



Hysteroscopically guided transvaginal ultrasound tubal catheterization—a novel office procedure



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ABSTRACT

Objective: Investigate a novel office hysteroscopic tubal catheterization therapeutic method for proximal tubal occlusion.

Study design: Prospective cohort study in a tertiary referral center. We evaluated the procedure on a group of 27 patients that were referred to our unit for proximal tubal occlusion demonstrated by hysterosalpingography, 9 (33.3%) of them with primary infertility and 18 of them (66.6%) with secondary infertility.

The intervention included the usage of the modified Novy cornual cannulation set which was inserted through a 5F working cannal during an office operative hysteroscopy, followed by fallopian tube irrigation with saline-air mixture under ultrasonographic imaging.

Results: Our series revealed no complication during or after the procedure; anesthesia was not required. One patient lost from follow-up. Of the remaining 26, 10 patients (38.4%) conceived either spontaneously or with treatment by clomiphene or gonadotropine associated with intrauterine insemination. The median time to conception was 5 months (range 4–17).

Conclusion: We therefore concluded that office hysteroscopic tubal catheterization is a simple (without anesthesia required) option for the treatment of patients suffering from proximal tubal occlusion. Fertility outcomes in our series are comparable to other treatments options for tubal catheterization. Therefore, tubal catheterization should not delay the assisted reproduced techniques if indicated but we propose to include it in a global integrated approach.

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Introduction

Tubal catheterization is usually reserved for infertility treatment in selected cases of bilateral proximal tubal occlusion [1]. As the incidence of this condition is limited to approximately 10–20% of women with mechanical infertility [2], the hitherto published data concerning the best therapeutic approach for these patients is scarce [3,11].

Hysteroscopy with dye instillation is considered the gold standard for comprehensive evaluation of the female reproductive organs. Moreover, while the gold standard for evaluation of the uterine cavity is diagnostic hysteroscopy [4], tubal patency may be validated by either hysterosalpingography (HSG), or ultrasonic

evaluation using Echovist-200 [5–7]. However, interpretation of the passage of contrast medium into the proximal portion of the tube remains somewhat uncertain.

Since hysterolaparoscopy with dye instillation, is an expensive and an invasive procedure, with potentially life-threatening risks [8], the search for a safer and less invasive techniques is still ongoing. In the present report we describe for the first time, an office hysteroscopic tubal catheterization that combines uterine cavity investigation and assessment of tubal patency, with the concomitant advantage of therapeutic tubal re-canalization.

Patients and method

The study group consisted of infertile patients diagnosed with either unilateral or bilateral proximal tubal occlusion by HSG, who attended the outpatient clinic of the Sheba Medical Center during a 3-year period. All patients tried to conceive before the procedure for at least 12 months. No patient suffered from anovulation. All

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patients received a detailed explanation about the procedure and signed an informed consent approved by the local institutional review board.

Patients with hydrosalpinx, diagnosed either by HSG or ultrasonographic evaluation, acute pelvic inflammatory disease and an undiagnosed vaginal bleeding, were excluded.

After a careful scanning of the uterus and ovaries by transvaginal ultrasound in our fertility unit, special attention was paid to visualizing possible pathology in the tubes and pouch of Douglas. Diagnostic hysteroscopy was proposed only after excluding hydrosalpinx or any pathology in the pouch of Douglas.

Procedure

With the patient in the lithotomy position, a transvaginal ultrasound scan was performed.

Hysteroscopy was performed with a GMS 50K Versascope hysteroscope (Gynecare, Ethicon Inc., Somerville, NJ, USA) using sterile saline. The procedure was performed without the use of a speculum or tennaculum [9]. The uterine cavity was inspected and the tubal ostia identified. Regarding the settings of the procedure, fluid pressure is determined by the need of the surgeon by the gravity and how high the liquid is placed (we are not using automatic system for pressure), temperature is the temperature of the consultation room (between 19 °C and 22 °C). The procedure is always performed on the first stage of the cycle before the ovulation.

Immediately after hysteroscopy, vaginal ultrasound scanning was performed while the irrigation pressure was increased gradually by using an admixture of saline and air in a 20 cc injection syringe in order to allow perfusion of the tubes. The ultrasound probe is introduced into the vagina immediately when the proximal ostia is cannulated, then the probe is introduced and the water is injected. If it is technically too difficult the surgeon asked assistance to hold the ultrasound by another person and if the transvaginal ultrasound was not feasible then abdominal ultrasound can be used. If patients were obese or with history of previous surgery with potential adhesions we prefer to perform transvaginal ultrasound to have a better evaluation of the patency of the tubes.

