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TECHNIQUES AND INSTRUMENTATION

Clinical implementation of the hysteroscopic morcellator for removal of intrauterine myomas and polyps. A retrospective descriptive study

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Abstract The aim of this study is to report our experience with a novel technique, the hysteroscopic morcellator (HM), for removal of intrauterine myomas and polyps. We performed a retrospective study on 315 women undergoing operative hysteroscopy with the HM in our university-affiliated teaching hospital. We collected data on installation and operating times, fluid deficit, peri- and postoperative complications. In 37 patients undergoing myomectomy with the HM, mean installation time was 8.7 min, mean operating time, 18.2 min, and median fluid deficit, 440 mL. Three out of 37 HM procedures were converted to resectoscopy, related to a type 2 myoma. In 278 patients, mean installation and operating times for polypectomy with the HM were 7.3 min and 6.6 min, respectively. All procedures were uneventful. Implementation of the HM for removal of type 0 and 1 myomas ≤3 cm, and removal of polyps appears safe and effective.

Keywords Operative hysteroscopy · Hysteroscopic morcellator · Endometrial polyp · Submucous myoma

Background

The use of hysteroscopic mono- or bipolar instruments is considered the gold standard in circumstances where scissors are not successful for removal of intrauterine lesions (e.g., myomas or polyps) [1, 2]. The choice of a specific hysteroscopic instrument depends on the origin, location, as well as the size of the intrauterine lesion [1, 2]. Recently, a novel device, the hysteroscopic morcellator (HM), became commercially available, using mechanical cutting to reduce the tumor into small chips and consequently evacuating these chips out of the uterine cavity by aspiration. The HM has been reported as an effective and safe new technique to remove intrauterine lesions [3]. Furthermore, it was reported that the HM is a safe and effective alternative to conventional resectoscopy in both experienced and inexperienced hands [4]. Results with the HM in clinical practice have hardly been documented [3, 4]. In this article, we present our retrospective data on the HM for removal of intrauterine myomas and polyps.

Methods

In our university-affiliated teaching hospital (Catharina Hospital, Eindhoven, the Netherlands), the HM was introduced in 2006 for hysteroscopic removal of intrauterine lesions. Up till that year, resectoscopy had been the standard procedure. We evaluated the introduction of the HM in retrospect.

Morcellation was performed with the HM (TRUCLEAR, Smith & Nephew, Andover, USA; Fig. 1). The HM has a 4-mm blade, consisting of a rigid inner tube which rotates within an outer tube. The blade is inserted into an electrically powered control unit which connects to a handheld motor drive unit. A foot pedal activates the blade and regulates the direction of rotation of the internal blade tube. The direction can be oscillating or continuous, with the optimal number of rotations per minute being 750 or 1,100, respectively. The rotary morcellator is recommended

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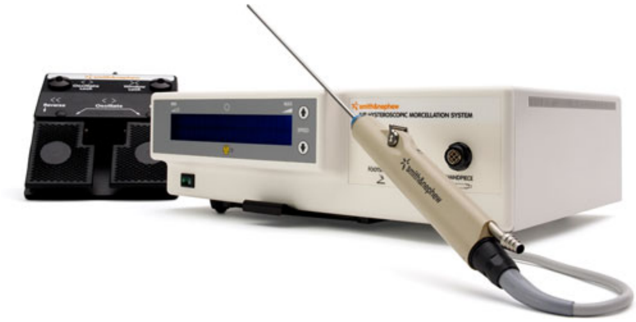

Fig. 1 The hysteroscopic morcellator

for polypectomy, and the reciprocating blade for myomectomy (Fig. 2).

The blade has a window opening at the end with cutting edges through which tissue is aspirated by means of a vacuum source. The vacuum source is connected to a regulator valve with a manometer. The optimal suction power connected to the inner tube of the HM blade is 200 mmHg. When the inner tube is not activated, the window opening is locked to prevent active suction of the distension liquid in order to avoid uterine cavity collapse. The removed tissue is discharged through the device, collected in a pouch, and made available for pathology analysis.

