Hysteroscopic Tubal Occlusion Using Iso-AMYL-2-Cyanoacrylate

A Pilot Study

Presented as a Thesis Submitted in Partial Fulfillment of the Master Degree in Obstetrics & Gynecology

Presented By

Mahmoud Amr Abdel Aziz Nadim
(MB, B. Ch - Ain Shams Faculty of Medicine 2012)
Resident of Obstetrics & Gynecology, Ain Shams Faculty of Medicine

Under Supervision of

Professor Ihab Hassan Abdel Fattah
Professor of Obstetrics & Gynecology- Ain Shams Faculty of Medicine

Professor Karam Mohamed Bayoumy
Professor of Obstetrics & Gynecology -Ain Shams Faculty of Medicine

Doctor Amr Helmy Yehia
Assistant Professor of Obstetrics & Gynecology -Ain Shams Faculty of Medicine

Ain Shams University
Faculty of Medicine
2016

إغلاق أنابيب فالوب

عن طريق حقن عقار أيزو أميل-٢- سيانوأكريلات

بإستخدام المنظار الرحمي

دراسة إستكشافية مقدمة كبحث توطئة للحصول على درجة ماجستير أمراض النساء و التوليد

من الطبيب

محمود عمرو عبد العزيز نديم

بكالوريوس الطب و الجراحة من كلية الطب جامعة عين شمس (٢٠١٢)

