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# Perforated Intrauterine Contraceptive Device: Single Institution Experience

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## **Abstract**

**Background:** Intrauterine contraceptive device (IUCD) is the most commonly used contraceptive method, especially in developing countries given its cost-effectiveness. However, its use is not without complications, the most important of which is uterine perforation.

**Objective:** To evaluate the clinical presentation, management and outcome of women with perforating IUCDs referred to a single tertiary centre, especially with a nationwide campaign to increase the utilization of contraceptive methods.

**Methodology:** This is a cross-sectional study conducted at a University Hospital in the time period from January 2017 to June 2018, with the aim to evaluate cases presenting with a confirmed diagnosis of perforated IUCD.

**Results:** We managed 32 women with perforated IUCD. All had copper IUCD. The most common presentation was pelvic pain (43.75%), however, 37.5% were asymptomatic. Ultrasound was valuable in the evaluation of surgical risk in most cases. Extraction of IUCD using minimal invasive approach was possible in 90.6 % of cases.

**Conclusion:** The least invasive approach for extraction of perforated IUCD should always be considered as it allows an enhanced recovery. Ultrasound is an essential tool in the preoperative evaluation and can guide the surgical approach to be used.

**Keywords:** Intrauterine contraceptive device, perforation, contraception, hysteroscopy, laparoscopy, cystoscopy.

## **INTRODUCTION**

In developing countries, intra-uterine contraceptive devices (IUCDs) are considered one of the contraceptive methods of choice, being cheap, readily available, reversible & long-acting (1,2,3). However, despite its wide safety profile, still, its use is not free of complications. Uterine perforation by the IUCD and its dislodgement in an inappropriate site is considered a serious complication (4) that ranges from 0.05 to 13 per 1000 insertions (5).

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Case reports of uterine perforation reveal that it is no longer a rare complication, and its occurrence is increasing relative to the prevalent use of IUCD (6-9).

To our knowledge, few studies have reported the diversity of risk factors, presentation and diagnosis of such complication (6,8,10,11). So, the aim of our study is to highlight the clinical course of reported cases with perforated IUCD, starting from the history, clinical presentation and finally, the diagnosis and management.

## **Materials and Methods**

This was a cross sectional study conducted at the Department of Obstetrics and Gynecology, Cairo University Hospital in the period from January 2017 to June 2018. The study was approved by the Research and Scientific committee of the Department of Obstetrics and Gynecology with ethical approval number (I16009). All cases with a confirmed diagnosis of perforated IUCD referred to the outpatient clinic of the Department of Obstetrics and Gynecology at Cairo University Hospital were included. All cases had detailed history. Diagnosis of all cases was confirmed by ultrasound showing an empty uterus and an X-ray confirming the intra-abdominal or intra-pelvic location of the device (Figure 1). All cases underwent careful preoperative evaluation using both transvaginal and transabdominal ultrasound with the aim to locate the perforated device and assess possible difficulties during the surgery such as involvement of viscera and expected adhesions. Demographic data of the patients were described including age, body mass index (BMI), parity and mode of delivery. Presenting complaints, duration of symptoms, time interval from last delivery to IUCD insertion and time interval from IUCD insertion to diagnosis were reported. A minimal invasive approach was always thought for removal of the perforated IUCD, unless otherwise indicated. We reported the surgical management and intraoperative

findings including type and location of IUCD as well as presence of adhesions or pus formation. We evaluated the ability of ultrasound to locate the perforated IUCD as well as the surgical difficulty expected. We excluded cases with malposition, or partial embedment that were managed hysteroscopically at the outpatient clinic. Ease of IUCD placement was also evaluated by questioning the women about their experience at time of insertion.



**Figure 1:** Plain X-ray showing abnormal position of IUCD, seen at left side of the pelvis.

## **Statistical Analysis**

The statistical analysis was done using Microsoft Excel 2016. Data were statistically described in terms of mean  $\pm$  standard deviation ( $\pm$ SD), or frequencies (number of cases) and percentages when appropriate.

