Original Article

Expert Consensus on the Management of Adenomyosis: A Modified Delphi Method Approach by the Taiwan Endometriosis Society

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Abstract

Objectives: To establish the expert opinions and consensus recommendations from the Taiwanese Endometriosis Society on managing adenomyosis.

Materials and Methods: This study employed a two-round modified Delphi method incorporating a national panel of expert gynecologists to form the consensus on managing adenomyosis. The first round of the Delphi procedure involved an expert panel from the board members to evaluate the relevance of each item. In the subsequent round of votes, gynecologists affiliated with the Taiwan Endometriosis Society participated and used a 5-point Likert scale to cast votes and approve each statement. The rating scales for each item of the key recommendations were analyzed for the distribution of degrees of agreement.

Results: The consensus for managing adenomyosis was developed, encompassing various aspects including imaging diagnosis, hormonal treatment, surgical treatment, noninvasive/minimally invasive treatment, infertility concerns, and obstetric considerations. In the first round of voting, all 25 recommendations received approval from the board members, advancing them to the second round. During the second round of voting, the majority of recommendations received either a "strongly agree" or "agree" response. There was divergence regarding the similarity of effectiveness in alleviating adenomyosis-related pain by either laparotomic or laparoscopic approaches (55% strongly agree or agree vs. 21% disagree or strongly disagree).

Conclusion: The Taiwan Endometriosis Society expert panel has established a set of consensus guidelines for the management of adenomyosis. There are diverging opinions among experts regarding the optimal surgical approaches for resection of adenomyosis.

Keywords: Adenomyosis, consensus, Delphi technique, endometriosis

Introduction

Endometriosis is one of the most common gynecologic conditions that affect around 10% of reproductive age women. According to the International Classification of Disease, Tenth Revision 2024, adenomyosis is defined as endometriosis of

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uterus. While the overall incidence of adenomyosis among women aged 16–60 years was approximately 1% based on a United States population-based study, the healthcare burden was significant as the majority of these patient required medical and surgical treatments.[1,2]

The complex and heterogeneous nature of adenomyosis presents a significant challenge for modern practitioners in its management. For example, adenomyosis has been classified into subgroups based on histological or morphological features, and the differences among these subtypes may have therapeutic implications.[3,4] In addition, addressing adenomyosis is crucial for achieving optimal reproductive outcomes, as it is associated with various obstetric and reproductive adverse outcomes. Despite the current lack of a universal practice guideline for managing adenomyosis, there is a clear need for the development of a treatment consensus that clinical practitioners can follow to optimize the management of affected patients. This is particularly important given the accumulating data that has been emerging regarding the various aspects of management of this complex condition. Against this background, the Taiwan Endometriosis Society has taken the initiative to gather the opinions of national gynecological experts, and this work aims to report on the resultant list of recommendations for the management of adenomyosis that has been developed through the collaborative efforts.

Materials and Methods

Study design, materials and participants

To develop a national consensus on the management of adenomyosis, a modified Delphi procedure was employed. Initially, the authors created a set of recommendations for managing adenomyosis based on the literature covering various aspects of clinical practice, such as imaging diagnosis, hormonal treatment, surgical treatment, noninvasive/minimally invasive treatment, infertility issues, and obstetric concerns. The initial versions of the recommended items were drafted by exploring and referencing existing published national, regional, and international guidelines. Specifically, the management guidelines for adenomyosis issued by the Society of Obstetricians and Gynecologists of Canada[5] and the Asian Society of Endometriosis and Adenomyosis were used as the primary references.[6]

In the first round of voting, a panel of expert gynecologists of board members assessed the relevance of each item. In the second round, gynecologists from the Taiwan Endometriosis Society used a 5-point Likert scale to cast votes and approve each statement, thereby forming the essential recommendation content of the consensus. The distribution of the questionnaire and the voting process were conducted online, and all the collected data were compiled and analyzed in a database.

