“LEARNING CURVE AND COMPLICATIONS CONCERNING RANSVAGINAL HYDROLAPAROSCOPY IN UNEXPLAINED INFERTILITY”

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The Clinic is a facility dedicated to the superspecialty care in Gynaecological Endoscopy and looks to embrace newer techniques in this field in order to maximize patient benefit and to bring in latest technology to the people of India.

It performs a sizeable number of office procedures like hysteroscopy and fertiloscopy and strives to dissipate this knowledge and technology by training Gynaecologists in this art.
SUMMARY:

Transvaginal hydrolaparoscopy (THL) is based on vaginal access, using needle puncture and saline distension and is done under local anaesthesia in an office setting. Technical improvements in the optical quality of smaller diameter scopes has regenerated interest in this procedure, an offshoot of the erstwhile culdoscopy. Diagnostic Laparoscopy though considered as the gold standard in infertility investigation has remained as invasive as when it was introduced, thus at times delays investigation in patients.

THL along with salpingoscopy, microsalpingoscopy, a dye test and hysteroscopy now known as fertiloscopy provides us an alternative more acceptable route for earlier investigation of such patients in a “one stop fertility clinic” in an out patient setting.

This chapter takes a look at the procedure, its practical aspects, the learning curve and complications associated with it.

OVERVIEW

Unexplained infertility may be defined when the ovulating woman who has normal clinical and biochemical profile fails to become pregnant i.e. there is no obvious pathology.

It may also be said to be state in which no cause could be detected to explain infertility inspite of thorough investigation for both partners. It remains one of the most frustrating conditions for both the patient and the clinician.

It is in these cases that Transvaginal Hydrolaparoscopy(THL) can be proposed as a first line diagnostic procedure that helps in further management.
This is a relatively new technique and as the name suggests, Trans-vaginal Hydro-laparoscopy utilizes a transvaginal route instead of a transabdominal route and uses saline hydro-floatation instead of carbon-di-oxide for visualization of anatomy.

**HISTORY**

Dr. Dmitri Ott at the meeting of the Gynaecological and Obstetrical Society of St. Petersberg in Russia, held on April 19, 1901, presented a more resourceful use of the colpotomy by the introduction of ventroscopy through the incision (1).

Drs. A. Decker and T. Cherry described Culdoscopy and most of their studies were performed at the Knicker bocker Hospital located in Uptown Manhattan, New York (2).

Culdoscopy was abandoned in the 1970’s as laparoscopy provided a panoramic view of the pelvis and was shown to be superior for tubal sterilization (3).

While technology of laparoscopy was continuously improved, the technique of culdoscopy did not advance after the 1960’s.

Transvaginal Hydrolaparoscopy introduced by Gordts et al (1997-1999) (4) and worked upon extensively by A. Watrelot at the Centre for Sterility research and study (CRES) Lyon, France is essentially and extension of the erstwhile culdoscopy technique itself.
THE TECHNIQUE:

PATIENT SELECTION

For the success of any procedure, proper patient selection is of utmost importance. Failure to do so would lead to failure of results and then disrepute to the procedure itself. Using this yardstick THL requires proper patient selection in order to accrue maximum benefits from this procedure.

Patients with unexplained infertility in whom it is important to obtain a diagnosis, select the adequate therapeutic option and at times even initiate treatment (as in polycystic ovarian disease, adhesions etc), THL is an ideal procedure at the initial stage and as the first line, one stop fertility management procedure.

Patients having contraindications to the procedure must be offered alternative methods like laparoscopy for evaluation. There really is only one real contraindication, namely obstructive pathology of the recto-uterine pouch. Pelvic masses like posterior myomas, ovarian cysts, fixed uterine retro flexion, cul-de-sac obliteration as in deep infiltrating endometriosis or recto-vaginal septum endometriosis etc constitute some of these pathologies. A Pelvic clinical and ultrasound examination will be helpful in the diagnosis of these lesions and hence choosing the correct patient for the procedure.
PROCEDURE

THL is performed with the patient in dorsal decubitus position. After disinfection with a suitable agent like aqueous chlorhexidine solution, the central part of the posterior fornix is infiltrated with 2ml of 1% xylocaine with or without adrenaline after lifting the posterior lip of the cervix with a volsellum forceps.

