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i-Ceat RESONANCE

TEN COMMANDMENTS SERIES

Role of Hysteroscopy in ART

"In order to succeed, we must first believe that we can"
– Nikos Kazantzakis

Preface

i-Ceat RESONANCE, the monthly bulletin, is the trailblazing academic initiative by the Clinical and Embryology Academy of ART. It aims to mentor the budding fertility specialists and embryologists from the very basics to the highest level of clinical expertise.

We present before you the '**fifth volume**' of this monthly bulletin **"Role of Hysteroscopy in ART"**. This article gives us an overview of role of Hysteroscopy in infertility and certain dos and donts while doing hysteroscopy. Hysteroscopy is a magic wand in the hands of a gynaecologist.

As a clinical embryologist, I Hope this information would help you choose the suitable machine according to your patient's volume.

We sincerely wish that our fraternity is benefitted academically and that the knowledge enhances their results.

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You are never too old to set another goal or to dream a New dream
- C.S. Lewis

Role of Hysteroscopy in ART

- Hysteroscopy is an important armamentarium in the hands of a fertility practitioner.
- Dr. Linda Bradley of Cleveland rightly calls hysteroscope as the stethoscope of Uterus.
- Despite many advances in ART procedures some patients are unable to achieve success. It has been known that uterine factors play about 15 to 20 % role in female infertility.
- Comparing ultrasound, saline infusion sonography, and hysteroscopy for endometrial pathology, the relative sensitivities and specificities are 89% and 56%, 91.8% and 60%, and 97.3% and 92%[1] respectively
- So ruling out any evidence of intra uterine pathology by hysteroscopy is an important step before an ART procedure (more so in patients with previous IVF failures).

Ten commandments in Hysteroscopy

1. **Evaluate pre operative clinical history :** A detailed history including medical history, like asthma or cardiac problems drug history like using antiplatelets, antiepileptics etc is very important.
2. **Clinical examination :** A thorough general examination and gynaecological examination is mandatory to exclude infections – general or local which needs treatment before taking up an invasive procedure.
3. **Pre op evaluation and informed consent** : Essential investigations including blood workup and imaging has to be performed.

   Getting a pre anaesthetic check up is wise in High risk cases.

   A detailed counselling about the procedure, its risks and benefits should always be explained to the patient and family and documented.
4. **Use of standard instruments :** Good quality instrumentation add to the precision of surgery and gives good outcome.
5. **Diagnostic followed by operative :** Despite proper pre op evaluation there are chances of sudden surprises. So always do a diagnostic followed by operative hysterosopy.

   Gentle and proper cervical dilatation to be done, chances of forming false passages and uterine perforation to be kept in mind.
6. **Knowledge of energy sources is essential :** Now a days various energy sources are available, the detailed knowledge of physics and its application and its utility depending upon the indication is very valuable to avoid complications. As medicolegally they are considered as preventable mishaps.
7. **Skill of the surgeon :** Machine is important but the (wo)man behind the machine is very important as well. The results and outcome will be directly proportionate to the skill of the operator.
8. **Distension media :** Choosing appropriate fluid to perform the procedure especially the operative procedures with energy sources is mandatory.

   As non compatible combinations like Monopolar energy with Normal saline as fluid medium can lead to severe complications.

   Avoid having air column in the irrigating channel to avoid air embolism.
9. **Intraoperative monitoring :** A vigilant team consists of anaesthetist assistance, theatre staff are all valuable. Vital signs, warning indications, to be observed.
10. **Recording and documentation :** No documentation – no medicolegal defence. We also need this documentation for sharing of knowledge and for learning purpose.

    Most important is Passion for Performance and Perfection.

A list of the many intracavitary conditions that affect reproductive outcomes identifiable through hysteroscopy and how hysteroscopy helps to overcome these conditions

1. Spontaneous pregnancy rate increases after Hysteroscopic Polypectomy

Women undergoing evaluation for infertility may have a finding of an endometrial polyp on ultrasound or hysteroscopy. Various studies have shown a prevalence of polyps ranging widely from 3-24%, in infertile population as 15.3%[2] and in patients undergoing in vitro fertilization is 6 to 8 percent.

