

SHORT THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (PhD)

Application of office hysteroscopy in gynaecological practice

by **Péter Török, MD**



Supervisor: Tamás Major, MD, PhD

UNIVERSITY OF DEBRECEN

DOCTORAL SCHOOL OF CLINICAL MEDICINE

Debrecen, 2014

Application of office hysteroscopy in gynaecological practice

By **Péter Török MD**

Supervisor: Tamás Major, MD, PhD

Doctoral School of Clinical Medicine, University of Debrecen

Head of the Examination Committee: Prof. József Balla, MD, DSc

Members of the Examination Committee: István Csízy, MD, PhD

Béla Molnár G., MD, PhD

The Examination takes place at the Library of Department of Obstetrics and Gynecology, Faculty of Medicine, University of Debrecen, at 11 am, April 03, 2014.

Head of the Defense Committee: Prof. József Balla, MD, DSc

Reviewers: Prof. Csaba Tóth, MD, DSc

Ferenc Lintner, MD, CSc

Members of the Defense Committee: István Csízy, MD, PhD

Béla Molnár G., MD, PhD

The PhD Defense takes place at the Lecture Hall of Bldg. A, Department of Internal Medicine, Faculty of Medicine, University of Debrecen, at 1 pm, April 03, 2014.

Introduction

Visualizing the uterine cavity was the desire of doctors for a long time. In 1866 Panteloni examined the nasal cavity of a woman and 3 years later described his examination with postmenopausal bleeding. He found an intrauterine polyp and managed to cauterise it with silver nitrate. This was the first documented hysteroscopy, not only diagnostic, but operative as well. Development of hysteroscopy stopped for decades. In 1907 Charles David described using a cystoscope with an internal light source and lens system to examine the uterine cavity, and in 1925 Rubin used CO₂ for distension. The first flexible hysteroscopes were designed by Mohri in 1971, but the quality of the image was poor compared with those obtained by rod lens system designed by Hopkins.

At the early 1980s for diagnostic procedure 4 mm rod lens system scope and total diameter of 5 mm simple sheath was used. Insertion of speculum and grabbing the cervix by tenaculum was part of the routine procedure. To avoid the pain related to the application of the tenaculum and the traction of the cervix general, local or paracervical anaesthesia was used. According to the technical opportunities (lack of digital camera) the reliability of the procedure was strictly related to the gynaecologist's experience. Hysteroscopy brought revolution to the gynaecology, making it possible to diagnose and treat local intrauterine pathologies without abdominal operation. In many cases hysterectomy could be avoided. In gynaecologists every day work up diagnostic hysteroscopy became "gold standard" method in short time. Instead of traditionally performed D&C, hysteroscopy was used to evaluate and treat submucosal fibroids, polyps, adhesions and septal defects.

In Hungary first hysteroscopies were described in 1984.

New technologic improvements made it possible to use it in an outpatient setting at the beginning of the 1990s. New scopes were introduced with a diameter less than 3 mm, total diameter less than 5 mm. Cervical dilation was not necessary for the insertion of the instrument, so the procedure was painless. Without operating theatre, general anaesthesia, the hysteroscopy could be performed in an outpatient setting. Images were recordable, could be projected, which made the opportunity for off-line consultation and education.

According to the instrumental developments new methods were published in the usage of hysteroscopes. Saline was used instead of the CO₂ as the distension material. Thanks to the new method named „no touch” technique the use of the speculum and tenaculum is no longer necessary. Diameter of the scope is less than 3 mm, and the outer diameter is less than 4 mm. The vaginal cavity can be distended by introducing a distension medium. By gentle movements under visual control scope can be inserted through cervical canal into the uterine cavity without using traction, grabbing and dilatation of the cervix. The experienced discomfort associated with the traditional approach to the uterus has been definitively eliminated. During the traditional procedure, the most frequent complication is uterine perforation. Using the outpatient method, perforation rate can be reduced radically, because blind mechanical dilatation is not needed and the insertion happens under visual control.

For office hysteroscopy anaesthesia is not needed, therefore no previous laboratory tests, anaesthesiological consultation would be needed, either. It can be performed in an outpatient setting, so operating theatre, hospitalisation is not required. Diagnosis and operation of deformities hysteroscopically in an office setting is a fact that decreases considerably the costs, strain, and time of the procedures which both the patient and the physician benefit from.

Indications of the new and the traditional methods are the same, mostly infertility, abnormal uterine bleeding, recurrent miscarriage, or intrauterine pathology suspected by

transvaginal sonography. Advantage of office way in examining the background of abnormal uterine bleeding is that no supplementary test is needed. It can be performed even during the routine gynaecological examination. During the infertility work-up outpatient method can be used more frequently, because there are no side effects (cervical insufficiency, miscarriage, preterm delivery) caused by the cervical dilatation.

