

Patients' Knowledge and Perceptions of Morcellation

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ABSTRACT

Background and Objectives: Morcellation has received increased media and professional attention, but it remains unclear how much the average patient knows about this topic. We sought to evaluate patients' knowledge of morcellation, assess their perceptions of the risks and benefits, and determine how these perceptions affect their decision regarding the route of surgery.

Methods: Anonymous paper surveys were administered to 500 patients attending gynecologic appointments at the University of Michigan. Survey questions gathered demographic information and assessed knowledge of various surgical approaches for hysterectomy and myomectomy. Questions regarding patients' knowledge of morcellation explored various types of morcellation and the risks and benefits of this procedure.

Results: Of the 500 surveys administered, 396 patients answered at least 1 survey question resulting in a response rate of 79.2%. The mean \pm SD age of respondents was 47.0 ± 14.1 years, 80.8% were white, and 83.1% had completed some college. Only 8.3% of patients reported that they had ever heard of morcellation. Even among women who were actively considering a hysterectomy or myomectomy ($n = 33$) or those who had undergone a hysterectomy or myomectomy ($n = 98$), only 12.1 and 7.1%, respectively, had heard of morcellation. Of those who had heard of morcellation ($n = 32$), only 9.4% correctly identified the definition in a multiple-choice ques-

tion. Only 4.0% of women would choose an abdominal approach to avoid morcellation.

Conclusions: Patients have very little knowledge about morcellation and most patients have never heard of the procedure. Very few patients would refuse morcellation and opt for an abdominal surgery instead.

Key Words: Abdominal hysterectomy, Laparoscopic hysterectomy, Morcellation, Myomectomy, Patient knowledge.

INTRODUCTION

Media scrutiny of electromechanical morcellation started after the technique was reported to have led to dissemination of an occult leiomyosarcoma during hysterectomy for presumed leiomyomata. Subsequent United States Food and Drug Administration (FDA) safety warnings were issued in April and November 2014, discouraging the use of laparoscopic power morcellation.^{1,2} In addition to the popular media attention, the morcellation debate has been a common topic of discussion among gynecologic surgeons performing minimally invasive procedures, resulting in more published articles and commentaries, e-mail notifications from professional organizations, and presentations at national and international conferences. Practice patterns have changed as a result of this controversy, including a decline in the use of power morcellation and an increased use of laparotomy.³⁻⁵

It remains unclear how much the average patient knows about morcellation, the sources and accuracy of this information, and how patients' decisions regarding hysterectomy and myomectomy are affected by this level of knowledge. In a survey of AAGL Advancing Minimally Invasive Gynecologic Surgery Worldwide and the American College of Obstetricians and Gynecologists Collaborative Ambulatory Research Network (ACOG CARN) members, 74.6% of physicians reported that 50% or less of their patients had heard about the FDA warnings against power morcellation.⁵ However, this was an estimate made by providers and not a direct assessment of patient knowledge. Further characterization of patient knowledge regarding morcellation is needed to optimize patient counseling and education.

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Disclosures: none reported.

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DOI: 10.4293/JSLS.2017.00009

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Our objectives were to evaluate patient knowledge of morcellation. We also sought to assess patient perceptions of the risks and benefits of morcellation and determine how this affects decisions regarding route of hysterectomy or myomectomy.

METHODS

Anonymous paper surveys were administered to a convenience sample of 500 patients attending gynecologic appointments at the University of Michigan from January 22, 2015, through February 20, 2015. Surveys were distributed to patients at check-in and completed before they were evaluated by a physician. All participants were evaluated at the main hospital in Ann Arbor, Michigan; no satellite sites participated. Patients who answered at least 1 question in the survey were included in the analysis. Exclusion criteria included patients unable to complete a written survey in English, those less than 18 years of age, and those presenting for an obstetric indication. The University of Michigan Institutional Review Board provided "not regulated" status to this study (HUM00096384).

The survey collected basic demographic information including age, race, ethnicity, marital status, level of education, and employment status. Survey questions then assessed whether patients had ever heard of morcellation or undergone hysterectomy or myomectomy. Respondents were asked to quantify their knowledge of morcellation and to identify the source of their knowledge. Respon-

dents answered multiple-choice questions regarding the definition of morcellation and the risks and benefits of the procedure. Incorrect answers for the multiple-choice questions were based on misperceptions patients had expressed in our clinics. Finally, patients answered questions regarding their preferred method of hysterectomy and whether concerns about morcellation affected their preference.

