



Turkish surgeons' experiences and perception about single-incision laparoscopic surgery

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ABSTRACT

Objective: We aimed to show Turkish surgeons' current status of experience and perception about single-incision laparoscopic surgery.

Material and Methods: The experience and perception of general surgeons, who were members of the Turkish Surgical Association (3.5%, 116/3312), about single-incision laparoscopic surgery were analyzed according to demographic characteristics and a self-report questionnaire with the following four domains: surgeons' perception regarding the performance of single-incision laparoscopic surgery in their clinical practice; their experience of laparoscopic surgery; education, experience, and attitude for single-incision laparoscopic surgery; and the reason for performing/not performing single-incision laparoscopic surgery in their practice.

Results: There were no significant factors affecting Turkish surgeons' preference of surgical approach. Although, most surgeons performing single-incision laparoscopic surgery were educated (72.2%), the dominant factor driven them to perform this surgery seemed to be personal achievement and satisfaction (57%). Most surgeons who did not perform single-incision laparoscopic surgery were not interested to do so and considered it unnecessary (62.1%). In addition, the need for special equipment and training were dominant barriers (61%).

Conclusion: It seems that Turkish surgeons' perception to perform single-incision laparoscopic surgery was more related to their personal achievement and satisfaction.

Key Words: Perception, surgeon, single-incision laparoscopic surgery

INTRODUCTION

Ever since the advantage of minimal invasive surgery was proved in the era of surgery, a number of procedures have been performed laparoscopically. Beside the wide acceptance of laparoscopy as a primary approach for a number of surgical problems, for some procedures such as cholecystectomy, fundoplication, and adrenalectomy, it was accepted as "gold standard treatment." In addition to well-known advantages such as less blood loss, shorter hospital stay, enhanced recovery, and decreased complication rate, today, more complex oncological procedures are performed laparoscopically with a reliable level of efficacy and safety (1). The rapid development of minimal invasive surgery has led surgeons to advance its cosmetic benefits to the patients. Scarless surgery concept was developed from this point. For this purpose, reducing port number, applying mini-instruments, and using natural orifices were implemented for current surgical practices. Over time, application of natural orifice transluminal endoscopic surgery (NOTES) in humans remain limited, because of a lack of surgical ergonomics and the perception of patients and surgeons (2, 3). Laparoscopy with mini-instruments still being performed in some centers with the limitation of the need for special equipment. Today, the port reduction concept of advanced laparoscopic surgery is commonly accepted as single-incision laparoscopic surgery (SILS). With SILS, most of the expected benefits are successfully provided to patients. However, in terms of minimal postoperative pain and hernia development, controversies still exist (4-6).

As most of the surgeons received no education about SILS, the beginning of the development of this concept was driven by the industry, and in the early period, it was presented as instrument-dependent. The common consideration about the need for special instruments and controversies about results have decreased the interest toward SILS and have slowed the progress. Fortunately, early reports with the use of standard laparoscopic equipment and the definition of various single-incision access techniques, which did not require any special device, has helped to draw the attention of surgeons (7-9). Today, most of the operation is performed with the use of standard laparoscopic equipment. However, surgeons' perception about SILS did not show similar progress. According to a previous report about the patients' perception of SILS, most of them (89%) stated that they are willing to accept to undergo SILS if recommended by their surgeons (10). As expected, surgeons' perception about the minimal invasive surgery affects information about procedure selection, which is given to patients by surgeons. From this aspect, judging that "the patients' procedure choice was directly associated with the surgeon's perspective," would not be wrong. In this cross-sectional research, we aimed to show Turkish surgeons' attitudes and perception about SILS.

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MATERIAL AND METHODS

Participants

This study employed a cross-sectional research design. General surgery specialists who were members of the Turkish Surgical Association were invited to participate in this research project via e-mail (n=3312). Data collection took place over a 4-week period from May to June 2014. One hundred and sixteen out of 3312 general surgeons agreed to participate in the survey. The response rate was 3.5%.

