

Population perception of surgical approach in minimally invasive surgery

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Abstract

Introduction: The aim of this study was to better understand the impact that public opinion might have on surgical approaches in urologic minimally invasive surgery (MIS).

Methods: We collected surveys from 400 participants, including the general population ($n = 220$) and paramedical staff ($n = 180$). Participants were anonymous. The survey included 16 questions on the characteristics and preference for the surgical approach if a urologic MIS were performed on them.

Results: The responders preferred the transumbilical approach (57.0%) to the subcostal approach (43.0%). In particular, the preference for a transumbilical approach was significantly higher in females (65.1% vs. 49.3%, $p = 0.0014$). Similarly, when participants were divided into two groups (<50 years and ≥ 50 years), the preference for the transumbilical approach was significantly higher in the younger group (60.8% vs. 48.0%, $p = 0.0187$). Logistic regression analysis revealed that preference for this approach was about 2 times more likely to rise in the females ($p = 0.032$).

Conclusions: Preference for the transumbilical approach was significantly higher young female respondents. This patient subset most values the cosmetic benefits of transumbilical approach in urologic MIS.

Introduction

In recent years, there has been a paradigm shift in the field of minimally invasive surgery (MIS), as laparoscopy progresses toward scarless techniques.¹ Since the initial report of urologic laparoendoscopic single-site (LESS) surgery in 2007,² the number of LESS surgeries has substantially increased. Over the last few years, there has been increasing enthusiasm and interest in this novel MIS technique.³ This surgery has been done for various urologic diseases, and studies of prospective outcomes indicate less pain, shorter hospital stays, and excellent cosmetic outcomes.⁴⁻⁹

Evaluation of LESS surgery cosmesis has largely involved subjective operator assessment with objective evaluations limited by small sample sizes^{3,10-13} and evaluation as a secondary endpoint.^{14,15} Also, with regard to LESS adrenalectomy (LESS-A), the cosmesis outcome was largely based on the transumbilical approach rather than the subcostal approach. Performing LESS-A through an umbilical access can be extremely challenging due to the approach angle and the difficulty in retracting organs. Nevertheless, the cosmesis outcome in subcostal LESS-A has been rarely reported.¹

Evaluation of patient perception and interest for MIS at this time would have allowed the surgical community to control its improvement and diffusion and enable safer evolution from open surgery to MIS.¹⁶ If LESS appears to be a desirable alternative to current surgical procedures, surgeons will need to learn and adopt these techniques early.¹⁷ Therefore, LESS surgery will be performed much more in the near future, so we need to know which approach patients would prefer: transumbilical or subcostal. Having learned from the laparoscopic revolution that patients' demand may be one major trigger for surgical evolution,¹⁸ we wanted to understand the impact public opinion might have on surgical decisions. To do so, we surveyed the general population and paramedical staff.

Methods

The questionnaire developed by one of the authors (SI), included age, sex, profession, body mass index (BMI), experience of prior surgery, and preference for the surgical approach if urologic MIS were performed on them. No pictures of the surgical wound were presented and no information about risks, advantages, or scientific knowledge of both the transumbilical and subcostal approach was presented.

The study was a cross-sectional survey of urological MIS preferred by the general population and paramedical staff. Paramedical staff responders consisted of nurses from Hiroshima University Hospital. We offered participants the

opportunity to complete an anonymous 16-question survey in Japanese. They were sent the survey by mail. The participants were allowed to complete the questionnaire and return it later.

Data were analyzed using the chi-square test. Each analysis was two-tailed, and a p value <0.05 was considered statistically significant. To evaluate the preference of surgical approach in the urological MIS, the logistic regression model was applied. Analyses were done using JMP version 10 statistical software package (SAS Institute Inc., Cary, NC).

Results

Surveys were collected from 400 participants, including the general population ($n = 220$) and paramedical staff ($n = 180$). The mean age of participants was 35 (range: 21-63) (Table 1).

If urologic MIS were performed on them, over half of respondents preferred the transumbilical (57.0%) to the subcostal approach (43.0%). In particular, preference for the transumbilical approach in urologic MIS was significantly higher in females (65.1% vs. 49.3%, $p = 0.0014$). Similarly, when participants were divided into 2 groups of younger (<50 years) and older (≥ 50 years) participants, preference for the transumbilical approach was significantly higher in the younger group (60.8% vs. 48.0%, $p = 0.0187$). When the participants were divided into 2 groups based on BMI value and history of prior abdominal surgery, there were no significant differences in surgical preference between groups (Table 2).

Interestingly, if urologic MIS was performed on them, respondents were most concerned about the transumbilical approach. They were concerned about umbilical pain

(75.3%), umbilical deformity (75.0%), and the resistance to transumbilical approach (59.8%). There were significantly higher concerns about umbilical pain, deformity and resistance to the transumbilical approach in participants with a preference for the subcostal approach (Table 3).

To clarify which patients were best suited for the transumbilical approach, we performed a multivariate analysis. Logistic regression analysis revealed that preference for the transumbilical approach is about 2 times more likely to rise in females ($p = 0.032$, odds ratio = 1.749, 95% confidence interval 1.050 to 2.928) (Table 4).