## **RESULTS**

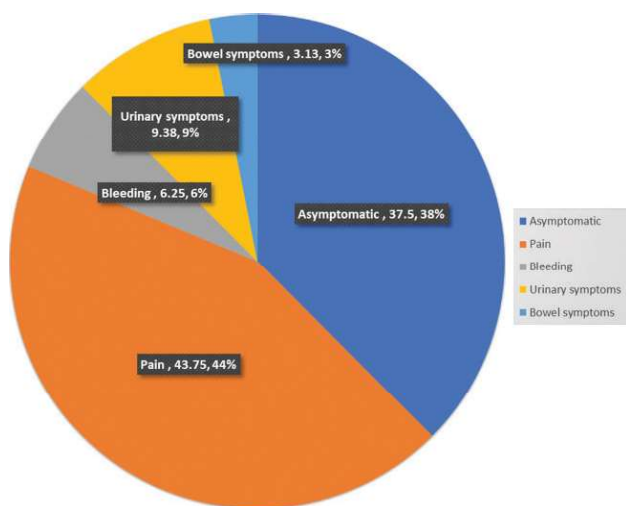
We managed 32 cases with perforated IUCD who were referred to the Department of Obstetrics and Gynecology - Cairo University Hospital in the period from January 2017 to June 2018. The mean age of cases was 28.38 years ranging from (19 to 42 years) with a

mean body mass index (BMI) of 28.75 kg/m<sup>2</sup>. The majority of women lactated (81.25%). The baseline characteristics of women with cases are summarized in **Table 1**. Majority of women had IUCD inserted at the end of the puerperium (71.9%). The average time from insertion to diagnosis was 680.8 days (ranging from 10 to 3285 days). In our study, two thirds of the cases were diagnosed during the first year of insertion with one third within the first month and another one third after 1 year.

The most common presenting complaint was pain (43.75%) followed by being asymptomatic (37.5%). **Figure 2** Pie Chart showing presenting complaints for women with perforated IUCD in our studied population.

**Table 1: Baseline characteristics of the women who had perforated IUCD**

Variable	Mean $\pm$ SD (Range)	N	%
<b>Age (years)</b>	28.38 $\pm$ 5 (19-42)	32	100
<b>BMI (kg/m<sup>2</sup>)</b>	28.75 $\pm$ 4.63 (22-40.2)	32	100
<b>Gravidity</b>	2.71 $\pm$ 1.48 (1-6)	32	100
<b>Parity</b>	2.34 $\pm$ 1.06 (1-4)	32	100
• P1		9	28.1
• P2		8	25
• P3 or more		15	46.9
<b>Mode of last delivery</b>			
• NVD		18	56.3
• CS		13	40.6
• VBAC		1	3.1
<b>Breastfeeding</b>			
• Yes		26	81.3
• No		6	18.7
<b>Time interval from delivery to insertion of IUCD (days)</b>	78.125 $\pm$ 65.3 (30-330)		
• 6 weeks or less		23	71.9
• > 6 weeks- 6 months		7	21.9
• 6 months- 1 year		2	6.2
<b>Time interval from insertion to diagnosis (days)</b>	680.8 $\pm$ 1006.2 (10-3285)	32	100
• Less than or equal 1 month		10	31.25
• More than 1 month – 1 year		10	31.25
• More than 1 year		12	37.5



**Figure 2:** Pie Chart showing presenting complaints for women with perforated IUCD in our studied population.

We questioned women about their experience during the insertion of the IUCD. Only 22 were able to report on that. Out of the 22 women, 16 described insertion as being painful or painful with bleeding while 6 cases described the insertion as being painless and uneventful (27%). None of the cases confirmed having ultrasound immediately after the insertion.

All cases had combined transvaginal and trans-abdominal ultrasound with the aim to locate the IUCD by relating it to the pelvic organs. It was possible to identify the location of the IUCD in 30 cases, and this failed in 2 cases. Figure 3 demonstrates an example for localization of the IUCD using transvaginal scan which showed IUCD perforated into the left ovary with no visible bowel seen around predicting uncomplicated procedure, which was confirmed on laparoscopy.



**Figure 3 (a)**

**Figure 3 (b)**

**Figure 3:** IUCD perforating into left ovary  
**Figure 3a:** TVS showing IUCD perforating into the left ovary, no evidence of bowel surrounding the ovary which was mobile during ultrasound examination

**Figure 3b :** Laparoscopic view confirming the ultrasound findings

#### **Management of Perforated IUCD:**

Four cases had partial perforation, while 28 cases had complete perforation of the uterine wall. One case was managed by laparotomy from the beginning due to high suspicion of bowel involvement. One case was extracted by cystoscopy due to perforation into the urinary bladder. Three cases were partially embedded in the uterine wall and were removed by hysteroscopy under anesthesia due to failed office hysteroscopy. The management of the remaining 27 cases was attempted by laparoscopy, however, two cases were converted to laparotomy; one due to bowel involvement and the other one was due to inability to locate the perforated IUCD, which was found during laparotomy hidden at the ileocecal fold between ileum and cecum. Table 2 showed surgical approach used for management of perforated IUCD. All cases went uneventfully with no complications. Hospital stay was least with cases managed with hysteroscopy, cystoscopy and laparoscopy.

**Table 2: Surgical approach used for management of perforated IUCD**

	Laparotomy	Cystoscopy	Hysteroscopy	Laparoscopy
<b>Number of cases (%)</b>	1 (3%)	1 (3%)	3 (9%)	27 (85%)
<b>Estimated blood loss (ml)</b>	200 ml	Nil	Nil	61.85 ± 54.9
<b>Hospital stay (days) (mean +/- SD)</b>	6	2	1	2.22 ± 1.18
<b>Complications</b>	Nil	Nil	Nil	Conversion to laparotomy ( 2 cases)

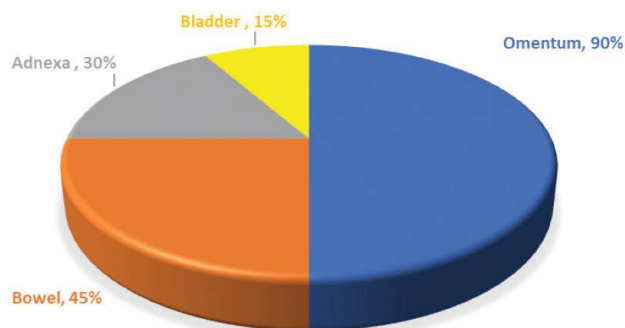
### Intraoperative findings:

The type of IUCD in all cases was Copper T device (100%) as this is the most commonly used nationwide. Three cases had partial perforation into the myometrium. One case perforated the bladder, two cases had bowel perforation. Most common intra-abdominal location of the perforated IUCD was the pouch of Douglas. Table 3 showed location of the perforated IUCD.

**Table 3: Location of the perforated IUCD**

Location of the IUCD:	Number	Percentage
• Anterior to the uterus	6	18.75
• Above the fundus	3	9.4
• Pouch of Douglas	8	25
• Broad ligament	2	6.25
• Left adnexa	4	12.5
• Right adnexa	2	6.25
• Perforating sigmoid colon	2	6.25
• Ileocecal fold	1	3.1
• Urinary bladder	1	3.1
• Myometrium	3	9.4

In cases with complete perforation of the IUCD into the peritoneal cavity (n=28); abscess formation was observed in 5 cases (4 managed early within 10 days, 12 days, 20 and 25 days of insertion, and one found to have encysted pus collection after 1.5 years). Adhesions were found in 20 out of 28 women (71.42 %) with complete perforation into the peritoneal cavity and was found involving most commonly the omentum (90%) as well as bowel (50%), adnexa (30%) and bladder (15%) as demonstrated in **Figure 4**. **Figure 5**: demonstrates laparoscopic view of perforated IUCD with adhesions involving the omentum.



