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Review article

# Laparoscopic removal of an intra-abdominal intrauterine device: case and systematic review☆

Richdeep S. Gill[a,1], Dereck Mok[a,1], Matthew Hudson[b], Xinzhe Shi[c], Daniel W. Birch[c], Shahzeer Karmali[c,*]

[a]*Department of Surgery, University of Alberta, Edmonton, Alberta, Canada T6G 2N8*
[b]*Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada T6G 2N8*
[c]*Centre for the Advancement of Minimally Invasive Surgery, Royal Alexandria Hospital, Edmonton, Alberta, Canada T5H 3V9*

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**Abstract**

**Background:** Uterine perforation by intrauterine devices (IUDs) is a rare but well recognized complication. In the past, the presence of adhesions and perforation of viscera often resulted in the need for a laparotomy to remove the IUD. However, advances in laparoscopic technique have allowed surgeons to safely retrieve perforated IUDs. In this review, we analyze uterine perforation by an IUD and assess laparoscopic vs. open methods for removal of a perforated IUD.
**Study Design:** A systematic search strategy was applied to several electronic bibliographic databases: Medline/Pubmed, Embase, Cochrane Library, and OCLC PapersFirst. Key words used were IUD, laparoscopy, and uterine perforation.
**Results:** One hundred seventy-nine cases of attempted laparoscopic removal of perforated IUDs were identified in the English literature between 1970 and 2009. Patient age ranged from 17 to 49 years. Diagnostic laparoscopy was performed in all 179 cases reported. Laparoscopic removal of perforated IUDs was achieved successfully in 64.2% (115/179) of cases.
**Conclusion:** This systematic review highlights how advances in laparoscopic technique and skill have allowed surgeons to safely retrieve IUDs without laparotomy. We recommend an attempt at laparoscopic removal as first-line treatment in symptomatic patients and as a reasonable treatment option in asymptomatic patients.


*Keywords:* Intrauterine device; IUD; Uterine perforation; Laparoscopy; Laparoscopic surgery

## 1. Introduction

Intrauterine devices (IUDs) are one of the most common forms of reversible birth control used, with more than 100 million women using an IUD globally, and are safe and effective [1]. Uterine perforation secondary to an IUD is a rare but serious complication. It is estimated that the rate of perforation is between 0 and 1.3 per 1000 patients [2]. The World Health Organization recommends that all displaced IUDs be removed promptly [3]. Perforation of the uterus necessitates surgical removal of IUDs due to the potential for bowel perforation or obstruction. In the past, the presence of adhesions and perforation of viscera often resulted in the need for a laparotomy to successfully remove the IUD; however, advances in laparoscopic technique have allowed surgeons to safely retrieve perforated IUDs. We report a case of a perforated copper IUD adherent to the sigmoid colon, which was successfully removed laparoscopically using a harmonic scalpel. Second, we systematically review the literature on the effectiveness of laparoscopic removal of intra-abdominal IUDs.

## 2. Case

A healthy 26-year-old gravida 5, para 1 woman presented with a 1-week history of nausea and vomiting with

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* Corresponding author. Royal Alexandra Hospital, Community Services Center, Edmonton, Alberta, Canada T5H 3V9. Tel.: +1 780 735 6650; fax: +1 780 735 6652.
*E-mail address:* shahzeer@ualberta.ca (S. Karmali).
[1] Co-first authors.

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intermittent lower left quadrant pain. She had a copper IUD inserted 4 months earlier by her family physician. Vaginal examination revealed fullness in the left adnexal region. The patient had leukocytosis of $14\times10^9$ cells/L, with an elevated serum β-human chorionic gonadotrophin (59,623 U/L). An ultrasound revealed a live intrauterine pregnancy, and her IUD situated in the posterior cul-de-sac, external to the uterus abutting a bowel loop. The patient elected to terminate the pregnancy at 7 weeks gestation via suction dilatation and curettage. A diagnostic laparoscopy revealed the IUD on the sigmoid colon adherent to an appendix epiploica (Fig. 1). An attempt to free the IUD with blunt dissection by the patient's gynecologist was unsuccessful, and the patient was referred to a general surgeon. A second laparoscopic procedure was arranged. Due to concerns regarding transmission of thermal energy by the copper IUD, electrocautery was avoided. Instead, a harmonic scalpel was used to dissect the IUD free from the sigmoid colon. The sigmoid colon was oversewn with intracorporeal suture and tested by air insufflation using intraoperative colonoscopy. The patient made an unremarkable recovery and was discharged on the second postoperative day.