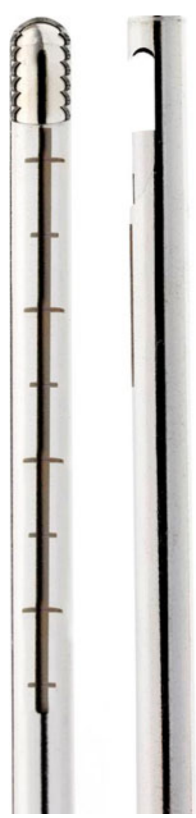

Fig. 2 The rotary and reciprocating blade of the HM

The blade of the HM was introduced into the uterine cavity through the working channel of a continuous flow 9-mm rigid hysteroscope with 0-degree optic (Smith & Nephew, Andover, USA). After dilatation of the internal os of the uterine cervix with Hegar dilators, atraumatic insertion was accomplished with the use of an obturator in the outer sheath of the hysteroscope. The working channel also acts as the inflow channel and the hysteroscope contains a separate outflow channel. Continuous flow was used for optimal distension, irrigation, and visibility. The inflow is pressurized with a peristaltic pump (Smith & Nephew, Andover, USA) with a maximum pressure setting of 120 mmHg and a maximum flow setting of 700 mL/min, similar to standard resectoscopy. The outflow is passive. Normal saline was used for distension and irrigation of the uterine cavity. All fluid was collected from the passive outflow tubing of the hysteroscope as well as from the vacuum tubing connected to the inner blade, and both measured volumes were subtracted from the measured inflow volume resulting in the fluid deficit.

First, we retrospectively describe our results with the HM—using the reciprocating blade—for removal of type 0 and 1 myomas from 2006 until 2009. We collected information on time needed to install the equipment, operating time, fluid deficit, and peri- and postoperative complications from medical records. Conversion rates to resectoscopy are mentioned.

Secondly, we report our data for removal of intrauterine polyps with the HM—using the rotary blade—between 2006 and 2009. We collected data on installation and operating time, fluid deficit, peri- and postoperative complications, and conversion rates from medical records.

For both myomas and polyps, the diameter was measured by ultrasound preoperatively. Patients were hospitalized in daycare. Procedures were performed under spinal or general anesthesia, and data on type of anesthesia are given. All patients received antibiotic prophylaxis with a single dose of metronidazole 500 mg and cefuroxime 1,500 mg. For all procedures, data on pathology analysis were available.

Findings

Myomas

Our results for removal of intrauterine myomas with the HM are summarized in Table 1. We performed this HM procedure in 37 patients aged 26 to 49 (median 45 years). The mean myoma diameter was 2.0 cm. A type 0 myoma was seen in 23 patients (62%), 11 patients had a type 1 myoma (30%), and three patients (8%) had a type 2 myoma. Since the HM can only be used for complete

Table 1 Data on hysteroscopic myomectomy and polypectomy with the HM

Tissue	*N*	Age (years)[a]	Diameter of tissue (cm)[b]	Installation time (min)[b]	Operating time (min)[b]	Fluid deficit (mL)[a]	Type of myoma		
							0	1	2
Myoma	37	45 (26–49)	2.0 (0.4)	8.7 (1.4)	18.2 (4.1)	440 (100–890)	23	11	3
Polyp	278	47 (23–81)	2.4 (0.7)	7.3 (2.5)	6.6 (3.3)	40 (0–300)	–	–	–

[a] Values are median (range)

[b] Values are mean (SD)

removal of type 0 and 1 myomas, in the latter three cases conversion to resectoscopy was necessary. Mean time needed to install equipment was 8.7 min, and mean operating time was 18.2 min. The limits for fluid deficit were respected. Seventy-two percent of the procedures was performed under spinal anesthesia. No complications occurred. Pathology analysis confirmed the presence of a myoma in all cases.