The veress needle is then introduced 1-1.5 cm below the cervix in the following way: Prime the needle and “impact” to 1mm depth in the vaginal wall over the midline, loosen the needle spring and introduce it with a firm movement. The axis of penetration must be in relation to the position of the uterus. In a retroverted uterus the axis must be parallel to the posterior blade of the speculum and it must be horizontally inclined in an anteverted uterus. Tactile feel for transfixing of the vaginal wall and the peritoneum is obtained with practice. Saline should flow without hindrance as a sign of correct placement of the needle.

Approximately 100-200ml of normal saline at 37°C, which may or may not be diluted with 1% Xylocaine in a concentration of 1/100 is instilled in the pouch of Douglas. After removing the veress needle the blunt trocar or Fertiloscope for the optics is introduced in the same place (may be facilitated by a stab incision in the fornix) with the same axial orientation as the veress needle, which it replaces. When the mandrel is withdrawn, saline flows out indicating correct placement of the trocar. A 30° rigid scope 2.9mm in diameter is introduced 1cm beyond the trocar sheath into the pouch of Douglas with the optical angle in upward position and systematically the posterior wall of the uterus is examined. By rotation and deeper insertion of the scope the tubo-ovarian structures are seen. It is important to continue saline irrigation while doing the procedure. At the end of the
procedure, saline (upto 400-500ml used) can be left inside or removed along with the instruments. Patients must be informed about vaginal leakage or bleeding and not to use tampons and abstain from intercourse for a period of 6-7 days. Prophylactic antibiotics are prescribed for 3 days. The whole examination takes around 15-30 minutes.

LIMITATIONS/ DISADVANTAGES OF THL:

When compared to laparoscopy THL has its limitations.

1) The view is limited to the posterior part of the pelvis, it is impossible to see the anterior aspect of the uterus or the UV fold.

2) Most gynaecologists are more familiar with the panoramic view of the pelvis as seen at Laparoscopy.

3) Without manipulating the adnexa not all pathologies can be seen.

4) The range of interventions that can be performed as yet with THL is limited to adhesiolysis, polycystic ovarian drilling, biopsies, pain mapping, small cystectomies, and gamete transfers.

Having mentioned the limitations, there are definite advantages of this procedure, which need to be enumerated too.
1) THL is excellent for patient comfort and is done as an outpatient procedure under local anesthetic in an office setting thus doing away with the potential complications of general anesthesia.

2) It does away with CO₂ used in laparoscopy. This gas provokes patient discomfort, acidosis and is potentially harmful where gamete transfers are involved. THL has thus also done away with the concern expressed that growth and spread of tumor cells may be accelerated by laparoscopy with air or CO₂\(^5\).

3) It is physiological in its approach since fallopian tubes and ovaries have no longer to be displaced in order to be examined.

4) Hydro-floatation avoids collapse of fine structures, such as filmy adhesions and preserves microvascularisation.

5) Trendelenberg position is not required and risk of injuring major blood vessels is much less.

6) THL can be used in conjunction with, Dye test, Salpingoscopy, Microsalpingoscopy, and Hysteroscopy known together as Fertiloscopy as a one stop Fertility investigation in an office setting thus having all advantages of an outpatient investigation for the patient.

7) The invasiveness of Laparoscopy frequently postpones patients complaining of infertility or chronic pelvic pain until the last stage of investigation or until therapeutic trials have already failed, thus diagnosis of pathology of significance and its treatment are delayed. Fertiloscopy circumvents this.
8) It is relatively easy to learn and needs just a little more skill than culdocentesis, which is routinely performed still in developing countries for diagnosis of ectopic pregnancy!

