Endometrial aspiration cytology in gynecological disorders

ABSTRACT

Context: Endometrial aspiration is not a popular modality for the study of the endometrium despite its simplicity and potential utility.

Aim: The present study was aimed at evaluating the utility of endometrial aspiration in various gynecological disorders.

Materials and Methods: In this diagnostic accuracy study, 55 prospectively registered women with various gynecological disorders were evaluated clinically and subjected to endometrial aspiration cytology and study of endometrial histology. Endometrial aspiration was performed by infant feeding tube in 10 cases and intra cath cannula in 45 cases. The slides were stained with rapid Papanicolaou (PAP) stain and Leishman stain.

Results: Endometrial aspiration cytology showed 90% and 94.6% sampling adequacy with infant feeding tube and intra cath cannula, respectively. Intra cath cannula was very convenient to handle and superior to infant feeding tube in aspirating the endometrium. Of the two stains used, rapid PAP stain was less time-consuming and superior to Leishman stain in studying the nuclear details. Leishman stain was helpful in detecting cytoplasmic vacuoles of secretory endometrium. Overall diagnostic accuracy of endometrial cytology was 90.4% while that for morphological hormonal evaluation was 97.6%. It enjoyed a sensitivity of 91.66%, a specificity of 88.23%, positive predictive value of 94.28%, and negative predictive value of 83.33%.

Conclusion: Intra cath cannula emerged as an inexpensive, effective, and convenient device for endometrial aspiration. Endometrial aspiration proved to be a fairly effective, simple, and informative diagnostic modality.

Key words: Endometrial aspiration; endometrial cytology; infant feeding tube; intra cath cannula

Introduction

Ambulatory health care is the demand of the day and gynecologists have started responding to this trend by providing cost-effective care without significantly compromising the quality of care. This is reflected in the widespread use of cervical and vaginal cytology which has gained popularity as an additional and sometimes independent diagnostic tool. Endometrial aspiration has not become very popular until very recently.[1] This is despite many years of interest and research. This probably is due to lack of uniform results with endometrial sampling methods and inability to obtain satisfactory and representative samples.[2] Furthermore, the pathologist may find it difficult to interpret it morphologically as its criteria are different from those of cervical and vaginal cytology. Above all, tradition still remains and this is the reason curettage is a more popular procedure than endometrial aspiration even today in developed and developing countries despite the existence of less invasive and less expensive techniques of endometrial sampling.[3,4]

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Endometrial aspiration is reported as a safe, simple, cost-effective office procedure, which requires no anesthesia. In this view, we thought it worthwhile to study its diagnostic utility in gynecological disorders.

**Materials and Methods**

In this diagnostic accuracy test, 55 prospectively registered women with various gynecological problems were enrolled. They were then clinically reviewed and subjected to endometrial aspiration after obtaining ethical clearance and informed consent. Endometrial aspiration was performed by infant feeding tube (Poly medicure Ltd.) in the initial 10 cases by the pathologist in the gynecology theater under supervision of the gynecologist and without administering anesthesia. The infant feeding tube attached to a 20 cc syringe (Iscon surgical Ltd.) with its piston at the highest position was inserted in the uterine cavity through cervical os and was rotated there in an attempt to touch the endometrial lining. The negative pressure was applied by withdrawing the piston. The tube was then withdrawn and the syringe was detached and the aspirated material was expressed and tapped on slides to make smears. In view of the technical difficulties encountered in endometrial aspiration with this procedure, in further 45 cases it was performed in a similar manner with disposable intra cath cannula (Poly medicure Ltd) (routinely used for putting intravenous lines) attached to the 20 cc syringe. Three smears were obtained from each case. The smears were stained with rapid Papanicolaou (PAP) (readymade kit) stain and Leishman stain. The smears were evaluated for sampling adequacy, background, nature of glandular and stromal cells, phasing of the endometrium, and any other abnormality. Forty-five of these patients underwent diagnostic curettage and 10 patients underwent hysterectomy. These endometrial specimens were processed and evaluated histologically. Findings on cytology were correlated with histology to assess the diagnostic utility of endometrial cytology.