Polyps

We performed this HM procedure in 278 patients aged 23 to 81 (median 47 years; Table 1). The mean diameter was 2.4 cm. In 37 patients (13%), the procedure was part of an infertility treatment. Mean time to install was 7.3 min, and mean operating time was 6.6 min. Fluid deficit ranged from 0 mL to 300 mL (median 40 mL). The procedure took place under spinal anesthesia in 68% of the cases. No complications occurred. There were no conversions to resectoscopy. Pathology analysis showed 264 cases of benign intrauterine polyps, 13 cases of hyperplastic polyps, and in one patient, the intrauterine lesion appeared to be a placental site nodule.

Discussion

Few data on the use of the HM have been published so far [3, 4]. Our results with the HM over a time period of 4 years show that it's a fast technique for removal of smaller type 0 and 1 myomas, as well as larger polyps, and that no complications occurred.

The HM beholds some advantages over monopolar resectoscopy. The use of saline solution prevents hyponatremia, although meticulous measurement is indicated to prevent excessive absorption and fluid overload. When using the HM, similar to using bipolar electrosurgical systems instead of the monopolar resectoscope, there is no generation of stray currents with consequent risk of electrical burns [5]. No damage is done to the surrounding of the intrauterine lesion that needs to be removed, and we note that with the HM, no gas bubbles arise, in contrast to resectoscopy. Lethal complications have been described using hysteroscopic electrosurgery causing air bubbles and consequent gas embolism [6]. Furthermore, aspiration of the tissue fragments by the HM ensures a clear view and tissue is preserved for histological examination. In contrast, in resectoscopy, tissue fragments can block the hysteroscopic view and they need to be removed one by one, thus, making repeated in and out movements necessary, possibly causing uterine damage, and fragments might be lost.

We do acknowledge certain disadvantages of the HM. First, the inability to coagulate bleeding vessels encountered during surgery might be a disadvantage [5]. However, so far, no significant intraoperative or postoperative bleeding was documented [3]. In addition, our results show no evidence of significant bleeding during or after the HM procedure. Secondly, the HM cannot be used for the treatment of type 2 submucous fibroids [2]. Therefore, conversions to resectoscopy might occur when a type 2 myoma is misdiagnosed as a type 1 myoma preoperatively. Third, in case of larger myomas, the use of the HM can become quite time consuming. Fourth, in general, the cost of the disposables (blades and tubings) needed to perform a HM procedure is higher than that of the material needed for a hysteroscopic resection. Finally, regional or general anesthesia is mandatory for the HM procedure as it is necessary to dilate the cervix up to 8 or 9 mm. In contrast, data on successful ambulant removal of polyps, sized 2–4.5 cm [7–10], and submucous and partially intramural myomas, with a diameter up to 2 cm [7], with Versapoint (twizzle) have been published.

We report short installation and operating times for hysteroscopic myomectomy and polypectomy with the HM. Emanuel et al. report a mean operating time of 16.4 min for myomectomy and 8.7 min for polypectomy with the HM [3]. Comparing these data to other hysteroscopic techniques, the HM shows a marked reduction in the time needed to perform hysteroscopic myomectomy and polypectomy. Emanuel et al. reported a mean operating time of 42.2 min for hysteroscopic myomectomy and 30.9 min for polypectomy with the monopolar resectoscope [3]. Preutthipan et al. reported mean operating times ranging from 20.9 min to 31.9 min for polypectomy with grasping forceps, microscissors, electric probe, and resectoscope [11].

Unfortunately, data for our study were retrieved retrospectively, and in our center, no comparable control group was available for other hysteroscopic techniques. Prospective studies comparing the HM with, for example, monopolar resectoscopy are needed to confirm the possible advantages of the HM—such as the reduction of operating time—for removal of myomas and polyps. One should also retrieve more long-term follow-up data checking for persistence or recurrence of intrauterine myomas and polyps. Cost-effectiveness of the HM also needs to be evaluated.

Conclusion

We conclude that in our experience, the HM is a fast, safe, and easy method for removal of both smaller type 0 and 1 myomas, as well as polyps. Prospective data are needed to confirm these findings.

Declaration of interest We report no conflict of interest.

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