Measures

A self-report questionnaire was developed for the specific purposes of this study (Questionnaire form, supplement 1). The questionnaire included the following four domains: surgeons' perception regarding the use of SILS in their clinical practice; their experience of laparoscopic surgery; education, experience and attitude for SILS; and the reason for performing/not performing SILS in their practice. Also, demographic details including surgeon's age, gender, experience of surgery, academic degree and type of hospital practiced at were obtained from the questionnaire. The procedures that were performed with laparoscopy or SILS, except appendectomy or cholecystectomy, were defined as advanced laparoscopy or SILS. The questionnaire consisted of 15 questions and took approximately 5 min to complete.

All data were collected anonymously online, and a link to the self-report questionnaire was e-mailed to all Turkish Surgical Association members via the secretary of the association.

To recognize the underlying differences between surgeons who performed and did not perform SILS, two groups were designated (SILS and non-SILS), and demographic characteristics, numbers of performed surgeries in the last year, and the experience of performing laparoscopic surgery were compared.

Statistical Analysis

Continuous data were presented as mean±standard deviation (SD) or median and range. Dichotomous and categorical data were presented as numbers with percentages. Normally distributed continuous data were assessed with Student's t-test. The chi-square test and Fisher's exact test were used to compare categorical variables. A two-tailed p value <0.05 was considered statistically significant. Statistical analyses were performed with the Statistical Package for the Social Sciences, version 16.00 (SPSS, Inc., Chicago, IL, USA).

RESULTS

Participants

The mean age was 32.8±7 (31-60). Demographic characteristics, experience of performing surgery, academic degree, and type of hospital practiced at are presented in Table 1.

Single-Incision Laparoscopic Surgery Education

The SILS education status of the surgeons was as follows: 36 (31%) of 116 surgeons took at least one type of SILS education; 17 (14.7%) surgeons joined a SILS operation as an observer,

Table 1. Demographic characteristics, experience of surgery, academic degree and the type of hospital they practice

Total, n (%)	116 (100)
Age (years), mean±SD	42.8±7
Sex, n (%)	
Female	4 (3.4)
Male	112 (96.6)
Years of experience (years), n(%)	
<6	21 (18.1)
6-15	47 (40.5)
>15	48 (41.4)
Hospital, n (%)	
University hospital	22 (19)
Education and research hospital	44 (37.9)
Private university hospital	3 (2.6)
State hospital	29 (25)
Private hospital	18 (15.5)
Academic degree, n (%)	
Professor	9 (7.8)
Associate professor	18 (15.5)
Assistant professor	13 (11.2)
Assistant in education and research hospital	8 (6.9)
General surgery specialist	68 (58.6)

12 (10.3%) surgeons joined a SILS simulation workshop, and 7 (6%) surgeons joined animal operation course as an operator. Eighty (69%) of 116 surgeons received no education.

Single-Incision Laparoscopic Surgery Experiences

In the educated group, 26 (72.2%) of 36 surgeons were performing SILS in their own clinical practice, whereas in the non-educated group, only 16 (20%) of 80 surgeons were performing SILS. The difference between the groups was found to be statistically significant (p<0.001). Twelve (10.3%) of 116 surgeons stated that they performed advanced SILS procedures: 7 (6%) in the educated and 5 (4.3%) in the non-educated group (p=0.763).

All surgeons who participated in the survey were performing advanced laparoscopic procedures in their practice. Except for the number of advanced laparoscopic surgeries performed in the last year, there was no difference between the SILS and non-SILS groups. SILS-performing surgeons performed more advanced laparoscopic procedures in the last year (p=0.008). On subgroup analysis, statistical differences were found to be related to the number of advanced laparoscopic procedures they performed. In the non-SILS group, most of the surgeons (87%, 65/74) stated that they performed <50 advanced laparoscopic procedures, whereas in SILS group, 61% (26/42) performed <50 and 39% (16/42) performed >50 advanced laparoscopic procedures in the last year (p=0.001). On age group analysis, no significant difference was detected in surgeons younger than 40 years, in

