Review article

Evidence-based guidelines for vaginal hysterectomy of the International Society for Gynecologic Endoscopy (ISGE)

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A B S T R A C T

Objective: This project was established by the International Society for Gynecologic Endoscopy (ISGE) to provide evidence-based recommendations on the selection of women in whom vaginal hysterectomy can be safely performed.  
Study design: The ISGE Task Force for vaginal hysterectomy for non-prolapsed uterus defined key clinical questions that led the literature search and formulation of recommendations. The search included Medline/PubMed and Cochrane Database. English language articles were reviewed from January 2003 to January 2018, in conjunction with reviews published by the American College of Obstetricians and Gynecologists (ACOG) and the American Association of Gynecologic Laparoscopists (AAGL). The bibliographies of selected works were also checked to acquire additional data where relevant. The available information was graded by the level of evidence using the approach developed by the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Working Group. For each clinical question, the ISGE recommendations were defined in accordance with the evidence quality.  
Results: Six recommendations on patient selection for vaginal hysterectomy, including two grade 1B and four grade 2B recommendations were established.  
Conclusion: Vaginal hysterectomy for non-prolapsed uterus is the treatment of choice for many gynaecological patients in whom hysterectomy can be indicated. It may be safely executed, and thus, should be offered to a large group of appropriately selected women, who today are operated in the main by the abdominal or laparoscopic approach. All efforts should be directed towards teaching the technique of vaginal hysterectomy during residency.
Introduction

Hysterectomy is one of the most common operative procedures for benign uterine diseases [1]. It can be performed abdominally, vaginally, or laparoscopically, with or without robotic assistance. The advantages provided by vaginal hysterectomy (VH), laparoscopic-assisted vaginal hysterectomy (LAVH), and laparoscopic hysterectomy (LH) over abdominal hysterectomy (AH) include less postoperative pain, less need of analgesia, shorter hospital stay, and more rapid recovery and return to daily activities [2–6]. Additionally, there are fewer intra-operative and postoperative complications reported with vaginal hysterectomy as compared with abdominal hysterectomy (AH) or laparoscopic hysterectomy (LH) [7–9]. AH for benign uterine conditions remains the chosen route worldwide. This preference is largely due to a lack of experience in VH, resulting in the surgeon’s reluctance to perform VH, especially in patients without uterine prolapse, with uterine fibroids, previous caesarean sections, previous laparotomies, as well as in nulliparous women. Correctly challenging these contraindications may lay the foundation for implementing different approaches towards an increased number of VHs [10–13].

 Globally, the rate of LH has been shown to be increasing, without a significant reduction in AHs. Seventy to 80% of hysterectomies have been shown to be carried out via the abdominal approach, according to all large-scale surveys, except when treating uterovaginal prolapse, for which the vaginal route is generally preferred. This latter indication accounts for about 10% of all hysterectomies conducted worldwide [14]. This increase in LH has thus been incurred at the expense of VH while, ideally, it is the VH rate that should increase at the expense of the AH rate. This decrease in the rate of VH is demonstrated clearly in Australia, where the rates of VH have dropped between 2001 and 2015 by 53% in younger patients and 29% in the older age group [15]. Nigeria demonstrated a further decrease in VH, where the vaginal route was utilised in approximately 12% of hysterectomies performed in a teaching university hospital. In Norway, the preferred route of hysterectomy has changed in favour of LH, where the number of VHs have decreased to below 10%, mainly performed for utero-vaginal prolapse [16]. It is a common perception that the decreasing VH rate, which came about as a consequence of the dependence on LH, may be at least partially attributed to the impact of the industry that manufactures and promotes the laparoscopic equipment.

A lack of adequate training offered in VH is also of relevance in new generations of gynaecologists performing total laparoscopic hysterectomy (TLH) in patients who may have otherwise undergone an uncomplicated VH. In a study performed in the USA in 2011, by Antosh et al., only 41.7% of residents reported VH as their preferred route of hysterectomy, as compared to 47.1% who preferred laparoscopic approaches [17]. Lee and King, considering the difficulties in teaching both LH and VH during residency, have suggested that TLH represent the new gold standard in minimally invasive approaches for hysterectomy, while the professional societies, such as the American College of Obstetricians and Gynaecologists (ACOG) and the American Association of Gyneco-logic Laparoscopists (AAGL), have been encouraged to direct more resources to promote education in and practice of LH if a substantial decrease in AH is truly our primary goal (http://www.contemporaryobgyn.net/modern-medicine-feature-articles/vaginal-versus-laparoscopic-hysterectomy). However, this highlights a fundamental problem currently facing clinical gynaecology, namely insufficient VH training/practice due to the inadequate experience of junior trainers in VH, and the consequent lack of appreciation of the benefits afforded by VH.

VH for the non-prolapsed uterus is an appropriate alternative for a large group of women who are predominantly operated upon via LH or AH today. The International Society for Gynaecologic Endoscopy (ISGE) was motivated to carry out this endeavour to establish evidence-based recommendations on the selection of women for VH.