Contraindications are the same as well. Hysteroscopy should not be performed in case of unfamiliarity with equipment, instruments, or technique, lack of appropriate equipment, or staff's familiarity with the equipment. Contraindications include acute pelvic inflammatory disease, pregnancy. Previously genital tract malignancy contraindicated the examination because of the dissemination of cancer cells. According to some publications the dissemination is not correlated with worse prognosis, and at the same time hysteroscopy has a role in precise diagnostic and treatment of malignancy.

By performing office hysteroscopy these intrauterine lesions can be diagnosed:

Polyp

Endometrial polyp – which is hyperplasia of the basal membrane, covered by epithelium – can be found in many cases of abnormal uterine bleeding. Incidency is increasing by age, most of them can be diagnosed after menopause. Risk factors for endometrial polyp can be obesity, hypertension and diabetes. Density of progesteron and oestrogen receptors is higher compared to the normal endometrium.

Adenomyosis

Adenomyosis is a special type of endometriosis (endometriosis interna). It is a benign, oestrogen-dependent lesion, where ectopic endometrial tissue can be found in the myometrium.

In the diagnostic procedure hysteroscopy and targeted biopsy of the uterine wall is important. Hormonal and surgical therapy can be applied according to the severity and localization of the lesion.

Fibroid

Fibroids are myometrial, monoclonal, benign tumors of muscular wall of the uterus occurring mainly between the ages of 35-50. During pregnancy, hyperoestrogenos status can be found in 0.1-5 % of patients. According to its localization, we have seuberous, intramural and submucosal types.

Malignancy and hyperplasia

Endometrial carcinoma can be diagnosed mostly at postmenopausa. The incidence of it is increasing by the age.

During hysteroscopy differentiation of the intrauterin lesion can be achieved by the visualization or the targeted biopsy. During this procedure small lesions can be resected, as well.

Precise classification and differentiation of sessile lesions (polyp, fibroid) can be difficult. Evaluation of vascularisation of the area during ultrasound examination helps in this procedure, but the exact diagnose can be achieved by histological examination. These pathological changes stand in many cases at the background of infertility, abnormal uterine bleeding, or recurrent miscarriage.

Infertility can be diagnosed in cases with unprotected sexual intercourses for one year without conception.

Incidence of infertility has been decreasing for past years and it affects 15% of couples. Investigating the background, female, male factors can be found in 40%-40% and common reason can be found in 20% of cases. As gynecologist, we can face organic and

functional female factors. As first step gynaecological examination is recommended, followed by special hormonal, endocrine, immunological examinations.

Organic factors can be divided into two groups: intrauterine pathology and tubal pathology. Evaluation of uterine cavity can be managed by ultrasonography (HyCoSy) or by X-ray (HSG). Both of them are indirect methods.

„Gold-standard” method of evaluating uterine cavity is hysteroscopy. Traditionally this procedure is done under anaesthesia in an operating room. During the examination shape of the uterine cavity, tubal ossia, endometrium are evaluated. The costs of this procedure are high, because of the costs of the operating room, staff and the hospitalization.

Abnormal finding can be endometrial polyp that deforms uterine cavity that can cause infertility or miscarriage. Polyps should be rejected independently their sizes and numbers.

Fibroids, myometrial benign tumors have subserosal, intramural and submucosal types. Submucosal and intramural types that deforms uterine cavity can stand in the background of infertility and miscarriage. Transcervical resection of these fibroids can be performed during traditional hysteroscopy.

Fusional or absorbtional defects of the Müllerian tubes can lead to uterine anatomical problems that cause recurrent miscarriage, but do not influence fertility. Diagnose and operation of these malformations is safer and faster using hysteroscopy compared to the traditional laparotomy.

Having intrauterine operation in the history we can face intrauterine adhesions (different severity of Asherman syndrome) in many cases that can stand in the background of infertility. Hysteroscopic adhesiolysis is one of the most difficult intrauterine operations. By

laparoscopic assistance the precise localization of the hysteroscope can be helped in severe cases.

For treatment of the adhesions that formed after intrauterine operation, diagnostic hysteroscopy with adheiolysis is optional, which can be performed every 2-3 weeks till no adhesions can be found.

Many types of classification of intrauterine lesions were described before that stand in the background of recurrent (3 or more consequent) miscarriage. To standardize the categories ESHRE/ESGE made a consensus in the year of 2013 with almost 90 members included me.

Surgical treatment of septated uterus happened traditionally by laparotomy. Technical development brought the chance for performing the septotomy by hysteroscopy, even without anesthesia on office setting.