Using the Health Belief Model (HBM) framework, patients were asked about their perceived susceptibility to complications of morcellation, perceived severity of potential complications, and perceived benefits of morcellation (Figure 1). HBM was first developed in the 1950s and used by the United States Public Health Service to assess the failure of screening programs for tuberculosis. This model has subsequently been used to predict a wide variety of health-related behaviors.^{6,7} Respondents were asked to use a Likert scale to respond to 2 statements about perceived susceptibility to the complications, perceived severity of complications, and perceived benefits of morcellation. Response options included "strongly disagree," "disagree," "neutral," "agree," and "strongly agree." Statements assessing perceived susceptibility to complications of morcellation included: "If I were to undergo surgery with morcellation, there is a good possibility that I will have a complication," and "I worry a lot about complications from morcellation." Statements assessing perceived severity of morcellation complications

Please use the following scale to indicate how much you agree with the following statements. Please circle your answer.

Strongly Disagree Disagree Neutral Agree Strongly Agree
 1 2 3 4 5

If I were to undergo surgery with morcellation, there is a good possibility that I will have a complication.	1	2	3	4	5
I worry a lot about complications from morcellation.	1	2	3	4	5
Problems that I would experience from morcellation would last a long time.	1	2	3	4	5
If I had a complication from morcellation, my whole life would change.	1	2	3	4	5
Having a hysterectomy or myomectomy with morcellation will prevent future problems for me.	1	2	3	4	5
I have a lot to gain by undergoing a hysterectomy or myomectomy with morcellation.	1	2	3	4	5

Figure 1. Assessment of perceived susceptibility to and severity of potential complications and perceived benefits of morcellation using the HBM.

Table 1.
Demographics

Characteristic	All Respondents (N = 396)	Women Who Had Heard of Morcellation (n = 32)	Women Had Not Heard of Morcellation (n = 364)	P
Mean age ± SD (years)	47.0 ± 14.1	48.9 ± 12.1	47.4 ± 15.2	0.582
Race				0.763
White or Caucasian	320 (80.8)	28 (87.5)	292 (80.2)	
Black or African American	37 (9.3)	2 (6.3)	35 (9.6)	
Asian	7 (1.8)	0	7 (1.9)	
American Indian or Alaskan Native	3 (0.8)	0	3 (0.8)	
Native Hawaiian or Pacific Islander	0	0	0	
More than one race	11 (2.8)	0	11 (3.0)	
Other	13 (3.3)	1 (3.1)	12 (3.3)	
Not answered	5 (1.3)	1 (3.1)	4 (1.1)	
Marital status				0.394
Single	75 (18.9)	5 (15.6)	70 (19.2)	
Married	246 (62.1)	22 (68.8)	224 (61.5)	
Cohabiting	15 (3.8)	1 (3.1)	14 (3.9)	
Divorced/separated	43 (10.9)	2 (6.3)	41 (11.3)	
Widowed	11 (2.8)	1 (3.1)	10 (2.8)	
Other	2 (0.5)	1 (3.1)	1 (0.3)	
Not answered	4 (1.0)	0	4 (1.1)	
Highest level of education				0.050
Less than high school	7 (1.8)	0	7 (1.9)	
Completed high school or GED	55 (13.9)	2 (6.3)	53 (14.6)	
Some college or 2 year degree	127 (32.1)	9 (28.1)	118 (32.4)	
Completed 4 year college degree	97 (24.5)	5 (15.6)	92 (25.3)	
Graduate/profession school	105 (26.5)	16 (50.0)	89 (24.5)	
Not answered	5 (1.3)	0	5 (1.4)	
Reason for gynecology appointment*				
Irregular menstrual periods	73 (18.4)	7 (21.9)	66 (18.1)	0.601
Heavy menstrual periods	72 (18.1)	9 (28.1)	63 (17.3)	0.128
Bleeding between menstrual periods	36 (9.1)	5 (15.6)	31 (8.5)	0.180
Uterine fibroids	38 (9.6)	4 (12.5)	34 (9.3)	0.561
Pelvic pain or discomfort	99 (25.0)	8 (25.0)	91 (25.0)	1.0
Endometriosis	38 (9.6)	1 (3.1)	37 (10.2)	0.195
Adenomyosis (glands in the uterine muscle)	4 (1.0)	0	4 (1.1)	0.551
Uterine, ovarian, endometrial or cervical cancer	3 (0.8)	0	3 (0.8)	0.606
Infertility (difficulty becoming pregnant)	13 (3.3)	0	13 (3.6)	0.277
Other medical problem	128 (32.3)	11 (34.4)	117 (32.1)	0.796
Not answered	120 (30.3)	9 (28.1)	111 (30.5)	0.780

Unless otherwise indicated, data are expressed as n (% of the study group).