First round of vote

In the initial round of the procedure, a total of 16 gynecologists from the diverse fields of gynecology, participated in the voting. Each expert was tasked with reviewing the recommendation statements and deciding whether to retain or discard them for the second round of voting. They were also given the opportunity to provide feedback on any necessary modifications to the statements. Furthermore, the experts had the freedom to propose any additional recommendations that they considered relevant and important to be included in the consensus. The authors incorporated the suggestions provided by the experts for the modifications, resulting in the final version of the recommendation statements, which were utilized for the second round of voting.

Second round of vote

In the second round, a group of expert gynecologists of various subspecialty from the Taiwan Endometriosis Society participated. The previously approved recommendation items from the first round were distributed among these gynecologists, who rated each item using a 5-point Likert scale. The scale ranged from "strongly agree" to "strongly disagree," with options of "agree," "no comment," and "disagree" in between. The degree of agreement among the experts was used to calculate the relevance of each statement based on the responses received from the questionnaire.

Statistical analyses

The results of the two voting sessions were tabulated. The first round of voting was presented with the percentage of agreement among the participants, while the second round of voting provided the median scores of the degree of agreement. The results were further stratified based on the subspecialties of the participants. The differences among the subspecialties of gynecologists were assessed using the Kruskal–Wallis test, and statistical significance was indicated for $P < 0.05$. The GRADE system was utilized to evaluate consensus items, categorizing recommendations as either "strong" or "conditional." A strong recommendation reflects the panel's confidence that the benefits of following the advice significantly outweigh any potential risks. In contrast, a conditional recommendation indicates that the panel believes the benefits probably exceed the drawbacks, but there is less certainty in this assessment.

Results

The voting took place from November 2023 to December 2023. Table 1 displays the recommendations items that were drafted by the authors and subsequently modified based on the feedback received during the first round of voting. In the initial round of

Tables 1: Selected recommendations after modification in the first round of voting (translated to English for the current study)