Tubal dysfunction is a leading factor in female infertility. Laparoscopy dye is the gold standard to detect tubal patency, but hysterosalpingography (HSG) and hystero-contrast-sonography (HyCoSy) are also widely applied. Using office hysteroscopy guided selective chromopertubation (OHSC-SPT) we aimed to develop a less invasive effective and reproducible method, which can be performed in an outpatient setting without anesthesia.

Vaginoscopy is a well-known method in adolescent gynaecology for examination of recurrent vaginal discharge, vaginal bleeding. Using office hysteroscope is having the advantage of the saline distension and digital camera. Due to the small diameter, the examination causes less pain. Distending the vagina with saline visualization is better. With the digital camera the examination can be recorded, archived and used for latter discuss or teaching.

For searching “lost” IUDs curettage was used before. Using office hysteroscopy it is easier to find the device and targeted it is more efficient the removing.

Sterilization is performed world-wide via laparoscopy. During office hysteroscopy tubes can be blocked (Essure) in an office setting without anesthesia. Without anesthesia and operating theatre the costs of the procedure can be decreased.

During infertility work-up functional and organic pathologies should be examined. Evaluation of uterine cavity was performed by sonography before. After some failed cycles HSG or traditional hysteroscopy was suggested. Decreased cost of office hysteroscopy gives the option for low strain and cost method for evaluating uterine cavity even before the first cycle.

Objectives

These were the aims of the study:

- 1.** Introducing the new examination procedure in Hungary. Getting experiences during the usage of office hysteroscopy.
- 2.** Evaluating the experienced pain during the procedure with the help of VAS. Verifying the fact, that it can be performed in an office setting without anaesthesia. Evaluating the effect of parity, menopausal status, type of the instrument on the level of pain.
- 3.** Comparing my results of office hysteroscopy to the data found in international publications.
- 4.** Comparing the accuracy of evaluating tubal patency during office hysteroscopy to the gold standard laparoscopic operation.
- 5.** According to the results assessing the importance of office hysteroscopy in infertility work-up.

Materials and methods

Examinations were performed between 01.05.2008 and 31.12.2011, at the University of Debrecen Medical and Health Science Center, Department of Obstetrics and Gynecology. Results of 400 examinations analysed statistically. Office hysteroscopy was performed for the well-known indications such as abnormal uterine bleeding, infertility, recurrent miscarriage, and lost intrauterine device (IUD). Contraindications were pelvic inflammatory disease (PID), pregnancy, cervical malignancy, and profuse bleeding. These factors were ascertained via routine gynecological examination.

All examinations were performed between the 4th and the 11th cycle days by the same physician. Previous blood tests, anaesthesiologist consultation were not needed.

A rigid 30°, 2.7-mm optic (EMD Hungary) was used, with a 3.7-mm outer diameter diagnostic and a 5.5-mm outer diameter operative sheath with a working channel. For the distension, normal saline was used at a controlled pressure of 60-80 mmHg. Through working channel catheter, bipolar electrode, grasping forceps can be inserted. Diagnostic or operative procedures were used as required. 150 W halogen light source was used. Digital camera was connected to the scope, so recording of images or off-line consultation could be carried out.

The modified „no touch” technique [Bettocchi et al. 1997] was applied, using a speculum but no tenaculum in dorsal lithotomy position. The speculum was acceptable for patients as a part of a general gynecological examination, and provided an opportunity for thorough disinfection. Scope was inserted without grasping and dilatation of cervix, so any kind of general or local anaesthesia is not needed. The duration of the procedures ranged from 1 to 8 minutes (diagnostic, 1-5 minutes; operative, 2-8 minutes). Pain scoring by the patient on a Visual Analog Scale (VAS) was recorded. The VAS was a 10-cm printed horizontal line

with major and minor tick marks at each cm and mm, respectively, representing a linear continuum from no pain at all (left end, numeric value 0) to maximum pain (right end, numeric value 10); patients were asked after the procedure to place a mark across an unmarked VAS using a pen, at the point they felt most consistent with their experienced pain level. Value less than 4 means painless intervention, between 5-7, mild pain and value above 8 indicate severe pain.