*Patients could select more than 1 answer.

Have you ever heard of a procedure called morcellation?

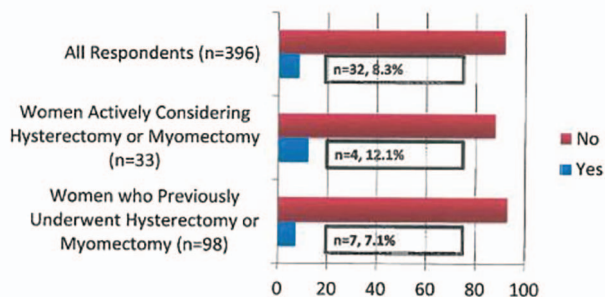


Figure 2. Responses to the question, “have you ever heard of morcellation?”

included: “Problems that I would experience from morcellation would last a long time,” and “If I had a complication from morcellation my whole life would change.” Statements assessing perceived benefits of morcellation included: “Having a hysterectomy or myomectomy with morcellation will prevent future problems for me,” and “I have a lot to gain by undergoing a hysterectomy or myomectomy with morcellation.” Susceptibility, severity, and benefits scores were calculated by assigning 1 point for each “agree” or “strongly agree” answer. The maximum score was 2 within each category.

Data were reported descriptively. Differences between continuous variables were assessed with the 2-sided *t* test, and differences between categorical variables were assessed with the χ^2 test. *P* < .05 was considered statistically significant. Data analyses were performed with STATA 13.0 (StataCorp, College Station, Texas, USA) and SAS 9.4 (SAS Institute, Cary, North Carolina, USA).

RESULTS

A total of 396 eligible patients answered at least 1 survey question, resulting in a response rate of 79.2%. One patient was excluded for being younger than 18 years. The demographic characteristics of respondents are listed in **Table 1**. The mean age was 47 years, 80.8% were Caucasian, and 83.1% had completed at least some college. The most common reasons patients attended a gynecology appointment were pelvic pain or discomfort (n = 99; 25%), irregular menstrual periods (n = 73; 18.4%), and heavy menstrual periods (n = 72; 18.1%). Women who answered in the affirmative when asked if they had heard of morcellation were more likely to be more educated.

As shown in **Figure 2**, only 8.3% (32/396) of all respondents had ever heard of morcellation. This number was slightly higher (4/33; 12.1%) for women actively considering hysterectomy or myomectomy and was lower (7/98; 7.1%) for women who had undergone hysterectomy or myomectomy. Power morcellation was first used in gynecologic procedures at our hospital in 1999, and the practice became increasingly common nationally over the next decade. Knowledge of morcellation was not significantly different between those who underwent the procedure before 1999 (3/42; 7.1%) and those who had the procedure after 1999 (4/56; 7.3%, *P* > .99).

Among women who had heard of morcellation, the most common sources of information were a healthcare provider (37.5%) or newspaper (37.5%) followed by television/radio (33.3%), Internet (25%), and friend/family (6.3%). No one listed a pamphlet as a source of knowledge about morcellation.

As shown in **Figure 3**, only 12.5% of the respondents who had heard of morcellation characterized their knowledge as “very good” or “excellent.” The respondents’ self-evaluation of their knowledge about morcellation was low, consistent with their incorrect answers to basic questions about morcellation. The multiple-choice questions addressing the definition of morcellation and the risks and benefits associated with the procedure are listed in **Figure 4**. Of the women who had heard of morcellation, only 15.6% identified one of the correct definitions of the procedure. Correct answers to the multiple-choice question included “removing tissue by using a knife or scalpel to cut it into smaller pieces” or “removing tissue by using a power tool to cut it into long strips.” Only 9.4% were able to identify both correct answers. Women who reported they had never heard of morcel-

How would you describe your knowledge of morcellation?