Items	Description	Grade of recommendation
0–0	For premenopausal women who are experiencing symptoms such as dysmenorrhea, pelvic pain, abnormal vaginal bleeding, or infertility, clinicians should consider the diagnosis of adenomyosis[7,8]	Strong
	Imaging diagnosis	
1–1	Transvaginal ultrasound is the first-line imaging tool for diagnosing adenomyosis[9]	Strong
1–2	If the ultrasound evaluation is inconclusive or there is suspicion of potential pelvic lesions, MRI should be considered as a second-line imaging tool for diagnosing adenomyosis[10]	Strong
1–3	In patients suspected of having adenomyosis, transvaginal ultrasound should be adopted to assess for typical features of adenomyosis, lesion location, local or diffuse involvement, presence of cystic lesions, affected layers of the uterine muscle, extent of the lesions, and lesion size[11]	Strong
1–4	The characteristic features of uterine adenomyosis as diagnosed by ultrasound include uterine enlargement, asymmetry of the myometrial layers, myometrial cysts, heterogeneous myometrium, sub-endometrial echogenic striation, irregular endometrial-myometrial interface, poor definition and thickening of the junctional zone, and the presence of the question mark sign[9,12]	Strong
1–5	For patients in whom transvaginal ultrasound is not suitable or in cases of significant uterine enlargement, abdominal ultrasound may be helpful in diagnosing adenomyosis[13]	Conditional
1–6	MRI is used to diagnose uterine adenomyosis primarily based on the presence of high-intensity myometrial cysts. Other criteria include a junctional zone thickness >12 mm, difference between the thinnest and thickest junctional zone >5 mm, and a junctional zone to myometrium ratio exceeding 40%[10,14,15]	Conditional
	Hormonal treatment	
2–0	For the majority of affected patients, pharmacological treatment is effective in relieving pain associated with adenomyosis[16,17]	Conditional
2–1	Combined oral contraceptives or low-dose estrogen-progestin combinations are known to have a certain degree of effectiveness in alleviating pain associated with adenomyosis[18,19]	Conditional
2–2	GnRH agonists are highly effective in relieving pain associated with adenomyosis. However, if significant menopausal symptoms occur during their use or if they are used for more than 6 months, appropriate add-back hormones should be administered[20,21]	Strong
2–3	Oral progestin therapy, such as dienogest, is known to be effective in relieving pain associated with adenomyosis[21-23]	Strong
2–4	The LNG-IUS is effective in treating pain and heavy menstrual bleeding associated with adenomyosis[19,24]	Strong
	Surgical treatment	
3–1	Adenomyomectomy is another effective treatment option for some symptomatic patients with adenomyosis[25-27]	Strong
3–2	Clinicions should counsel patients undergoing adenomyomectomy regarding the impact of the surgery on fertility and pregnancy. They should be informed about the potential increased risk of uterine rupture during pregnancy and the need for pre-labor cesarean delivery[28,29]	Strong
3–3	There is no significant difference in the efficacy of pain relief between laparoscopic and laparotomic surgery for the treatment of adenomyosis[30]	Conditional
3–4	Minimally-invasive surgery is a suitable treatment option for focal uterine adenomyosis, whereas a laparotomic approach is prioritized for treating diffuse adenomyosis[28,31]	Conditional
3–5	Hysterectomy is the most comprehensive treatment for adenomyosis and can effectively alleviate symptoms associated with the condition. For women who have completed their childbearing, after discussing the associated risks, benefits, and alternative treatments, hysterectomy can be offered as a treatment option[26]	Strong
	Noninvasive/minimally invasive treatment	
4–0	For women who desire pregnancy and are not suitable or unwilling to undergo long-term medical treatment, conservative surgical or interventional treatment can be considered for adenomyosis. These include procedures such as uterine artery embolization, HIFU, as well as thermal ablation like radiofrequency ablation and microwave ablation[32-36]	Conditional
	Infertility issues	
5–1	In cases of adenomyosis-related infertility that does not improve after attempting medical treatment, surgical removal of the adenomyotic lesions may be effective[25,37]	Conditional
5–2	Before the fresh embryo transfer, the use of GnRH agonists can be considered to increase the pregnancy rate[38,39]	Conditional
5–3	Before the frozen embryo transfer, the use of GnRH agonists can be considered to increase the pregnancy rate[40,41]	Conditional
	Obstetric concerns	
6–1	Adenomyosis has adverse effects on pregnancy, including a higher risk of miscarriage, preterm birth, fetal growth restriction, gestational hypertension, cesarean section, malpresentation, and postpartum hemorrhage[42,43]	Strong
6–2	Close monitoring is requried for pregnant women who have adenomyosis in order to detect and address any potential pregnancy complications[42,43]	Strong

Contd...

Tables 1: Contd...

Items	Description	Grade of recommendation
6–3	Even with the use of assisted reproductive techniques, adenomyosis is associated with lower clinical pregnancy rates and higher miscarriage rates[43,44]	Strong
6–4	Adenomyomectomy can be performed to enhance pregnancy outcomes. However, it is recommended to provide counseling to the patient regarding the potential complications related to the surgery, such as uterine rupture and placenta accreta[37,45]	Conditional

MRI: Magnetic resonance imaging, GnRH agonists: Gonadotropin-releasing hormone agonists, LNG-IUS: Levonorgestrel intrauterine system, HIFU: High-intensity focused ultrasound

Table 2: Percentages of approval for recommendation items and difference among sub-specialties of the first round of votes