طبيب مقيم أمراض النساء و التوليد - مستشفى أمراض النساء و التوليد

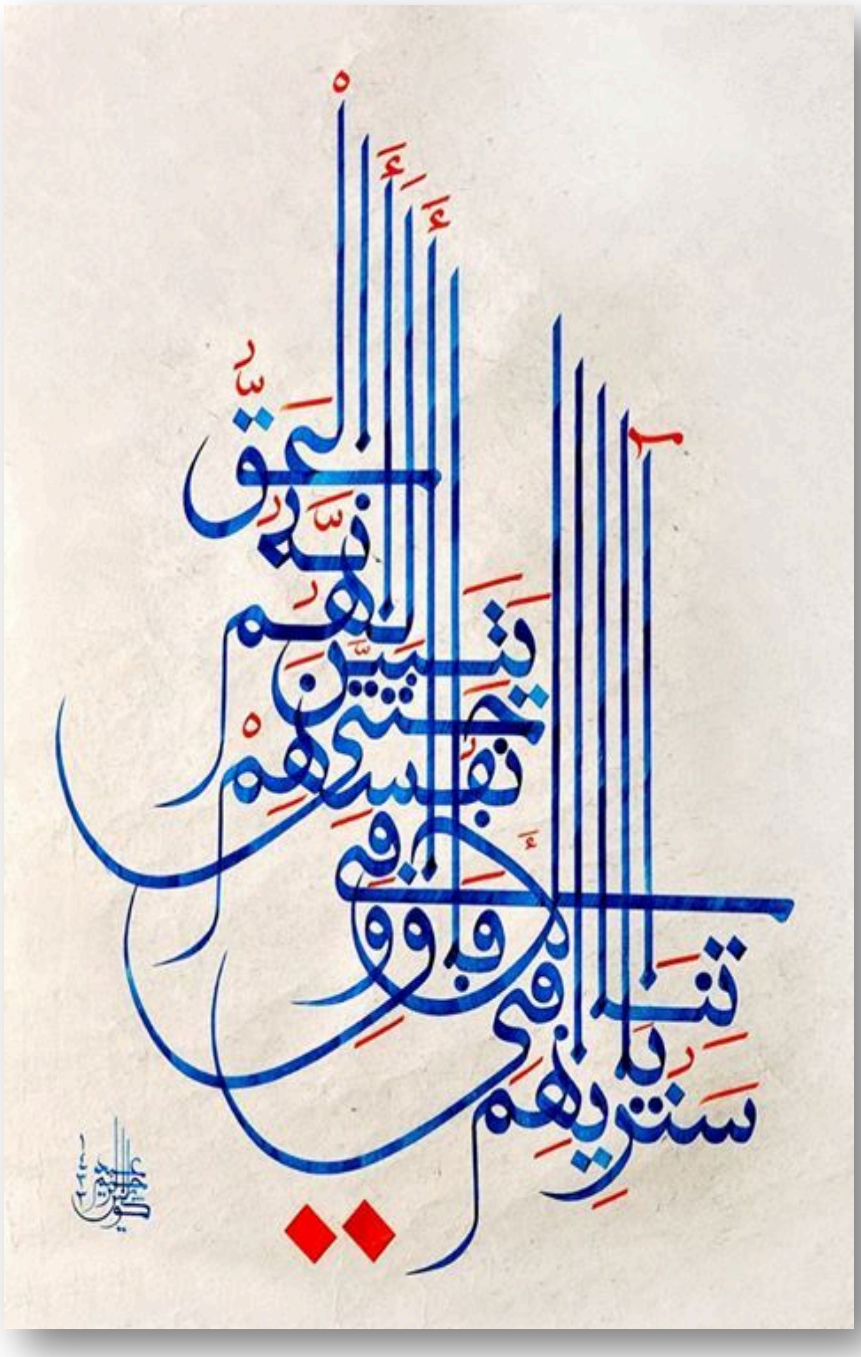
تحت إشراف

الأستاذ الدكتور/ إيهاب حسن عبد الفتاح
أستاذ أمراض النساء و التوليد- كلية الطب جامعة عين شمس

الأستاذ الدكتور/ كرم محمد بيومي
أستاذ أمراض النساء و التوليد- كلية الطب جامعة عين شمس

الدكتور/ عمرو حلمي يحيى
أستاذ مساعد أمراض النساء و التوليد- كلية الطب جامعة عين شمس

جامعة عين شمس
كلية الطب



سورة فصلت – الآية 53

"إنِّي رأيتُ أنَّه لا يكتُبُ
إنسانٌ كتابًا في يومِه؛ إلاَّ
قالَ في غَدِهِ: لو غُيِّرَ هذا
لكان أحسنَ، ولو زِيدَ كذا
لكان يُستَحسَنُ، ولو قُدِّمَ هذا
لكان أفضلَ، ولو تُرِكَ هذا
لكان أجملَ. هذا مِنْ أعظَمِ
العِبَرِ، وهو دليلٌ علَى
استيلاءِ النَّقصِ علَى جُملةِ
البَشَرِ."

القاضي البيساني في خطاب إلى العماد الأصفهاني

Hysteroscopic Tubal Occlusion Using Iso-AMYL-2-Cyanoacrylate A Pilot Study

By

Ihab Hassan Abdel Fattah, Karam Mohamed Bayoumy, Amr Helmy Yehia & Mahmoud Amr Abdel Aziz Nadim

Department of Obstetrics and Gynecology, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Corresponding Author: *Mahmoud Amr Abdel Aziz Nadim*

E-mail: mahmoud.anadim@gmail.com

Tel. No.: 01224443151

Abstract

Background: Several retrospective and prospective studies have long demonstrated a negative effect of hydrosalpinx on the success rates in patients undergoing in vitro fertilization (Anderson et al, 1994 and Vandromme et al, 1995). Two reports, with promising results, were published to evaluate the pregnancy and perinatal outcomes of ultrasound sclerotherapy with 98% ethanol and tetracycline (Eun Duc Na et al, 2012) or with ethanol only (Zhang et al, 2014) on women with hydrosalpinx before in vitro fertilization and embryo transfer. In 2007 an animal experiment was conducted in Brazil to test the effectiveness and safety of the use of a cyanoacrylate derivative for hysteroscopic occlusion of rabbit uterine tubes. The authors concluded that this approach offers a safe and feasible method of uterine tube obstruction (Rivoire et al, 2007).

Aim of the work: The present study was conducted to assess the safety and efficacy of hysteroscopic tubal occlusion using Isoamyl-2-cyanoacrylate (Amcrylate®; Concord Drugs Ltd., Hyderabad, India).

Study design: This is a pilot study conducted in the Early Cancer Detection Unit of the Ain Shams University Maternity and Women's Hospital, Abbassia – Cairo, Egypt.

