



# Use of 3D ultrasound in the hysteroscopic management of Asherman syndrome

Jose Carugno<sup>1</sup>, Antonio Simone Laganà<sup>2</sup>, Salvatore Giovanni Vitale<sup>3</sup>

<sup>1</sup>Department of Obstetrics, Gynecology and Reproductive Science, Minimally Invasive Gynecology Division, University of Miami, Miller School of Medicine, Miami, FL, USA; <sup>2</sup>Department of Obstetrics and Gynecology, “Filippo Del Ponte” Hospital, University of Insubria, Varese, Italy; <sup>3</sup>Unit of Gynecology and Obstetrics, Department of General Surgery and Medical Surgical Specialties, University of Catania, Catania, Italy

*Correspondence to:* Jose Carugno. Department of Obstetrics, Gynecology and Reproductive Sciences, Minimally Invasive Gynecology Division, University of Miami, Miller School of Medicine, 1321 NW 14th Street Suite 201, 33136, Miami, FL, USA. Email: jac209@med.miami.edu.

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One of the most challenging clinical conditions that the gynecologist encounters in clinical practice is the management of patients with intrauterine adhesions (IUAs). The presence of IUAs were initially described by Heinrich Fritsch in 1894 (1). It was not only until 1948 when Joseph Asherman described the association of structural amenorrhea with inactive endometrium due to stenosis of the internal cervical OS. He then published his landmark paper in 1950 entitled “*Traumatic intra-uterine adhesions*” (2) describing uterine adhesions causing obliteration of the intra-uterine cavity, generating the consequent amenorrhea naming this entity as Asherman’s Syndrome. The term “Asherman’s syndrome” and “intrauterine adhesions” are often used interchangeable to refer to the presence of intrauterine synechiae, although the syndrome requires the association of amenorrhea and infertility in the presence of IUAs. Several other terms such as uterine atresia, endometrial sclerosis and traumatic uterine atrophy are also frequently used to describe this clinical entity (3).

IUAs develop following endometrial trauma to the basalis layer of the endometrium, frequently caused by curettage or infection and occasionally because a combination of both (4,5). However, multiple other procedures such as cesarean section, myomectomy (especially of submucous myomas), hysteroplasty in cases of Müllerian anomalies, or inflammatory processes such as genital tuberculosis may

lead to IUAs.

Common clinical symptoms of patients with IUAs are decreased menstrual flow (hypomenorrhea) up to amenorrhea, infertility, cyclic pelvic pain, recurrent pregnancy loss, preterm labor and abnormal placentation such as placenta accreta among other obstetrical complications (6).

The incidence of this complex pathology is difficult to estimate. Gilman *et al.* reported a 15% incidence of IUA after suction curettage (7). A very similar prevalence was also found in a systematic review and meta-analysis that reported 19% of IUAs in patients who had curettage after spontaneous abortion (8).

The diagnosis is frequently initially suspected by the clinical symptoms. Imaging methods used for the diagnosis of IUAs include ultrasound (US), sonohysterography (SHG), hysterosalpingography (HSG) and magnetic resonance imaging (MRI). However, it must be confirmed with hysteroscopy that is considered the gold standard for diagnosis of IUAs (9).

There are multiple different classification systems that have been proposed to classify the severity of the disease. The most commonly used system is the one proposed by the American Society of Reproductive Medicine (ASRM) that classify the severity on IUAs based on the extent of the cavity involvement, the type of adhesions, and the menstrual

**Table 1** American Society for Reproductive Medicine (ASRM) intrauterine adhesions classification

Condition			
Cavity involvement	<1/3 (1 point)	1/3 to 2/3 (2 points)	>2/3 (4 points)
Type of adhesion	Filmy (1 point)	Filmy and dense (2 points)	Dense (4 points)
Menstrual pattern	Normal (0 point)	Hypomenorrhea (2 points)	Amenorrhea (4 points)

Mild (Stage 1): 1–4 points; Moderate (Stage 2): 5–8 points; Severe (Stage 3): 9–12 points.

pattern (*Table 1*). It assigns points to each finding and classifies the condition as mild, moderate or severe based on the assigned score (10). It is a good classification system, however when used in clinical practice, it does not correlate with clinical prognosis (9).