Item	Numbers of agreement (%)	Sub-specialty			*P*
		Oncology (%)	Infertility (%)	General (%)	
0–0	93.75	100.00	90.00	100.00	0.741
1–1	100.00	100.00	100.00	100.00	1
1–2	100.00	100.00	100.00	100.00	1
1–3	100.00	100.00	100.00	100.00	1
1–4	100.00	100.00	100.00	100.00	1
1–5	93.75	75.00	100.00	100.00	0.223
1–6	93.75	100.00	90.00	100.00	0.741
2–0	87.50	75.00	90.00	100.00	0.651
2–1	75.00	75.00	70.00	100.00	0.687
2–2	100.00	100.00	100.00	100.00	1
2–3	93.75	75.00	100.00	100.00	0.223
2–4	93.75	100.00	90.00	100.00	0.741
3–1	100.00	100.00	100.00	100.00	1
3–2	100.00	100.00	100.00	100.00	1
3–3	75.00	50.00	80.00	100.00	0.368
3–4	93.75	100.00	90.00	100.00	0.741
3–5	100.00	100.00	100.00	100.00	1
4–0	75.00	75.00	70.00	100.00	0.687
5–1	100.00	100.00	100.00	100.00	1
5–2	87.50	100.00	80.00	100.00	0.526
5–3	100.00	100.00	100.00	100.00	1
6–1	100.00	100.00	100.00	100.00	1
6–2	93.75	75.00	100.00	100.00	0.223
6–3	100.00	100.00	100.00	100.00	1
6–4	100.00	100.00	100.00	100.00	1

Kruskal–Wallis test

voting, a total of 16 gynecologists participated, representing different disciplines. Out of the 16 participants, 4 (25%) were from the field of oncology, 10 (62.5%) specialized in infertility, and 2 (12.5%) were general gynecologists and obstetricians [Table 2]. The majority of items gained approval from over 75% of experts across all three subspecialties, and there was no significant difference in agreement percentages among the experts from each discipline. The lowest level of agreement, at 50%, was observed among gynecooncologists regarding the equal efficacy of pain relief between laparoscopic and laparotomic surgery for treating adenomyosis.

The second round of voting engaged a total of 34 gynecologists. The distribution of the degree of agreement among the participants for the recommendation items that were approved in the first round of voting is represented in Figure 1, and the corresponding median scores are displayed in Table 3. The majority of these items received a median score of four to five, indicating a high level of agreement among the participants. However, when considering the effects of pain relief through laparotomy or laparoscopic approaches for the surgical treatment of adenomyosis (item 3-3), 18% of experts voted "disagree" and 3% voted "strongly disagree," while 24% voted "agree" and 31% voted "strongly agree." There was no significant difference observed among the experts from different subspecialties regarding their level of agreement on all the recommended items. However, divergence of