Results

1. Evaluating the experienced pain during office hysteroscopy

During a prospective study in 70 cases level of the experienced pain were recorded. Patients were selected in three main groups: nulliparous premenopausal (nulliparous), non-nulliparous premenopausal (non-nulliparous), and non-nulliparous postmenopausal. Non-nulliparous patients had at least one delivery in the anamnesis, in reproductive age. Postmenopausal patients were at least one year beyond their last menstruation. Each main group was divided into diagnostic and operative subgroups according to the type of procedure. Ten cases were included in each but the nulliparous-diagnostic group where we had 20 patients, because most of the procedures were performed upon the indication of infertility. The patients' mean age was 41.1 years. The mean (SD) pain scores in the groups were: nulliparous-diagnostic, 3.4 (1.27); nulliparous-operative, 3.5 (0.85); non-nulliparous-diagnostic, 3.27 (0.65); non-nulliparous-operative, 3.4 (1.07); postmenopausal-diagnostic, 3.4 (0.84); and postmenopausal-operative, 4.2 (0.92). The overall mean (SD) pain score of the 70 patients was 3.51 (1.01). One-way ANOVA produced no evidence of a significant overall pain score difference between the groups ($p = 0.366$). The mean pain score in postmenopausal patients with an operative procedure was higher, but no pairwise difference formed with any of the remaining groups was significant. The severity of experienced pain was not proven to be affected by menopausal status, parity, or type of procedure. In light of our results we postulate that the pain score differences observed may have been due to personal variability in pain tolerance.

2. Application of office hysteroscopy in gynaecological practice

On the basis of the favourable results of the first study I performed 400 office hysteroscopy between 01.05.2008 and 31.12.2011. In 395 cases examination was successful. In 5 cases (0.012%) insertion of the instrument could not be carried out. These interventions happened at the beginning of the learning curve. For the indication of infertility 226 examinations were performed. Indication was abnormal uterine bleeding in 90 cases, in 41 cases suspected intrauterine pathology by sonography, in 27 cases recurrent miscarriage and in 10 cases lost IUD. The patients' mean age was 37.7 years.

Patients' mean age was 33.2 years, that have undergone hysteroscopy for indication of *infertility* (56% of examinations). Any kind of previously not suspected pathology was found in 79 cases (35%). In 29 cases result of hysteroscopy was polyp, in 11 examinations fibroid were found. In 26 cases septum (in one case fibroid at the same time, too), in 10 cases arcuate uterus was diagnosed. Endometrial pathology was found in 5 cases (in one case fibroid at the same time, too).

Patients' mean age was 42.8 years, that have undergone hysteroscopy for indication of *abnormal uterine bleeding* (23% of examinations). Examination ended with positive result in 64 cases (71%). Hysteroscopic finding was polyp in 33, fibroid in 18, septum in 5, endometrial abnormality in 5 and retained placental tissue in 3 cases.

Intrauterine abnormality suspected by sonography indicated hysteroscopy in 41 cases (10%). These patients' mean age was 52.3 years. Despite of the sonographic findings in 9 cases hysteroscopy verified no pathology. Polyp was the diagnose in 21 cases, fibroid in 4, uterus duplex in 3, adhesions in 2 cases. In one case biopsy verified adenocarcinoma.

Office hysteroscopy has been performed to examine the background of recurrent miscarriage. Mean age of patients' was 32.9 years. Once polyp, once fibroid was diagnosed,

in 7 cases (26%) septate, 5 cases arcuate uterus and in one case endometrial abnormality was found.

Lost intrauterine device was indication of office hysteroscopy in 10 cases. Despite sonographic finding, in 3 cases no IUD could be found in the uterine cavity. In one case, the IUD was in normal position, in 5 cases dislocated device was removed and in one case the IUD penetrated the myometrium.

In one case sonography suspected corpus alienum, but during office hysteroscopy empty uterine cavity was found.

3. Evaluating tubal patency by selective pertubation via office hysteroscopy

Tubal dysfunction is a leading factor (30%) in female infertility. Several methods are used worldwide for the assessment of the uterine cavity and tubal patency. Hysterosalpingography (HSG), Hystero-contrast-sonography (HyCoSy) and laparoscopic dye are the most widespread ones. Laparoscopic operation with dye is the most precise and effective method, considered the gold standard, but the costs of running the operating room, the wages of the staff, the costs of the tests and the anaesthesiology consultation will enhance the overall cost of the procedure.

Aim of the study was to compare the new diagnostic test that can be performed on an outpatient basis with less expense and without anaesthesia to the “golden standard” laparoscopic evaluation.

Examination was started with a basic office hysteroscopy, during which any deformity of the uterine cavity and the endometrium could be visualized. In the second step a 1.7 mm plastic catheter was inserted through the working channel and the tip of it was placed to the tubal ostium. Through the catheter methylene blue dye was injected slowly. In case of patent

Fallopian tube no blue fluid would appear in the uterine cavity. Normal colour of the endometrium could be seen, while the catheter turned blue, according to the methylene blue flowing inside it. Occluded Fallopian tube changed the uterine cavity into blue, according to the backflow of the methylene blue. After evaluation of tubal patency, blue dye cleared up within 3-4 seconds and the whole procedure was repeated on the other side. Total examination time was 4-8 minutes. This procedure can be performed in an office setting, without any kind of anaesthesia. To evaluate the accuracy of the new method, we compared its results to laparoscopic findings.

