

# Indications, limitations and complications of operative hysteroscopy: a retrospective study of an 8-year experience

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## Summary

Operative hysterectomy (HSC) is now considered the gold standard treatment of most benign intrauterine pathologies [2]. The exam is performed using general anesthesia in day surgery procedure. Operative HSC enables the gynecologist to make diagnoses, obtain targeted endometrial specimens for histological examination, apply therapies (e.g. endometrial ablation), and perform a variety of surgical procedures (e.g. adhesiolysis, myomectomy, polypectomy). Operative HSC is also indicated for Müllerian anomalies (e.g. uterine septa), retained intrauterine contraceptives, endocervical lesions, and abnormal uterine bleeding unresponsive to medical treatment. The aim of the study was to analyze hysteroscopic procedures performed over an 8-year experience, highlighting indications, limitations, and complications of this technique in a sample of 1,412 women.

*Key words:* Operative hysterectomy; Benign intrauterine pathologies; Endometrial specimens.

## Introduction

The first successful operative hysteroscopy (HSC) was reported by Pantaleoni in 1869 [1]. Its use has increased with time and within few years it has become very popular among gynecologists. Operative HSC is now considered the gold standard treatment of most benign intrauterine pathologies [2]. The exam is performed using general anesthesia in day surgery procedure. Operative HSC enables the gynecologist to make diagnoses, obtain targeted endometrial specimens for histological examination, apply therapies (e.g. endometrial ablation), and perform a variety of surgical procedures (e.g. adhesiolysis, myomectomy, and polypectomy). Operative HSC is also indicated for Müllerian anomalies (e.g. uterine septa), retained intrauterine contraceptives, endocervical lesions, and abnormal uterine bleeding unresponsive to medical treatment [3]. As regards hysteroscopy-related complications, they are limited and can be categorized in intraoperative (e.g. cervical lacerations, uterine perforations, hemorrhages, bowel or bladder injuries, gas embolization, fluid overload, hyponatremia,) and postoperative (e.g. endometritis, postoperative synechiae, haematometra, procedure failure, myometrial damage, and obstetrical morbidity) [3-5]. Complications of

hysteroscopy can be also classified into those caused by hysteroscopic approach (e.g. perforation) and those caused by hysteroscopic technique (e.g. electrosurgery, inflow pressure) [6]. However, with strict preoperative evaluation, rigorous procedure and monitoring, complications are largely preventable. The short operating times and the avoidance of cutting too deeply into the myometrium are some of the parameters to be considered when hysteroscopy is being performed [7]. Technologic advances, ongoing research, and postgraduate training in hysteroscopic technique continue to expand the safe and beneficial applications of hysteroscopy into the next century [8]. The aim of the study was to analyze hysteroscopic procedures performed over 8-year experience, highlighting indications, limitations, and complications of this technique in a sample of 1,412 women.

## Materials and Methods

This retrospective study was performed on data stored in the database of the Gynecological Unit of Sant'Andrea Hospital of Rome ("Sapienza" University of Rome), pertaining to all patients who underwent operative hysteroscopy between January 2005 to May 2013 (n=1,412). The authors examined: the age of the pa-

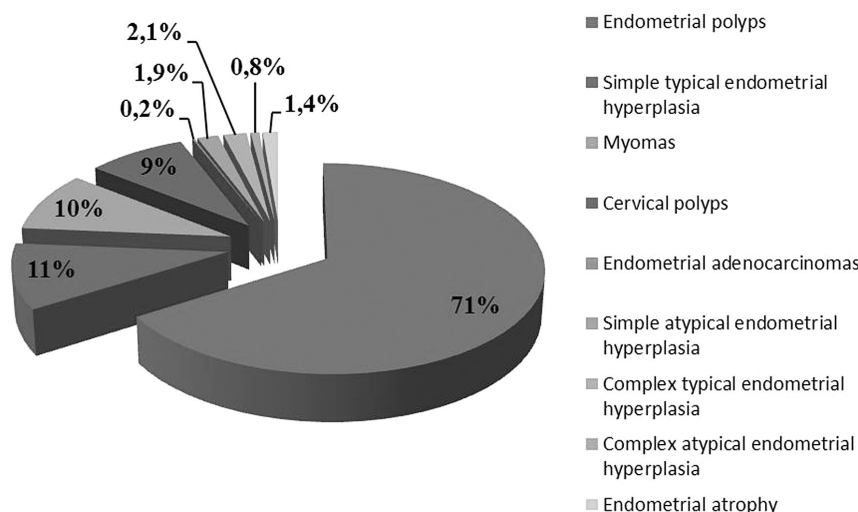


Figure 1. — Histological diagnosis at operative hysteroscopy in the present medical Centre.