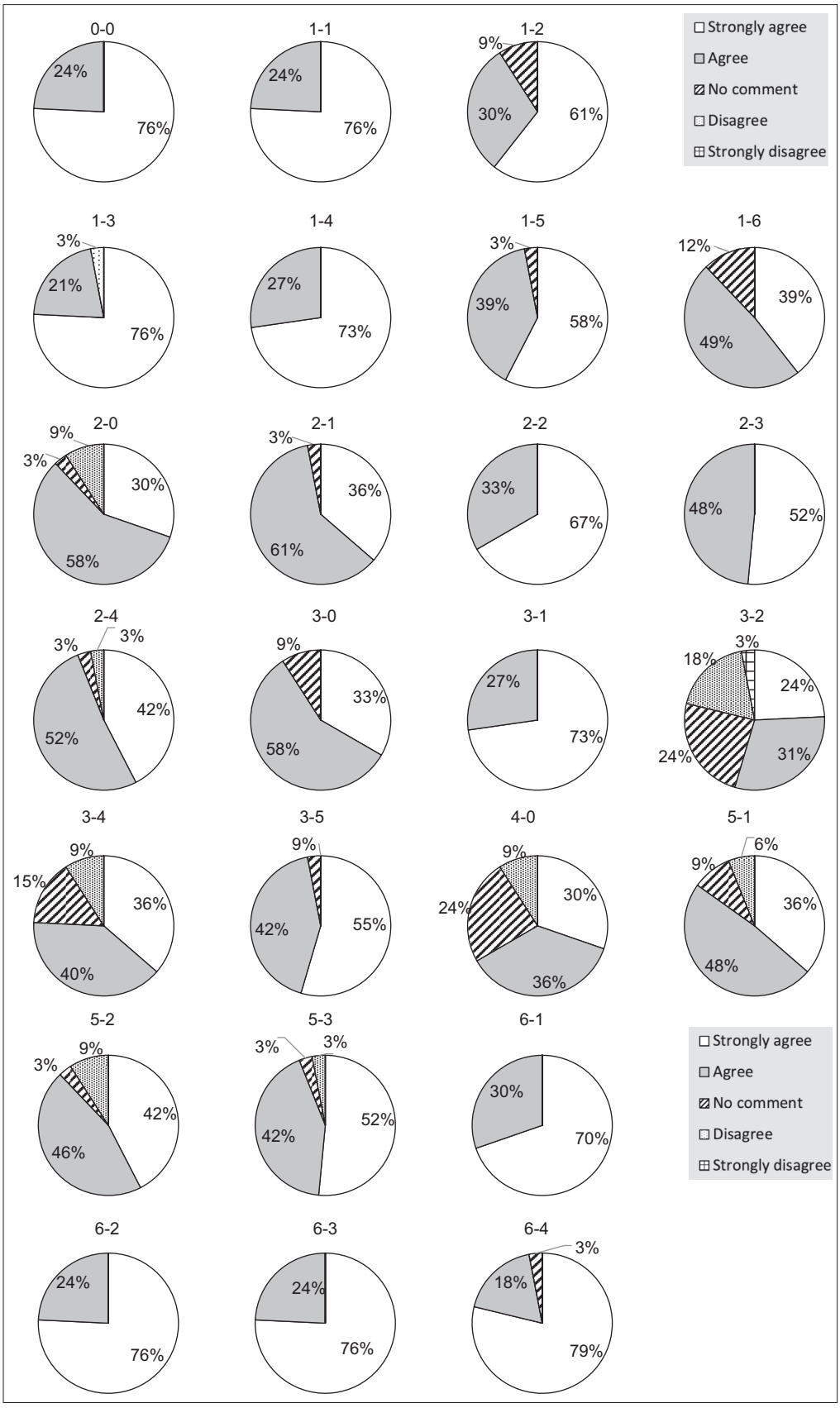

Figure 1: The circle chart depicted the percentages of participants in the second round of voting, indicating their degree of agreement with each recommendation item. The color white represented "strongly agree," gray represented "agree," slash pattern represented "no comments," dotted pattern represented "disagree," and grid pattern chart represented "strongly disagree"

Table 3: Scores for recommendation items and difference among sub-specialties of the second round of votes

