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## Case Report

# Long-term indwelling copper intrauterine device (IUD) found during primary infertility work up

Mayer Rubin, BS<sup>a</sup>, Raphaella DaSilva, MD<sup>b</sup>, Donald Phillibert Jr, MD, FACOG<sup>c</sup>, Mark Guelfguat, DO<sup>d,\*</sup>

<sup>a</sup> Albert Einstein College of Medicine, 1300 Morris Park Ave, The Bronx, NY 10461, USA

<sup>b</sup> DASA - diagnósticos das americas SA, Rua José de Brito, 125, Barra da Tijuca, Rio de Janeiro, RJ 22793-220, Brazil

<sup>c</sup> Jacobi Medical Center, Department of Obstetrics and Gynecology, 1400 South Pelham Parkway, Building 1, Room BS25, The Bronx, NY 10461, USA

<sup>d</sup> Jacobi Medical Center, Department of Radiology, 1400 South Pelham Parkway, Building 1, Room 4N15, The Bronx, NY 10461, USA

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## ABSTRACT

Infertility is a public health concern worldwide. Hysterosalpingogram is a useful diagnostic tool to both evaluate the contours of the uterine cavity and to assess tubal patency. Intrauterine devices (IUDs) are the world's most prevalent form of long-acting reversible contraception. In this case, a 30-year-old P0 female, an immigrant from Jamaica, was referred for hysterosalpingogram for primary infertility workup. Under fluoroscopic imaging, an unexpected T-shaped IUD was visualized in the expected location of the uterus. The IUD lacked portions of the radiopaque copper lining. The patient initially denied IUD insertion. However, after further investigation, the patient's mother admitted IUD insertion at the age of 14 in Jamaica. This case raises a concern for the possibility of unexpected IUD discovery during infertility work up and emphasizes the importance of clinician awareness of the changes that may be seen on imaging when these devices are in place long-term.

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## Introduction

Infertility has been recognized as a public health issue worldwide by the World Health Organization. A review by Boivin et al indicates a 9% prevalence of infertility (after 12 months), with 56% of couples seeking medical care [1]. Causes of infer-

tility include a wide range of etiologies such as male factors and ovulation problems, as well as uterine and tubal pathologies [2].

Workup of suspected infertility includes a thorough history and physical exam, female hormonal assessment, hysterosalpingography (HSG), pelvic sonogram and/or MRI, hysterosonogram, and semen analysis. HSG is a widely used

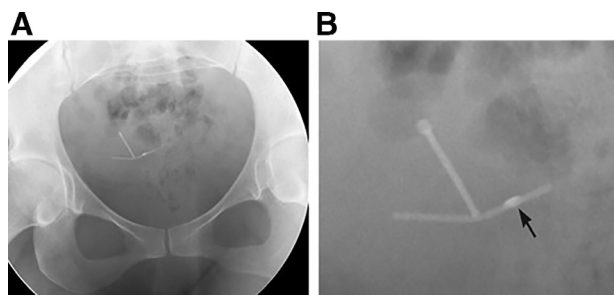
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\* Corresponding author.

E-mail address: [mguelfguat@gmail.com](mailto:mguelfguat@gmail.com) (M. Guelfguat).

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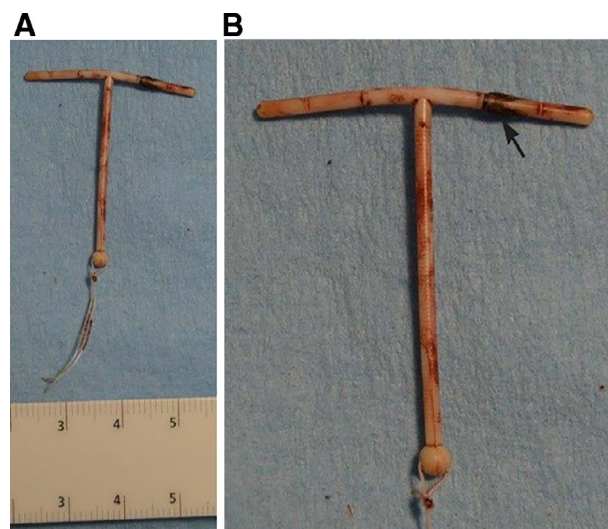
**Fig. 1 – (A) Spot HSG image demonstrating a T-shaped radiopaque IUD in the usual pelvic location. (B) Minimal residual copper material is seen on the left side-arm of the device on a magnified image (black arrow). There is no copper on the other side-arm or stem.**

radiological procedure that allows for the evaluation of the morphology of uterine cavity size and shape as well as the patency of fallopian tubes [2]. IUDs are a widely used method for long-acting reversible contraception. With nearly 160 million users, the IUD is the second most popular contraceptive method after sterilization and the most widely used form of reversible birth control [3]. Long-term retention of IUDs has been reported in the past. However, associated IUD deformities, long-term IUD imaging correlations, and infertility due to the unexpected presence of an IUD have not been described. This case provides an unusual perspective on long-term copper IUD retention.

