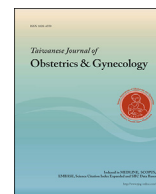




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Original Article

Clinical application of Lin's biopsy grasper for intrauterine targeted biopsy and polypectomy during office hysteroscopy

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ABSTRACT

Objective: Hysteroscopy has widely been used for diagnosis of the uterine cavity; however, target biopsy has often been difficult in part to the inherent limitations of ancillary instruments. Lin's biopsy grasper was specifically designed to work in conjunction with a flexible hysteroscope to obtain intrauterine biopsy under transabdominal sonography. Herein, we share our clinical experience in the management of endometrial abnormalities with the use of Lin's biopsy grasper during office-based hysteroscopy.

Materials and methods: From February 2006 to November 2016, the use of Lin's biopsy grasper for tissue biopsy was attempted on 126 cases. We retrospectively recorded and analyzed the patients' preoperative characteristics and biopsy outcomes to demonstrate the feasibility and efficacy of Lin's biopsy grasper.

Results: Out of the one hundred and twenty-six enrolled patients, satisfactory targeted biopsies were achieved; including high diagnostic rate (92.1%, with 116 cases confirmed histologically) and adequate tissue retrieval (77.8%, with 98 cases obtaining optimal specimen volume). All patients tolerated the procedure without analgesics or anesthesia.

Conclusion: Diagnostic flexible hysteroscopy combined with the use of Lin's biopsy grasper has proven to be an effective tool for intrauterine evaluation and obtaining tissue sample.

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Introduction

Diagnostic hysteroscopy provides the most direct way to visualize and evaluate the interior of the uterus [1,2]. It provides a method to investigate the endocervical canal, endometrial cavity, and tubal ostia through a lighted telescope-like device. One of the most common use for diagnostic hysteroscopy is to find the cause of abnormal uterine bleeding. Other indications include confirmation of abnormal findings, such as: unusual hysterosalpingography, thickened endometrial lining on ultrasound, and confirmation of Müllerian anomalies. Furthermore, hysteroscopy has also been considered to play a role in evaluating patients with recurrent miscarriage or infertility [3,4].

With advances in endoscopic technology, most patients can undergo diagnostic hysteroscopy in an office setting without the

need of anesthesia. Whenever a suspicious lesion is encountered under hysteroscopy, further interventional procedures may be warranted. Some hysteroscopes are equipped with small operating channels which provide space for ancillary instruments but small-caliber forceps are often inefficient to provide adequate tissue sample for proper histological evaluation.

Here, we present a newly developed grasper, Lin's biopsy grasper (Takasago, Tokyo, Japan), which can be used after diagnostic flexible hysteroscopy and accomplish intrauterine targeted biopsy under the assistance of transabdominal ultrasound.

Materials and methods

A retrospective cohort study was conducted between February 2006 and November 2016 by analyzing medical records from our center, the Department of Gynaecology Endoscopy, Kawasaki Municipal Hospital. During this period, 126 patients underwent targeted biopsy with Lin's biopsy grasper for intrauterine lesions diagnosed by flexible hysteroscope. The biopsy grasper is a curved instrument with a serrated fenestrated jaw measuring

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3.0 × 2.5 × 7.0 mm which can be opened to an angle of 60° and reaching a maximum distance of 11 mm between the tips of the jaw. (Fig. 1(a,b)).

In the office setting, the patient was placed in a lithotomy position and a 3.1 mm flexible diagnostic hysteroscope was introduced through the cervical canal and into the uterine cavity without cervical dilation, analgesia, anesthesia, or use of a tenaculum to grasp the cervix. 5% glucose was used as our distension medium and placed about 80 cm above the level of the uterus and connected to the inflow port of the flexible hysteroscope (HYF-XP; Olympus).

The clinical indications for targeted biopsy with Lin's biopsy grasper included: uterine polyp, submucosal myoma, suspicious malignant lesion or other endometrial abnormalities diagnosed during flexible hysteroscopy (Table 1). If a suspected intrauterine lesion was visualized, Lin's biopsy grasper was inserted into the uterine cavity without further need of cervical dilatation after withdrawing the flexible hysteroscope and targeted biopsy was performed under guidance of transabdominal ultrasound. The biopsy procedure sometimes requires repeated grasping action to remove the entire lesion. Transvaginal ultrasound is performed upon completion to confirm removal of the pathologic lesion. All obtained specimens were sent for histopathological evaluation.

