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Diagnostic Opportunities of X-Ray and Ultrasound Methods for the Assessment of Fallopian Tube Patency

L Ezieshvili

Department of Radiology, TSMU First University Clinic, Georgia, Tel: +995577453535

***Corresponding author**

L Ezieshvili, Department of Radiology, TSMU First University Clinic, Georgia, Tel: +995577453535.

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Infertility globally affects millions of couples. Nowadays worldwide there are 86.000 couples infertile (WHO) and leading reason is secondary tuba abnormality, majorly induced by infection, stress, environmental pollution, unhealthy nutrition, smoking, drug addiction etc. Artificial abortion occurs to be the leading reason of pelvic inflammatory disease. If the first abortion is a risk factor of infertility on 16 % of the cases every other one increases this risk almost up to 100 % [1,2].

Fallopian tubes play the most important role in the process of fertilization, which takes place in a patent tube. Assessment of fallopian tubes is one of the most important diagnostic opportunities to estimate the condition of female reproductive system, it also shortens the time of identifying the reason and making the correct and adequate plan of consequent management, finally increasing the chances of pregnancy.

The main method for the assessment of female reproductive tract is considered to be the radiological methods and the most valuable one is ultrasound [3,4,5].

For the assessment of tubal patency there are several radiological methods used nowadays: hysterosalpingography (HSG) and sonohysterosalpingography (sonoHSG). HSG is a method of choice widely used all over the world, sonoHSG is a comparatively new method but also frequently used by the practitioners for the assessment of tubes [6, 7].

HSG-Traditional method gives an opportunity to visualize endometrium with high quality resolution and confirms the fact of tubal patency when contrast media pours into abdominal cavity. Sono HSG is an additional method used by ultrasound guidance, revealing pathological changes of reproductive organs more detailed compared to HSG [8, 9, 10].

In our clinic we have used both above mentioned methods for the assessment of tubal condition during our study aiming to reveal advantages and disadvantages of methods, thus helping practitioners to choose a diagnostic method relying on a clinical situation.

Material and Methods

On the base of TSMU The First University Clinic Department of Radiology we have studied 50 cases of reproductive aged (25-

36 years old) woman. In all cases the reason to address hospital was infertility of different duration. In 34 cases (68%) there was secondary infertility with a history of STD (chlamydia trachomatis 13 cases (26%), gonorrhea 20 cases (40%), syphilis 1 case -2%) and in 12 cases (35%). In 12 cases medical history was aggravated by artificial abortion, in 5 cases (11%) done for more than twice, in 6 cases (17%) abortion was done only once. In major of the cases 9 patient medication abortion was done. Dilatation and curettage of the uterine cavity was used in 3 cases and 1 case was complicated by post abortion endometritis.

Study Inclusion Criteria

1. Reproductive age
2. The first case of addressing to the hospital
3. Absence of male factor of infertility
4. Absence of pregnancy prove by blood HSG test
5. Signed informed consent

In all our 50 patients we have used both diagnostic methods—HSG and sonoHSG. The aim of the combination of these two methods was to increase diagnostic value and compare the methods.

The assessment of patients has been done with 2-3 day intervals, in the first phase of menstrual cycle, with standard vaginal swab bacterioscopy to exclude ascending infection and overview ultrasound for primary assessment of reproductive organs. We preferred to use transvaginal ultrasound, putting the vaginal transducer in an anterior vaginal fornix to enhance visualization of reproductive organs.

We have used Hyper echogenic contrast media. External cervical os was visualized by Cusco speculum and cleaned by antiseptic solution without using toothed tenaculum for cervix immobilization, thus excluding the risk of tubal spasm as a reflective reaction to the pain and possibility to receive false positive results of tubal occlusion.

Before insertion to the uterine cavity catheter was irrigated by saline solution to decrease chances of echogenic mistake. Balloon catheter was positioned on the level of internal cervical os and followed by inflation with saline solution to keep it immobile and obturate cervical canal from pouring installed contrast media. Later we were positioning ultrasound vaginal transducer into an anterior or posterior vaginal fornix for observation of contrast movement.

During infusion of contrast, we were scanning uterus by fan shape longitudinal view directing from one uterus angle to another, followed by 90-degree angle frontal view of uterus from internal cervical os to uterus fundus including bilateral tubal scanning from tubo uterine angle to the direction of tubal fimbriae. It was easily possible to visualize isthmus portion of the tube by using hyper echogenic contrast media. To confirm the pouring of the contrast to the abdominal cavity we were observing paraovarian spaces bilaterally revealing turbulent fluid into a peritoneal cavity. In the case of patent tube contrast media pours freely giving possibility to visualize ovaries apparently and finally occurring in a Douglas pouch.