## Case report

A 30 year-old female P0 presented for evaluation of primary infertility. The patient was unsuccessfully attempting to conceive for over 9 months. Of note, the patient and her partner were treated for Chlamydia in the past. On physical exam, the uterus was reported to be non-tender, normal in size and shape. The cervix was normal. No IUD strings were identified on speculum exam.

The patient was referred for a hysterosalpingogram as a part of her infertility workup. Fluoroscopic evaluation of the uterus demonstrated the presence of a T-shaped IUD in the anticipated location of the uterine body and fundus (Fig. 1A). Although its general shape was compatible with Paragard IUD (copper-containing IUD) (The Cooper Companies, Pleasanton, CA, USA), the radiopaque/copper-containing portion was not apparent on the right side-arm, and smaller than expected on the left (Fig. 1B). These observations were suggestive of copper absorption/oxidation over time. The referring physician was notified, and the patient scheduled an appointment for IUD removal. Serum copper level was not measured, as prior studies demonstrated no alteration in serum copper levels in long-term copper IUD wearers [4]. After its removal, images of the retrieved IUD were obtained in the Pathology laboratory and demonstrated corrosion of copper, right side-arm greater than left, as seen on fluoroscopy (Figs. 2A, B).



**Fig. 2 – (A) Photograph of the removed IUD shows intact strings. (B) Zoomed photograph of the device shows minimal amount of the residual copper material on the left side-arm bar corresponding to the HSG findings (black arrow).**

## Treatment

The patient was born in Jamaica, moved to the USA as a teenager, and was unaware of IUD placement. Upon further interrogation, the patient admitted having a “procedure” performed in Jamaica at age 14. The patient’s mother confirmed the IUD placement.

The initial attempt to remove the IUD in a Gynecology clinic was unsuccessful. Removal of the IUD was subsequently performed under anesthesia through hysteroscopy. The patient was able to conceive within 3 months after the IUD’s removal.

## Discussion

IUDs are a popular form of long-acting reversible contraception worldwide due to their safety, availability, and efficacy [5]. Their primary contraceptive effect is due to prevention of fertilization and implantation by interfering with sperm motility and survival. The reaction of the intrauterine foreign body (copper) with the endometrium activates the release of leukocytes and prostaglandins that act not only in the uterus, but also in the oviduct and cervix to impede sperm and egg development [6]. As soon as the device is inserted, chemical changes on the surface of the copper wire occur with 3 stages of copper corrosion in utero: rapid surface oxidation, slower but increasingly uneven corrosion, and uneven corrosion developing in the core of the copper wire eventually resulting in its breakage. The time limit for effective use of the copper device is estimable based on the observed rate of corrosion in utero. Theoretically, the life span of the device would be about 180 months (the time limit for the exhaustion of copper),

but uneven corrosion, breakage, and other structural factors shorten the lifespan of the device [7]. Babu et al suggested that copper released from a copper IUD may not be readily absorbed from the uterine fluid. In their study, the mean range and frequency distribution of serum copper levels in long-term copper IUD wearers were similar to those seen in the normal population [4].

Although long-term indwelling IUDs are rare, there are reports in the literature about long-term “forgotten” IUDs present for 50 years [8]. However, no reports were found with long-term Paragard IUDs demonstrating copper erosion on imaging or in a pathological specimen.

This case raises the consideration of unknown IUD in infertility work up in an immigrant population. A forgotten IUD can lead to a range of complications, including infertility, pelvic inflammatory disease, actinomycosis, ectopic pregnancy, uterine perforation, and postmenopausal bleeding. Difficulties associated with IUD removal may occur in up to 9% of patients. Removal of “lost” IUDs within the uterus require operative removal in 40% of cases [9]. As a safety measure, patients without known medical records, seeking fertility, may benefit from a baseline ultrasound to evaluate for a preexisting IUD.

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