Table 2. Demographic characteristics, surgeon's last year performance and experience levels according to the groups

	Non-SILS group (n=74)	SILS group (n=42)	p values
Age (years), mean±SD	43.4±7.3	41.8±6.5	0.234
Sex, n (%)			
Female	3 (4.1)	1 (2.4)	0.999
Male	71 (95.9)	41 (97.6)	
Years of experience (years), n (%)			
<6	13 (17.6)	8 (19)	0.978
6-15	30 (40.5)	17 (40.5)	
>15	31 (41.9)	17 (40.5)	
Hospital, n (%)			
University hospital	11 (14.9)	11 (26.1)	0.103
Education and research hospital	27 (36.5)	17 (40.5)	
Private university hospital	1 (1.4)	2 (4.8)	
State hospital	24 (32.3)	5 (11.9)	
Private hospital	11 (14.9)	7 (16.7)	
Academic degree, n (%)			
Professor	4 (5.4)	5 (11.9)	0.363
Associate professor	10 (13.5)	8 (19)	
Assistant professor	8 (10.8)	5 (11.9)	
Assistant professor in education and research hospital	4 (5.4)	4 (9.5)	
General surgery specialist	48 (64.9)	20 (47.7)	
Laparoscopic surgery experience (years), n (%)			
<6	19 (25.6)	9 (21.4)	0.550
6-15	41 (55.4)	19 (45.3)	
>15	14 (19)	14 (33.3)	
Total number of surgeries in last year, n (%)			
<200	20 (27)	12 (28.5)	0.386
200-400	38 (51.2)	17 (40.5)	
>400	16 (21.8)	13 (31)	
Number of laparoscopic surgeries in last year, n (%)			
<100	42 (56.9)	14 (33.3)	0.165
100-200	24 (32.3)	21 (50)	
>200	8 (10.8)	7 (16.7)	
Number of advanced laparoscopic surgeries in last year, n (%)			0.008
<50	65 (87.7)	26 (61.9)	0.001
50-100	6 (8.2)	10 (23.8)	0.040
>100	3 (4.1)	6 (14.3)	0.048
SILS: single-incision laparoscopic surgery			

terms of performing SILS and the number of surgeons performing advanced laparoscopic surgery and advanced SILS in the last year ($p=0.304$, 0.241 , and 0.190 , respectively). Demographic characteristics, last year's performance and experience levels of the surgeons according to the groups are presented in Table 2.

Surgeons' Perception About Single-Incision Laparoscopic Surgery

Surgeons who did not perform SILS were questioned about the underlying reason for not performing SILS. Possible reasons were predefined and classified by the study group. Three (4%) surgeons did not answer the question. Thirty-two (43.2%) surgeons marked "I did not desire to do." The other predefined reasons "I think it is unnecessary," "Could be dangerous for the patients," "I was never requested to perform SILS by a patient," "Because of the need for special equipment," and "Because of longer operation times" were also marked by 14 (18.9%), 1 (1.3%), 3 (4%), 17 (22.9%), and 4 (5.7%) surgeons, respectively.

When their thoughts about the barriers to perform SILS were questioned, 21 (28.3%) surgeons did not answer the question. "The need for special equipment," "I did not train," "Bad surgical position and ergonomics," and "Lack of standardized operation techniques" were marked by 26 (35.1%), 19 (25.9%), 3 (4%), and 5 (6.7%) surgeons, respectively.

Surgeons who performed SILS were questioned about the underlying reason for performing SILS. Twelve (28.5%) surgeons did not answer the question. Thirteen (30.9%) surgeons marked "To be able to perform advanced laparoscopic surgery." The other predefined reasons "To be able to perform advanced laparoscopic surgery and for cosmetic benefits for the patients," "For cosmetic benefits and decreased postoperative pain," "On patients' request" were marked by 11 (26.1%), 4 (9.8%), 2 (4.7%) surgeons, respectively.

DISCUSSION

Despite the proven advantages of SILS, a limited number of surgeons informed their patients about its benefits. To date, surgeons' perception about SILS and NOTES have been reported in a few studies; however, this is the first study about Turkish surgeons' current status of experience and perception about SILS (3, 11-13).

