

# Intrauterine adhesions after hysteroscopic treatment for retained products of conception: what are the risk factors?

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**Objective:** To assess the prevalence and risk factors for intrauterine adhesions (IUA) after hysteroscopic treatment of retained products of conception (RPOC).

**Design:** Retrospective cohort study.

**Setting:** Gynecologic endoscopy unit.

**Patient(s):** A total of 167 women referred to our institution from 2009 to 2013.

**Intervention(s):** Operative hysteroscopy for treatment of RPOC and office hysteroscopic follow-up to assess for IUA.

**Main Outcome Measure(s):** We investigated demographic characteristics, obstetrics parameters, and surgical variables to evaluate which factors could be associated with IUA formation.

**Result(s):** Of 167 women treated for RPOC, 84 (50.3%) had undergone a follow-up hysteroscopic evaluation after the operative hysteroscopy and were included in the study. Intrauterine adhesions were found in 16 cases (19.0%), of which only 3 (3.6%) were severe adhesions. Multivariate analysis showed that the presence of IUA was associated with RPOC after cesarean section (5 of 10 [50.5%] developed IUA, vs. 7 of 49 [14.3%] after vaginal delivery). Intrauterine adhesions were also found in 4 of 23 women (17.4%) undergoing hysteroscopy for RPOC after abortion. Patient age, gravidity, parity, and the interval between the index pregnancy and treatment for RPOC were not associated with postoperative IUA.

**Conclusion(s):** Hysteroscopic treatment for RPOC had a 3.6% incidence of severe intrauterine adhesions formation in this descriptive series. Women with RPOC occurring after delivery by cesarean section are particularly at risk for development of IUA. (Fertil Steril® 2015;103:775–9. ©2015 by American Society for Reproductive Medicine.)

**Key Words:** Adhesions, retained, products, conception, hysteroscopy, Asherman

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Intrauterine adhesions (IUAs), also known as Asherman's syndrome, are a severe complication of residual products of conception (RPOC), occurring in up to 30% of women undergoing postpartum curettage (1). This syndrome is associated with secondary infertility and severe obstetric

complications, such as placenta accreta (1). The extent of adhesions and their severity are directly related to the long-term complications (2). The operative hysteroscopy technique, using focused and limited dissection of the uterine cavity instead of the blind global curettage, has been proposed

by Goldenberg et al. (3), with the aim of reducing the prevalence of IUA. Further studies have subsequently shown relatively low rates of postoperative adhesions using the operative hysteroscopy technique for treatment of RPOC after delivery and abortion (4–6). Our group recently evaluated the rates of IUA after hysteroscopy in a systematic literature review (7). Although IUAs were found to be relatively rare after hysteroscopy for treatment of RPOC (occurring in approximately 4% of cases), the available studies were insufficient to determine superiority over traditional curettage.

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Severe IUAs with near-complete obliteration of the uterine cavity are difficult to treat, and fertility outcomes are often compromised (1). The significant consequences of severe IUA have prompted a growing interest in the prevention of IUA, using different pharmacologic approaches. These prophylactic treatments may include the use of adhesion barriers in the uterine cavity and the prescription of postoperative estrogen medications (8, 9). Although the efficacy of prophylactic measures in the prevention of adhesions has yet to be established, those treatments may be of use in those patients deemed to be at high risk for development of IUA. Thus, the aim of the present study was to investigate the risk factors associated with development of IUA after hysteroscopy for RPOC.

## MATERIALS AND METHODS

We searched our computerized database for patients who underwent operative hysteroscopy for removal of suspected RPOC at our department from January 2009 to December 2013. For the reasons described above, it is our policy to perform hysteroscopy for the treatment of RPOC whenever it is clinically possible (the patient is hemodynamically stable and without acute and severe bleeding). Some patients were treated for the index pregnancy (delivery or abortion) at our medical center and subsequently diagnosed with RPOC, and some were referred by outside providers only for treatment of RPOC. We retrospectively reviewed the medical records and abstracted information regarding general and obstetric demographics (i.e., age, gravidity, parity), description of the index pregnancy and any complications related to it (i.e., vaginal or cesarean delivery, medical or surgical abortion, peripartum manual removal of the placenta, or postpartum hemorrhage), clinical presentations at time of RPOC diagnosis (i.e., asymptomatic patient, bleeding, or fever), surgical procedure for removal of RPOC, postoperative follow-up, and the final pathology report of the resected material. The study was approved by the institutional review board (Assaf Harofe Medical Center, Zerifin, Israel).