Between January 2010 and January 2011 in patients scheduled for laparoscopy and hysteroscopy as the part of their infertility evaluation, selective pertubation with office hysteroscopy was performed just prior to the scheduled laparoscopy, chromohydrotubation. Patency was evaluated in 70 Fallopian tubes. The mean age of the patients was 32.97 (3.645) years (95%CI of mean, 31.7-34.2; range, 24–42 years). In 35 cases the tubes were patent with both methods. In 23 cases occluded tubes were diagnosed by laparoscopy and hysteroscopy as well. In 7 cases the tubes were patent according to laparoscopic dye, but couldn't be detected as such by hysteroscopy. In 5 cases, occlusion was found by laparoscopy, but during the hysteroscopy patency was detected. In the non-patent cases all the hysteroscopic results matched the laparoscopic result so the specificity was 100% (PPV: 100, NPV: 82.14). In 63 (70-7) cases, the hysteroscopy was concordant to the laparoscopy in 58 (35+23) cases, reaching 87.5% sensitivity. The area under ROC curve was 0.944. Hysteroscopic assessment way had 92.06% accuracy compared to the laparoscopic method. No complication or failure occurred.

Conclusion

The hysteroscopy is a frequently used endoscopic method, which is „gold standard” for the examination of the uterine cavity changes, used widely in the gynaecological practice. The office hysteroscopy is an intervention that makes the accomplishment of ambulant examination, opposite to the traditional method. According to the small diameter of the device the anesthesia is unnecessary, because there is no need of the dilatation of the cervix. The indications of the examination are wide-ranging. Besides the abnormal uterine bleeding, it can be used in the examination of infertility, and those intrauterine changes (polyp, submucosal myoma, adhesion), that were diagnosed by other imagining methods that cause infertility complaints.

Evaluation of the uterine cavity has become more important at the age of assisted reproductive techniques. Dilatation of the cervix can be avoided, so the procedure can be performed in an outpatient setting, without anaesthesia. With no risk of anaesthetic complications, decreased costs, and shorter hospitalization and recovery times, benefits of office hysteroscopy are evident. According to the international publications and my results, no supplementary examinations, lab test are needed before the procedure. Requiring no anaesthesia, operating theatre and requisite staff, the office procedure is much more cost-effective. Due to faster recovery and thus less time away from work, cost savings also manifest at the community health care/insurance system level.

Since the new technical developments operative interventions could be performed in an office setting accordingly too. Abnormalities visualised during diagnostic procedure could be treated as well without any anaesthesia. Using small-diameters scopes featuring working channels, mechanical or bipolar instruments made the procedure safe. For the bipolar

equipment saline could be used instead of glycine for distension, which caused less complication. We do not have data with operating procedures in this work.

Endometrial polyps are often responsible for abnormal uterine bleeding or infertility, which could be treated by operative office hysteroscopy. The new method named “see & treat” replaced the traditional D&C in diagnosing and treating endometrial polyps. The effectiveness was much higher than the previously used curettage. The sensitive innervations in the uterus starts from the myometrium out, whereas the endometrium and any fibrotic tissue present are not sensitive, so polypectomy can be performed without anaesthesia. Polyps, smaller than 2 cm, can be treated safe during office hysteroscopy. By using Narrow Band Imaging technique detection of intrauterine lesions can be more precise. In it images of mucosal microstructures and capillary structures are enhanced by shifting the light spectrum to a narrow band. Using NBI has improved the qualitative diagnosis of the grade and depth of invasion of an atypical lesion.

Fibroids can be found very often as the cause of infertility or recurrent miscarriage. Fibroids can be placed submucosal, intramural, or subserosal. Hysteroscopic point of view submucosal ones are interesting. According to the classification of European Society of Hysteroscopy (ESH) three types of myomas (0, I, II) can be diagnosed. Myomas entirely within the endometrial cavity (type 0) can be removed most effectively. Traditionally used “wait&see” attitude recommended to change to the “see&treat”, used already for polyps. Myomas with maximal diameter of 15 mm can be enucleated by office hysteroscopy. New method named (OPPIuM – preparation of partially intramural myomas in office setting) was published in 2009. The OPPIuM technique consisted of an incision of the endometrial mucosa covering the myoma by scissors or bipolar electrode, along its reflection line on the uterine wall, up to the precise identification of the cleavage surface between the myoma and its pseudo-capsule. Such procedure was aimed at triggering the protrusion of the intramural

portion of the myoma into the uterine cavity during the following menstrual cycles, thus facilitating the subsequent total removal of the lesion via resectoscopic surgery.