In a study conducted on 45 Society of Gastrointestinal Endoscopic Surgeons (SAGES) members by Islam et al. (12), only 5 performed at least one SILS, according to objective simulator-based assessments and surgeon perceptions. They concluded that performing SILS with currently available instruments are more difficult than conventional laparoscopy. As the experience about SILS grows rapidly, many surgeons who were performing SILS suggest that it is not difficult to learn (14, 15). In previous surveys, surgeons' main concern about advanced minimal invasive approaches (SILS or NOTES) was procedure related risk, and most surgeons stated that if this procedure reaches desirable levels of safety similar to conventional laparoscopy, they would choose to undergo a SILS or NOTES procedure for themselves (3, 11-13). Also, there were much more data about patients' perception in the preoperative period. Some of these studies indicated that cosmesis and reduced postoperative pain are the most important issues, whereas some indicated that safety is the most important (10, 16). Golkar et al. (17) conducted a study to compare patients' preoperative and postoperative perceptions about SILS preoperatively; the patients were most concerned about safety, but postoperative concern was shifted to cosmetic outcomes. Bucher et al. (18) reported a decreased SILS preference with increasing medical knowledge; patients and general

population (86%), paramedical staff (70%), and medical staff (67%). Only 25%–50% of questioned surgeons would choose a SILS or NOTES cholecystectomy for themselves (3, 13).

Less experienced and surgically active Danish surgeons were found to be more interested in performing SILS or NOTES, and most of them considered that SILS will become a standard procedure for cholecystectomy in the near future (13). Similarly, the number surgeons who were interested in NOTES training was found to be correlated with younger age, SAGES membership, minimally invasive surgery specialization, and high flexible endoscopy volume (3). Fan et al. (11) suggested that being younger than 40 years is the single most significant factor affecting a surgeon's preference of surgical approach. They reported that if these surgeons had satisfactory supporting data, 66.6% of them would change their attitude. To recognize the underlying differences between SILS-performing and not performing surgeons in Turkey, we compared the groups. Age, sex, experience of surgery, experience of laparoscopic surgery, type of working hospital, academic degree, and number of total and laparoscopic operations performed in the last year showed no difference between SILS-performing and not performing surgeons. Although these findings are not consistent with previous studies, we have concerns about the homogeneity of our study population. First, our response rate was low (3.5%, 116/3312) despite the support of the association; second, all participants stated that they performed advanced laparoscopic operations (except appendectomy or cholecystectomy) in the last year. This situation suggests that the survey was filled by the surgeons who have minimal invasive surgery specialization. To evaluate the effects of surgeon age on their attitude, we performed a subgroup analysis. In surgeons younger than 40 years, no significant difference was detected in terms of performing SILS and the number of performed advanced laparoscopic surgery and advanced SILS last year. The only statistically significant difference between SILS-performing and not performing groups was the SILS-performing surgeons' superior advanced laparoscopy performance in the last year regarding the number of performed operations. Expectedly, the surgeons who were experienced in minimal invasive surgery were more interested in performing SILS.

Islam et al. (12) suggest that despite the technical difficulties and the expectations about increased complication risk, a clear majority of participants anticipate a wide adoption of SILS, and all of them would offer SILS if appropriately trained. Most studied surgeons expressed an interest in becoming trained in SILS or NOTES (3, 11, 12). We showed a significantly positive trend to perform SILS and advanced SILS among educated surgeons. On the other hand, in our study, 16 non-educated surgeons performed SILS procedures, and 7 of them expressed advanced SILS experience. In English literature, we have no data to compare this finding, but it could be explained with broad industry support, wide availability of the operation videos on social media, and surgeons' perception of personal achievement and satisfaction. A clear majority of SILS-performing surgeons expressed "To be able to perform advanced laparoscopic surgery" and "To be able to perform advanced laparoscopic surgery and for cosmetic benefits for the patients" as the underlying reason for performing SILS. Nearly two-thirds of the surgeons who did not perform SILS expressed "I did not desire to do" and "I think it is unneces-

sary" as the reason of not performing SILS; the need for special equipment and longer operation times remained less important than surgeons' desire. Among the surgeons who did not perform SILS, need for special equipment and lack of training were expressed as dominant barriers to perform SILS.