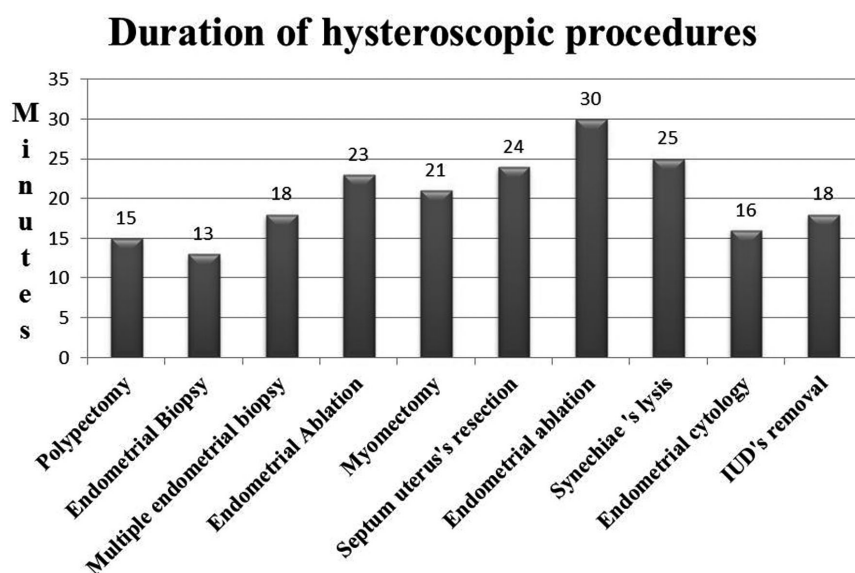


Figure 2. — Mean duration of each operative hysteroscopic procedure (operating time).

tients, the medical histories, the indications for surgery, the surgical procedure, the duration of the procedures (operating time), the causes of the eventual transfer to the ordinary hospitalization, the intraoperative and postoperative complications, the results of histological examinations, and the results of the gynecological exam performed 15 days after the surgery. Absolute contraindications to the procedure were pregnancy, active pelvic infections, and known cervical or uterine cancer. All patients underwent vaginal examination, transvaginal ultrasound, blood tests (glycemia, electrolyte, blood count, creatininemia, azotemia, coagulation function,  $\beta$ -hCG), sonohysterography which gave indication for operative hysteroscopy, and anesthesiological examination. Before undergoing the procedure, it was necessary to perform an electrocardiogram and to view a recent ( $\leq 1$  year) vaginal cytology not showing inflammation, precancerous, and/or cancerous lesions. An antibiotic prophylaxis was performed with Ceftriaxone (1 g; iv). Patients were counselled about all potential risks and benefits of the operative HSC and were asked to sign an informed consent form. The operation was performed under gen-

eral anesthesia by inserting a 10-mm rigid hysteroscope after dilatation of the cervix with a Hegar n. 10, and the introduction of the hysteroscope. The uterus was distended with a mixture of 3% sorbitol and 0.5% mannitol to a mean pressure of 120 mmHg and at least a volume of 500 mL; during the procedure blood pressure, temperature, pulse rate, and inflow and outflow were constantly supervised. All procedures were video monitored and all resected specimens were collected for histologic examination.

## Results

The mean age of the patients was 45 (range 18 to 89 ). The most common indication for operative HSC was endometrial neof ormation or thickening revealed by transvaginal ultrasound; other indications were cervical neof ormation, menorrhagia and/or metrorrhagia, sterility or infertility, abnormal uterine bleeding in the postmenopausal period, intrauterine fluid collection, septum

Table 1. — *The most common indications for operative HSC in the present medical Centre.*