A randomized trial showed a higher pregnancy rate in women undergoing intrauterine insemination who underwent polyp removal compared with hysteroscopy alone.

In a study by stamatellos et.al, Spontaneous pregnancy and delivery at term rates increased after hysteroscopic polypectomy and were 61.4% and 54.2% respectively.[2]

2. Hysteroscopic myomectomy of submucosal fibroids improves fertility rate

Leiomyomas that distort the uterine cavity (submucosal or intramural with an intracavitary component) result in difficulty in conception and an increased risk of miscarriage. A trial comparing hysteroscopic myomectomy for major cavity abnormalities with expectant management in patients affected by fibroids who had been trying to conceive for a year without success reported improved overall pregnancy rates following myomectomy.

3. Pregnancy outcome improves in patients with septate uterus after hysteroscopic metroplasty

Septate uterus comprises for about approximately 55% of müllerian duct anomalies, among which 40% of patients have reproductive problems which usually manifest as reproductive failure, obstetrical complications, Premature birth (9% to 33%) and an increase in the incidence of recurrent miscarriages. The prevalence of septate uterus in recurrent abortions is estimated to range from 26% to 94%. The mean pregnancy rate in previously known infertile women with septate uterus after procedure increases to 47%. The length of the septum does not appear to correlate with differences in obstetric outcome[4] A recent study performed by Duan et al. revealed that:

- The amount of the endometrium glands on septum was less than that on the uterine wall.
- The positive index level of estrogen and progestogen receptors on septum was weaker than that on uterine wall.
- The densities of the smooth muscle cells were thicker, and the collagenous fibres were sparser at the base and the middle of the septum compared with the uterine wall.
- The amount of the small arteries in septum were rarer than in uterine wall.
- Ultrastructure characters showed glandular epithelium cells distributed irregularly and poor pili on septum.

Pregnancy outcome in patients with septate uteri after hysteroscopic metroplasty :

STUDY	PATIENTS	PREGNANCIES	ECTOPIC	ABOR-TION	PRETERM DELIVERY	TERM DELIVERY	LIVE BIRTH
NM Ludwin et al. (2003)	31	27	0	44.4%	11.1%	44.4%	55.5%
Saygili-Yilmaz (2003)	361	180	0	16%	18.8%	57.2%	75%
Pabuccu et al. (2004)	61	25	0	28%	20%	52%	72%
Le Ray et al. (2006)	10	8	12.5%	50%	12.5%	25%	NM

4. Hysteroscopic Tubal cannulation improves pregnancy rates:

Tubal disorders as a cause of subfertility account in upto 30% of women, and 10-25% of these are due to proximal tubal obstruction.

Tubal patency can be assessed through vortex formation of fluid dynamics – Fehmi sign.[6]

Hysteroscopic tubal cannulation and fluoroscopic tubal catheterization are essential modalities for assessment of proximal tubal patency.

Occlusion of the tube by fibrosis is the commonest histologic tubal abnormality as observed by both Wiedemann et al. and Fortier and Haney, followed by salpingitis isthmica nodosa.

Other causes for proximal tubal oclclusion are :

a. Endometriosis & Cornual Polyp -10%

b. Cornual Spasm -20%

c. Stromal Oedema, Tubal debris, Intraluminal adhesions, Viscid Secretion - 30%

Reviewing many observational studies showed that hysteroscopic tubal cannulation was associated with a higher pregnancy rate (49%) than salpingography and tubal cauterization (21%) in women with Proximal tubal occlusion.

With combined laparoscopy and hysteroscopic tubal cannulation, Das et al. concluded that hysteroscopic cannulation of the fallopian tube is a safe diagnostic procedure that can be used to identify those patients with true proximal occlusion, and can also be a therapeutic procedure in some of these patients, however, patients with distally blocked tubes are not good candidates for this procedure . A theoretical hazard after restoring tubal patency using cannulation procedures is tubal ectopic pregnancy, as the recanalized portion of the tube may still have an abnormal epithelial lining.