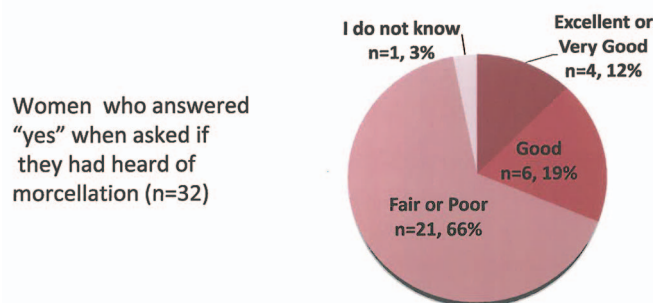


Figure 3. Responses to the questions, “how would you describe your knowledge of morcellation?”

What is morcellation? Please select ALL of the correct answers:

- Removing tissue by using radiation to make it disintegrate
- Removing tissue through the vagina
- Removing tissue by using a knife or scalpel to cut it into smaller pieces
- Removing tissue by using a power tool to cut it into long strips
- Removing tissue by burning it
- I do not know what morcellation is

What are the benefits of morcellation? Please select ALL of the correct answers:

- Doctors get paid more if they use morcellation
- Faster surgery
- Technically easier for your doctor
- Surgery can be performed with smaller incisions

What are the risks of morcellation? Please select ALL of the correct answers:

- Morcellation can spread cancer around the abdomen.
- Morcellation can stretch the vagina and cause prolapse (vagina falling down).
- Morcellation can cause increased postoperative pain due to smoke exposure from burning tissue.
- Morcellation can leave benign (non-cancerous) tissue in the abdomen that can continue to grow.
- Morcellation can cause damage to other organs like the bowel or bladder.
- Morcellation can increase the risk of cancer in the future due to radiation exposure.
- I do not know the risks of morcellation.

Figure 4. Multiple-choice questions addressing the definition of morcellation and the risks and benefits associated with this procedure.

lation (n = 364) were also asked to choose a definition of morcellation and only 2 (0.5%) chose one of the correct definitions. Most responded that “they did not know” (301/364, 82.7%), but others chose incorrect answers including removing tissue through the vagina (22/364, 6.0%), removing tissue by burning it (15/364, 4.1%), or removing tissue by using radiation to make it disintegrate (11/364, 3.0%). A total of 29 women (8.0%) did not answer this question.

Women who had heard of morcellation were more knowledgeable about the risks and benefits of the procedure than those who had not heard of it; 75% were able to correctly identify at least one of the risks of morcellation, including “morcellation can spread cancer around the abdomen,” “morcellation can leave benign (noncancerous) tissue in the abdomen that can continue to grow” or “morcellation can cause damage to other organs like the bowel or bladder.” However, only 12.5% were able to identify all 3 risks correctly. The majority of patients who had heard of morcellation (84.4%) were also able to correctly identify its benefit: “surgery can be performed with smaller incisions.” However there are clearly many misperceptions about the benefits of this procedure, as 40.6% chose at least 1 of the wrong answers: “doctors get paid more if they use morcellation,” “faster surgery,” or “technically easier for a doctor to complete your surgery.”

Unlike morcellation, the benefits of laparoscopic surgery were well known in our gynecologic patient population. As shown in **Table 2**, more than 55% of all patients correctly identified that laparoscopic surgery is associated with smaller incisions, lower blood loss, and shorter hospital stays. **Table 3** depicts the answers when patients were asked their most preferred method of hysterectomy. For those who had heard of morcellation, 62.5% stated that their most preferred route of hysterectomy was either laparoscopic or vaginal. For those who were considering a hysterectomy or myomectomy, 60.6% preferred either a vaginal or laparoscopic approach. No patients in either of these subgroups desired an abdominal approach and only 2% of all respondents stated that their preferred approach was abdominal.

As shown in **Table 4**, the perceived susceptibility to and severity of the complications of morcellation and the perceived benefits of morcellation were all low. This result was true when women who had heard of morcellation and women planning a hysterectomy or myomectomy were examined separately. However, the percentage who agreed or strongly agreed with both statements regarding perceived severity of morcellation complications was higher among women who had heard of morcellation (n = 11; 36.7%) versus those who had not heard of it (n = 13; 5.3%; $P < .001$).