Item	Median score (IQR)	Sub-specialty			*P*
		Oncology	Infertility	General	
0–0	5.0000 (1.00)	4.5000 (1.00)	5.0000 (1.00)	5.0000 (0.00)	0.153
1–1	5.0000 (1.00)	5.0000 (0.25)	5.0000 (1.00)	5.0000 (0.00)	0.177
1–2	5.0000 (1.00)	5.0000 (1.00)	4.5000 (1.00)	5.0000 (0.25)	0.265
1–3	5.0000 (1.00)	5.0000 (0.25)	5.0000 (1.00)	5.0000 (0.00)	0.175
1–4	5.0000 (1.00)	5.0000 (0.25)	5.0000 (1.00)	5.0000 (0.00)	0.120
1–5	5.0000 (1.00)	4.5000 (1.00)	4.0000 (1.00)	5.0000 (0.00)	0.063
1–6	4.0000 (1.00)	4.5000 (1.00)	4.0000 (1.00)	4.5000 (1.00)	0.358
2–0	4.0000 (1.00)	4.0000 (0.25)	4.0000 (1.00)	3.5000 (2.25)	0.118
2–1	4.0000 (1.00)	4.0000 (1.00)	4.0000 (1.00)	4.0000 (1.00)	0.986
2–2	5.0000 (1.00)	5.0000 (0.25)	5.0000 (1.00)	4.0000 (1.00)	0.173
2–3	4.5000 (1.00)	4.5000 (1.00)	4.5000 (1.00)	4.5000 (1.00)	0.992
2–4	4.0000 (1.00)	5.0000 (1.00)	4.0000 (1.00)	4.0000 (1.00)	0.358
3–1	4.0000 (1.00)	4.5000 (1.00)	4.0000 (1.00)	4.0000 (1.25)	0.471
3–2	5.0000 (1.00)	5.0000 (0.25)	5.0000 (1.00)	5.0000 (0.25)	0.495
3–3	4.0000 (1.25)	3.5000 (1.50)	4.0000 (2.00)	3.5000 (2.25)	0.860
3–4	4.0000 (1.25)	4.5000 (1.00)	4.0000 (1.00)	3.0000 (2.25)	0.067
3–5	5.0000 (1.00)	4.5000 (1.00)	4.0000 (1.00)	5.0000 (0.50)	0.471
4–0	4.0000 (2.00)	3.5000 (2.00)	4.0000 (2.00)	4.0000 (1.25)	0.961
5–1	4.0000 (1.00)	4.0000 (1.00)	4.0000 (1.00)	3.5000 (1.50)	0.193
5–2	4.0000 (1.00)	4.0000 (1.00)	4.0000 (1.00)	4.5000 (1.00)	0.837
5–3	5.0000 (1.00)	4.0000 (1.25)	5.0000 (1.00)	4.5000 (1.00)	0.470
6–1	5.0000 (1.00)	5.0000 (0.25)	5.0000 (1.00)	5.0000 (1.00)	0.666
6–2	5.0000 (1.00)	5.0000 (1.00)	5.0000 (1.00)	5.0000 (0.00)	0.279
6–3	5.0000 (1.00)	5.0000 (0.25)	5.0000 (1.00)	5.0000 (0.25)	0.641
6–4	5.0000 (0.25)	5.0000 (0.25)	5.0000 (1.00)	5.0000 (0.00)	0.248

Kruskal–Wallis test. IQR: Interquartile range

opinion arose about the surgical approach to focal or diffuse uterine adenomyosis (item 3–4). Despite the fact that 76% of participants chose "agree" or "strongly agree" regarding the recommendation item, 9% of participants disagreed with it. Specifically, the group of general gynecology, which included gynecological endoscopists, gave a median score of 3.0, which was lower than the oncology or infertility groups, when considering the prioritization of a laparotomy approach over a laparoscopic approach for diffuse adenomyosis. This difference in opinions did not reach statistical significance though.

Discussion

The current study revealed that the majority of committee members of our group were in agreement with the adopted description. The transvaginal ultrasound has been widely accepted as the primary imaging modality for diagnosing adenomyosis. While there have been various classifications of this heterogeneous condition in the literature, the International Morphological Uterus Sonographic Assessment group proposed a consensus terminology for describing the ultrasound features of adenomyosis in 2015,[46] which had been revised to elaborate the statement and definition of the agreed-upon features.[47] Regarding the pharmacological treatment of adenomyosis, the committee members generally reached a consensus that various types of hormonal treatment, such as combined oral contraceptives, oral progestin therapy, or gonadotropin-releasing hormone (GnRH) agonists, were effective in alleviating pain associated with adenomyosis. Even though evidence has been accumulating to support the use of these agents, comparative studies in future may be required to further understand the differences between these agents and determine which one is most suitable for specific circumstances considering that effective treatment may vary based on individual conditions.[48]