**Figure 4:** Structured involved in adhesions with perforated IUCD



**Figure 4:** Laparoscopy showing IUCD with adhesions to omentum and anterior abdominal wall

## **DISCUSSION**

IUCD is the most widely used contraceptive method, covering a large scale of the population, especially in developing countries. Though safe, but still uterine perforation by IUCD is considered one of the most serious complications following insertion. In face of under-reporting of the condition, the incidence documented in literature may not reflect the actual prevalence of its occurrence. In addition, there is diversity in risk factors, presentation, means of diagnosis and management.

In this study, we aimed to evaluate cases with perforated IUCD, including risk factors, clinical presentation, preoperative evaluation and management. We assessed 32 cases with confirmed uterine perforation by IUCD, who attended to Gynecology clinic in Kasr El-Aini Hospital, and were examined thoroughly by history taking, examination and investigations (plain X-ray and US).

In all cases (n=32), the type of IUCD was Copper-IUCD, being the cheapest and the most widely available in our community. Several studies have reported more cases of uterine perforation with Copper-IUCD in comparison to hormonal IUCD (known as the Levonorgestrel Intrauterine System or LNG-IUS), probably due to its availability, and patient's intention to use it for a longer time (9-13). In contrary, Turok et al (7), in evaluating 95 cases of uterine perforation; noted more prevalence with LNG-IUS (12), whereas, Jensen et al (14), didn't report such complication in 500 LNG-IUS insertions (9).

Lower parity, in the study by Caliskan et al., was found to be a risk factor for uterine perforation while increasing parity was found to reduce this risk (15). In our study, slightly more cases were encountered in women who were para 2 or less (53.1%) compared to 46.9% women who were para 3 or more. On the other hand, the expulsion rates were reported to be higher in multiparas (6, 8)

In the current study, 81.25% (n=26) of cases were lactating mothers, and the majority (71.9%) were inserted by the end of puerperium. Breast feeding and post-partum period have been proposed by many authors, as one of the risk factors of uterine perforation by IUCD, due to thin uterine wall, endometrial atrophy secondary to hypoestrogenic state, and accelerated uterine involution (10,12,16). Yet, Kho and Chamsy (6) stated that it is probably a reflection of the practice for the timing of insertion, rather than a definite causality. Supporting this is a multicenter 6-month follow-up study in which copper IUCD was inserted in 1,149 women with no perforations reported in any of the women whether breast-feeding or not (17).

It has been reported that most cases of uterine perforation by IUCD were inserted within 1 year after delivery, and the perforation has occurred during the insertion, whether partial or complete (5,6,9,12,13, 18).

In our study, 43.75% of cases had uterine scar due to previous cesarean delivery. Thus, the incidence did not increase with uterine scarring. This support the evidence in literature that previous history of cesarean delivery was not associated with the risk of uterine perforation (15, 19).

The time interval from insertion to diagnosis of a perforated IUCD is interestingly variable. In around 90% of cases, perforation was not recognized at the time of IUCD insertion (20, 21). In our study, almost equal number of cases were diagnosed within the first month, from one month to the first year of insertion and after one year of insertion with two thirds of cases diagnosed within the first year of insertion. This is somehow similar to previous data which reported that almost 50% of cases were diagnosed after 1 year of insertion (20).

Uterine perforation should be thought of in case of painful insertion associated with or without bleeding, however, painless insertion



does not rule out the possibility of uterine perforation. In our study, 27% of cases did not experience pain at time of insertion. Thus, routine ultrasound post-insertion is necessary to confirm correct placement. In a study by Chi et al., it was noted that the insertion of IUCD was less painful in lactating women which may be explained by higher levels of  $\beta$ -endorphins (17).

