Hysteroscopic tubal electrocoagulation in cases with communicating hydrosalpinx and planning for IVF - A pilot study

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ABSTRACT

Objective: To evaluate the hysteroscopic tubal electrocoagulation for the purpose of tubal occlusion of communicating hydrosalpinx in patients scheduled for IVF.

Subjects and intervention: Hysteroscopic rollerball and needle electrode coagulation of the cornual end of the tubes was performed in 10 patients with unilateral or bilateral communicating hydrosalpinx, prior to IVF. The rollerball electro coagulation technique was performed in 4 patients. The needle electrode technique was used on 10 tubes (in 6 patients).

Results: Ten patients underwent the procedure successfully. The mean duration for both techniques used was 5 minutes. Postoperative complications included pain and vaginal spotting that lasted up to 3 days. In the group of the “rollball electro coagulation technique”, the occlusion of 6 tubes was tried, one was successfully closed, 3 tubes were partially opened owing to the fact that a decrease of the hydrosalpinx mass was succeeded, and 2 tubes were totally opened. The needle electrode technique had a 90% success rate of occlusion (only one tube found opened). In total 6 patients have undergone an IVF trial following the procedure, 2 of whom underwent the rollerball electrocoagulation and had negative BHCG, and 4 of the patients of the needle electrode technique group (two had positive BHCG, one chemical pregnancy and a clinical ongoing pregnancy).

Conclusions: The hysteroscopic needle electrode occlusion of communicating hydrosalpinx seems to be a simple, effective and economic method, and it could be an alternative in patients with extensive pelvic adhesions and a clinical ongoing pregnancy.

Key words: Hydrosalpinx, hysteroscopy, electrocoagulation, in vitro fertilization

INTRODUCTION

The prevalence of hydrosalpinx in IVF (in vitro fertilization) patients ranges from 10-13% when diagnosed by ultrasound and could reach up to 30% if diagnosed by HSG (hysterosalpingogram), laparoscopy or open surgery. Hydrosalpinx is a bad prognostic factor according to published results of IVF. It is believed that the fluid acts as a mechanical barrier to implantation of embryos. Also, cytokines, prostaglandins and toxins are present in the fluid and contribute to the impact of hydrosalpinx to IVF success rates.

It has been proved that salpingectomy increases peri-implantation endometrial Hoxa-10 expression in women with hydrosalpinx, a gene that is necessary for a successful implantation. Studies have advocated salpingectomy prior to IVF or proximal tubal occlusion and this is currently performed laparoscopically in most cases. However, a large proportion of infertile tubal factor patients have severe pelvic adhesions that require open surgery and in some situations make the procedure impossible.

Hysteroscopic tubal occlusion by electro coagulation has been used as a method of sterilization. This is a Pilot study that aims to the evaluation of the hysteroscopic electro coagulation as a new approach for proximal tubal occlusion in patients with communicating hydrosalpinx scheduled for IVF.

MATERIALS AND METHODS

The study tracked 10 patients from the outpatient clinic at the National Research Center and at the Kasr El Eini Teaching Hospital affiliated to Cairo University. A written approval was obtained from the Bioethical Committee of the National Research Center and an informed consent statement was signed by the patients prior to inclusion in the study.

INCLUSION CRITERIA

- Age 20-40 years
- Primary or secondary infertility
- Diagnosis of communicating hydrosalpinx; diagnosed by HSG, TV U/S showing distended tubes and intrauterine fluid, or patient complaining of prolonged brownish vaginal discharge
- Necessity of an IVF procedure.

Patients with non communicating hydrosalpinx, uterine anomalies or with a serious medical condition, contraindicating for pregnancy, were excluded.
Before any intervention is decided, a gynecological history with special attention to the cause of infertility, symptoms of vaginal discharge, congestive dysmenorrhea, and abdominal surgeries, was acquired. A pelvic examination was performed to examine the cervix, the vaginal wall, to detect pelvic organ abnormalities and evaluate the pelvic pain and vaginal discharge. All patients had a HSG within the last 6 months showing unilateral or bilateral hydrosalpinx. A Transvaginal Ultrasound examination was conducted and an hydrosalpinx was confirmed by various appearances; cogwheel, interrupted septae.