Results

From February 2006 to November 2016, usage of Lin's biopsy grasper for tissue biopsy was attempted on 126 cases at our

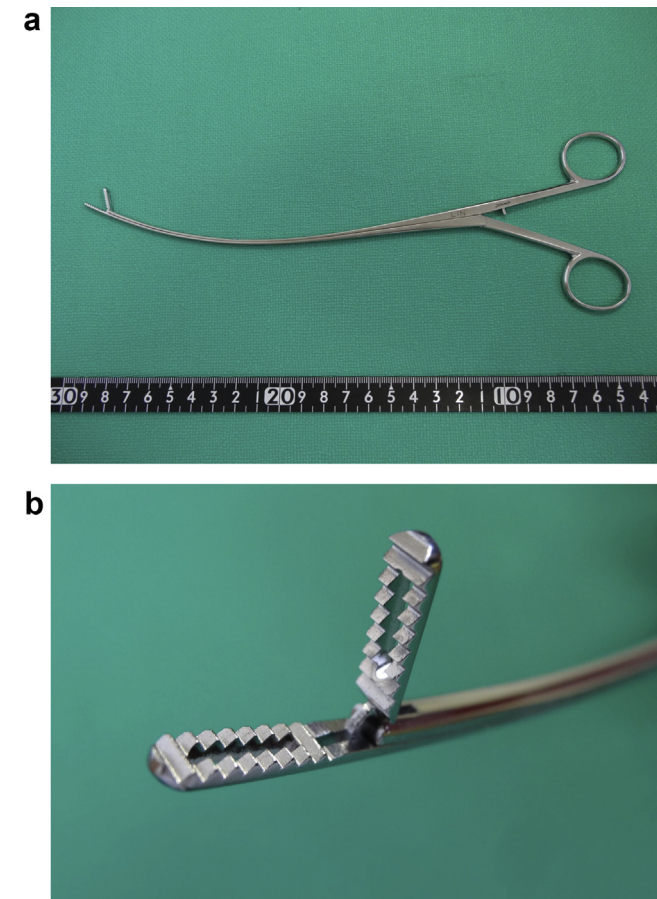


Fig. 1. a) An overall view of Lin's biopsy grasper, b) A close-up view of Lin's biopsy grasper.

institute. The mean age was 42.0 years, with a standard deviation of 11.1 years (range: 24–76 years). In these cases, the clinical indication of diagnostic hysteroscopy comprised of abnormal uterine bleeding (33.3%), menorrhagia (21.4%), suspected uterine polyp on ultrasound image (18.3%), infertility (19.0%), postmenopausal vaginal bleeding (6.3%) and abnormal uterine cytology (1.6%).

In our study, the achievement rate of targeted biopsy was 92.1% (Table 1). The amount of obtained tissue was defined as optimal (adequate) ($\geq 7 \text{ mm}^3$) or minimal (inadequate) ($< 7 \text{ mm}^3$) for histologic evaluation (Table 2). In the majority of collected cases (77.8%), sufficient amount of specimen was provided to help establish an accurate pathologic diagnosis. Only nine patients (7.1%) failed to obtain any specimen in the process. The distribution of pathologic diagnoses from the 116 cases is shown in Table 3.

In 80 patients who were hysteroscopically diagnosed as uterine polyp (including endometrial polyp and endocervical polyp), final pathology results were as follow: endometrial or endocervical polyp in 65 cases, endometrial hyperplasia in 1 case, leiomyoma in 2 cases, foreign body with neutrophil exudate in 1 case, normal endometrial tissue in 7 cases, and failure to retrieve any specimen in 4 cases. In the four cases where no specimen was obtained, alternative methods (ex. Lin's Snare [5], D&C or resectoscope) were performed to remove the polyp.

Among patients with hysteroscopic diagnosis of submucosal myoma (9 cases), targeted biopsy was attempted for differential diagnosis and trial to treat tiny lesions. Lesion removal was possible in 3 cases (2 of them proved to be pedunculated myoma; the other proved to be necrotic tissue). In the remaining 6 cases, resectoscopic myomectomy [6] was subsequently arranged in 5 of them while 1 case was lost to follow-up after diagnostic hysteroscopy.

For patients having suspicious malignant lesion (9 cases), targeted biopsy was performed depending on location of the lesion. Adequate amount of specimen was obtained and pathologic results are as follow: endometrioid adenocarcinoma in 5 cases, atypical endometrial gland (highly suspected adenocarcinoma) in 1 case, atypical polypoid adenomyoma (APAM) in 1 case, atypical complex endometrial hyperplasia in 1 case, and residual placental tissue in 1 case. Patients with pathology confirmed malignancy received staging surgery; however, the patient diagnosed with APAM underwent medical treatment with progestin, followed by periodical endometrial biopsy. The patient with residual placenta achieved complete removal of gestational tissue after targeted biopsy and no apparent vaginal bleeding was noted after the procedure. Loss of follow up was noted in the patient with atypical complex hyperplasia.

During the study period, patients didn't complain of intra/post operative discomfort or pain. Vagina spotting was noted in a few cases but no major adverse effects were reported.

Discussion

Hysteroscopy can be regarded as a diagnostic procedure to evaluate the uterine cavity with a detection rate of 98% for intra-uterine disease [7,8]. With the development of modern microendoscopy, miniature hysteroscope (outer sheath 3–4 mm in diameter) has widely been used during outpatient visits. Two types of diagnostic hysteroscope are available – flexible and rigid. Flexible hysteroscope is designed with a bendable tip with distal steerability which endow the scope superiority in overcoming the severely flexed uterus or distorted uterine cavity [9]. Moreover, it is usually associated with less discomfort during an outpatient setting [10,11]. Rigid hysteroscope may provide better image, fewer procedure failure, and reduced cost [12]. However, there is no way to define which one is better than the other, and the choice of hysteroscope is still within the discretion of the physician. In our

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