Prior knowledge of morcellation appeared to influence patients’ preferred route of surgery. As shown in **Table 5**,

Table 2.

Patient Perceptions of and Knowledge about Abdominal Versus Laparoscopic Surgery

Response	Frequency
Risk of a <i>wound infection</i> is higher with an abdominal “open” surgery (single large incision) than a laparoscopic surgery (3–5 small incisions).	
True	227 (57.2)
False	21 (5.3)
Unsure	116 (29.3)
No response	32 (8.1)
Risk of <i>blood loss</i> is higher with an abdominal “open” surgery (single large incision) than a laparoscopic surgery (3–5 small incisions).	
True	236 (59.6)
False	15 (3.8)
Unsure	112 (28.3)
No response	33 (8.3)
Patients who have a laparoscopic hysterectomy or myomectomy (3–5 small incisions) usually spend <i>less time in the hospital</i> than patients who have an abdominal “open” surgery (single large incision).	
True	246 (62.2)
False	4 (1.0)
Unsure	114 (28.8)
No response	32 (8.1)

Data are presented as n (% of total respondents; N = 396).

25% of women who had heard of morcellation versus 2.2% of those who had not heard of it preferred a laparotomy to avoid the procedure ($P < .001$). Overall, a very small number of patients reported that they would prefer an abdominal approach to avoid morcellation: 3% of women considering hysterectomy or myomectomy and 4.0% of all respondents.

DISCUSSION

Minimally invasive gynecologic surgery providers have been inundated with the morcellation debate and information regarding the risks and benefits of this procedure and the alternatives to it. However, little is known about how much knowledge the average patient has regarding morcellation. This study demonstrated that knowledge of morcellation is not common among women seeking gynecologic care at our tertiary referral center. More than 90% of women had never heard of the procedure. Only 12.5% of women who had heard of the procedure self-

reported their knowledge to be “very good” or “excellent,” and only 9.4% could correctly identify the definition of morcellation in a multiple-choice question.

Women who had heard of morcellation were more likely to prefer an abdominal route to avoid it than were women who had not heard of it (25.0% vs 2.2%; $P < .001$). Given how limited patient knowledge of morcellation is, this decision may be a result of misinformation and misperceptions of risks and benefits. Only 4.0% of all respondents reported that they would prefer an abdominal approach to avoid morcellation. Of the women who reported they would prefer an abdominal approach, 50% had stated that they had never heard of morcellation. Thus, it is possible that these women became uncomfortable with the idea of morcellation after taking the survey and having to answer multiple questions about potential risks.

The most common sources of knowledge of morcellation are healthcare providers and the newspaper. This finding highlights the importance of comprehensive preoperative counseling and the impact physicians can have as educators. The 2014 FDA warnings also recommended that the risks and benefits of morcellation be thoroughly discussed with patients.

Using the HBM framework, the perceived susceptibility to and severity of complications of morcellation was low overall. However, the perceived benefits of morcellation were also low. The benefits of laparoscopy compared to laparotomy were well known, including lower risk of wound infection, less blood loss, and shorter hospital stays. It seems that patients do not necessarily understand that morcellation is used to maintain a laparoscopic approach in cases in which the uterus or fibroid is too large to be removed through small incisions.

The strengths of this study include a large number of respondents. Questions were diverse and structured to address the various types of morcellation and various aspects of the risks and benefits. However, the study has several limitations. It was conducted at a single tertiary care healthcare facility where the population may not be representative of other geographic regions, given such a high percentage of Caucasian respondents and respondents with a high level of education. We hypothesize that this survey may actually overestimate knowledge of morcellation as patients with lower levels of education would likely have less knowledge of the procedure. Furthermore, women with limited medical knowledge may have been reluctant to complete the survey at all. The response rate, especially with ques-

Table 3.
Preferred Method of Hysterectomy

Response	Women Who Had Heard of Morcellation (n = 32)	Women Considering Hysterectomy or Myomectomy (n = 33)	All Respondents (N = 396)
Abdominal	0	0	8 (2.0)
Laparoscopic	7 (21.9)	14 (42.4)	97 (24.5)
Vaginal	13 (40.6)	6 (18.2)	83 (21.0)
No preference	7 (21.9)	7 (21.2)	149 (37.6)
Not answered	5 (15.6)	6 (18.2)	59 (14.9)