Indications	Number of patients	Rate (per 100)
Endometrial neoformation or thickening	1246	88
Cervical neoformation	121	8.6
Menorrhagia/metrorrhagia	112	8
Sterility/infertility	34	2.4
Abnormal uterine bleeding	27	1.9
Intrauterine fluid collection	8	0.6
Septum uterus	8	0.6
Lost IUD	6	0.4
Synechiae	4	0.3
Ashermann's syndrome	3	0.2
Retained placenta	2	0.1

uterus, lost intrauterine devices (IUD), synechiae, Ashermann's syndrome, and retained placenta (Table 1). The most common histological diagnosis was endometrial polyp (n=1002; 71%) followed by simple typical endometrial hyperplasia (n=160; 11%), myomas (n=144; 10%), cervical polyps (n=131; 9%), complex typical endometrial hyperplasia (n=30; 2.1%), simple atypical endometrial hyperplasia (n=27; 1.9%), endometrial atrophy (n=20; 1.4%), complex atypical endometrial hyperplasia (n=11; 0.8%) and endometrial adenocarcinomas (n=3; 0.2%) (Figure 1). The mean duration of the surgical procedure was 19 minutes, with the shortest lasting 13 minutes (endometrial biopsy) and the longest lasting 30 minutes (endometrial ablation) (Figure 2). In the present study the main limitation was the need to perform operative HSC in ordinary hospitalization in 85 patients (6%) because the anesthetic criteria ASA I and II (Classification from the American Society of Anesthesiologists) were not insured, thus they were not suitable for day surgery procedure. The causes of transfer to ordinary hospitalization because of the inadequate ASA criteria are shown in Table 2. Another limitation was the need to perform the myomectomy of large submucous myomas with two subsequent operative HSCs (e.g. two-step procedure) in three patients (0.2%). Intraoperative complications occurred in 24 patients (1.7%) and experienced panic attack (n=3; 0.2%), bronchospasm (n=2; 0.1%), hypertensive crisis (n=1; 0.07%), stenotic uterine ostium (n=8; 0.5%), laceration of the anterior cervical lip during dilatation due to excessive traction using the clamp (n=8; 0.5%), and uterine perforation (n=2; 0.1%) (Table 3). One case of perforation occurred in a patient operated for a lost IUD. The discharge from the uterus was not detected by the preoperative ultrasound, but just after the introduction of the hysteroscopic optical. Thus, the perforation was caused by the IUD itself. On the other hand, the second case of perforation was caused by the introduction of the hystrometer. Except for the eight patients with the laceration of the anterior cervical lip (in

Table 2. — *Causes of transfer to ordinary hospitalization due to the inadequate ASA-criteria in the present medical Centre.*

Inadequate ASA-criteria	Number of patients	Rate (per 100)
Heart disease (cardiomyopathy, valvular insufficiency, drug-refractory arrhythmia)	7	8
Body mass index >30	35	38
Drug-resistant hypertension	16	18
Unstable diabetes	6	7
Chemotherapy for breast cancer	3	3
Pre-operative haemorrhage	13	14
Non-stabilised hypothyroidism	2	2
Neurological disease	2	2
Anorexia	1	1

Table 3. — *Intraoperative complications of operative HSC procedures in the present medical Centre.*

Intraoperative complications	Number of patients	Rate (per 100)
Panic attack	3	0.2
Bronchospasm	2	0.1
Hypertensive crisis	1	0.07
Stenotic uterine ostium	8	0.5
Laceration of the anterior cervical lip	8	0.5
Uterine perforation	2	0.1

which the lesion was repaired with absorbable sutures, not requiring a longer hospital stay), the rest of the patients with intraoperative complications needed to interrupt the procedure and were transferred to ordinary hospitalization for a watchful observation, some of them turning into other surgical techniques, and some others postponing the operative HSC. The authors did not record any postoperative complication, both during the hospital stay and at the gynecological examination performed 15 days after surgery. Moreover, none of the patients returned to report any late complication.

## Discussion

Over the years operative HSC has increased as a surgical option for various gynecological disorders because it has a great accuracy in diagnosis and treatment and it reduces patients' hospital stay, convalescence period, and healthcare costs compared to major surgery [9-11]. In the present series, the most common indication of operative HSC was endometrial neoformation or thickening (88%). In literature, the authors found it as the second most common indication in a study conducted by Mettler *et al.* in 2002 [12], demonstrating the high prevalence of this pathological condition. It is therefore important to perform a transvaginal ultrasound screening in adult women to diagnose endometrial pathologies before clear symptoms appear and to treat them at an early stage with better prognosis.