At the start of the procedure, we assessed the presence of free fluid in the pouch of Douglas and the presence of evolving hydrosalpinx. If a tube filled with saline was observed, with no passage of fluid to the pouch of Douglas, distal tubal occlusion was diagnosed and the procedure was terminated. If there was no passage of fluid into the tube and only the uterine cavity was filled with saline, proximal tubal occlusion was diagnosed and we proceeded to the next stage, which was tubal catheterization.

Through a working channel of 5F, a Modified Novy J-NCS-503570 Cornual Cannulation Set (Cook Medical, Inc., Bloomington, IN, USA) was inserted. After the catheter was introduced into the tubal ostium and through the intramural part of the tube, tubal patency was confirmed by injecting sterile saline-air mixture through the Novy catheter under vaginal ultrasound surveillance. Restoration of tubal patency was confirmed by demonstrating saline passage through the tube.

If the tube was still occluded (no saline passage), a second plastic 3F catheter was introduced through the main Novy catheter

into the intramural portion of the tube. Tubal patency was then reevaluated by flushing the inner catheter with sterile saline-air mixture. If the tube remained occluded, a metal guide wire was introduced through the second catheter to dislodge cellular and mucous debris. The wire was introduced 2–3 cm into the intramural part of the tube. The wire was then removed and the tube was irrigated again under ultrasound surveillance. After removal of the wire and subsequent irrigation, either there was immediate passage of fluid, no passage of fluid, or the guide wire did not pass. If the guide wire passed but there was no passage of fluid, another trial was carried out. If the second wire guide did not pass the occlusion, the procedure was stopped. If the passage of saline-air mixture through the tube was inconclusive, color flow Doppler was performed.

Hysteroscopic tubal cannulation is not, in itself, novel. But the fact that the evaluation of the patency of the tubes is performed by ultrasound in an office setting is novel and give the opportunity to increase the indications of this easy procedure and by that could increase the chance of spontaneous pregnancies even for patients who are starting IVF treatment for tubal factors.

Results

Twenty seven patients with proximal tubal occlusion underwent the above procedures. Nine (33.3%) patients had primary infertility while 18 (66.6%) had secondary infertility. No patient suffered from anovulation in our group. In our group no patient had other intra-uterine pathologies found, such as polyps, fibroids or adhesions.

In our series, there was no intra- or post-procedure complication. No patient required general or local anesthesia.

Twenty-two of the 27 patients (81.5%) suffered from mechanical infertility alone, whereas 5 patients also had male factor infertility.

Bilateral proximal tubal catheterization was performed in 18 (66.6%) of the 27 patients and unilateral catheterization in the remaining 9 (33.3%). Table 1 presents the outcome of tubal catheterization in patients with uni- or bilateral tubal occlusion. Only in 8 (29.6%) patients, we had to proceed to the step of metal guide wire insertion. We obtained a successful passage into the proximal part of the tube, in 6 of these 8 patients.

One patient was lost to follow-up. Ten (38.4%) of 26 patients conceived either spontaneously (5 patients), either after treatment by clomiphene (3 patients) or either with induction of ovulation with gonadotropins associated with intra uterine insemination [2]. Ovulation induction with gonadotropins was used mainly due to the age of the patients and decrease in their ovarian reserve. None of the patients conceived with IVF. The median time from treatment to conception was five months (range 4–17). Table 2 describes the outcomes of the subsequent pregnancies.

Discussion

This report presents a novel office procedure combining office hysteroscopy with transvaginal ultrasonography for the diagnosis and treatment of proximal tubal occlusion. This method allows optimal evaluation of intra-uterine cavity pathologies, which may underlie proximal tubal occlusion, such as small polyps, fibroids, or

Table 1
The outcome of tubal catheterization in patients with uni- or bilateral tubal occlusion.

	Unilateral tubal obstruction	Bilateral tubal obstruction
No. of patients	9	18
No. of blocked tubes (%)	9	36
No. of patent tubes following successful tubal catheterization (% of tubes)	6/9 (66.6)	17/36 (47.2)
No. of patients with at least one patent tube (% of patients)	9 (100)	10 (55.5)

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