## 3. Methods

### 3.1. Criteria for considering studies for this review

#### 3.1.1. Types of studies

Human case series and case reports.

#### 3.1.2. Types of participants

The target population consists of female adults (>18 years old) with a uterine perforation secondary to an IUD.

#### 3.1.3. Types of interventions

Removal of the IUD, which had perforated the uterus, was attempted laparoscopically.

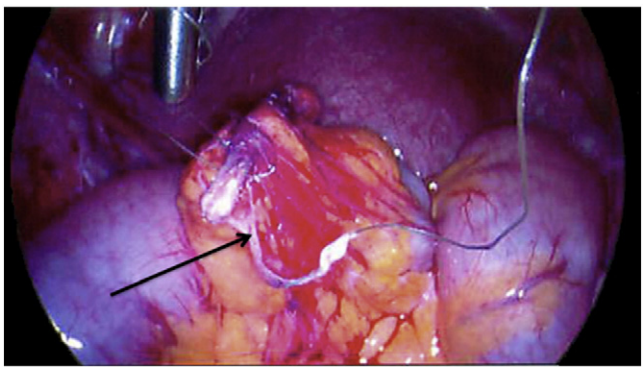

Fig. 1. Intrauterine device (black arrow) embedded in appendix epiploica of sigmoid colon.

### 3.2. Types of outcome measures

#### 3.2.1. Primary outcomes

The primary outcome was successful removal of the perforated IUD from the abdomen.

#### 3.2.2. Secondary outcomes

The secondary outcome includes conversion rates to laparotomy, location of IUDs, presence of adhesions and presence of colonic perforation.

### 3.3. Search methods for identification of studies

#### 3.3.1. Electronic searches

English-language manuscripts were considered for review inclusion. A comprehensive search of electronic databases (e.g., MEDLINE/Pubmed, EMBASE, Cochrane Library, Scopus, Health Technology Assessment database, OCLC PapersFirst) using broad search terms such as IUD, laparoscopy and uterine perforation was conducted between 1970 and 2009.

#### 3.3.2. Selection of studies and data collection and analysis

Studies of any design involving laparoscopic retrieval of an intra-abdominal IUD following uterine perforation for female adult patients were included. The electronic searches were conducted, and one author conducted a prescreen to identify articles clearly irrelevant by title, abstract and keywords of publication. Two independent reviewers then assessed the studies for relevance, inclusion and methodological quality. Two reviewers independently extracted data from the full versions of the manuscripts. The extracted information included demographics (e.g., age, sex), presenting clinical symptoms, successful removal of perforated IUDs laparoscopically, intra-abdominal location of perforated IUDs, need for conversion to laparotomy.

## 4. Results

A total of 386 articles were identified using our search criteria for screening (Fig. 2). Following assessment by our exclusion criteria, 183 were rejected and 203 studies remained for abstract review, of which 49 met the inclusion criteria following careful screening. These included 15 case series [2,4–17] and 34 case studies, which identified a total of 179 cases of perforated IUDs in which laparoscopic removal was attempted.

The mean age of the patients was 26 years old, ranging from 17 to 49 years old (Table 1). The majority (80%) of the females included were multiparous. Patients presented with a variety of clinical symptoms following uterine perforation, with pain and unexpected pregnancy being the most common (Table 2).

Diagnostic laparoscopy was successfully performed in all 179 patients. Subsequently, the removal of the perforated IUD was completed laparoscopically in 64.2% (115/179) of cases. Laparotomy either after diagnostic laparoscopy or