Patients and methods: This is a pilot study conducted in the Early Cancer Detection Unit of the Ain Shams University Maternity and Women's Hospital, Abbassia – Cairo, Egypt in the period from November 2015 to June 2016. It included twenty patients who were scheduled for abdominal hysterectomy and bilateral salpingo-oophorectomy for a benign gynecological indication.

Results: Overall 5 cases were histopathologically considered as not occluded (25%), 9 cases (45%) were partially occluded and 6 cases were completely occluded (30%). A perisalpingitis reaction was noted in one case and a stromal reaction was noted in all cases. A methylene blue test was performed on the hysterectomy specimen after the end of the intervention. A negative methylene blue test was indicative of successful tubal occlusion. Four cases out of 20 had a positive methylene blue test representing a 20% failure rate.

Conclusion: The present study clearly demonstrates that the use of Isoamyl 2 cyanoacrylate to effect hysteroscopic tubal occlusion is a rather safe procedure. It can be conducted as an office procedure with little discomfort. As to the effectiveness of the procedure we had an 80% negative methylene blue testing.

Key words: Isoamyl 2 cyanoacrylate, Hysteroscopy & tubal block.

Acknowledgements

This work was never to be achieved without the help and dedication of people who were beside me when I needed them…I am much indebted to all of them…

To Professor Ihab Abdel Fattah for always being a mentor and role model.

To Professor Mohamed Amer for being such a wonderful tutor and coach.

To Professor Karam Bayoumi for a constant help and unlimited support.

To Professor Magda Hassan for so meticulously and benevolently doing the histopathologic work.

To Doctor Amr Helmy for his patience, meticulous revision and guidance.

To Doctor Mortada El Sayed for always being there when I needed him.

To my friend AbdElRahman Safwat for making the arrangement with the patients very smooth.

To my friend Mohab Fouad for providing an unlimited supply of ureteric catheters.

To my brother Ali who made the video editing.

To all the staff of the early cancer detection unit in our prestigious department for their dedication and constant help.

To all patients who accepted to be part of this work while knowing that it is not necessary for their treatment.

To my wife for always being beside me.

To my family for believing in me.

Introduction

Several retrospective and prospective studies have long demonstrated a negative effect of hydrosalpinx on the success rates in patients undergoing in vitro fertilization (Anderson et al, 1994 and Vandromme et al, 1995).

Laparoscopic salpingectomy before in Vitro Fertilization & Embryo Transfer (IVF-ET) has been demonstrated to restore outcomes but is invasive and is associated with higher risk in patients with significant intraabdominal adhesions (Jonson et al, 2004) In addition; salpingectomy may disturb ovarian blood supply and result in a reduced ovarian response during stimulation (Gelbaya et al, 2006). Results of laparoscopic proximal tube occlusion have been promising, but this approach also involves entry into the abdominopelvic cavity (Surrey et al 2001).

More recently, a hysteroscopic approach to proximal occlusion of a hydrosalpinx using the Essure® microinsert (Conceptus, Inc., Mountain View, CA) and a resultant IVF-ET pregnancy was described (Rosenfield et al, 2005). A systematic review and pooled analysis was just published in 2014 concluding that hysteroscopic hydrosalpinx tubal

occlusion by Essure microinsert appears to be an effective option for management of hydrosalpinx in women before IVF. However, the cost of performing the procedure is as high as 2400$ (Arora et al, 2014).

In a low resource setting a trial was conducted to effect proximal tubal occlusion by hysteroscopic roller ball coagulation (Atef et al, 2010), but the authors did not follow on the effect of such a procedure on the rate of implantation in cases of IVF-ET.

Two reports, with promising results, were published to evaluate the pregnancy and perinatal outcomes of ultrasound sclerotherapy with 98% ethanol and tetracycline (Eun Duc Na et al, 2012) or with ethanol only (Zhang et al, 2014) on women with hydrosalpinx before in vitro fertilization and embryo transfer.

In 2007 an animal experiment was conducted in Brazil to test the effectiveness and safety of the use of a cyanoacrylate derivative for hysteroscopic occlusion of rabbit uterine tubes. The authors concluded that this approach offers a safe and feasible method of uterine tube obstruction (Rivoire et al, 2007).