Discussion

As with laparoscopic surgery, the advancements of MIS are largely a patient-driven process. The rapid introduction and spread of laparoscopic cholecystectomy has been driven largely public demand.¹⁹ Medical scientists and clinicians often do not consider the impact of public opinion on their practice;^{20,21} therefore medical practitioners need to know and understand patient preferences, concerns, and demands.¹⁷

This survey showed that most potential patients had a lower preference for the transumbilical approach for a visceral operation provided the risk was non-significant compared with conventional laparoscopy or natural orifice transluminal endoscopic surgery (NOTES). The most common position for access in LESS surgery has been the umbilicus for its cosmetic benefits. The frequency of the scarless surgical approach may be due to the societal importance of cosmesis, body image, and surgical safety.¹⁷

Previous publications have raised the cosmetic advantages of the LESS approach without objectively studying cosmesis outcomes.^{3,10-13} There are no validated studies reporting

Table 1. Study population

Characteristics	No. patients	%
Total	400	
Age, year		
<50	250	62.5
≥ 50	123	30.8
Sex		
Male	205	51.3
Female	195	48.7
BMI, kg/m ²		
<25	272	68.0
≥ 25	70	17.5
Prior abdominal surgery		
No	342	85.5
Yes	40	10.0
Occupation		
General population	220	55.0
Paramedical staff	180	45.0

BMI: body mass index.

Table 2. Preference for surgical approach

Characteristics	Transumbilical approach		Subcostal approach		p value
Total	228	57.0	172	43.0	
Age, year					
<50	152	60.8	98	39.2	0.0187
≥ 50	59	48.0	64	52.0	
Sex					
Male	101	49.3	104	50.7	0.0014
Female	127	65.1	68	34.9	
BMI, kg/m ²					
<25	158	58.0	114	42.0	0.2236
≥ 25	35	50.0	35	50.0	
Prior abdominal surgery					
No	198	57.9	144	42.0	0.5139
Yes	21	52.5	19	47.5	

BMI: body mass index.

Table 3. Participant concerns about transumbilical approach

Concerns	Transumbilical approach		Subcostal approach		p value
	No. patients	%	No. patients	%	
Total	228		172		
Feeling umbilical pain	158	69.3	143	83.1	0.0015
Feeling umbilical deformity	151	66.2	149	86.6	<0.0001
Resistance to transumbilical approach	101	44.3	138	80.2	<0.0001

levels of patient satisfaction with their scar after abdominal surgery.²² Alternatively, Park and colleagues published a study in which they comprehensively evaluated and compared cosmesis outcomes in urologic patients who underwent kidney surgery by LESS, conventional laparoscopic surgery (CLS), and open surgical approaches. They found that urologic patients favoured LESS cosmesis outcomes over those for CLS or open surgery.²³ We found no significant differences in satisfaction or cosmesis score between the LESS-A and conventional laparoscopic adrenalectomy (CLA) groups in our previous study.¹ However, in young and female patients, the satisfaction scores were significantly higher in the LESS group than in the conventional group. This result suggests that as young and female patients were less satisfied with CLA and would prefer a novel procedure, they may be ideal candidates for LESS-A.¹

On the other hand, performing LESS-A through an umbilical access is extremely challenging due to the angle of approach and the difficulty in retracting organs. Furthermore, because the distance from the access port to the target tissue is longer in the transumbilical approach than in the subcostal approach, the direction in the transumbilical approach becomes more tangential in LESS-A. In fact, as the target area of dissection becomes more cranial, the difficulty of dissection using the transumbilical approach increases substantially. This raises the unanswered question of whether the subcostal approach for LESS-A provides more benefits and greater safety than the transumbilical approach.¹ However, we do not regard cosmesis as more important than the safety in urologic MIS.

This study is the first to investigate public perception of the transumbilical approach of urologic MIS in the Japanese people. Importantly, our results suggested that more than 40% of the respondents did not prefer the transumbilical to

the subcostal approach. Why? The reason may be that the transumbilical approach raised concerns, such as umbilical pain and deformity in almost all participants if urologic MIS were to be performed with this approach.

Our study has its limitations. First, our research sample size was small. Second, we only included the general population and paramedical staff; the inclusion of various participants, such as patients and other medical staff, would have been more comprehensive. Finally, the survey was not evaluated for validity or reliability. Despite these limitations, we believe that our findings provide valuable insight into the preference for the transumbilical approach. A further prospective study with more participants will be needed to further evaluate and confirm these findings.

Conclusion

Our results showed that the all participants did not necessarily prefer transumbilical approach in urologic MIS because they worried about umbilical pain and deformity postoperatively. However, in the female and younger group, preference for the transumbilical approach was significantly higher; this population subset most values the cosmetic benefits of transumbilical approach in urologic MIS.

Competing interests: Authors declare no competing financial or personal interests.

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Table 4. Multivariate analysis to identify the contributing factors to preference for transumbilical approach

Variables	SE	p value	OR	95%CI
Age, years <50	0.124	0.136	1.446	0.426–1.124
Sex: Female	0.131	0.032	1.749	1.050–2.928
BMI, kg/m ² : <25	0.152	0.714	1.118	0.492–1.622
No prior abdominal surgery	0.185	0.667	1.172	0.564–2.424

BMI: body mass index; SE: standard error; OR: odds ratio; CI: confidence interval.

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