Materials and methods

The ISGE Task Force for vaginal hysterectomy for the non-prolapsed uterus defined key clinical questions (Panel 1), which led to the literature search from Medline/PubMed and the Cochrane Database. English language articles, both original works and previous reviews (published from January 2003 to January 2018, with the bibliographies of selected works checked to identify additional references and relevant data), were analysed in conjunction with reviews/guidelines published by the ACOG and AAGL. The available information was graded by the level of evidence, using the GRADE approach, proposed and developed by the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) Working Group (http://www.gradeworkinggroup.org) (Table 1). In accordance with the evidence quality, the recommendations were established for each clinical question. No Ethical Committee approval was required for this work.

Literature review and recommendations

Most hysterectomies are performed for benign indications such as symptomatic uterine fibroids, abnormal uterine bleeding, endometriosis, and prolapse. The hysterectomy rates differ considerably among countries [18]. Almost 30% of women in the USA are submitted to the procedure by the age of 60 years, while the hysterectomy rates in developing countries are lower (https://www.medscape.com/viewarticle/712569). In the USA, almost 600,000 hysterectomies are performed yearly for benign disease. In 2007, Wu et al., reported on hysterectomy rates in the USA for the year 2003, and found that the abdominal route was the most common (56.1%), followed by vaginal (21.8%) and laparoscopic (11.8%) routes [19].

Panel 1. Vaginal hysterectomy – key clinical questions.

| Question 1: Which route of hysterectomy should be considered as the first choice in women undergoing hysterectomy for benign indications? |
| Question 2: Should nulliparity, absence of utero-vaginal prolapse, uterine fibroid(s), previous caesarean section, premalignant cervical and/or premalignant endometrial disease be considered as contraindications to vaginal hysterectomy? |
| Question 3: Which factors should be considered prerequisites for a successful vaginal hysterectomy? |
| Question 4: In women without adnexal disease and who are not at an increased risk for cancer, should routine removal of the ovaries and fallopian tubes be recommended during vaginal hysterectomy? |
The introduction of robotics has changed the rates in favour of robotic hysterectomy (RH) with a further decline not only in VH but also in conventional LH [15,20]. Recent findings in the USA hospitals, where robotics have been introduced, have indicated that the use of abdominal hysterectomy has declined from 66.1% in 2003 to 54.2% by 2010. The use of VH declined throughout, from 24.8% in 1998 to 16.7% in 2010. Use of LH increased to a peak of 15.5% of cases in 2006, and then declined to 8.6% of procedures in 2010, whereas use of RH increased from 0.9% in 2008 to 8.2% in 2010 [20]. Robotics do not truly make a difference in increasing the ratio of VH and conventional LH in favour of AH, as evidenced by the fact that the latter remained at a constant 64% nationwide in the USA in 2009 [21].

**Comparison of different approaches to hysterectomy**

Currently available evidence indicates that minimally invasive procedures, including VH and LAVH/LH/RH, should be the preferred route of hysterectomy, as they offer the same benefits, and avoid large and painful abdominal incisions that are needed for AH. Additionally, longer hospital stay and a delay in returning to daily activities are also avoided [2,5,22,23]. Specifically, the 2009 Cochrane review found that VH, as compared to AH, is associated with a shorter hospital stay, the ability of the patient to resume normal daily activities more quickly, and fewer infections and episodes of raised temperature after surgery [2]. LH, as compared to AH, has the same advantages as VH. While there was less blood loss and fewer wound infections in LH, as compared to AH, LH took longer and was associated with a greater risk of damaging the ureter or the bladder [2]. No differences were found between LH and VH with regards to their benefits. However, when compared to VH, LH takes 39.3 min longer than VH, on average, and is associated with a higher rate of complications [2]. Fewer complications have been associated with VH, when comparing this method of hysterectomy to all other routes. In 2015, a further Cochrane review by Aarts et al. confirmed the findings of Nieboer et al. regarding the advantages of VH over the other routes of hysterectomy, including RH [2,22]. He found that RH presented no difference in outcomes when compared to conventional LH, beneficial or otherwise. Thus, both Cochrane reviews concluded that VH should be considered the first choice for hysterectomy in the treatment of benign conditions (Grade: 1B).

The 2009 ACOG guidelines on choosing the route of hysterectomy for benign disease state that, when feasible, VH is the safest and most cost-effective route by which to remove the uterus [23]. LH is an alternative to AH for those women in whom a VH is not indicated or possible [23]. The AAGL adopted the statement advising that surgeons without requisite training and skills required for the safe performance of VH or LH should enlist the aid of colleagues who do, or should refer patients requiring hysterectomy to such individuals for their surgical care [24].