Despite the support of the Turkish Surgical Association, our response rate was low (3.5%, 116/3312). In addition to the low response rate, after the interpretation of our results, we realized that studied surgeons were more experienced in minimal invasive surgery than normal Turkish surgeons. We aimed to assess the current status of attitude and perception, so some of the commonly mentioned issues were not addressed in this descriptive study. Therefore, the absence of questions which was related to the surgeons' procedure choice for themselves, may be accepted as a limitation of this study. We did not assess the relationship between flexible endoscopy experience and attitude about SILS.

CONCLUSION

Our results indicate that educated surgeons performed more SILS and advanced SILS and SILS-performing surgeons performed more advanced laparoscopic procedures. It seems that there was no significant factor affecting Turkish surgeons' preference of surgical approach, but their personal desire of being able to perform advanced laparoscopic procedures and education level are of utmost importance. Although most of the SILS-performing surgeons were educated, non-educated surgeons expressed to perform SILS and advanced SILS procedures in their daily practice. From this aspect, it seems that, most of the surgeons who performs SILS, does this surgery for personal achievement and satisfaction. On the other hand, most of the surgeons who did not perform SILS were not interested to do so and considered it unnecessary. Also, the need for special equipment and training were expressed as dominant barriers.

It seems that Turkish surgeons' perception about performing SILS was more related with their education level, personal achievement, and satisfaction.

Ethics Committee Approval: As our study was designed to uncover surgeons's perception and experience about SILS, and it was not contained any information about patients we have not taken ethics committee approval.

Peer-review: Externally peer-reviewed.

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Survey 1. Questionnaire form

Turkish surgeons' experiences and perception about single-incision laparoscopic surgery

- 1) Age:
- 2) Sex:
 Male Female
- 3) Please indicate your surgical experience (years):
 <6 years 6-15 years >15 years
- 4) Which type of hospital you are working at?
 University hospital
 Education and research hospital
 Private university hospital
 State hospital
 Private hospital
- 5) Which is your academic degree?
 Professor
 Associate professor
 Assistant professor
 Assistant professor in education and research hospital
 General surgery specialist
- 6) Please indicate your performance about total number of surgeries in last year:
 <200 200-400 >400
- 7) Please indicate your laparoscopic surgery experience (years):
 <6 6-15 >15
- 8) Please indicate your performance about total number of laparoscopic surgeries in last year:
 <100 100-200 >200
- 9) Please indicate your performance about total number of advanced laparoscopic surgeries in last year:
 <50 50-100 >100
- 10) Please indicate your education level about single-incision laparoscopic surgery:
 I have no education
 I have joined SILS operation/s as an observer
 I have joined SILS simulation workshop
 I have joined animal operation course as an operator
- 11) Please indicate your total number of single-incision laparoscopic surgery procedures:
 <50 50-100 >100
- 12) Please indicate your total number of advanced single-incision laparoscopic surgery procedures:
 <50 50-100 >50
- 13) Please indicate the reason of not performing single-incision laparoscopic surgery
 I did not desire to do
 I think it is unnecessary
 Could be dangerous for the patients
 I have never requested to perform single-incision laparoscopic surgery by a patient
 Because of, the need for special equipment
 Because of, longer operation times
- 14) Please indicate the barrier to performing single-incision laparoscopic surgery
 The need for special equipment
 I was not trained
 Bad surgical position and ergonomics
 Lack of standardized operation techniques
- 15) Please indicate the reason of performing single-incision laparoscopic surgery
 To be able to perform advanced laparoscopic surgery
 To be able to perform advanced laparoscopic surgery and for cosmetic benefits for the patients
 For cosmetic benefits and decreased postoperative pain
 For patients' request