

*The Role of Hysteroscopy Before IVF and
ICSI*

Essay

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By

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Abstract

The endoscopic techniques for diagnosis and treatment of several disease have gained importance in medicine especially over recent years, where the advantages lie in the direct optical judgment of the body cavities and frequently the possibility of surgical treatment during the same procedure.

This was the aim of hysteroscopy which had begun during its early history as a diagnostic and operative tool which was not accepted in routine gynaecology.

Key Words :

Invitro fertilization – Luteal Phase Support – Lutenizing hormone .

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"وَاللَّهُ خَلَقَكُمْ مِنْ تُرَابٍ ثُمَّ مِنْ نَظْفَةٍ ثُمَّ جَعَلَكُمْ
أَزْوَاجًا وَمَا تَحْمِلُ أَنْثَى وَلَا تَضَعُ إِلَّا بِعِلْمِهِ وَمَا
يَعْمُرُ مِنْ عَمْرٍ وَلَا يَنْقُصُ مِنْ عَمْرِهِ إِلَّا فِي
كِتَابٍ إِنَّ ذَلِكَ عَلَى اللَّهِ يَسِيرٌ"

صدق الله العظيم

سورة فاطر الآية ١١

توكلت على الله رب العالمين وبه نستعين

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*To
My Wife
And
My Family*

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List of Abbreviation

ASRM	American Society of Reproductive medicine
ART	Assisted reproductive technique
FSH	Follicular stimulating hormone
GnRH	Gonadotropine releasing hormone
HCG	Human chorionic Gonadotropine
HFEA	Human fertilization & embryology authority
HIV	Human Immun deficiency virus
ICSI	Intracytoplasmic sperm injection
IUI	Intrauterine insemination
IVF	Invitro fertilization
LPS	Luteal phase support
LH	Lutenizing hormone
PVP	Poly vinyl pyrrolidone
WHO	World health organization

CHAPTER 1

Hysteroscopy

Chapter I

(A) History of Hysteroscopy

- Endoscopic techniques for diagnosis and treatment of several diseases have gained importance in medicine especially over recent years, where the advantages lies in the direct optical judgement of the body cavities and frequently the possibility of surgical treatment during the same procedure.
- This was the aim of hysteroscopy which had begun during it's early history as a diagnostic and operative tool which were not accepted in routine gynecology. It was only in 1967 that "fritzmenken" made his first step towards an atraumatic ambulatory approach using a pediatric cystoscope to perform hysteroscopy. The distension of the uterine cavity was done with a high colloidal liquid called luviscol and an elastic cone was used to seal the cervical canal and prevent the leakage of the liquid. **(Menken FC, 1967).**
- In the 1970s Lindemann and Gallinat (1976) and lindemann et al. (1976, 1979) published their experimental findings regarding the influence of CO₂ gas during hysteroscopy, here for the first time not only the advantages of the new method but also the possible dangers and complications of gas insufflations were analyzed. **(Lindemman HJ, and Gallinat A , 1976).**
- Cornier et al (1986) and lindemman and et al. (1987) tried to find a new way by using a flexible hysterscope, a small flexible hysteroscope, a small flexible bored instrument with a channel for instrument application, through which for example laser wires

could be applied, the use of Na-YAG laser for the destruction of the endometrium in the patients with idiopathic uterine bleeding disorders. **(Cornier E, 1986).**

- At the end of the 1980's Co2 was replaced by watery (or) low viscosity solutions as a distension medium and the introduction of a continuous flow system enabled the surgeon to restore view in nearly every situation.
- The introduction of the atraumatic technique, the new mini hysteroscopes and the technically superior video documentation now raises the chances that hysteroscopy both diagnostic and operative, may become established as a routine procedure by every gynecologist.
- The new generation of mini-endoscopes both rigid and micro fiber systems, have excellent to acceptable optical qualities with large image diameter, sufficient brightness good resolution and a field of view allows panoramic sight, these instrument are suitable for both laparoscopy and hysteroscopy. **(Karabaccek et al ,1997).**

(B) Components of Hysteroscopy

- The telescope consists of 3 parts: the eye piece, the barrel, and the objective lens, the focal length and angle of the distal tip of the instrument are important for visualization.
- Angle options include: 0°, 12°, 15°, 30° and 70°, A 0 hysteroscope provides a panoramic view, where as angled one might improve the view of the ostia in an abnormally shaped cavity.

(1) Types of Hysteroscopes:

[i] Conventional Hysteroscope: (Rigid Hysteroscopes)

- They are the most commonly used procedure where we use Rigid Hysteroscopes in which their wide range diameter allows for a complex operating room procedure and in some times office hysteroscopes, because of it's narrow options (3-5 mm in diameter). The 4mm scope offers the sharpest and the clearest view. It accommodates surgical instruments and still small enough to require minimal cervical dilatation, in addition patients tolerate well this instrument with only paracervical anesthesia
- Rigid scopes larger than 5mm in diameter (commonly 8-10mm) require increased cervical dilatation for insertion. Therefore, they are most frequently used in the operating room with (IV) sedation or general anesthesia, and these large instruments include an outer sheath to introduce and remove media and to provide ports to accommodate large and varied surgical instruments.

[ii] Office hysteroscopes: (flexible hysteroscopes)

- Flexible hysteroscopes are the most commonly used and it's notable for it's flexibility, with a tip that deflects over a range of 120° – 160° it's the most appropriate for use as it accommodates the irregular shaped uterus, where it navigates around the intra uterine lesions in addition it can be used in operative procedures.
- During insertion, the flexible contour accommodates to the cervical canal more easily than does a rigid scope of a similar small diameter.

(2) Light source:

- Each hysteroscope is attached to an internal (or) external light source for illumination of the distal tip, energy sources include tungsten, metal halide, and xenon.
- A xenon light source with a liquid media is considered the superior option. (Shapiro, 1988).

(3) Surgical instruments

They are available in both rigid and flexible forms to be inserted through operating channels of the scopes examples of surgical instruments as follows:

- Scissors – to incise a septum, excise a polyp, or lyse synechiae.
- Biopsy forceps – to perform directed biopsy for pathogenic review.
- Grasping instruments – to remove foreign bodies.
- Roller ball, barrel – to perform endometrial ablation and/or desiccation (This instrument used with Resectoscope).
- Loop electrode – to resect a fibroid or polyp or endometrial ablation.
- Scalpel – to cut or coagulate tissue, with high power density at it's tip.

(4) Energy sources and uses:

(a) Monopolar Cautery

- The resectoscope is a specialized instrument with monopolar double armed electrode, and a trigger device for use in hypotonic non conductive media such as glycine.

- The monopolar cautery cuts and coagulates tissue by means of contact desiccation with resistive heating. **(Brill, 2000).**
- The depth of the thermal damage is based upon several factors, endometrial thickness, speed, pressure, and duration of contact during motion and setting. **(Luciano AA,1995).**
- A thin electrode can cut tissue, where as one with a large surface area such as a ball or barrel, is best suited for coagulation **(Indman PD, 2000).**

(b) Bipolar Cautery :

The versa point system (Gynecare, Inc, Someville, NJ), uses bipolar circuitry for electrosurgery, which can be performed in isotonic conductive media, this system includes aspiring tip for haemostatic vaporization of large areas and a ball tip for precise vaporization and a twizzle tip for haemostatic resection and morcellation of tissue, there is also a cutting loop similar to traditional resectoscopy. **(Brill ,2000).**

(C) Laser technique:

- Several fiberoptic lasers are available for gynecologic use. The potassium – titanyl – phasphate (KTP) and argon lasers have different wave lengths, 0.532mm and 0.458-0.515mm (Respectively), but have very similar effects. Both are visible as green light and can pass through flexible fibers and fluids. They are absorbed by darkly pigmented tissue and penetrate to a 1- to 2-mm depth with minimal scatter. Both are effective in cutting tissue, but the argon laser has the unique effect of blowing smoke, odour, fluids and blood out of the area of use, increasing its visual field of operation.

- The neodymium: yttrium-aluminum-garnet (Nd : YAG) laser with a wave length of 1.064, also can pass through flexible fibers and fluid, it transmits easily through liquid media and not absorbed by water or clear tissue, but it penetrates deeply into tissue before being absorbed, scattering on contact, thus making it poor for cutting but useful in coagulation. The necrosis of the tissue is self limited to 4mm in all directions A sculpted sapphire tip or sculpted quartz fiber can be used to focus the beam and as a laser scalpel however, the tip cannot be cooled with gas, and the sapphire tip is contraindicated for intrauterine operation.
- We can conclude that difference between various types depends on the cutting and coagulating capabilities of each type which helps us in giving the decision which one to you use. (**John C petrozza, 2006**).

(5) Media:

The use of media is critical for panoramic inspection of the uterine cavity, the medium opens the potential space of the otherwise narrow uterine cavity. The intrauterine pressure needed to adequately view the endometrium is proportionate to the muscle tone and thickness of the uterus. The refractive index of each medium affects magnification and visualization of the endometrium.

(A) Gases :

- Carbon dioxide is rapidly absorbed and easily cleared from the body, the refractory index of CO_2 is 1.0 which allows excellent clarity and widens the field of view at low magnification.
- The gas easily flows through narrow channels in small-diameter scopes, making it use full for office-based diagnostic hysteroscopy

However this method offers no way to clear the blood from the hysteroscope, and CO₂ hysteroscopy is diagnostic only.

- With CO₂, a hysteroscopic insufflators is required to regulate flow and limit maximal intra uterine pressure, flow rate to 40-60 ml/min at a maximum pressure of 100mmHg is generally accepted as safe, pressures and rates higher than this can result in cardiac arrhythmias and arrest. (**Shapiro BS, 1988**).

(B) Fluids:

- The advantages of fluid over gas is the systemic distension of the uterus with fluid and it's effective ability to flush blood mucus, bubbles, and small tissue, fragments out the visual field.
- Both low-viscosity and high-viscosity fluid media can be used in distension, and pressures of 75mm Hg is usually adequate for uterine distension, rarely is more than 100mm by required, and pressures higher than this can increase the risk of intravasation of the medium. (**Marlow JL, 1995**).
- As noted above new sophisticated efflux mechanisms are being designed to improve the clearance of both blood and particulate matter from the operating space, closed systems actively return fluid to a pump reservoir, whereas open systems allow free flow of the media out of the cervix into a collection bag for volume monitoring.

1- 0.9% sodium chloride and lactated Ringer solutions:

- Normal sodium chloride solution and lactated ringer solution are isotonic, conductive, low-viscosity fluids that can be used for diagnostic hysteroscopy and for limited operative procedure,