Hysterosalpingography VIRTUAL WITH TC, A NEW TECHNIQUE

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ABSTRACT:
Recent advances in reproductive medicine have created a demand for more imaging methods that are more accurate to identify the specific cause of female infertility and other gynecological disorders. Virtual hysterosalpingography (HSG-V) is a mode where the established technique of hysterosalpingography technology combined with multidetector computed tomography (CT) to allow a comprehensive evaluation and high precision, both the female reproductive system and pelvic anatomy in genera (1). Unlike ultrasound (US) and magnetic resonance imaging (MRI), multidetector CT is able to represent both the external and internal surfaces of the uterus, fallopian tubes and other pelvic organs, providing high-resolution data that are suitable for three-dimensional reconstructions and virtual endoscopic views. Thus, the HSG-V can be superior to other non-invasive assessment of tubal patency. Furthermore, compared with conventional hysterosalpingography, which may involve clamping cervical, HSG-V is painless. Because of the health risks associated with ionizing radiation, the use of another modality (RM and US), May be preferred if a focal lesion suspected uterine. However, the HSG-V CT can provide a diagnostic advantage in complex cases (2).

Keywords: virtual hysterosalpingography, female infertility

RESUMEN:
Los recientes avances en medicina reproductiva han generado la demanda de métodos de imagen que cada vez sean más precisos para la identificación de una causa específica de la infertilidad femenina y otros trastornos ginecológicos. La histerosalpingografía virtual (HSG-V) es una modalidad donde la histerosalpingografía convencional se combina con la tecnología de tomografía computarizada multidetector (TC), para permitir una evaluación integral y de alta precisión, tanto del sistema reproductor femenino como de la anatomía de la pelvis en general. A diferencia del ultrasonido (US) y la resonancia magnética (RM), la TC multidetector es capaz de representar tanto las superficies externas e internas del útero, las trompas de Falopio y otros órganos pélvicos, proporcionando datos de alta resolución que son adecuados para reconstrucciones bidimensionales, tridimensionales y endoscópica virtual. Así, la HSG-V puede llegar a ser superior a otras modalidades no invasivas.

Palabras clave: histerosalpingografía virtual, infertilidad femenina.

INTRODUCTION:
The virtual hysterosalpingography (HSG-V) is a tomographic technique for evaluating the uterus and fallopian tubes. The main clinical indication for this test is female infertility, other indications include recurrent spontaneous abortion, preoperative evaluation before myomectomy and postoperative assessment (1).

There are few published studies about the usefulness of this new technique in the evaluation of female reproductive tract has traditionally been assessed Hystersonography and HSG-C (2), so that the HSG-V is a diagnostic method recently described and proposed as one procedimentoque could be considered the first choice because it is minimally invasive, built on the foundations of the new-generation computed tomography, which have a high spatial resolution and scanning speed.

During the last decade, the development of multidetector CT technology with all its capabilities has revolutionized the study of the heart, colon, and airways so that the HSG-V is an application that combines these capabilities of multidetector CT with the established technique of hysterosalpingography to allow a comprehensive evaluation of the female reproductive system. The reconstruccionesbi-dimensional and virtual laendoscopia provides a detailed and high precision of the cervix, uterus, tubes and its anomalies and provides additional information about other pelvic structures.

The HSG-V podría be the diagnostic study of choice if female infertility, also having many other clinical indications (3).

Reproductive system abnormalities are of diverse origin, ranging from normal variants, congenital malformations up, without forgetting abnormalities acquired, some of which may be related to repeated abortions, or simply do not
have input on major cause of infertility, so it must be diagnosed accurately for proper treatment and even unnecessary surgery may be avoided (4).

An advantage of the HSG-V is its ability to evaluate the uterine wall and defining the outer contour of the uterus, making an accurate diagnosis of abnormalities in a single examination (6).

Normal fallopian tubes are so thin that they bypass the media representation ultrasound and conventional HSG, so that the HSG-V CT is considered the best method of image reconstruction capability to assess their permeability, not only may represent the tubal lumen and wall of the same but also allows virtual endoscopic navigation when dilated (5). When normal tubal patency, contrast material is seen freely leak into the peritoneal cavity and the fallopian tubes appear as thin smooth tubular structures with varying degrees of crookedness. Tubal occlusion and stenosis due to postoperative complications or abnormalities are common infections that are well represented in the HSG-V (9).

VIRTUAL hysterosalpingography TECHNIQUE (HSG-V)

It is similar to the conventional HSG. The difference is that it is a minimally invasive examination, cervical fixation need not and is not indicated for prophylactic antibiotics (4).

Contraindications:
The pregnancy, active pelvic infection and allergy to iodinated contrast media are absolute contraindications for this study.
The test must be performed on days 7-10 of the menstrual cycle and the patient should abstain from intercourse from the cessation of menstruation until the end of the test (5).