LEARNING CURVE:

As all procedures in endoscopy THL has its own learning curve. It is necessary to adjust to the basic hand eye coordination as in most endoscopic procedures. The utilization of fluid instead of gas to visualize the structures needs a little getting used to as is the inverted view obtained of the anatomy during the procedure. Structures are seen from Bottom up rather than the more traditional view of top to bottom in laparoscopy. One needs to get used to a narrower field of vision a view of the pelvis from a different angle. It is similar to microlaparoscopy in a conscious patient with less CO₂ distention where the field of view is restricted as panoramic view is decreased.

It is important to proceed systematically identifying initially the posterior part of the uterus as the roof of the explored space. Three basic movements are:

1) Inwards and outwards movement
2) Sweeping movement from left to right
3) Rotating the 30o telescope around its longitudinal axis.

It is wise to keep an identified fixed structure always in view and try and identify other structures in relation to this.
The closeness of the structures and the smaller field of vision is akin to the smaller field of view in hysteroscopy. Hence someone comfortable with office Hysteroscopy should be able to master THL.

COMPLICATIONS:

These are basically of three types

a) Rectal Injury
b) Infection
c) False Passage

RECTAL INJURY:

This is the most important and principal problem faced by those doing THL. The rate is generally said to be less than 1% (6). Watrelot et al in their study reported an incidence of 0.5% (7).

These rates agree with those reported in the 1960’s and 1970’s for culdoscopy also (8,9). Rectal injury is sub peritoneal and as a rule does not require any special treatment other than increased patient surveillance for 48 hours and an antibiotic cover.
INFECTION:

This generally has not been observed and hence remains more theoretical, though reports of infection in transvaginal oocyte retrieval peg this at 0.5% in some studies (10,11).
Meticulous asepsis, part preparation and prophylactic antibiotics should avoid this complication.

FALSE PASSAGE:

While inserting the veress needle, it may accidentally go through and lie in the structures between the peritoneum and vaginal vault. Due to this, the fluid flow becomes irregular and should be turned off to minimize the resultant trauma. Once a large fluid volume has been instilled under the peritoneum it becomes very difficult to advance the needle correctly and the procedure needs to be abandoned or changed to a laparoscopy.

An incidence of 2 out of 160 of false passage was reported by A. Watrelot et al (7) in their study. In order to prevent this complication it is very important to insert the veress needle with a firm movement. If the fluid does not enter freely into the rectouterine pouch, one must withdraw the needle and reinsert it.

Though theoretical other injuries like large vessel injuries must be added to complete the list.

By enlarge proper selection and meticulous technique will help in a complication free procedure.
THE FUTURE:

THL allows atraumatic detailed exploration of the tubo-ovarian structures in infertile patients without obvious pathology. It can be combined with hysteroscopy and dye hydrotubation and has the potential of offering the patient a complete and early exploration of reproductive tract in a painless, safe and cost effective way (4). The physiological nature of the examination means it holds promise for the future to be helpful in better understanding of the “ovum pick-up” phenomenon. Further studies should also allow us to determine the minimum requirement of tubo-ovarian function in order to obtain pregnancy.

In cases of unexplained pelvic pain it can be an asset in pain mapping and hence understanding the underlying cause.

Me, being from a developing country, India would like to think and do genuinely believe that this procedure holds great promise for the future, by decreasing the load on already overburdened Operating theatres. Also by bringing diagnostic and therapeutic ability to the office setting it decreases the costs of the procedure making it within reach of more people in an economically poor country.

Also it can be learnt without much difficulty especially in a country where the diagnosis of ectopic pregnancy is still relied upon in many areas by culdocentesis, and most hence being proficient in this procedure!
What is needed really is to embrace the culture of Office procedures like Office Hysteroscopy and THL as they strive to bring diagnostic acceptability to a therapeutic ability and by bringing these procedures to the office setting tend to decrease patient trauma and maximize benefit.

The complication rates come down drastically and patient comfort is kept to a maximum, thus making surgery “minimally invasive” in the actual sense of the word.

In conclusion it is important to note that THL and fertiloscopy are not intended to replace laparoscopic procedures but are actually meant to be an earlier rung in the ladder of protocol for infertility management especially in the unexplained variety.
REFERENCES: