Operative Ultrasonography for Upper Genital Tract Pathology

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Purpose: A procedure using transvaginal sonohysterography (SHG) to perform operative intrauterine biopsies and resections is described.

Methods: Seven women, six with intrauterine pathology noted on diagnostic SHG and one with a thickened endometrium noted on transvaginal ultrasonography, underwent attempted operative SHG. The indications were peri- and postmenopausal bleeding ($n = 4$) and infertility requiring assisted reproduction ($n = 3$). Access to the uterine cavity was accomplished with a 9-F cervical access catheter (CAC) with a 3-ml balloon (BEI Medical Systems, ZSI Gynecology Products Division, Chatsworth, CA), which was placed in the cervical canal or lower uterine segment. Depending on the position of the noted uterine pathology, a 6-F uterine ostial access catheter (UOAC) (BEI Medical Systems, ZSI Gynecology Products Division) was placed through the CAC. The uterine cavity was distended with 5–10 ml of 1% Lidocaine and a 3-F loop grasper or finger-like biopsy grasper was then passed through the UOAC or a 5-F operative instrument directly within the CAC with attempted resection under ultrasound guidance. Biopsied samples were sent to pathology for definitive diagnosis. Office hysteroscopy was then performed to confirm adequate resection.

Results: Three of six patients had adequate resection or biopsy of intrauterine pathology, while the seventh patient successfully had a directed biopsy of the fundal cavity under ultrasound guidance. In one case, the visualized lesion could not be grasped. In the other two cases, each patient had severe cervical stenosis and declined in-office cervical dilation precluding the procedure. Each procedure was well tolerated, with an average time from start to finish of about 25 min (range, 18–43 min) without complications.

Conclusions: Operative SHG makes it possible to resect and biopsy intrauterine pathology often missed on Pipelle sampling. If found to be as effective as hysteroscopy, opera-

tive SHG would provide a cost-effective alternative. Further study is ongoing to perfect the existing instruments to allow removal of larger lesions both safe and possible.

KEY WORDS: operative sonohysterography; uterine pathology; hysteroscopy.

INTRODUCTION

The use of abdominal or transvaginal sonography followed by the introduction of saline into the upper genital tract, called sonohysterography (SHG), has greatly aided the diagnostic evaluation of uterine cavity pathology. Compared with the traditional technique of hysterosalpingography, SHG has the added advantage of three-dimensional imaging which clearly defines uterine cavity defects with a submucosal component alone and/or with intramural involvement. SHG also avoids exposure to ionizing radiation and iodinated contrast material and is associated with less discomfort because there is minimal intraperitoneal instillation of contrast (1,2). Diagnostic applications include the evaluation of abnormal uterine bleeding in postmenopausal women, dysfunctional uterine bleeding, recurrent miscarriage, infertility, and assessment of tubal anatomy (1,3–7).

Symptomatic and asymptomatic intrauterine pathology is a common finding in postmenopausal women and in women seeking infertility treatment (1,8), often necessitating operative intervention. Recently, successful operative intervention with ultrasound-guided fallopian tube cannulation for proximal tubal obstruction has been described in the office setting (9). Similarly, we have performed operative intrauterine biopsies and resections using transvaginal SHG to avoid operative intervention.

MATERIALS AND METHODS

Seven women, six with intrauterine pathology as noted on SHG and one with a thickened endometrium

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Table I. Characteristics of Patients Undergoing Operative SHG

Patient	Diagnostic SHG	Operative SHG	Pathology
1. Asymptomatic PM ^a thickened endometrium on TVUS ^b	Polyp, 15 mm	Biopsy of polyp	Benign polyp
2. PM bleeding	Polyp, 10 mm	Resection of polyp	Benign polyp
3. Perimenopausal bleeding	Polyp, 8 mm	Cervical stenosis precluding procedure	Hysteroscopic resection: benign polyp
4. Perimenopausal bleeding	Polyp, 12 mm	Cervical stenosis precluding procedure	Hysteroscopic resection: benign polyp
5. Infertility	Polyp, 10 mm	Unable to grasp polyp	Hysteroscopic resection: benign polyp
6. Infertility	Polyp, 7 mm	Resection of polyp	Benign polyp
7. Symptomatic PM bleeding, < 5-mm endometrial thickness on TVUS	Normal cavity	Random biopsies of fundal cavity	Atrophic endometrium consistent with Pipelle sampling

^a Postmenopausal.^b Transvaginal ultrasonography.

noted on transvaginal ultrasonography, underwent operative SHG. The indications were peri- and postmenopausal bleeding ($n = 4$) and infertility requiring assisted reproduction ($n = 3$) (Table I).