Procedure:
For the HSG-V, the patient should be positioned on the table gynecological deltomógrafo. First performed aseptic perineal and then covered with sterile drapes. We proceed to place the vaginal speculum (plastic disposable) to access the uterine cervix, which is also cleaned. The browser gets a view of the pelvis before the contrast material is introduced. Next, a plastic cannula 10 F is positioned in the cervical canal and 15 mL of iodinated contrast media (2.5 ml lopamiron diluted with 12.5 ml of saline) is instilled (preferably by using a power injector at a rate of 0.3 ml / sec.). Scanning is initiated 45 seconds after instillation in contrast and due llevarase out by using TC-multidetector least 16 rows (3).

Post-processing tools
To reconstruct the images and analyze are: multiplanar reformatting
The sagittal and coronal images are reconstructed with window settings to evaluate soft tissues of the uterus, fallopian tubes and extraterine structures. Images are reconstructed multiplanar curves to permit evaluation of the cervix, uterus and fallopian tubes in a single plane and continuous, this method allows a full assessment of their anatomy, avoiding the interposition between the structures. (Fig. 1) (2-3).

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Fig 2 MIP image of HSG-V provides an excellent representation of the fallopian tubes which appear permeable with adequate amount of contrast material.

**Volumen Rendering**
This reconstruction algorithm provides three-dimensional exterior view of the entire female reproductive system, which allows the detection of stenoses, uneven wall, polyps and hydrosalpinges (Fig. 3) (2-3).

Fig 3 Image Volume Rendering of HSG-V, showing normal structures of the cervix, uterus and fallopian tubes.

**Virtual Endoscopy**
This complements the three-dimensional volumetric intraluminal providing information similar to that obtained with hysteroscopy, this can allow the verification of the results questionable images being obtained with other methods of reconstruction (Fig. 4) (2-3).

Figure 4 Image of virtual endoscopy HSG-V, where endometrial polyps are observed in the fundus, and the entrance is evidenced tubes.

The technical artifacts are important factors to be taken into account so the air bubbles can be unintentionally introduced into the uterine cavity during HSG-V, which in conventional HSG, could be confused with filling defects due as polyps, blood clots or submucosal fibroids. HSG-V In filling these defects are Identified with a high degree of confidence (Fig. 5) (2-3).

Fig. 5 (A) air bubble in the HSG V, curved multiplanar image shows a round structure with hypoattenuation, (B), virtual endoscopic view showing the air bubble.

**Risks and complications of HSG-V:**
Generally the HSG-V is considered a very safe procedure but there are a number of known complications that can occur in less than 1% (2).

The problem may be more serious pelvic infection, this usually occurs before a previous infection of the fallopian tubes so retrograde that reaches the pelvic cavity spreading and even reaching complicated by sepsis (6).

Often the patient may feel dizzy during or immediately after the procedure, there is a possibility of small amounts of blood for one or two days later, caused by the placement of the probe.

In a few cases and previous history the patient may be allergic to iodinated contrast media in these patients may use other methods of study (U.S., MRI) (7).

**CONCLUSIONS:**

The new three-dimensional virtual imaging studies that have been developed in recent years are innovative tools in the field of medicine, and are intended to increase the diagnostic accuracy in certain pathologies (1).

The HSG-V with two-dimensional reconstructions, three-dimensional virtual navigation allows a comprehensive evaluation of the female reproductive system may become the only imaging test for diagnosis.

The use of multidetector CT is simple, relatively painless and well tolerated, it can be used with low-dose radiation. However, the resulting exposure of the patient to ionizing radiation is a relative disadvantage to be judged according to the risk-benefit. Cases in which suspected focal uterine injury, the use of other methods that do not involve ionizing radiation, may be adequate for diagnosis.

An accurate diagnosis can be achieved by correlating the imaging findings with clinical and surgical history of the patient.
The ability of the HSG-V to represent the uterine wall allows quick and easy detection of uterine growth, abnormal contour, and focal masses. Leiomyomas Subserosal and intramural, adenomyosis, and postoperative changes can be recognized with a high degree of accuracy (8).

HSG-V made multidetector CT is considered the best method of image reconstruction capability to assess the patency of the fallopian tubes may not only represent the tubal lumen and the wall of the same but also allows virtual navigation endoscopic within the fallopian when dilated.

Tubal occlusion and stenosis due to postoperative complications or infections are also common anomalies are well represented in the HSG-V.

Because the whole pelvis is scanned during HSG-V, uterus and tubal anatomy can be evaluated simultaneously. Ectopic incidental findings may include solid and cystic adnexal lesions, intestinal abnormalities, pelvic mass and bone abnormalities. Most of these findings have no clinical relevance, and only a small percentage require further diagnostic evaluation (7).

Conflict of Interest:
None reported by the authors

1. REFERENCES: