COMPARATIVE STUDY BETWEEN HYSTEROSALPINGOGRAPHY, SALINE INFUSION SONOHYSTEROGRAPHY AND OFFICE HYSTEROSCOPY IN EVALUATION OF UTERINE FACTORS OF INFERTILITY

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قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

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Abstract

Evaluation of the uterine cavity is mandatory when studying infertile patients. Likewise, assessment of the implantation site is an important step in the management of patients with diagnosed infertility, indeed uterine cavity pathologies such as fibroids, polyps and Müllerian anomalies can impair fertility and result in recurrent pregnancy loss and poor outcome of pregnancy. Thus, their detection and treatment are important in order to achieve therapeutic success.

The direct view of the uterine cavity through hysteroscopy offers a significant advantage over other diagnostic methods which offer only a blind or indirect view of the cavity.

Keywords:

Infertility

Hysterosalpingography

Sonohysterography

Office hysteroscopy

List of contents

List of abbreviations

AAGL	American Association of Gynecologic Laparoscopists
ACOG	American Congress of Obstetricians and Gynecologists
ART	Assisted Reproductive Technology
AS	Asherman's syndrome
ASRM	American Society of Reproductive Medicine
AUB	Abnormal uterine bleeding
D&C	Dilatation and Curettage
DES	Diethylstilbesterol
DH	Diagnostic hysteroscopy
FDA	Food and Drug Administration
GnRH	Gonadotropin-Releasing Hormone
HSG	Hysterosalpingography
ICSI	Intra cytoplasmic sperm injection
IUAs	Intrauterine adhesions
IUI	Intrauterine insemination
IVF	Invitro fertilization
LR	Lactated Ringer's Solution
MAC	Monitored Anaesthesia Care
MAP	Mean Arterial Pressure
NIC's	Normal Infertile Couples
NPV	Negative Predictive Value
NS	Normal Saline
NSAID	Nonsteroidal anti-inflammatory drugs
OD	Outer Diameter
OH / OHS	Office Hysteroscopy
PID	Pelvic Inflammatory Disease
PPV	Positive Predictive Value
SCHS	Saline contrast hysterosonography
SD	Standard deviation
SHG	Sonohysterography
SIN	Salpingitis isthmica nodosa
SIS	Saline Infusion Sonohysterography
TVS	Transvaginal Sonography
WL	Working Length
β-hCG	β-human Chorionic Gonadotropin

List of Tables

List of Figures

INTRODUCTION

One of the basic steps of an infertility workup is to evaluate the shape and regularity of the uterine cavity. Acquired uterine lesions, such as uterine fibroids, endometrial polyps, intrauterine adhesions, or all of these, may cause infertility by interfering with proper embryo implantation and growth. **(Brown et. al, 2000)**

In fact, infertility related to uterine cavity abnormalities has been estimated to be the causal factor in as many as 10% to 15% of couples seeking treatment. Moreover, abnormal uterine findings have been found in 34% to 62% of infertile women. (**Pansky et. al, 2006**).

Traditionally hysterosalpingography (HSG) has been the most commonly used technique in the evaluation of infertility. It gives reliable information about the patency and morphology of the fallopian tubes. It is also helpful in evaluating uterine cavity abnormalities. **(Roma et. al, 2004).**

Sonohysterography (SHG) is considered a simple, effective and well tolerated technique for enhanced transvaginal sonographic imaging of the endometrial cavity. The instillation of sterile saline into the uterine cavity via a fine catheter provides both a contrast medium and an expanding agent. So, Saline infusion sonohysterography can help to triage patients to (1) no anatomic pathology, (2) globally thickened anatomic pathology that may be evaluated with blind endometrial sampling, or (3) focal abnormalities that must be evaluated under direct vision ***(Goldstein, 2006)***.

Hysteroscopy is the gold standard for the investigation of uterine cavity, particularly when a pathology is suspected. It is a safe test for the direct and accurate diagnosis of intrauterine abnormalities. It permits direct visualization of the uterine cavity, revealing the nature, location, shape, size and vascular pattern of any uterine cavity abnormalities, such as polyps, submucosal fibroids, differences in endometrial thickness and adhesions. It also allows a directed biopsy and therapeutic intervention for the treatment of any pathology. Thus hysteroscopy is performed as a definitive diagnostic tool to evaluate any abnormality suspected on HSG, transvaginal ultrasound or SHG in routine investigation of infertile patients. **(De Placido et. al, 2007).**

Based on the results of the previous studies, it appears that more than 1/3 of the patients interpreted as normal following HSG are found to have a uterine abnormality after diagnostic hysteroscopy, which might be a significant cause of reproductive failure. These women may be wrongly treated, or unnecessarily investigated, while their intrauterine lesion has been missed. **(Shushan A et. al, 1999).**

AIM OF WORK

The aim of this work is to compare the findings of hysterosalpingography, saline infusion sonohysterography & office hysteroscopy in patients with suspected uterine causes of infertility.

Infertility

Infertility can be defined as the failure to achieve a pregnancy within one year of regular unprotected intercourse (Zegers et al., 2006).

The general time needed for having a pregnancy has been defined. Fecundability is the probability of achieving a pregnancy within one menstrual cycle while fecundity is the probability that single cycle will result in a live birth. The fecundability of a "normal" couple (<35 years) is approximately 25% (Sperrof et al., 2005).

The average chance for conception after periovulatory intercourse for a couple is about 25% in a given cycle, the probability increases to about 66% By 6 months, and after 1 year, 85% of couples trying to have a pregnancy will succeed.

Significant improvements in fertility diagnosis and, more importantly, in treatment have made it possible for many patients to conceive with medical assistance (Elizabeth and Terri, 2010), the success rates have markedly improved with the widespread use of assisted reproductive technologies. Treatment options and success vary with the cause of infertility. Approximately 15% to 30% of couples will be diagnosed with unexplained infertility after their diagnostic workup (Alexander and Anuja 2008).

The causes of infertility include abnormalities of any portion of the male or female reproductive system. A specific cause can be identified in approximately 80% of couples: one third of causes are due to female factors alone, one third to male factors alone, and one third to a combination of problems. "Unexplained" infertility, in which no specific cause is identified, occurs in approximately 20% of infertile couples (Whitman and Baxley, 2001). Couples with unknown etiology can be

categorized as normal infertile couples (NICs), indicating that all findings from standard tests used in the infertility workup are normal. In normal infertile couples, the actual cause for infertility cannot be detected; perhaps there is dysfunctional interaction between the sperm and the oocyte, poor quality of the embryo, or a disruption at the implantation site. In the future, identifying a mutation or the absence of a specific gene as the cause of infertility may be possible in this patient population. Other lifestyle factors that have been associated with an increased risk of infertility include environmental and occupational factors; toxic effects related to tobacco, marijuana, or other drugs; excessive exercise; inadequate diet associated with extreme weight loss or gain; and advanced age. (Elizabeth and Terri, 2010)

Female Factor:

Table (1): Causes of female factor of infertility

Ovulation disorders (40%)
-Aging
-Diminished ovarian reserve
-Endocrine disorder (e.g., hypothalamic amenorrhoea, , thyroid disease, adrenal disease)
-Polycystic ovarian syndrome
-Premature ovarian failure
-Tobacco use
Tubal factor (30%)
-Obstruction (e.g., history of pelvic inflammatory disease, Tubal surgery)

Endometriosis (15%) **Uterine/cervical factors (5-10%)** -Congenital uterine anomaly -Fibroids & Polyps -Uterine synechiae -Poor cervical mucus quantity/quality (caused by smoking, infection)
(Rowe et al., 1993; Adamson et al., 2003)

a) Uterine factor

Uterine factor infertility comprises only a small proportion of couples undergoing IVF [Wright VC et al.,2008]. Yet, it is a serious diagnosis because when it is recorded as the sole indication for IVF, it is accompanied by lower-than-average live birth rates [Pabuccu R et al.,1997].

The uterus supports the journey of spermatozoa from the cervix to the fallopian tube and performs the following roles:

- Retention of the zygote after arrival from the fallopian tube for several days before implantation.
- Provision of a suitable environment for implantation.
- Protection of the embryo/fetus from the external environment. (Coney et al., 1993)

The uterus is the final destination for the embryo and the place where the fetus develops until delivery. Therefore, uterine factors may be associated with primary infertility, secondary infertility or with pregnancy wastage and premature delivery. Uterine factors can be