Pain scoring by the patient on a Visual Analog Scale (VAS) was recorded. The VAS was a 10-cm printed horizontal line with major and minor tick marks at each cm and mm, respectively, representing a linear continuum from no pain at all (left end, numeric value 0) to maximum pain (right end, numeric value 10); patients were asked after the procedure to place a mark across an unmarked VAS using a pen, at the point they felt most consistent with their experienced pain level. Values less than 4 can be measured in case of no pain or discomfort. Recorded values of 5-8 indicate mild pain. Values above 8 can be observed in cases of severe pain. Mean value of my study was 3.5 ± 1.01 . According to these results and results of other published studies, it can be stated that office hysteroscopy can be performed in an outpatient setting, without any kind of anaesthesia. The aim of the study was to evaluate factors that may influence the experience of pain during hysteroscopy. In light of my results we can say that the evaluated factors (menopausal status, parity, diameter of the instrument) have not been proven to affect the level of experienced pain. Interpreting these findings, we can propose that the pain levels observed may have been influenced by individual differences of pain tolerance only.

Since introduction of the method 400 examinations were performed. Indication of office hysteroscopy was infertility, abnormal uterine bleeding, recurrent miscarriage or Intracavitary abnormality suspected by sonography. Analyzing data shows, that hysteroscopy is the most precise method in evaluating uterine cavity. Out of 400 examinations in 395 cases hysteroscopy was successful. Unsuccessful procedures occurred at the beginning of learning curve (first 50 examinations). Almost 50% of examinations ended in positive result. Despite of intrauterine abnormality suspected by sonography, result of hysteroscopy was negative in 22%.

Due to the financial, psychological and physical strain of the IVF-ET, the evaluation of tubal patency is more and more important in the early phase of infertility workup. Selective perturbation with office hysteroscopy is a reliable method for the assessment of tubal patency. As a minimal invasive office procedure it can be offered as a first line method for the measurement of the uterine cavity and the tubes in infertile women. To evaluate the accuracy of the new method, we compared its results to the “golden standard” laparoscopic evaluation. The mean age of the patients was 32.97 (3.645) years (95%CI of mean, 31.7-34.2; range, 24–42 years). Hysteroscopic tubal assessment had 92.06% accuracy with the laparoscopic dye method taken as reference.

According to the statistical analysis of our data (sensitivity, specificity) the new method is precise and accurate compared to the laparoscopic examination that is world widely used as “golden standard”. The novel method of OHSC-SPT is an effective, accurate, highly minimal invasive method to investigate tubal patency. Because of its low costs and minimal strain, it can be performed as an examination method, which is as effective, precise and reproducible as laparoscopy, but can be performed in an outpatient office, without anaesthesia.

Role of hysteroscopy in infertility work-up is unquestionable. According to some protocols assessment of uterine is required before any kind of IVF treatment. Diagnostic and operative procedures can be performed as well. Endometrial polyps were found in 13% (compared to 25% published rate) of examinations indicated by infertility. Submucosal fibroid were diagnosed in 5 % compared to rate of 5-10% found in literature. Septated uterus occurred in 11% of cases (3-4% found in other publications).

More than one third of gynaecological consultations happen because of abnormal uterine bleeding. Incidence of bleeding disorders decrease at peri- and postmenopausal ages. Despite of its frequency, there is still no consensus in nomenclature.

In cases of chronic disorder, it lasts for six months and it does not need acute intervention. In acute cases urgent intervention is needed to stop blood loss.

In the year of 2009 in Cape Town, FIGO Congress accepted a new nomenclature for abnormal uterine bleeding. An abbreviation – PALM-COEIN - was created out of the causes that can stand in the background of bleeding disorders. PALM stands for organic causes that can be diagnosed during physical examination, or by any imaging technique.

Polyp, Adenomyosis, Leiomyoma, Malignancy and hyperplasia

Coagulopathy, Ovarian dysfunction, Endometrial originate, Iatrogen, Non-classified

In my work PALM group disorders were examined by hysteroscopy.

Transvaginal sonography is widely used for evaluating uterine cavity, but the sensitivity and specificity of this method are lower, than CTs and MRIs. Costs of these imaging methods are very high, so office hysteroscopy is a good choice for examination of uterine cavity.

For diagnosis and treatment of bleeding disorders still D&C is mostly used. This procedure has therapeutic effect, but generally is performed under anaesthesia. Precision of curettage in resection of local disorders is low.

Since 2002, according to recommendation of Association of Professors of Gynaecology and Obstetrics hysteroscopy is accepted as the gold-standard method for evaluating uterine cavity. Hysteroscopy is a minimally invasive endoscopic procedure. During this examination evaluating the inside of uterine cavity targeted biopsy and operative procedure can be performed. Precision of targeted biopsy is higher, compared to the curettage.

