VAPORIZATION OF SUBMUCOUS MYOMAS WITH DIODE LASER IN AMBULATORY HYSTEROSCOPY: RESULTS OF THIS NOVEL TECHNIQUE
Dr J. E. Arjona; Dr E. Velasco - Hospital Reina Sofia - Cordoba - Spain

INTRODUCTION

Uterine myomas are today the most frequent benign uterine pathology, with an incidence of 25 to 30% in women at reproductive age. So it’s no wonder that referrals to uterine myomatosis comprises 3 to 5% of gynecologic consultation, and that non-treated cases, require a long follow-up period with multiple visits to the gynecologist. Because of all this, myomas comprise a health issue of great importance, not so much for its severity, but because of the costs on the health system that monitoring and treatment generate.

Location of myomas is one of the most important factors in the severity and frequency of symptoms. Submucous myomas comprise 5-10% of the total, and they are the most symptomatic, producing cases of anemia producing hypermenorrhea, sterility or infertility. This capacity to provoke important symptoms is what leads to the need for treatment.

Surgical treatment of uterine myomas has evolved along the years, from laparotomy to minimal invasive surgery. Most symptoms can be managed by endoscopy. Hysteroscopic surgery is considered nowadays a minimally invasive procedure, associated to a short hospital stay and early recovery.

The limits between ambulatory myomectomy and surgical myomectomy are not precise, and they depend on the ability and experience of the surgeon, available material at the office, location, size, and specially, myoma’s myometrial component and patient tolerance of the procedure.

With these advances in hysteroscopy a greater number of patients have been able to be treated, decreasing hospitalization and related costs, with the same results rate and patient satisfaction.

Hysteroscopic myomectomy is considered the choice technique for patients with submucous myomas that produce abundant uterine bleeding, infertility or repetitive miscarriages. Traditionally, intracavitary uterine pathologies needed treatment with the use of a resectoscope. In the last years, thanks to development of small caliber hysteroscopes and bipolar electrosurgical systems, resection of small polyps or myomas is done in the office, so treatment is carried out at the moment of diagnosis (“see and treat”).

Currently, only resection of small and completely submucous myomas is possible. To do this, electric energy is employed, with a commercially available bipolar electrode called Versapoint®, although different manufacturers have developed their own. Resection is badly tolerated due to the fact that electric energy is transmitted to the myometrium when the active electrode gets in contact with it, which causes pain, uterine contractions and frequently vagal syndrome. Hysteroscopic morcellators have also been commercialized for the ambulatory extirpation of polyps and myomas; however, the need for a specific and expensive device has prevented this procedure from becoming a choice technique (Table 1).

Laser is increasingly being used in medicine, because it acts selectively on the target zone, with minimum damage to adjacent tissue. Therefore, it produces very little side effects related to destruction of healthy tissue and its surroundings and inflammation.

Laser is currently used in ambulatory hysteroscopy for resection of polyps, uterine septa and very small myomas, using conical 1000 micron fibers with a 30 Watt diode laser. These fibers, as they are of very small diameter, do not allow vaporization but only cutting of tissue; which is why largely sized lesions are unlikely to be treatable with this instrument.

Therefore to this date, we can say that there are no small effective instruments that can be introduced through the working channel of an ambulatory hysteroscope for the treatment of submucous myomas.

Work hypothesis

Since some time ago, urologists have been using different types of laser techniques for treatment of different urologic pathologies, and treatment of benign prostate hyperplasia has evolved in recent years, and today vaporization is one of the best alternatives for patients.
Because of the fact that a uterine myoma is similar in volume and consistency to the prostate adenoma, we believe that it is also susceptible to being vaporized with laser (Figure 1).

**Objectives**

**Main objectives:** To determined feasibility of technique as ambulatory and to evaluate the evolution of symptoms after treatment.

**Secondary objectives:** To assess tolerance to ambulatory procedure, to quantify volume of resected myoma in each procedure, to determine most frequent side effects and complications and to quantify average real and laser duration for completion of each procedure.

**Materials and Method**

Currently, technical modifications have taken place on commercially available ambulatory hysteroscopes, which allow for the introduction of diode laser fibers that urologists normally use with cystoscopes for contact vaporisation. The fiber of this type of laser, unlike the rest, allows for direct contact with myomas, which is why we can use it to vaporize as well as to cut, thus reducing intervention time.

**Evolve TM de Biolitec® diode laser:** It is a 150 Watt multidisciplinary laser that we use for contact vaporization, eliminating undesired soft tissue through the use of the MyoFiber fiber optic. A 980 nm wavelength is used, thus providing equal absorption of water and hemoglobin. Since soft tissues contain a high percentage of water, a surgical laser must be well absorbed by water to correctly eliminate tissue. In the same manner, absorption in hemoglobin is an essential factor for coagulation without carbonization and successful hemostasis. The Evolve™ laser system’s main feature is that it provides the greatest level of absorption of water and hemoglobin by means of the same wavelength. The fiber´s radiation pattern guarantees efficacy in energy supply and focus on tissue.