**Results**

Satisfactory endometrial samples were collected in 9 out of 10 cases with infant feeding tube and 43 out of 45 cases with intra cath cannula. The sampling adequacy for infant feeding tube and intra cath cannula was 90% and 94.6% sampling, respectively. The infant feeding tube owing to its long length and flexible nature tended to coil inside the uterine cavity and was cumbersome and inconvenient to handle. It did not offer resistance to ensure contact with the endometrial lining. It posed difficulties in expressing the material on the slide. This prompted us to shift to an innovative use of the intra cath cannula. It was comparatively easy to handle owing to its rigid nature. It offered resistance when in contact with endometrial lining, which ensured adequate sampling. It was easy to express the material on the slide. Two cases each by both these procedures experienced pain. It was of mild degree with intra cath cannula and of moderate degree with infant feeding tube.

PAP stain provided differentiation of cytoplasmic elements and fair demonstration of nuclear details but failed to demonstrate secretory vacuoles in the endometrial glands. Leishman stain on the contrary was best suited for detecting these secretory vacuoles and in staining the inflammatory cells and red blood cells (RBCs) in the background [Figure 1A]. Both these stains complemented each other in evaluation of the smears.

The presence of blood and mucus in the aspirate was frequently encountered and posed difficulties in spreading, staining, and interpreting the smears and resulted in thick smears with inferior staining. The contamination with squamous cells was noted in 11 cases. One such case showed contamination by anaplastic cells of cancer cervix. A case of missed pregnancy showed metachromatic stroma in addition to secretory changes in slides stained with Leishman stain.

The study group included 15 cases of infertility, 34 cases of dysfunctional uterine bleeding, five cases of postmenopausal bleeding, and one case of missed pregnancy.

The correlation of histology and cytology is shown in Table 1. Diagnostic accuracy of endometrial cytology was 90.4%. Hormonal evaluation on morphology was attempted in 15 cases of infertility and 26 cases of dysfunctional uterine bleeding where menstrual history was known. It was performed correctly in 40 out of 41 cases with 97.6% accuracy. The sensitivity of endometrial cytology was noted as 91.66%.

Table 1: Correlation between endometrial cytology and histology

| Diagnosis                  | Histology (n) | Cytology (n) | Misclassification (n) |
|----------------------------|---------------|--------------|-----------------------|
| Proliferative phase        | 23            | 27           | 4                     |
| Secretory phase            | 16            | 15           | 1                     |
| Simple hyperplasia         | 5             | 3            |                       |
| without atypia             |               |              |                       |
| Atypical hyperplasia       | 2             | 2            |                       |
| Adenocarcinoma             | 1             | 1            |                       |
| Atrophy                    | 3             | 3            |                       |
| Endometritis               | 1             | 1            |                       |
| Pregnancy                  | 1             | 0            |                       |
| Total                      | 52            | 52           | 5                     |
specificity as 88.23%, positive predictive value as 94.28%, and negative predictive value as 83.33%.

Discussion

Endometrial aspiration needs a small diameter device. It can be passed even through the stenotic postmenopausal cervix and snugly fits the cervix to seal it and permit negative pressure in the uterine cavity. This allows easy and adequate aspiration of the endometrium.[7]

The routinely used devices such as infant feeding tube and menstrual regulation (MR) syringe have been tried for endometrial aspiration.[7,8] The specially designed devices for the same included Isaac’s cell sampler, Vabra aspirator, and pistol aspirator.[4,6] The sampling adequacy offered by these devices ranged 77-98.7%.[4,6,8-10] In present study, we have used easily available intra cath cannula, routinely used for intravenous lines with 20-cc syringe as a device for endometrial aspiration, with 94.6% sampling adequacy. It has an opening at its tip and its length is comparable to the uterine height. This ensures ease and safety in handling. The procedure was well-tolerated except for mild discomfort in two cases. Authors such as Iversan and Segadalan and Hemlatha et al. have compared such discomfort to one experienced on insertion of intrauterine device.[4,10]

We were not particularly happy with the infant feeding tube on grounds of technical difficulties experienced in handling it and aspirating and expressing the aspirated material. This prompted us to look for an alternative, which happened to be a routinely used, easily available device such as the intra cath cannula, otherwise used for the intravenous lines.