Although, diagnostic hysteroscopy is considered the gold standard for the diagnosis of IUAs allowing to determine not only the presence of IUAs but also the extent and type of adhesions, it also offer the additional benefit of immediate treatment. However, hysteroscopy is not without disadvantages, especially when in the presence of severe disease in which case the risk of complications is high and the inability to access the uterine cavity render impossible its evaluation. In cases of severe adhesions that preclude the evaluation of the uterine cavity, the use of imaging modalities is the main alternative to facilitate the diagnosis. It is in this situation, in which the use of three-dimensional transvaginal ultrasound (3D-TVUS) has become a valuable tool allowing to use a high-frequency endocavitary ultrasound transducer in close proximity to the uterus improving the image resolution. Performing a preoperative evaluation of the uterine cavity using 3D-TVUS allows the surgeon to obtain a detailed map of the intrauterine cavity delineating the location of the obliterated areas as well as areas with functional endometrium facilitating the procedure.

Benefits of performing 3D US before proceeding with HA include:

- (I) clear determination of the size and contour of the uterus and ovaries, allowing to diagnose concomitant pathology such as adenomyosis, fibroids or ovarian pathology;
- (II) objective evaluation of the size of the uterine cavity including intercornual distance and isthmus to fundus distance;
- (III) identification of the presence of healthy endometrium in different segments of the uterine cavity.

Burjoo *et al.* (11) present a very interesting study that in a very elegant way demonstrate that preoperative

3D-TVUS evaluation helped the hysteroscopists with their intraoperative decision-making when performing HA. In comparison to those who did not have 3D-TVUS, those who underwent pre-procedure 3D-TVUS evaluation had a better surgical success rate in relation to the retrieval of fallopian tube ostia and the restoration of normal uterine cavity morphology. This study paves the way in the treatment of a complex disease remodeling the preoperative evaluation of the patient with IUAs that will then be used by the clinician intraoperative improving surgical outcomes.

Asherman syndrome has compelling reproductive implications for the affected individuals. 3D-TVUS not only provides useful information on the location and extent of the IUAs but also delineates areas of functional endometrium therefore facilitates the complex intrauterine adhesiolysis, decreasing complications, improving surgical outcomes and improving potential future fertility. Preoperative 3D-TVUS plays an important role in intraoperative judgment during hysteroscopic adhesiolysis. Consequences of adopting this practice on future fertility requires further investigation.

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## References

1. Dreisler E, Kjer JJ. Asherman's syndrome: current perspectives on diagnosis and management. *Int J Womens Health* 2019;11:191-8.
2. Asherman JG. Traumatic intra-uterine adhesions. *J Obstet Gynaecol Br Emp* 1950;57:892-6.
3. Tan IF, Robertson M. The role of imaging in the investigation of Asherman's syndrome. *Australas J Ultrasound Med* 2011;14:15-8.
4. Ahmadi F, Javam M. Role of 3D sonohysterography in the investigation of uterine synechiae/asherman's syndrome: pictorial assay. *J Med Imaging Radiat Oncol* 2014;58:199-202.
5. Zafarani F, Ahmadi F. Evaluation of intrauterine structural pathology by three-dimensional sonohysterography using an extended imaging method. *Int J Fertil Steril* 2013;7:1-6.
6. Schenker JG, Margalioth EJ. Intrauterine adhesions: an updated appraisal. *Fertil Steril* 1982;37:593-610.
7. Gilman AR, Dewar KM, Rhone SA, et al. Intrauterine Adhesions Following Miscarriage: Look and Learn. *J Obstet Gynaecol Can* 2016;38:453-7.
8. Hooker AB, Lemmers M, Thurkow AL, et al. Systematic review and meta-analysis of intrauterine adhesions after miscarriage: prevalence, risk factors and long-term reproductive outcome. *Hum Reprod Update* 2014;20:262-78.
9. Amin TN, Saridogan E, Jurkovic D. Ultrasound and intrauterine adhesions: a novel structured approach to diagnosis and management. *Ultrasound Obstet Gynecol* 2015;46:131-9.
10. Worldwide AAMIG. AAGL practice report: practice guidelines for management of intrauterine synechiae. *J Minim Invasive Gynecol* 2010;17:1-7.
11. Burjoo A, Zhao X, Zou L, et al. The role of preoperative 3D-ultrasound in intraoperative judgement for hysteroscopic adhesiolysis. *Ann Transl Med* 2020;8:55.

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