SUBJECTS OF THE STUDY
The mean age of the patients was 32.1 years (range 28-36). Seven cases (70%) had primary infertility and 3 cases (30%) secondary infertility. Six of the patients had no previous IVF procedures, one case had one failed IVF, one had 2 previous failed IVFs and 2 patients had three failed IVFs. Six patients were diagnosed with bilateral hydrosalpinx (picture 1), the remaining four had a unilateral hydrosalpinx.

All patients underwent diagnostic laparoscopies confirming the condition. Eight of the patients reported a history of pelvic surgery; ovarian cystectomy (5 cases), adhesolysis (2 cases) and a Caesarean section (1 case).

HYSTEROSCOPY AND TUBAL ELECTROCOAGULATION
Eight interventions were performed at El Ebtessama Hospital and 2 cases at Kasr El eini (Cairo university) teaching hospital. All hysteroscopies were performed in the early follicular phase up to day 9 of the menstrual cycle. All procedures were performed under general anesthesia.

We used a standard, rigid 4-mm hysteroscope with a 30° forward-oblique lens and a 5.5-mm diagnostic sheath (Karl Storz, Germany). Uterine distension allowed a panoramic view of the uterine cavity and identification of the tubal ostia. Two techniques were used, the roller ball (Ball Electrode, unipolar, 5 Fr) for the coagulation of the interstitial part of the tube and the uterine cornu area. Coagulation was done using Martin electrosurgical unit; the average time of current flow was 40-55 seconds of intermittent pulses (3-4 seconds per pulse). The second technique used a needle electrode (Betocchi needle electrode, unipolar 5 Fr) inserted into the interstitial part of the tube for about 5 mm (picture 2). Coagulation was done using the Martin electrosurgical unit, and using 40-50 watt power for 4-6 seconds.

FOLLOW UP
The patients were under follow up for 6-10 weeks following the procedure, HSG was done in the postmenstrual phase, after the second cycle postoperatively.

RESULTS
The electrocoagulation roller ball was used in 4 cases and the electrocoagulation needle in 6 cases (picture 2). The mean duration of the procedure was 5 minutes (from the start of hysteroscope introduction). Postoperative pain was perceived by the patients for a maximum of two days; 3 out of the 4 patients of the “roller ball group” had pain lasting two days, all patients “of the needle electrode group” had pain lasting only one day.
Postoperative spotting occurred in all cases and lasted for 2 days in one case of the roller ball electrocoagulation
and 3 days in the remaining 3 patients of this group. As for the needle electrode technique, 2 cases complained about spotting for 1 day and 4 for a maximum of 2 days.

In total 5 cases complained of heavy first menstrual cycle (following procedure) and all patients had a normal second menstrual cycle. An incidental finding was relief of pelvic congestion symptoms. (All patients had congestive dysmenorrhea in addition to the vaginal discharge and occasionally dyspareunia).

FOLLOW UP
This was scheduled to take place after the second menstrual cycle. For the roller ball electrocoagulation technique, 6 tubes underwent intervention (in 4 patients), with only one tube successfully closed, 3 tubes partially opened with reduction of the hydrosalpinx morphology, and 2 tubes opened totally.

As for the needle electrode technique, 10 tubes were tested, in 6 patients, and only one tube was found opened and 9 closed, with no visible hydrosalpinx at the follow up via HSG (Picture 3).

Six of the patients in the study have undergone an IVF following the procedure. Two of them, were in the rollerball electrocoagulation group, and had a negative BHCG (Beta–Human Chorionic Gonadotropin), and four in the needle electrode technique group; two of them had a positive BHCG, one turned out to be a chemical pregnancy and the second a clinical ongoing pregnancy.