Initially, all patients underwent a diagnostic SHG that was performed either during the follicular phase of a spontaneous menstrual cycle or following a progestin withdrawal bleed. Patients with a history of pelvic inflammatory disease or who were known to have tubal obstruction were administered doxycycline for 3 days prior to the procedure, similar to women undergoing HSG. All patients were required to take a nonsteroidal antiinflammatory drug 1 hr before the procedure. Diagnostic evaluation of the uterine cavity was performed using a 2-mm H-S catheter (Ackrad Labs, Cranford, NJ) placed transcervically, with the balloon distended in the lower uterine segment or cervical canal. Routine transvaginal sonography of the endometrium, myometrium, and adnexa was initially performed, followed by instillation of 5–10 ml of sterile saline through the catheter. The balloon was deflated to allow for proper assessment of the lower aspect of the uterine cavity. Transvaginal sonographic images of the sagittal and coronal views of the pelvis were recorded. Pathology with only a submucosal component was considered for resection.

In the same session, attempted access to the uterus was accomplished with a 9-F cervical access catheter (CAC) with a 3-ml balloon (BEI Medical Systems, ZSI Gynecology Products Division, Chatsworth, CA). This was placed in the cervical canal or lower uterine segment. Depending on the position of noted uterine pathology, a 6-F uterine ostial access catheter (UOAC) (BEI Medical Systems, ZSI Gynecology Products Division) was placed through the CAC. The UOAC has a 90° curvature and is routinely used for selective tubal ostia catheterization. This natural curvature has been applied to allow for directional placement within the uterine cavity. The uterine cavity was redistended

Fig. 1. Operative sonohysterography system. The UOAC and biopsy instruments introduced through the CAC.

Fig. 2. (a) Infertility patient with a lower uterine segment polyp. (b) Loop resection of the lower uterine segment polyp.

Fig. 3. (a) Symptomatic postmenopausal polyp. (b) Directed biopsy of the postmenopausal polyp.

with 5–10 ml of 1% Lidocaine. A 3-F loop grasper or finger-like biopsy grasper was then passed through the UOAC or a 5-F operative instrument directly within the CAC with attempted resection under ultrasound guidance (Fig. 1). Biopsied samples were sent to the pathology laboratory for definitive diagnosis.

RESULTS

Three of six patients had adequate resection or biopsy of intrauterine pathology, while the seventh patient successfully had a directed biopsy of the fundal cavity under ultrasound guidance. In one case, the visualized lesion could not be grasped. In the other two cases, each patient had severe cervical stenosis and declined in-office cervical dilation precluding the procedure. SHG was well tolerated, with the average time from start to finish being approximately 25 min (range, 18–43 min). There were no postoperative complaints. Following operative SHG and removal of all instruments, office hysteroscopy was performed to confirm adequate resection.

Figure 2a shows a lower uterine segment polyp in an infertility patient seen on diagnostic SHG, while Fig. 2b demonstrates the loop grasper around the polyp. The pathology laboratory returned a benign polyp. Figure 3a shows a symptomatic postmenopausal polyp followed by directed biopsy with a grasping forceps in Fig. 3b.

DISCUSSION

Many diagnostic indications for intrauterine saline infused ultrasonography have evolved, but more recently it has found a therapeutic application as an adjunct for tubal cannulation (9). Using operative SHG, it is now possible to resect and biopsy intrauterine pathology, which should further enhance its clinical utility. This technique evolved when it was noted that endometrial sampling using a Pipelle (Unimar, Wilton, CT) sampling was missing 50% of polypoid lesions seen on SHG (8). Pipelle sampling has been shown to sample at best 15% of the endometrial cavity, often missing lesions and potential neoplasia (10). Directed SHG biopsy and resection potentially ensure adequate removal or sampling, otherwise often missed.

Hysteroscopy remains the "gold standard" for diagnosis and treatment of intrauterine pathology. How-

ever, operative hysteroscopy may cost up to \$1,500, not including hospital costs, and is more invasive, whether performed in the operating room or office setting. Current procedure terminology coding for diagnostic SHG places reimbursement at \$285 to \$435, while transcervical introduction of the CAC and UOAC system ranges from \$300 to \$800. Clearly, operative SHG is a less expensive approach than operative hysteroscopy and, if found to be as effective, should provide a cost-effective alternative.

The overwhelming majority of endometrial lesions are small and pedunculated and are amenable to simple resection. However, caution is needed when attempting removal of lesions with intramural components. Further study is ongoing to perfect the existing instruments and to add Doppler-flow imaging of blood flow, which may make removal of larger lesions both safe and possible.

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