In major of the cases tubal patency assessed by HSG was proved by contrast media shift along the tube and homolateral parts of abdominal cavity. During HSG we were using 10 ml of contrast media and were taking 4 consequent X-ray pictures subsequently by 4 phases of filling. First was early filling phase of the uterus, second full filling phase of the uterus, this filling of tubes and the forth pouring of the contrast into an abdominal cavity. In all cases visualization of the tubes and interpretation of the results was adequate.

Results of the Study

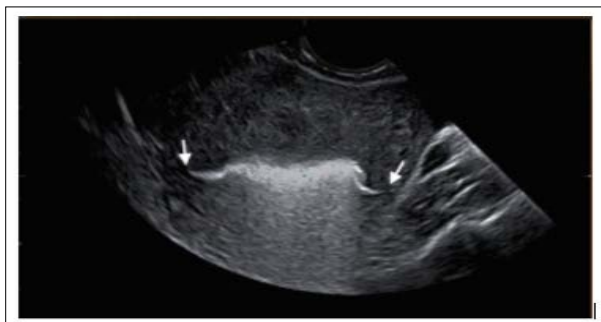
Among 50 patients studied by us in 22 cases we have defined tubal occlusion of different degree and localization.

Unaffected tubes cannot be visualized by ultrasound. In 4 cases because of exudate accumulated into an abdominal cavity it was possible to observe tubular structures with uneven edges. Presence of peritoneal fluid was proved by transvaginal ultrasound. Visualization of tubes was enhanced by using hyper echogenic contrast media "Echovist".

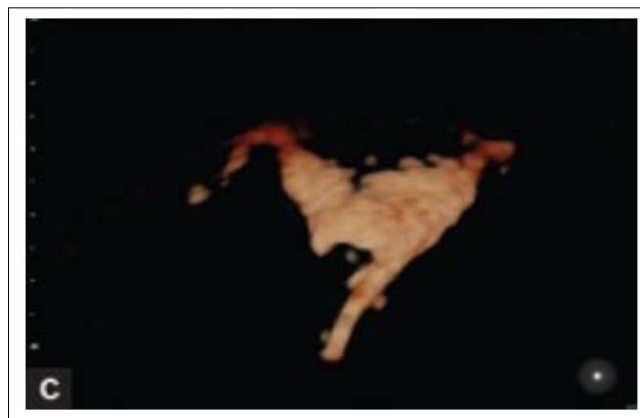
3-5 minutes later after installation of contrast media in the case of patent tubes we were observing turbulent leakage of fluid into an abdominal cavity. In one case with a fluid into abdominal cavity and paraovarian area before installation of the contrast media, it was much easier to identify tubes after use of hyper echogenic contrast on the base of an echogenic transudate.

In 4 cases we have defined interstitial tubal occlusion, using hyper echogenic contrast media, it was possible to identify level of the tubal occlusion.

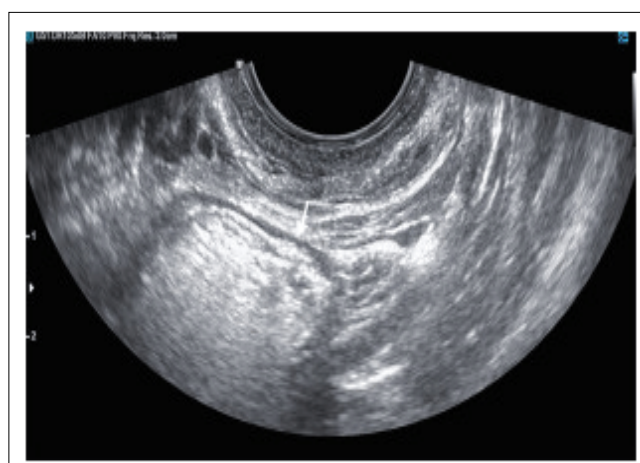
In 4 cases of our study presence of free fluid on any of the side with paraovarian location and additional extension of uterine cavity was defined by us as unilateral tubal occlusion we had 14 cases like this. In 3 cases of our study bilateral tubal occlusion was identified as uterus cavity was extended on an interstitial level, with pain during contrast installation, when we stopped the procedure.