Because of its simplicity, office hysteroscopy can be performed at the same time with routine gynaecological examination in investigation the background of abnormal uterine bleeding. Rate of 52-94.6% of intrauterine abnormality was published before, compared my result of 71%. Submucosal fibroid was found in 16-28% causing menstrual disorder, which rate was 20% in my study. Diagnosis of hysteroscopy was endometrial polyp in 37% of cases, corresponding rate of 9.1-45.9% found in literature.

Positive result of hysteroscopy occurred in 44% (43% found in literature) of examinations performed for indication of recurrent pregnancy loss. In cases of 44% uterine malformation (compared to 28%) were found, endometrial polyp in 4% (6%) and fibroid in 5% (1-5%) were diagnosed.

Office hysteroscopy is known to be a viable and appropriate method in the diagnosis and treatment of the uterine cavity. Thanks to improved parameters of the instrument and the new procedural technique, both diagnostic and operative hysteroscopy can be carried out without anaesthesia, as an outpatient care procedure. By diagnosing and operating deformities hysteroscopically in an office setting, considerable costs, strain, and time can be saved, to benefit both the patient and the physician.

Summary

I present the advantages of the minimally invasive procedure, the first experiences of using the new method in Hungary and the procedure developed for evaluating the tubal patency in an outpatient setting. According to the data of experienced pain measurement I can state that hysteroscopy can be performed without anaesthesia. Statistical analysis of the results revealed no evidence that parity, menopausal status, or the thickness of the instrument influence the level of experienced pain. Selective perturbation during office hysteroscopy (OHSC-SPT) is a new diagnostic test to investigate tubal patency that can be performed on an outpatient basis with less expense and without anaesthesia. . The purpose of our study was to evaluate the accuracy of this diagnostic method compared to the gold-standard laparoscopic evaluation.

The aim of the dissertation is to enlighten the advantages of office hysteroscopy using it even more widely, because it doesn't need any preparation and it is minimal invasive. Economical cost-effectiveness is not questionable, cost saving can manifest even at community health care/insurance system level. We should use the traditional method that needs longer preparation, observation, anaesthesia and operating theatre only in cases of proven pathology.

Register Number: DEENKÉTK/15/2014.

Item Number:

Subject: Ph.D. List of Publications

Candidate: Péter Török

Neptun ID: XES242

Doctoral School: Doctoral School of Clinical Medicine

Mtmt ID: 10029273

List of publications related to the dissertation

1. **Török, P.**, Major, T.: Evaluating the level of pain during office hysteroscopy according to menopausal status, parity, and size of instrument.
Arch. Gynecol. Obstet. 287 (5), 985-988, 2013.
DOI: <http://dx.doi.org/10.1007/s00404-012-2667-x>
IF:1.33 (2012)
2. **Török, P.**, Major, T.: Accuracy of Assessment of Tubal Patency With Selective Pertubation at Office Hysteroscopy Compared With Laparoscopy in Infertile Women.
J. Minim. Invasive Gynecol. 19 (5), 627-630, 2012.
DOI: <http://dx.doi.org/10.1016/j.jmig.2012.03.016>
IF:1.608



List of other publications

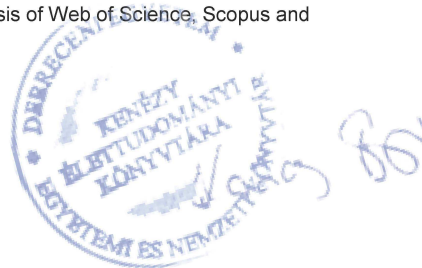
3. **Török P.**, Major T.: A meddőségi kivizsgálás során alkalmazott office hiszterozkópiával szerzett tapasztalataink.
Magyar Nőorv. L. 75 (5), 12-15, 2012.
4. Erdődi B., **Török P.**, Tóth Z., Jakab A.: A két- és háromdimenziós ultrahangvizsgálat hatékonysága a körülírt méhüregi elváltozások diagnosztikájában.
Onkológia. 1 (2), 128-132, 2011.
5. **Török P.**, Major T.: Office hiszterozkópia: Új vizsgálati lehetőség a nőgyógyászati gyakorlatban.
Orv. Hetil. 152 (2), 51-54, 2011.
DOI: <http://dx.doi.org/10.1556/OH.2011.28997>
6. Góth, L., Tóth, Z., Tarnai, I., Bérces, M., **Török, P.**, Bigler, W.N.: Blood catalase activity in gestational diabetes is decreased but not associated with pregnancy complications.
Clin. Chem. 51 (12), 2401-2404, 2005.
DOI: <http://dx.doi.org/10.1373/clinchem.2005.055517>
IF:7.717
7. Csorba R., **Török P.**, Daragó P., ifj. Aranyosi J., Bodnár B., Borsos A.: Szülés után kialakuló izolált petefészekrák.
Orv. Hetil. 143 (51), 2841-2842, 2002.

Total IF of journals (all publications): 10.655

Total IF of journals (publications related to the dissertation): 2.938

The Candidate's publication data submitted to the Publication Database of the University of Debrecen have been validated by Kenezy Life Sciences Library on the basis of Web of Science, Scopus and Journal Citation Report (Impact Factor) databases.

22 January, 2014



Oral presentations and posters

A novel method of selective chromopertubation at office hysteroscopy (oral presentation)

Török, P; Jakab, A; Major, T.

ESHRE, 2011 Stockholm

Hum. Reprod. 2011; 26 (suppl 1): i11-i14

Office hysteroscopy - a new method used in infertility workup (poster)

Török, P; Major, T.

The 16th World Congress on COGI, 2012 Singapore

Evaluating the effect of cervical dilatation prior to operative hysteroscopy to the week of subsequent delivery (poster)

Török, P; Farkas, E; Daragó, P; Lampé, R.

ESGE 22nd annual congress, 2013 Berlin

Gynecol Surg (2013) 10 (Suppl 1):S3

Tubal flushing effect of selective chromopertubation at office hysteroscopy (poster)

Daragó, P; Lampé, R; **Török, P**

ESGE 22nd annual congress, 2013 Berlin

Gynecol Surg (2013) 10 (Suppl 1):S8

A rare case of persistent intrauterine myoma (poster)

Lampé, R; Daragó, P; **Török, P**

ESGE 22nd annual congress, 2013 Berlin

Gynecol Surg (2013) 10 (Suppl 1):S21

Az office hiszteroszkópia, mint új vizsgáló módszer (oral presentation)

Török P.

Fiatal Nőorvosok IV. Országos Fóruma, 2008 Tapolca

Hiszteroszkópos vaginoszkópia a gyermeknőgyógyászati kórképek diagnosztikájában (oral presentation)

Török P.

A MNT Gyermeknőgyógyász Szekció XXVIII. Kongresszusa, 2008 Debrecen

Az office hiszteroszkópia szerepe a meddőségi kivizsgálásban (oral presentation)

Török P.

MART, 2009 Harkány

Kezdeti tapasztalataink az office hiszteroszkópiával (oral presentation)

Török P.

Minimál Invazív Határterületek Konferenciája, 2009 Tihany

Az office hiszteroszkópia szerepe az ambuláns nőgyógyászati ellátásban (oral presentation)

Török P.

A MNT Északkelet-Magyarországi Szakcsoportjának Tudományos Ülése, 2009

Hajdúszoboszló

Az office hiszteroszkópia alkalmazása (oral presentation)

Török P.

MNET Nagygyűlés, 2009 Debrecen

Az office hiszteroszkópia (oral presentation)

Török P.

Referátum

A MNT Északkelet-Magyarországi Szakcsoportjának Tudományos Ülése, 2010 Fehérgyarmat

Az office hiszteroszkópia szerepe az ambuláns nőgyógyászati ellátásban (oral presentation)

Török P.

Szakdolgozók továbbképzése, 2010 Debrecen

Az office hiszteroszkópia alkalmazása az ambuláns nőgyógyászati gyakorlatban (oral presentation)

Török P.

Az MNT Nagygyűlése, 2010 Debrecen

Diagnostic value of 2D and 3D ultrasonography in the detection of intrauterine lesions (oral presentation)

B. Erdodi, Z. Tóth, **P. Török**, A. Jakab

20th World Congress of ISUOG

Az office hiszteroszkópia az onkológiában (oral presentation)

Török P.

Cervixpatológiai Kongresszus, 2011 Hajdúszoboszló

Szelektív petevezető átjárhatósági vizsgálat office hiszteroszkópia során (oral presentation)

Török P.

MNET Nagygyűlés, 2011 Győr

Az office hiszteroszkópia alkalmazása a nőgyógyászati ellátás során (oral presentation)

Török P.

Román- Magyar Endoszkópos Napok, 2011 Csíkszereda

Hiszteroszkópia napjainkban (oral presentation)

Török P.

Endoszkópos továbbképzés, 2012 Debrecen

Other publicaton

Birinyi L, Daragó P, **Török P**, Csiszár P, Major T, Borsos A, Bacskó Gy.

Predictive value of hysteroscopic examination in intrauterine abnormalities.

Eur J Obstet Gynecol Reprod Biol. 2004; 115:75-79.