Data are expressed as n (% of the study group).

tions at the conclusion of the survey, was low, with many patients selecting “I do not know” or simply skipping the question. However, we infer this is a result of a low level of knowledge, further supporting our primary conclusions. Our assessment of patient perceptions regarding the risks and benefits of morcellation is limited, given such a low level of baseline patient morcellation knowledge. This survey was a pilot study administered to a convenience sample of gynecology patients at a tertiary care facility. Only 33 respondents were actively considering hysterectomy. Further studies should target this group, as we suspect they are more likely to seek information about morcellation, and it is their level of knowledge we would want to address in preoperative counseling. Finally, this survey was not intended as education, and future research should evaluate how patient’s perceptions of risk and desired route of hysterectomy change after education regarding morcellation.

CONCLUSIONS

Despite significant media coverage and increased professional discussion, women seeking care in gynecology clinics have very little knowledge about morcellation. Only 8.3% of respondents had ever heard of this procedure. Most patients were able to identify the benefits of laparoscopic surgery, and very few patients would refuse morcellation and opt for abdominal surgery instead. Overall knowledge and understanding of the risks and benefits of morcellation is limited in women seeking gynecologic

care and this highlights the importance of comprehensive preoperative counseling.

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Table 4. Morcellation-Related Health Beliefs According to Knowledge of Morcellation and Surgical Plan

Response	Women Who Had Heard of Morcellation	Women Who Had Not Heard of Morcellation	P	Women Planning Hysterectomy or Myomectomy	Women Not Planning Hysterectomy or Myomectomy	P
Perceived susceptibility to complications from morcellation						
Respondents, n	30	251		22	259	
Agreed or strongly agreed with both statements (susceptibility score = 2)	1 (3.3)	7 (2.8)	0.381	0	8 (3.1)	0.186
Agreed or disagreed with one statement (susceptibility score = 1)	7 (23.3)	35 (13.9)		6 (27.3)	36 (13.9)	
Strongly disagreed, disagreed, or had a neutral response to both statements (susceptibility score = 0)	22 (73.3)	209 (83.3)		16 (72.7)	215 (83.0)	
Perceived severity of potential complications from morcellation						
Respondents, n	30	246		21	255	
Agreed or strongly agreed with both statements (severity score = 2)	11 (36.7)	13 (5.3)	<0.001	0	24 (9.4)	0.141
Agreed or disagreed with 1 statement (severity score = 1)	0	0		0	0	
Strongly disagreed, disagreed, or had a neutral response to both statements (severity score = 0)	19 (63.3)	233 (94.7)		21 (100.0)	231 (90.6)	
Perceived benefits of morcellation						
Respondents, n	30	250		21	259	
Agreed or strongly agreed with both statements (benefits score = 2)	3 (10.0)	11 (4.4)	0.362	2 (9.5)	12 (4.6)	0.356
Agreed or disagreed with one statement (benefits score = 1)	2 (6.7)	12 (4.8)		2 (9.5)	12 (4.6)	
Strongly disagreed, disagreed, or had a neutral response to both statements (benefits score = 0)	25 (83.3)	227 (90.8)		17 (81.0)	235 (90.7)	

Data are expressed as n (% of the study group). Only patients who answered the questions are included in each group of questions.

Table 5. Preference for Open Surgery With a Large Incision Over Laparoscopy With Morcellation*

Response	Women Who Had Heard of Morcellation	Women Who Had Heard of Morcellation	Women Who Had Not Heard of Morcellation	P	Women Planning Hysterectomy or Myomectomy	Women Not Planning Hysterectomy or Myomectomy	P	All Respondents
Respondents, n	32	364	33		363	396		
Yes	8 (25.0)	8 (2.2)	1 (3.0)	<0.001	15 (4.1)	16 (4.0)	0.984	
No	8 (25.0)	93 (25.6)	8 (24.2)		93 (25.6)	101 (25.5)		
Unsure	13 (40.6)	205 (56.3)	19 (57.6)		199 (54.8)	218 (55.1)		
No response	3 (9.4)	58 (15.9)	5 (15.2)		56 (15.4)	61 (15.4)		

Data presented as n (% entire study group). *Question: If morcellation were required for your surgery to be performed laparoscopically (3–5 small incisions on the abdomen), would you prefer an open surgery (one large incision on the abdomen) instead?