In June 2017, the ACOG confirmed their 2009 statement defending VH as the route of choice wherever feasible. This statement was based upon data collected over the course of almost a decade, which indicated that VH was associated with better postoperative outcomes when compared with other approaches to hysterectomy (https://www.acog.org/-/media/Committee-Opinions/Committee-on-Gynecologic-Practice/co701.pdf?dmc=1&ts=20170702T0930167819). It was concluded that LH serves as a preferable alternative to open AH for patients in whom VH is contraindicated or not feasible (Grade2B). Through their analysis of the data captured, the ACOG found that the introduction of RH lead to a decrease in both LH and a VH, VH in particular had decreased from 25% in 1998 to 17% in 2010.

The evidence-based formal guidelines for the preferred route of hysterectomy have been largely neglected by surgeons, and as such, the choice for hysterectomy is usually based on subjective preferences rather than standardised selection criteria for the

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**Table 1**

Grading of recommendations and quality of supporting evidence.

<table>
<thead>
<tr>
<th>Grade of recommendation</th>
<th>Risk/benefit</th>
<th>Quality of supporting evidence</th>
</tr>
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<tbody>
<tr>
<td>1A. Strong recommendation, high quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.</td>
</tr>
<tr>
<td>1B. Strong recommendation, moderate quality evidence</td>
<td>Benefits clearly outweigh risk and burdens, or vice versa.</td>
<td>Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.</td>
</tr>
<tr>
<td>1C. Strong recommendation, low quality evidence</td>
<td>Benefits appear to outweigh risk and burdens, or vice versa.</td>
<td>Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.</td>
</tr>
<tr>
<td>2A. Weak recommendation, high quality evidence</td>
<td>Benefits closely balanced with risks and burdens.</td>
<td>Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.</td>
</tr>
<tr>
<td>2B. Weak recommendation, moderate quality evidence</td>
<td>Benefits closely balanced with risks and burdens, some uncertainty in the estimates of benefits, risks and burdens.</td>
<td>Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.</td>
</tr>
<tr>
<td>2C. Weak recommendation, low quality evidence</td>
<td>Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens.</td>
<td>Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.</td>
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With conditions appropriate prerequisites, con...
conservation during VH should therefore be undertaken routinely (Grade 2B) [36].

The success of removing ovaries and Fallopian tubes vaginally varies greatly, and is reported to range between 77% and 915% [36-39]. Once VH is performed, a moistened pack is gently placed in the pelvis to prevent bowel from obscuring visualization. The transected tube and utero-ovarian ligament are pulled medially into the field until the round ligament is visualised. The round ligament is then clamped, cut and ligated. This allows further descent of the tubo-ovarian pedicle into the field, which can be clamped just above the superior tip of the ovary and then ligated [40]. If there is initial uncertainty surrounding the success in removing the ovaries vaginally, laparoscopic-assisted vaginal hysterectomy (LAVH) should be employed first. Similarly, if a problem arises in removing the ovaries and the tubes during a VH, then laparoscopic assistance should be used to complete the surgery (Grade: 2B). In certain circumstance, such laparoscopic skills may not be easily obtained.

An algorithm for women undergoing hysterectomy for benign indications is shown in Fig. 1. A summary of ISGE recommendations for VH are presented below, in Panel 2.

Reflection

Minimally invasive approaches to hysterectomy are preferable options, based on their well-documented advantages over AH. When VH, the first line approach, is not indicated or feasible, the surgeon should choose between LH or open AH. LH is a preferable alternative in these settings. The 2015 Cochrane review concluded that RH demonstrates no significant advantage over conventional LH [7]. However, in cases where the uterine pathology precludes minimally invasive approaches, the importance of AH becomes apparent. AH also serves as an important alternative if LH or VH fail intra-operatively. Thus, while these guidelines strongly motivate for the increase in VH training, it does not aim to dismiss the importance of LH and AH, where their use is appropriate.

The clinician should assess cases by a focussed history, physical examination, and pelvic ultrasound with transvaginal probe before deciding which route of hysterectomy will most safely facilitate removal of the uterus and optimize patient outcomes, taking into account also the clinical situation (Fig.1), and surgeon training and experience. As the most highly recommended route of hysterectomy, VH should be considered a priority among procedures to be learned by residents. Trainee gynaecologists need to be helped by Program Directors to navigate between Senior Gynaecologists with different skill mix, in learning the performance of VH.

It is essential to revive the use of VH as it is safer, more economical, and has rapid recovery rates and fewer complications among all the routes of hysterectomy. It can be expected that reducing the prevalence of LAVH will prompt the surgeon to become more proficient in VH, and to recognise that laparoscopic assistance is only necessary in specific cases.

Conclusion

VH should be considered the ideal surgical approach when hysterectomy for benign uterine disease is undertaken. The guidelines proposed here provide suggestions that the majority of patients and clinicians would consider following. Their implementation can lead to a decrease of hysterectomies performed abdominally and a significant increase in hysterectomies performed vaginally, which may be achieved without an inappropriate increase in laparoscopic hysterectomy. Clinical judgement is needed for these suggestions, as physicians must evaluate the particular needs and expectations of each patient to arrive at the best management decision for each individual case.
Conflict of interest

The authors declare no conflict of interest.

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References