**Hysteroscope features:** An optical fiber and a Richard Wolf hysteroscope were chosen. Selected hysteroscope has an outer sheath diameter of 17.5 French (5.8 mm) with a working cannel of 9 French (3 mm). The reason for this choice of hysteroscope is based on that the external diameter is small, and the optics, in spite of being fiber, has an excellent image quality, which allows for a working cannel of 3 mm, thus allowing the use of any laser fiber and the introduction of auxiliary 7 French instruments.

**Diode laser fiber:** The biolitec® MyoFiber combines the work of a contact fiber with a curved design for ideal work at the uterine cavity. Its design is unique, since its cladding allows for working at very high energies without progressive degradation of fiber tip affecting quality and speed of our work, which allows us to carry out contact vaporisation on myoma soft tissue. Fiber curvature improves the process, allowing us to reach the target areas with greater ease. Correct vision of tissue being vaporized is achieved with a pilot beam located at the tip of the fiber.

**Medication:** All patients are prescribed hormonal contraceptives at least 1 month before treatment. One hour before treatment patients must take one 10 mg Diazepam pill and one 600 mg Ibuprophen pill.

**Local anesthesia:** For ambulatory procedures we use local anesthesia previous to hysteroscopy. We inject 2 1.8 ml blisters at 3% in each uterosacral, with a specific Carpulen syringe and needle.

**Patients**

**Inclusion criteria:** Symptomatic submucous myomas (menorrhagia, pain or sterility), women with menstrual cycle, single myoma with maximum diameter of 4 cm or two myomas that together do not measure more than 4 cm, previous hysteroscopy in which procedure can be carried out ambulatorily and in 1 or a maximum 2 sessions, Wamsteker G0-G1 y G2 myomas, collaborative patient.

**Exclusion criteria:** Asymptomatic myomas, menopausal patients, myomas greater than 4 cm in diameter, more than two submucous myomas, non-collaborative patient, non-acceptance of procedure by patient.

**RESULTS**
During the period between March 13, 2011 and March 12, 2012 at the Reina Sofía University Hospital (Córdoba), 22 hysteroscopic myomectomies have been carried out with diode laser and results have been encouraging, as patients have tolerated ambulatory procedure very well and the expectations regarding myoma resection have been fulfilled.

Patient age average is about 42 years and average parity is between one and two children. Menstrual cycle patterns presented by patients were hypermenorrhea and metrorrhagia, whereas presence of normal menstrual cycles was much lower. The average size of treated myomas was a challenge and most of them were classified as Wamsteker 0 and 2 (Table 2). As to procedure itself, average duration of ambulatory laser myomectomy is 50 minutes, with applied laser time less than 50% of procedure time. Average energy and maximum powers used are shown in table 3, as well as the characteristics related to number of vaporized myomas and resection percentage achieved. In three quarters of the cases, complete resection was achieved in the first session, and in incomplete resections, the incidence of persistent myomas decreased gradually, such that at present only one case has persisted at 4 months after treatment. Patient tolerance achieved, as can be seen in figure 2 has been excellent, as 73% of the patients referred not having felt pain during procedure and only three from every ten referred a level of pain scale greater than the one assigned with exclusively diagnostic hysteroscopy, carried out before the procedure. There was only one patient that referred intense pain, in whom hysteroscopy with laser was suspended for bad tolerance. It is important to point out that no vagal syndrome occurred during procedures.

The percentage of resected myoma as a function of its classification and location is appreciated in figure 3. The relationship between time employed in myomectomy, size of myoma and tolerance of patient are appreciated in figure 4.

COMMENTS AND CONCLUSIONS

The results obtained up to date with ambulatory resection of submucous myomas using diode laser in our center are encouraging, due to the high percentage of complete resection and the excellent tolerability by our patients.

Myoma resectability is not observed to be influenced by percentage of the intramural portion nor by its location, which indicates that location of the myoma is not per se a prediction of the rate of success of the procedure.

We have observed a progressive increment in pulsed laser time in the procedure as the myoma’s size for resection increases, as was expected; however, in the same way we have observed that longer intervention periods did not increase pain perceived by the patient during procedure.

The advantages of this technique would be: ambulatory resection without the need of admission, no need for general or spinal anesthesia, immediate patient recovery and better management of operating rooms. All these advantages, clearly contribute to improve hysteroscopy efficiency.

As it is a recent procedure at our unit, the number of patients treated with ambulatory laser myomectomy is limited. We expect to improve the technique and increase the number of treated patients in the following months. The objective set is to be able to appropriately analyze feasibility of the technique and evolution of the symptoms in patients to be able to implement the technique as an accepted treatment for hysteroscopic myomectomy.

(After these conclusions, and as long as the organizing committee and the Board of Directors of the Congress considers it appropriate, there is a 2 minute video projection where hysteroscopic vaporization with diode laser is shown)

BIBLIOGRAPHY