Some parts of disagreement and difference in the opinions from different subspecialties arise about the surgical approach to the management of adenomyosis. As a complex disease entity and sometimes technical challenges for gynecologists, various surgical techniques for cytoreductive surgery as part of uterus-sparing methods have been proposed.[28] Both laparotomic and laparoscopic methods have been reported to treat adenomyosis with the assessment of symptom relief and contraception outcomes in the literature. A previous study comparing laparotomic and laparoscopic approaches showed no significant difference in pain relief and recurrence

rate of dysmenorrhea.[30] As uterine rupture remains the most dreadful and focused issue of complications of uterus-sparing adenomyosis surgery, factors for uterine rupture after surgery of adenomyosis have been proposed, including methods of removing the lesions, extent of lesion resection, method of reconstruction, use of power instruments, and suture techniques.[28] Nevertheless, the long-term outcomes of various approaches are still limited to case series with scant concise evidence to guide the best approach. Currently, there is a lack of comparative studies examining the associated risks after laparotomic or laparoscopic adenomyomectomy. As a result, some experts may prefer a laparotomic approach for the resection of adenomyosis, particularly in cases with diffuse lesions. However, further evidence is needed to provide guidance on the optimal approach for this surgical procedure and the selection of patients based on their specific disease characteristics to determine the most suitable approach for each individual patient.

Analyzing surgical outcomes while considering individual surgical methods and the capabilities of the operators can be challenging, and it may introduce the biases when comparing different surgical approaches in terms of outcomes and complication rates. For instance, the prospective randomized Laparoscopic Approach to Cervical Cancer Trial assigned patients with early-stage cervical cancer to either open or minimally-invasive radical hysterectomy, and it concluded that the latter was associated with lower rates of disease-free survival and overall survival.[49] However, concerns have been raised about relying solely on the experience of certain institution to guide clinical practice.[50] In addition, reported techniques as part of a modified minimally invasive approach may address the concerns regarding suboptimal outcomes that could be attributed to improper execution of the minimally invasive procedure.[51] Hence, it is understandable that there may be difference in opinion regarding the outcomes of laparoscopic and laparotomic approaches to adenomyosis surgery. This difference was evident in the second round of voting in our study, where gynecological endoscopists were less inclined to support the notion that the laparotomy approach is preferable for managing diffuse adenomyosis.

To enhance the success rates of *in vitro* fertilization (IVF), the committee members agreed that surgical removal of the adenomyosis lesions has been suggested as an option for patients who cannot achieve a successful pregnancy through medical treatment alone. In addition, the majority of experts on the committee agreed that there the use of GnRH agonists before embryo transfer may be considered to increase the pregnancy rates in IVF treatment.[25,52]

The impact of adenomyosis on obstetric outcomes has significant clinical implications, including increased rates of miscarriage and obstetric complications.[53] The committee members of the current study agreed with these findings and emphasized the need for more intensive monitoring of these obstetric complications in individuals with adenomyosis or those who have undergone surgical intervention for this condition.

In conclusion, the expert panel of the Taiwan Endometriosis Society has developed a comprehensive set of consensus guidelines for managing adenomyosis in a two-step modified Delphi procedure. There are differing views among specialists about the most effective surgical methods for resecting adenomyosis and their therapeutic effects.

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Author contributions

M.H.W. conceived and designed the study, Taiwan Endometriosis Society Adenomyosis Consensus Group acquired the data, M.H.W. and C.F.Y. analysed and interpretated the data, C.W.L and H.Z.O. drafted the manuscript; M.H.W. and C.F.Y. revised the manuscript critically. All authors have read and agreed to the final version of the manuscript.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflicts of interest

Dr. Chih-Feng Yen , an editorial board member at *Gynecology and Minimally Invasive Therapy*, had no role in the peer review process of or decision to publish this article. The other authors declared no conflicts of interest in writing this paper.

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