The most common presenting symptoms in our studied population was abdominal or pelvic pain (43.75%) followed by being asymptomatic (37.5%). Other symptoms included; urinary symptoms (9.38%), vaginal bleeding (6.25%) and bowel symptoms (3.31%). Similar data has been reported by many authors (4,10, 20,22,23). While others reported occurrence of pregnancy as one of the manifestation, or missing strings as the most common presentation (7,11, 24). Since only cases with confirmed uterine perforation were referred to our gynecology unit, we did not encounter cases presented with pregnancy on top of perforated IUCD.

It is of utmost importance to accurately localize the IUCD pre-operatively (25) as this will be of benefit to guide the surgical approach used. Ultrasonography was our first diagnostic tool, together with plain X-ray. We did not require CT scan in any of the cases. Most studies conquered with our diagnostic steps, and, preserved CT scan for complicated cases, in which bowel involvement, or surgical difficulty were suspected (4,6, 15, 22,25, 26, 27, 28). Other diagnostic modalities, such as; fluoroscopy (9,29,30), cystoscopy and proctoscopy (31) have been reported to be used in specific conditions.

The ability of the ultrasound to detect and localize the IUCD depends largely on the type of the IUCD. In the study by Kho and Chamsy, ultrasound could not detect the perforated device in more than 50% of the cases (6). In this study 46% of perforated devices were LNG-IUS. Copper IUCD are easier to detect by ultrasound scan than

LNG-IUS as the visualization of the latter relies essentially on the observation of an acoustic shadow rather than visualization of the device itself (32)

A minimal invasive approach was considered in all cases except one case who required laparotomy from the start due to bowel involvement. Laparoscopy was used in 27 cases, however 2 of these cases were converted to laparotomy due to bowel perforation in one case and inability to locate the IUCD in the other case. One case required cystoscopy due to bladder perforation and 3 cases with partial perforation were removed using hysteroscopy. Thus, in our study, minimal invasive approach was successful in 90.6% of cases.

Laparoscopy should be considered the first and mainstay management of cases with perforated IUCD, being both safe and effective (1,4,6,10). Mantoğlu et al (10), reported successful laparoscopic management in almost 99% of their cases, but their study was limited by the small number of cases (n= 10), and their data being retrieved from a single center. On the contrary, the systematic reviews proposed by Gill et al (8), and Mosley et al (11), reported lower percentage of laparoscopic intervention; 64.2% (out of 179 cases) and 72.1% (out of 129 cases) respectively. Still these data should be interpreted with caution; Gill et al (8), was subject of bias, being limited by the quality of the primary studies included. Mosley et al (11), was limited by the long-time span (from 1970 to 2010), during which dramatic changes have occurred in laparoscopic tools and techniques.

Intra-operatively, the missed IUCD was located in various sites, similar to those previously mentioned in the literature (8,10,11), however, the pouch of Douglas was the most common site in which the IUCD was found. This agrees with the study by Zakin et al who found that the pouch of Douglas is the most common location for a completely perforated IUCD (27)

In cases in which IUCD perforated into the peritoneal cavity, abscess formation was noted in 15.6 % of cases, and was seen as early as 10 days and up to 1.5 years following the insertion. Thus, findings from our study suggests that perforating IUCD may induce sterile inflammatory reaction with pus formation in early phases.

On the other hand, adhesions were found in 71.4 % of the cases, most commonly involving the omentum (90% of cases). This agrees with the findings from the study by Sengul et al., 2014 in which IUCD was found most commonly attached to the omentum (33). Rarely, adhesion formation caused by the perforated IUCD resulted in intestinal obstruction (34). Several studies found that adhesion formation was more common with IUCDs than the LNG-IUS (6,35)

In conclusion, physicians should be aware of the risk of IUCD perforation. Post-insertion ultrasonography is essential to confirm correct placement. Regular follow up allows early detection of perforated IUCD. The least invasive approach for extraction of perforated IUCD should always be considered as it allows an enhanced recovery with a more favorable outcome. Ultrasound is an essential tool in the preoperative evaluation and can guide the surgical approach to be used.

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