

Original research article

# Safe and cost-effective ultrasound guided removal of retained intrauterine device: our experience ☆, ☆ ☆, ★

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## Abstract

**Objectives:** To evaluate the efficacy and difference in cost of ultrasound guided removal of retained intrauterine device (IUD).

**Study design:** A total of 23 women underwent ultrasound-guided retrieval of retained IUDs between January 2013 and March 2014. Transvaginal ultrasound was performed in all cases to assess the localization of the IUD. Under transabdominal ultrasound guidance, either the crochet type IUD hook (Gyneas, Goussainville, France) or Alligator forceps were used to grasp the IUD and remove it from the uterine cavity. The costs of the ultrasound guided procedure and the hysteroscopic removal of the IUD were compared.

**Results:** Twenty-three patients who failed IUD removal in the clinic were referred to our department for ultrasound-guided removal. All patients had an IUD present in the uterine cavity. Eleven patients had Paragard IUDs (48%), eight had Mirena IUDs (35%), three had Lippes loop (13%), and one had a ring IUD (4%). The patients' ages ranged from 20–56 years. The IUDs were in place for 8 months to 23 years. Of the 23 patients with retained IUDs, 19 were successfully removed (83%), and 4 underwent hysteroscopic removal of IUD. The IUD removal cost in the operating room on average was \$3562 US dollars and the cost of ultrasound-guided removal was \$465 US dollars.

**Conclusions:** Retained intrauterine devices with or without strings can often be safely removed in an office-based setting under ultrasound guidance at less cost than in the operating room, even in cases with embedded IUDs.

**Implications:** Our experience leads us to propose in-office IUD removal under ultrasound guidance as the first line in management of retained IUDs after failed removal by conventional practices. Ultrasound provides numerous advantages including direct visualization in a less invasive manner than hysteroscopy. Three-dimensional imaging can also be used for enhanced perspective.

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*Keywords:* Cost-effectiveness; IUD removal; Missing strings; Retained IUD; Ultrasound guidance

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## 1. Introduction

Intrauterine device utilization has increased considerably over the last 15 years. According to the National survey of family growth 2006–2010, among women 15–44 years of age who have ever had sexual intercourse, 7.7% of the women use IUD as contraception [1,2]. The use of

intrauterine device as a method of contraception has increased from 0.8% in 1995 to 8.5% in 2006–2010 [3,4]. Missing IUD strings, i.e., IUD strings that are not visible at the external cervical os, are reported to occur in about 5% of patients and may be the result of improper placement, retraction of IUD strings into the cervical canal, expulsion, perforation, or migration of the IUD [5]. Missing strings are noted in 4.5–18.1% of IUD users specifically at the time of IUD check up or removal [6–9]. Conventional practices of retrieval include: endocervical sweep with a cervical cytology brush, the use of a small forceps, or even colposcopy to improve visibility of the cervical canal [10,11]. Most of the IUDs with missing strings can be safely removed in the office via these methods with the use of proper instruments [5,7,9,10]. The IUD hook is the most commonly used device for removal of IUD from the uterine cavity. Other devices which have been used are 10 cm Kelly

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clamps and Alligator forceps [12,9]. If the strings are still not visible, then ultrasound should be performed to ensure that the IUD is in the uterine cavity [5]. In-office removal is effective, safe, cost effective, and is successful in most of the cases with lost strings [12]. Traditionally when IUD removal in the office setting is unsuccessful, the patient is scheduled for hysteroscopic IUD removal in the operating room [13].

We defined “retained IUDs” to refer to cases when the IUD was confirmed to be in the uterine cavity by ultrasound, and the attempts to remove the IUD in an office setting without ultrasound failed. We hypothesized that attempting removal of retained IUDs under ultrasound guidance is a safe and cost effective alternative, and it will improve the success rate of IUD removal in this particular group of patients in an office setting.