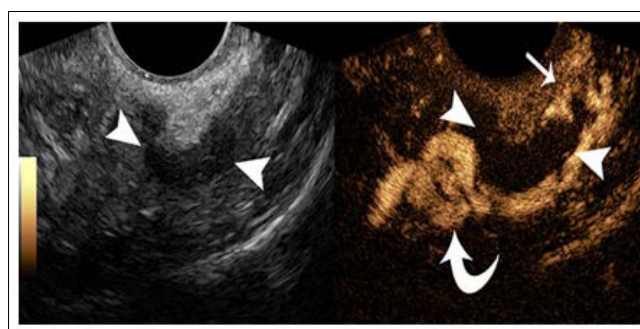
Sono HSG Bilateral Tubal Occlusion.



During sonoHSG using hyper echogenic contrast media it was possible to visualize every segment of fallopian tube which was not possible by using anechogenic contrast.



Sono HSG Using Hyper Echogenic Contrast Media



Sono HSG Using Anechogenic Contrast Media

In our study by HSG we have defined tubal damage: 2 case of hydrosalpinges, 3 case of nodular-isthmus salpingitis, 7 case of ampule tubal occlusion, 2 case of isthmus tubal occlusion, 6 case of tubal spasm or partial occlusion.

It is very important to mention that performing HSG patient is influenced by 0.9-1.0 milisvert effective dose of irradiation which is equal to natural radiation during 4 months. Parallel to our study radiology department has conducted assessment of radiation dose following protocol.

Conclusions

1. SonoHSG is considered to be an informative method to access tubal patency
2. By using hyper and anechogenic contrast media it is possible to increase the informative value of sonoHSG
3. SonoHSG is helpful method to choose patients for the next step of an adequate treatment and management.
4. SonoHSG gives us possibilities to avoid radioactive influence on reproductive organs by having almost equal diagnostic value as HSG

References

1. United Nations (1948) General Assembly resolution 217A: Declaration of human rights. December 10: 1948 <https://www.un.org/en/universal-declaration-human-rights>.
2. US Department of Health and Human Services (2019) Office on Women's Health website. Infertility <https://www.womenshealth.gov/a-z-topics/infertility>.
3. American Institute of Ultrasound in Medicine (AIUM), American College of Radiology (ACR), American College of Obstetricians and Gynecologists (ACOG), Society for Pediatric Radiology (SPR), Society of Radiologists in Ultrasound (SRU) (2014) AIUM practice guideline for the performance of ultrasound of the female pelvis. J Ultrasound Med 33: 1122-1130.
4. Bittencourt CA, Dos Santos Simxes R, Bernardo WM, Fuchs LFP, Soares Júnior JM, et al. (2017) Accuracy of saline contrast sonohysterography in detection of endometrial polyps and submucosal leiomyomas in women of reproductive age with abnormal uterine bleeding: systematic review and meta-analysis. Ultrasound Obstet Gynecol 50: 32-39.
5. Lea Langhoff Thuesen, Birgitte Oxlund-Mariegaard, Lene Hee Christensen, Lars Franch Andersen, Bent Brandt Hansen, et al. (2021) Reproductive surgery for female infertility. Ugeskr Laeger 183: V04210381.
6. Charles R B Beckmann Frank Ling, William N P Herbert, Douglas W Lauberg P Smith, Robert Casanova, Alice Chuang Alice R Goepfert, et al. (2014) Obstetrics and gynecology. Infertility 42: 374-377.
7. American College of Nurse-Midwives (ACNM), American College of Obstetricians and Gynecologists (ACOG), American College of Osteopathic Obstetricians and Gynecologists (ACOOG), American Society for Reproductive Medicine–Society for Reproductive Endocrinology and Infertility (ASRM-SREI), Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) (2012) AIUM practice guideline for the performance of a focused reproductive endocrinology and infertility scan. J Ultrasound Med 31: 1865-1874.
8. ACR Practice Parameter for the Performance of Hysterosalpingography (2021) <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/HSG.pdf>.
9. ACR Manual on Contrast Media (2021) ACR Committee on Drugs and Contrast Media. American College of Radiology https://www.acr.org/-/media/ACR/Files/Clinical-Resources/Contrast_Media.pdf.
10. Tejaswi Chalumuri, Dinesh Chalumuri, Y Trinadh (2019) Comparison of Sonohysterosalpingography Using Agitated Saline and Hysterosalpingography to Evaluate Tubal Patency in Infertile Women. JMSCR 7: 392.

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