Deaton et al. reported that cannulation of 13 tubes in 11 patients resulted in six pregnancies, three of which were distal ectopics that occurred in the patients with distal tubal disease.

Papaioannou et al. reported that 47.2% of spontaneous conceptions and 43.2% of all conceptions occurred after the first 12 months following cannulation.

Different studies show, recanalization success rate of 76% and intrauterine pregnancy rate of 39% following laparoscopy-assisted hysteroscopic tubal cannulation.

5. Hysteroscopic adhesiolysis for Asherman's syndrome is a safe and effective method of choice for restoring menstrual function and fertility

Intra uterine adhesions due to previous operative procedures and infectious causes may lead to infertility.

A study by Roy et al. opines that the overall conception rate was 40.4% after hysteroscopic adhesiolysis. The mean period for conceiving after surgery was 12.8 months. The percentage of conception was higher (58%) in mild Asherman's syndrome compared to 30% conception in moderate and 33.3% conception in severe cases. The take home baby rate was 86.1% and miscarriage rate was 11.1

Study by Perrine et al., has shown that out of the 202 women who benefitted from hysteroscopic adhesiolysis, 55% had an effective pregnancy desire. An intrauterine pregnancy was obtained for 52% women with a trend to a lower rate for type IV and Vb intrauterine adhesions .

6. Diagnosis and treatment of Endometritis by hysteroscopy increases pregnancy rates.

Endometritis can cause delay in endometrial maturation, causing uterine asynchrony to implantation. It is estimated for 9% to 67% of recurrent pregnancy losses and 30.3% of women with recurrent implantation failure[5]

Distinguishing normal endometrium from pathological one is easy with office hysteroscopy.

This type of pathology was easier to miss with older, low-resolution, flexible hysteroscopes, but with modern high-resolution endoscopes it is very clear. After identifying, 70% to 77% of cases are effectively treated, with a single course of antibiotics (doxycycline),[5] and there may be as high as 100% responsiveness with two courses. Antibiotic therapy for endometritis seems to restore normal fecundity in affected patients.[5]

7. Cesarean Isthmocele resection by hysteroscopy restores fecundity

- Cesarean isthmoceles have been associated with abnormal collection of bleeding post menstrually.
- Such collected blood theoretically could have a detrimental effect on cervical mucus, sperm, and embryonic implantation.
- The magnitude of the effect on fertility is not clear.
- Removal of an isthmocele by resectoscope or morcellation seems to restore normal fecundity

8. Removal of a forgotten IUS under hysteroscopic guidance also restores normal fertility.

9. Adenomyosis – hysteroscopic diagnosis and management

Adenomyosis is often identified through ultrasound and confirmed through magnetic resonance imaging, hysteroscopic findings may also be suggestive, though the sensitivity can be less than ideal at 40% to 63% .

As adenomyosis by definition is endometrial glands and stroma within myometrium at a distance of >2.5 mm beneath the basalis of the endometrium, hysteroscopic findings are only suggestive of the disease which include pitting of the endometrium toward the myometrium, hypervascularization, endometrial irregularity, and cystic hemorrhagic lesions. Hysteroscopic biopsy of the posterior wall seems more sensitive than specific (78.5% and 54.3%, respectively) though this is relatively comparable to transvaginal ultrasound (84% and 60%, respectively).

Though the current understanding of the role of adenomyosis in reproductive outcomes is evolving, a recent systematic review and meta-analysis found a 2.2 fold higher odds ratio for miscarriage in the presence of adenomyosis and a 41% decrease in live-birth rates. Hysteroscopic resection is feasible in some cases whereas bulk disease has to addressed differently (laparoscopic approach needed).

10. Lesions of unknown pathological significance ?subfertility

- Diffuse polyposis
- Strawberry pattern
- Hypervascularization
- Mucosal elevation
- Endometrial defects

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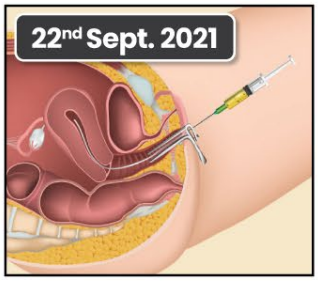

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