Cyanoacrylates are a family of strong fast-acting adhesives with industrial, household (Super glue) and medical uses. Octyl cyanoacrylate, butyl cyanoacrylate and amyl cyanoacrylate were developed to address toxicity concerns and to reduce skin irritation and allergic response (Fiscl et al, 1962).

In 1966 a cyanoacrylate spray was used in the Vietnam War to reduce bleeding in wounded soldiers until they could be brought to a hospital. Butyl cyanoacrylate has been used medically since the 1970s. The U.S. Food and Drug Administration approved its use as a medical adhesive in1998 with Dermabond (Singer et al, 2004). Research has demonstrated the use of cyanoacrylate in wound closure as being safer and more functional than traditional suturing (stitches). The adhesive has demonstrated superior performance in the time required to close a wound, incidence of infection (suture canals through the skin's epidermal, dermal, and subcutaneous fat layers introduce extra routes of contamination), and final cosmetic appearance (Moschos et al, 1997).

In the recent years Iso-amyl-2-cyanoacrylate was extensively used in the management of bleeding esophageal varices with

variable degrees of success (Joaquin, 2012). Furthermore, a case study was recently published involving the use of of isoamyl-2-cyanoacrylate (AMCRYLATE®; Concord Drugs Ltd., Hyderabad, India) as an effective therapy for gastric Dieulafoy's lesion without serious complications (Abdel Razek, 2013).

In this clinical trial, we are conducting a preliminary pilot study to test the effectiveness and safety of using a cyanoacrylate derivative (isoamyl-2-cyanoacrylate, Amcrylate®; Concord Drugs Ltd., Hyderabad, India) to effect hysteroscopic proximal tubal occlusion. This may provide a feasible office procedure for the performance of tubal occlusion in cases of hydrosalpinx prior to IVF-ET procedures as well as in cases requesting tubal occlusion as a method of permanent sterilization.

AIM OF THE WORK

The present study was conducted to assess the safety and efficacy of hysteroscopic tubal occlusion using Isoamyl-2-cyanoacrylate (Amcrylate®; Concord Drugs Ltd., Hyderabad, India).

REVIEW OF LITERATURE

Chapter 1

Anatomic and Physiologic Consideration

Anatomical Considerations

The fallopian tubes are bilateral muscular structures of paramesonephric duct origin. They are measuring from 7 to 12 cm in length and usually less than 1 cm in diameter. They have a lumen that varies considerably in diameter. It is extremely narrow, being less than 1 mm at its opening into the uterine cavity. It then widens in the isthmus being 2.5 mm and in the ampulla it is approximately 6 mm in diameter. The tube begins in the uterine cavity at the cornu and penetrates the myometrium (intramural or interstitial portion). The proximal intramural part of the tube is 1.5 to 2.5 cm long and has a relatively straight to slightly curved course. It is o,8 to 1,2 mm in diameter and can accommodate a 1 mm. diameter cannula without epithelial damage. This is followed by a 1.5 cm portion which is sinuous in 60% of cases and is difficult to catheterize and is very easily perforated. This anatomy is thought to assist in preventing

vaginal bacteria from gaining entrance to the body. At the same time, this tiny structure is prone to accumulation of secretions and scarring from inflammation, leading to unwanted sterility. The second portion is the relatively straight and narrow portion of the tube which emerges from the uterus posterior to and a little above the origin of the round ligament. The lumen of the narrow isthmus is relatively simple, with a few longitudinal folds. This portion of its tube is 2 or 3 cm long. There are three layers of musculature: the inner longitudinal, the middle circular layer, and the outer longitudinal layer. There is some evidence that the isthmus may act as a sphincter.

The ampulla is the largest and longest portion of the tube, approximately 5 cm or more in length. The lumen enlarges from 1 or 2 mm near the isthmus to over a centimeter at the distal portion. The mucosa has multiple longitudinal folds. The ampulla is the portion usually involved in gonorrheal salpingitis and tubo-ovarian abscesses and is the site of most ectopic pregnancies (Woodruff & Pauerstein , 2006).

At the distal end of the tube is the trumpet shaped infundibulum. The tube ends in a number of fimbriae or frond-like projections; the largest of these is ordinarily in contact with the ovary and is known as the ovarian fimbria.