Ultrasound findings considered suspicious for RPOC were the following. [1] Hyperechogenic masses observed in the uterine cavity on grayscale ultrasound with positive flow on color Doppler examination were considered highly suspicious for RPOC and immediately referred for surgery regardless of the mass's size. [2] Hyperechogenic mass without blood flow on color Doppler examination or a mixed hypo- and hyperechogenic mass were considered less suspicious for RPOC in an asymptomatic patients. These patients were followed up for 2–4 weeks, and if the repeat ultrasound examination revealed persistent findings, these patients were referred for hysteroscopy. The endometrial thickness was >5 mm in all these cases and ranged from 6 to 50 mm.

Operative hysteroscopy for removal of RPOC was performed using a standardized technique. All procedures were performed under general anesthesia. The cervix was dilated with Hegar's dilators up to 9.5 mm. Using 0.9% saline solution as a distension media, the Versapoint resectoscope (Gynecare, Ethicon Endo Surgery) fitted with a 4-mm electrosurgical loop was introduced into the uterine cavity, and the intrauterine findings suspected as RPOC were gently separated from the

uterine wall using the loop as a curette. The use of bipolar electro-surgery was minimized as much as possible to avoid causing thermal damage to the endometrium. After the procedure, patients were treated with a course of oral antibiotics (amoxicillin/clavulanic acid, 875 mg twice daily for 7 days) and combined estrogen and P preparation (11 days of 2 mg E<sub>2</sub> valerate, followed by 10 days of 2 mg E<sub>2</sub> valerate and 0.5 mg norgestrel).

Upon their discharge home and according to our routine follow-up protocol, all patients were advised to undergo diagnostic office hysteroscopic follow-up after 6–8 weeks, to assess adhesion formation after the initial procedure and to allow for further treatment if necessary. The occurrence of postoperative IUA was assessed at that time. The hysteroscopic findings on follow-up hysteroscopy were classified as [1] normal uterine cavity, [2] persistent RPOC, [3] mild IUA (adhesions occluding less than one-third of the cavity), [4] moderate IUA (adhesions occluding one-third to two-thirds of the cavity), and [5] severe IUA (adhesions occluding more than two-thirds of the cavity). The classification of IUA was based on a modification of the American Fertility Society classification for IUA (10). We used the description of intrauterine findings described in the American Fertility Society classification but removed the reference to the menstrual pattern, because the majority of our research cohort were in close proximity to delivery and their menstrual cycle may have been affected by lactation. In those cases in which persistent RPOC or IUA were found, a second operative procedure was recommended.

Data were collected on a standard spreadsheet (Microsoft Excel 2010). Statistical analysis was performed using SPSS software (version 15). Two tailed *P* values of < .05 were considered statistically significant. Descriptive parameters are expressed as mean ± SD or median (range). Frequencies are presented as percentages. Continuous variables were compared using the Student *t* test for parametric variables and the Mann-Whitney rank test or analysis of variance for nonparametric variables. The  $\chi^2$  test was used to compare frequencies. Stepwise multivariate regression analysis was performed to verify the significance of each variable in relation to IUA formation.

## RESULTS

During the study period, 167 women were referred for treatment of RPOC and underwent operative hysteroscopy. Of those, 84 patients (50.3%) presented for follow-up hysteroscopy and represent the population of the present study assessing risk factors for IUA (Fig. 1). Of those 84 cases, the index pregnancy was term delivery in 61 cases (72.6%) (including 50 vaginal deliveries and 11 cesarean deliveries) and abortion in 23 cases (28.1%) (15 by surgical abortion, 7 by medical abortion, and 1 case of spontaneous abortion). The mean patient age was 30.9 ± 5.6 years, their median gravidity was 2 (range, 1–6), and their median parity was 1 (range, 0–6). The clinical presenting symptom was reported for 81 women. Of those, vaginal bleeding was reported by 44 women (54.3%), and fever was reported by 2 women (2.5%), whereas 35 (43.2%) were asymptomatic and diagnosed by routine ultrasound. The type of pregnancy (i.e., vaginal delivery, cesarean delivery, and abortion) was not associated with the

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