because most of these instruments are reusable, they are not costly. However, companies produce flexible ports with three holes for the cannulas to pass and one hole for the insufflation cannula on them for SILS. In addition, flexible surgical instruments or those that can do reticulation have been produced to overcome major problems, such as the collision of standard instruments. Because these instruments are more expensive than standard instruments, SILS is more expensive than conventional laparoscopic procedures.

For this reason, in the recent past, many authors have defined new and cheap single-port surgical methods that they have performed or developed. In this article we presented the single-port laparoscopic method that we performed with a plastic bottle mouth and a glove. In most of the articles, they put the glove around that apparatus

by using a wound protector. We, instead, used the tip of a plastic water bottle.^[4,5,12]

In our method, it is sometimes difficult to ensure continuity of the pneumoperitoneum and to manipulate the instruments, but we think that this situation can be overcome by developing a similar system or port. We have not used this method in a large number of cases, but the duration of surgery is slightly increased in the cases we have operated on. In addition, two patients (33.3%) needed additional ports because manipulation could not be achieved, and laparotomy was performed on one of these (16.6%) patients. These ratios are slightly above those in the literature. Again, in a large meta-analysis involving 44 randomized controlled trials conducted by Li et al.,^[13] the incidence of surgical site infections for laparoscopic appendectomy was found to be 3.8%, while the rate of infections in our study was 16.6%. We attribute this to the small number of patients.

In conclusion, we think that when it is desired to perform a surgical procedure with the “Single Incision Laparoscopic Surgery” (SILS) method, this method can be used easily and safely by experienced hands. However, we hope that such methods will no longer be needed when companies manufacturing medical technology reduce the production costs of special ports for SILS in the near future.

Disclosures

Ethics Committee Approval: This retrospective study was not approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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