

Review Article

Hysteroscopy for Infertile Women: A Review

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ABSTRACT Hysteroscopy is widely performed in infertile women. A review of peer-reviewed, published literature from the PubMed database on uterine intracavitary pathology, proximal tubal occlusion, failed in vitro fertilization procedures, and first trimester miscarriages of infertile women was performed to examine the importance, feasibility, and success rates of diagnostic and operative hysteroscopy when evaluating and treating these conditions. *Journal of Minimally Invasive Gynecology* (2015) 22, 353–362 © 2015 AAGL. All rights reserved.

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In 2002, approximately 2.1 million US women were infertile. According to the National Center for Health Statistics, between 2006 and 2010, rates of infertility ranged from 8% to 30% in married women aged 15 to 44 years [1]. Assisted reproductive technology has been applied to treat many of these women; however, the peer-reviewed published literature has identified hysteroscopy as a valuable tool for diagnosis and treatment of some infertile women before or after undergoing an assisted reproductive technique.

Indications for hysteroscopy in infertile women include intracavitary abnormalities, such as submucous fibroids, endometrial polyps, uterine septum, adhesions, chronic endometritis, and retained products of conception. The use of hysteroscopy has been evaluated in proximal tubal occlusion, failed in vitro fertilization (IVF) cycle, and first-trimester miscarriage as well.

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Materials and Methods

A PubMed search of the literature was performed using the following Medical Subject Headings (MeSH) alone or in combination: hysteroscopy, infertility, myomectomy, polypectomy, uterine septum or metroplasty, Asherman's syndrome or intrauterine adhesions, uterine septum, retained products of conception, chronic endometritis, proximal tubal occlusion, failed in vitro fertilization, first trimester miscarriage, and embryoscopy. Our search was then filtered by selecting papers published in English from 1970 through 2014. Only prospective trials and meta-analyses were reviewed initially; however, for topics with a limited number of prospective studies, the search was expanded to include retrospective studies.

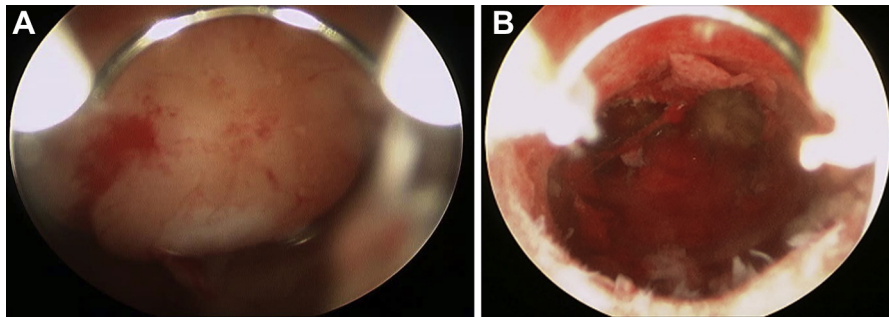
Intracavitary Pathology

Submucous Fibroids

Submucous fibroids are categorized as type 0, 1, and 2. A type 0 fibroid is located completely within the uterine cavity; type 1 fibroid, $\geq 50\%$ within the uterine cavity (Fig. 1A); and type 2, $< 50\%$ within the uterine cavity [2]. Postulated mechanisms by which fibroids cause infertility include the following:

Fig. 1

(A) Submucous myoma. (B) Hysteroscopic resection of submucous myoma restoring normal cavity architecture.



- Interference with normal patterns of endocrine function [3]
- Distortion of the endometrium [4,5]
- Dysfunctional uterine contractility [6]
- Distortion or obstruction of tubal ostia [7]
- Chronic endometrial inflammation [6]
- Abnormal uterine vascularization [8,9]
- Impaired endometrial receptivity [10]
- Implantation failure due to atrophy or venous ectasia over or opposite a submucous fibroid [11].

Pregnancy wastage rates frequently exceed 70% for submucous fibroids [12].

A small prospective cohort study published in 2005 by Shokeir [13] followed 29 consecutive women with submucous fibroids who desired pregnancy. Primary infertility was diagnosed in 14 women, and the other 15 had a history of poor obstetrical outcomes. All women were treated with a hysteroscopic myomectomy (Fig. 1B). Intraoperatively, all 29 women were found to have a single fibroid, 25 type 0 and 4 type 1, all no larger than 5 cm. Twenty-one of the 29 women (72%) achieved a total of 30 pregnancies; 13 of these women had live births. The rate of live birth increased from 3.8% to 63.2%, and the rate of abortion decreased from 61.6% to 26.3% after hysteroscopic myomectomy.

In 2009, Pritts et al [14] published a meta-analysis of 23 studies evaluating women with fibroids and infertility. Nine of these 23 studies looked at submucous fibroids. These 9 studies included 6 retrospective studies, 2 prospective studies, and 1 randomized control study. A comparison of infertile women with submucous fibroids and those without submucous fibroids revealed clinically significant differences in pregnancy, implantation, and ongoing pregnancy/live birth rates, as well as the spontaneous abortion rate. The clinical pregnancy rate was greater in the women who underwent a hysteroscopic myomectomy compared with those with fibroids left in situ. This study also found that the pregnancy rate in women after hysteroscopic myomectomy was comparable to that in women with no evidence of fibroids.

To date, only 1 prospective control study, published by Casini et al [4] in 2005, has analyzed whether the removal of fibroids before conception improves pregnancy rates and outcomes compared with no surgery. That study included a total of 181 patients age ≤ 35 years with infertility for at least 12 months and a fibroid < 4 cm in diameter. Ninety-two of the 181 patients underwent myomectomy, via either hysteroscopy or laparotomy, and 89 patients did not undergo surgery. All patients were followed up for 12 months to determine the rate of clinical pregnancy. Pregnancy rates were statistically higher in the patients who underwent myomectomy with submucous fibroids (43.35% vs 27.2% in the nonsurgical group) or submucous and intramural fibroids (36.4% vs 15% in the nonsurgical group) ($p < .05$). There was no statistically significant increase in pregnancy rate in the patients with only intramural or intramural and subserosal fibroids ($p > .05$).

Despite the findings of Casini et al [4], a further review of their data by the Cochrane Database found that in a subset of women with a submucous fibroid ($n = 94$), there was a statistically insignificant increased odds of clinical pregnancy (odds ratio, 2.4; 95% confidence interval, 0.97–6.2; $p = .06$) [15]. One other prospective study in the literature, by Shokeir et al [16], seemed to indicate a benefit to myomectomy in subfertile patients, but this paper was pulled from publication by the journal editor.

Endometrial Polyps (Fig. 2)

Postulated mechanisms by which polyps cause infertility include irregular endometrial bleeding, inflammatory endometrial response, obstructive inhibition of sperm transport, physical obstruction of exposure of the embryo to the endometrium, interference with normal patterns of endocrine function, and increasing glycodelin concentration, which inhibits sperm binding to the zona pellucida [17,18]. In 2005, Pérez-Medina et al [19] published a prospective study evaluating 204 women with infertility for ≥ 24 months. Exclusion criteria were age > 39 years, anovulation, uncorrected tubal disease, previous unsuccessful use of recombinant follicle-stimulating hormone, and an azoospermic partner. The study group ($n = 101$) underwent hysteroscopic

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