## 2. Materials and methods

A total of 23 women underwent ultrasound-guided retrieval of retained IUDs between January 2013 and March 2014 at Jackson Memorial Hospital/University of Miami in Miami, Florida. The patients initially sought evaluation for either IUD replacement, a complication secondary to IUD, desired subsequent pregnancy in the near future, or if they were concomitantly pregnant. This study included all the patients in whom IUD removal failed in our clinics or were referred to us from outlying clinics for IUD removal in the operating room. Residents and attendings attempted IUD removal in the clinic using an IUD hook or Alligator forceps and no bedside ultrasound was readily available. Institutional review board approval was obtained, and a protocol was devised for the patients who failed IUD removal in the clinic, which included a transvaginal ultrasound with 3D reconstruction in all cases to assess the localization of the IUD.

Based on the ultrasound findings and the overall clinical picture, the patients were extensively counseled regarding whether the IUD should be removed or not and the procedure was explained in detail. An informed consent for removal of IUD under ultrasound guidance was then obtained from the patient. Under transabdominal ultrasound guidance, either the crochet type IUD hook (Gyneas, Goussainville, France) or Alligator forceps was introduced into the uterine cavity to grasp the IUD, and it was gently removed. No local or regional anesthesia was necessary. In cases where IUD removal was unsuccessful under ultrasound guidance, the patients were taken to the operating room for hysteroscopic IUD removal. The data collected included the patients’ demographic features such as age, parity, and premenopausal or postmenopausal status. The information regarding type of IUD, duration of IUD use, location of IUD in the uterus determined by ultrasound, associated symptoms, associated gynecological conditions, success rate of IUD removal, and any complications during IUD removal was obtained from the computerized data base. The cost of both ultrasound-

guided and hysteroscopic IUD removal in the operating room was obtained from the Financial Department of Jackson Memorial Hospital/University of Miami.

## 3. Results

Twenty-three patients who failed IUD removal in the clinic were referred to us for ultrasound-guided removal. All patients had an IUD present in the uterine cavity confirmed by ultrasound. The patient’s age range was 20–56 years with a mean age of 39.3 years. The patients’ BMIs ranged between 20.7–42.33 with average of 28.5. The parity ranged from 1 to 5, with a median parity of 2. Three patients were postmenopausal and 2 of these patients presented with postmenopausal bleeding. The indications for the removal of IUD were: pelvic pain (6), past time of effectiveness/no symptoms (6), abnormal uterine bleeding (5), postmenopausal bleeding (2), concomitant pregnancy (2), desired pregnancy (1), and recurrent pelvic inflammatory disease (1). Three patients had fibroid uteri and in one case the uterine cavity was distorted by a posterior myoma displacing the IUD. The IUD was located up in the cavity and the hook was advanced under ultrasound guidance, successfully navigating the distorted cavity. The patients had IUDs in situ for a period ranging from 8 months to 23 years with a mean of 7.8 years. Eleven patients had Paragard IUDs (48%), eight had Mirena IUDs (35%), three had Lippes loop (13%), and one had a ring IUD (4%). In 6 patients (26%), the IUD was noted to be malpositioned (in the mid or lower cavity) in the uterus and 3 (50%) of these malpositioned IUDs were embedded in the myometrium. In 17 patients (74%), the IUD was in the normal location in the uterine cavity, and in 6 (26%) of these the IUD was embedded in the myometrium. Of the 23 patients, 19 were successfully removed (83%) and 4 underwent hysteroscopic removal of IUD. The four unsuccessful cases were at the beginning of adopting the ultrasound modality for IUD removal and failed due to patient inability to tolerate procedure (2), fibroid uterus (1), and malpositioned/embedded (1); later on the success rate was close to 100%.

## 4. Discussion

Intrauterine devices are long acting, highly effective forms of contraception now recommended as a first-line method for the majority of women by the American College of Obstetrics and Gynecology and the World Health Organization [14]. IUDs are now also widely considered safe to use in nulliparous women and by adolescents [14]. Mirena IUD use has especially increased because of its additional effectiveness in the treatment of menorrhagia [15]. In regards to removal, in-office removal of IUD with or without missing strings is a common practice and should be initially attempted in all patients. Swenson et. al reported that

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