We have performed the endometrial aspiration with infant feeding tube or intra cath cannula in the gynecology theater under supervision of the gynecologist before administering anesthesia [for further dilation and curettage (D&C) or other surgical procedures]. The same can be done as an office procedure in the gynecology outpatient departments or clinics by the gynecologist as it is safe and without any major discomfort owing to the blunt nature of the infant feeding tube and a short length and rigid consistency of the intra cath cannula. Bouchardy et al. have also indicated that endometrial aspirations can be performed as office procedures.[6]

The major strength of the present study was the innovative and cost-effective use of intra cath cannula for endometrial aspiration which is easily available and hence, the procedure can be performed even in resource-poor settings. Furthermore, the cytological processing reduces the turnaround time and cost of the investigation as compared to formalin fixation and histological study of cell block prepared from such aspirations or D&C. The distinct constraint of the present study was its very moderate sample size, which is attributed to apprehension shown by the gynecologist in allowing us to perform the procedure.

The present study enjoyed diagnostic accuracy of 90.4%. The diagnostic accuracy was compromised due to misclassifying two cases of secretory phase as proliferative phase. This occurred due to the absence of secretory granules in the glandular cells in these cases. Additionally, we failed to distinguish stromal cells from glandular cells and to interpret the absence of streaming effect of stromal cells in favor of secretory phase which is characteristic of proliferative phase [Figure 1B]. Two cases of simple hyperplasia without atypia were underdiagnosed as mere proliferative change owing to the marginal increase in cellularity and relatively less packed glandular cell clusters in these cases. The increased cellularity and tight clustering of glandular cells decides the hyperplasia and their nuclear features decide its nature [Figure 2A and 2B]. In one case of pregnancy, though we observed metachromatic substance on Leishman stain, we failed to ascribe it to conception-related mucosubstance, thus diagnosing it as a mere secretory phase.

When restricted to diagnosis of the endometrial phase, the diagnostic accuracy rose to 96.2%, with just two cases of early secretory phase being wrongly diagnosed as the proliferative phase. For hormonal evaluation it was 97.6%, with only...
one case of ovulatory endometrium being diagnosed as anovulatory. The results were comparable with the others as shown in Table 2.

The endometrial smears are considered notoriously difficult to interpret.[11] We wholeheartedly agree with this. According to Hemlatha et al., with enough experience it will not be too difficult to prescribe appropriate therapy on the basis of endometrial aspiration report and when used for symptomatic patients as a screening procedure, it may be possible to avoid about 60-70% curettages.[11,12]

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| Diagnosis on histology | Bhandari et al. | Schachter et al. | Fox et al. | Demirkiran et al. | Present study |
|------------------------|----------------|-----------------|-----------|------------------|--------------|
| Proliferative phase    | 91.3           | 86.4            | 95        | 100              |
| Secretory phase        | 91.3           | 78.5            | 71        | 87.5             |
| Simple hyperplasia     | 62.5           | 77              | 79        | 67               | 60           |
| Atypical hyperplasia   | —              | —               | —         | 75               | 100          |
| Endometritis           | 100            | —               | —         | 100              |
| Atrophic endometrium   | 90             | 94.6            | 81        | 100              |
| Endometrial carcinoma  | —              | 100             | —         | 100              |

Table 2: Correlation between endometrial cytology and histology in various series[2,3,10,11]

Conflicts of interest
There are no conflicts of interest.

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