Table 4. — *Reported complications of operative HSC procedures.*

	Cervical laceration	Uterine perforation	Overflow	Postoperative infections	Postoperative haemorrhage	Intraoperative haemorrhage
Caserta D. <i>et al.</i> (2013)	0.5%	0.1%	0%	0%	0%	0%
Propst <i>et al.</i> (2000)	-	0.4%	0.7%	0.2%	-	0%
Istre O. (2009)	-	1%	5.2% < 2 lt <sup>a</sup> ; 1% > 2 lt <sup>a</sup>	-	-	3%
Jansen F.W. <i>et al.</i> (2000)	-	0.8%	0.2%	-	-	-
Agostini A. <i>et al.</i> (2002)	-	-	-	1.42%	-	-
Wortman M. <i>et al.</i> (2013)	-	-	-	1.9%	-	-
Agostini A. <i>et al.</i> (2002)	-	-	-	-	-	0.61%
Mencaglia L. <i>et al.</i> (2013)	0.7%	0.7%	0.7%	-	-	-
Izetbegovic S. (2002)	-	0.3%	0.3%	-	0.6%	0.9%

<sup>a</sup> litres.

In the present study, the authors found a low rate of surgery-related complications compared to literature (Table 4) [6, 13-19]. Among the 24 (1.7%) intraoperative complications, 15 were patient-related (panic attack, bronchospasm, hypertensive crisis, stenotic uterine ostium, and uterine perforation caused by the lost IUD), while only nine were surgery-related: eight (0.5%) cervical lacerations and one (0.07%) uterine perforation caused by the hystrometer. The laceration of the anterior cervical lip, caused by excessive traction during the dilatation when the top portion of the cervix was grasped with a clamp, was the main surgical-related complication, representing just the 0.5% in this series. Furthermore, it should be noted that these lacerations had been repaired with just absorbable sutures, not requiring a longer hospital stay. The complication rate of cervical lacerations (0.5%) was similar compared to literature findings, for instance a study conducted by Mencaglia *et al.* in 2013 reported a rate of 0.7% [13]. On the other hand, the rate of uterine perforation is not completely in agreement with literature findings: a study conducted by Istre in 2009 reported a rate of 1% [14], while Janszen *et al.* in 2000 reported a rate of 0.8% [6]. In the present series, the authors had not experienced fluid overload (defined as the absorption of more than 1,500 mL of distension medium). The present results were completely in disagreement with that of Propst *et al.* [15], which reported the phenomenon as the most common complication (0.7%), and with the study of Istre, which reported that fluid overload of 1-2 litres and > 2 litres, respectively, occurred in 5.2% and in 1% of cases [14]. The lack of fluid overload may be partly explained with the particular attention avoiding long operating time and with the meticulous monitoring of the inflow pressure. Moreover, the authors did not experience any early or late postoperative complications. Regarding postoperative infections, (i.e. endometritis and urinary tract infections) Agostini *et al.* reported a rate of 1.42% [16] and Wortman *et al.* a rate of 1.9% [17]. In the present study the authors had not recorded any postoperative infection, which was probably due to the accurate antibiotic prophylaxis per-

formed in all patients. Moreover, they had not experienced intraoperative or postoperative hemorrhages; with regards to intraoperative ones, Agostini *et al.* reported a rate of 0.61% [18] and Istre, a rate of 3% [14]. Regarding postoperative ones, Izetbegovic reported a rate of 0.6% [19]. Haemorrhages were likely prevented by minimizing tissue's trauma, both limiting the handling of tissues for a safe completion of the procedure and reducing operating times. In the present study, the main limitation was the need to deny the day surgery procedure to 84 patients with ASA ≥ III and the subsequent performance of HSC in ordinary hospitalization. The most common ASA-criterion responsible for the impossibility to perform operative HSC in day surgery was a body mass index of >30. It is important to note that this limitation was not related to the operative HSC itself, but to the health condition of the patient which could be overcome with an ordinary admission to the hospital, just requiring longer preoperative and postoperative observation. Another limitation of this study was the need to perform the myomectomy of large submucous myomas with the two-step procedure, although undergoing two surgical operations may seem more dangerous for the patient, rather this method is in agreement with studies regarding the resection of submucous myomas, in which a two-session approach was recommended, i.e. re-hysteroscopy after several weeks, because after this time the intramural portion of the myoma will have shifted into the uterine cavity due to a decrease in internal pressure [20]. The present study confirms that operative HSC is a safe, effective, and minimally invasive procedure, with few limitations and complications, especially giving particular attention to the prevention of risks factors. Prevention begins with an accurate patient selection, analyzing the medical history and the anaesthesiological examination, and eventually transferring patients (preoperatively and/or postoperatively) to ordinary hospitalization for a watchful observation. Prevention is also ensured avoiding long operating time, the depth of resection, the manipulating of tissues, by performing an antibiotic prophylaxis in all patients, and a meticulous monitoring of the inflow pressure.

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