DISCUSSION
The latest meta-analysis Cochrane review suggested the laparoscopic unilateral or bilateral salpingectomy to all women with hydrosalpinx prior to IVF. The most studied technique has been laparoscopic salpingectomy as well as proximal tubal occlusion with good results for both techniques. Patients with hydrosalpinges, have in many instances severe pelvic adhesions. In addition, many of these patients have already undergone several pelvic surgeries and therefore are considered high surgical risk for laparoscopic salpingectomy or even proximal tubal occlusion. The laparoscopic route necessitates general anesthesia, involves recognized complications including; vascular damage, visceral organ injury or unintended laparotomy hospital stay and recovery period is much longer than hysterectomy performed under local anesthesia. A theoretical risk of decreased ovarian vascular perfusion has been suggested by some authors however Murray et al and Ejdrup et al in their study showed no negative effect of salpingectomy prior to IVF.

Hysteroscopy whether diagnostic or operative does have its reported complications; uterine perforation, bleeding and fluid overload, these have been found to be significantly higher with operative procedures due to longer operating time and the need for greater cervical dilatation. The current complication rate for operative hysteroscopic procedures lies around 3%, with the half of uterine perforations be related to dilation. In our patients no cervical dilation was needed as office hysteroscopy with 4mm diameter was used. The duration of the procedure did not exceed 5 minutes, which entails minimal distension.

The hysteroscopic route has been used successfully for tubal sterilization only one case of successful hysteroscopic tubal occlusion and IVF pregnancy has been reported, following Essure procedure, a microinsert use
in the proximal tubal orifice. Although this technique is more expensive than hysteroscopic electrocoagulation, it is cheaper than laparoscopy. In the old series of cornual end tubal electrocoagulation (for sterilization) the complication rate was similar to recent literature (3.2%), however there were all major complications28, out of 773 cases studied: 7 uterine perforations, 3 bowel damage with peritonitis, 4 cases of acute peritonitis, 8 ectopic pregnancies and 1 death from bowel perforation and peritonitis. In addition, 5% of minor complications were reported including bleeding, cramps, pain and endometritis.

Animal studies have tested occlusion of the cornual end of fallopian tube in rabbits, using radiofrequency electrocoagulation, the technique was successful with no complications reported. Quinones14 in his study (1976) noted the effect of the coagulating current on the uterine serosal surface in hysterectomy specimens, starting at 25 seconds of coagulation. This, of course, is a much longer duration than used in our study where coagulation was applied for 4-6 seconds only.

In our pilot study we used two techniques; the roller ball, which had a high failure rate (83.3%), this could be attributed to the fact that the technique relies on action of the coagulation on the endometrium of the cornua that possibly is shedded in the next cycle allowing reanalisation of the tube. The second technique; electrocoagulation using the needle electrode had much lower failure rate; 10%, this is because the needle is inserted into the tube for 5mm and allows complete damage of the endosalpinx and hence complete damage of the intramural portion of the tube.

Our results using the needle electrode technique are considered reproducible when compared to previous clinical trials. Richart13 had a success rate of 84%, similarly Quinones14, had a success rate of 87.7% using hysteroscopic electrocoagulation, for the purpose of sterilization, on 350 cases. These studies involved the use of an electrocoagulation catheter which is very much similar to the needle electrode. In the above reported series only one complication of cornual pregnancy was reported. Two other studies29,30 had a lower success rate of 75% and 73% respectively.

An additional advantage of needle electrode is that postoperative pain and spotting duration was less when compared to the roller ball. All patients had complete relief of symptoms of pelvic congestion (dysmenorrhea & dyspareunia), even those in whom the tubes were found patent, and had a decrease in the mass of hydrosalpinx or no visible hydrosalpinx. Possibly this could be explained by atrophy of the epithelium or absorption of the hydrosalpinx fluid.

The timing for the follow up examinations with HSG in the reported trials ranges from 6-16 weeks postoperatively. In our study we performed the follow up HSG after an average of 8-10 weeks after the intervention.

CONCLUSIONS

This pilot study suggests that the technique of hysteroscopic tubal electro coagulation seems to be a simple, time-sparing and minor-interventional procedure, in addition economic to be performed, in cases with communicating hydrosalpinx, and alternatively in patients with extensive pelvic adhesions, scheduled for tubal occlusion. The feasibility, safety and success of the sug-

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**Picture 3.** Bilateral tubal occlusion in follow up with HSG
gested procedure as well as of the subsequent IVFs will depend on the results of larger series.

REFERENCES