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### **Investigating the Diagnostic and Prognostic Significance of Vaginal Vault Cytology Following Hysterectomy: An In-depth Exploration into Postoperative Surveillance and Gynecological Pathology**

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**ABSTRACT**

**Background:** Papanicolaou cytology tests of the vaginal vault are a means of detecting recurrent invasive or preinvasive disease of the lower female genital tract in women who no longer have a cervix. Vault cytology testing may also be undertaken on asymptomatic women who had no abnormal cervical pathology at the time of hysterectomy, or prior to surgery, to screen for the recurrence of any neoplasm or to detect the occurrence of primary neoplasm. This study was undertaken to assess the utility of vault cytology in the follow-up of hysterectomized women.

**Methodology:** All vaginal vault smears for cytological examination were collected during the period from May 2022 to November 2023 at Saveetha Medical College and Hospital. The women presenting with various benign conditions had been treated by hysterectomy alone while cases of cervical cancer or other gynecologic malignancies were treated with surgery, radiation, and chemotherapy in different combinations depending upon the stage of the tumor, the operative risk, and the patient's preference. The smears were stained by the Papanicolaou staining method and reported under the following cytological categories: inconclusive, benign, infectious, and malignant.

**Results:** Total hysterectomies done was 150 out of which 16% were done secondary to atypical and malignant lesions. The most common benign cause for hysterectomy was uterine fibroid while the most common malignant cause was High grade Squamous Intraepithelial Lesion (HSIL). Of all the vault smears examined most showed a normal smear followed by few cases showing infectious agents like candida. One smear showed atypical changes secondary to chemotherapy and one patient showed incidence of primary Low grade Squamous Intraepithelial Lesion (LSIL).

**Conclusion:** Our data revealed that in women with previous history of gynecological cancers, vaginal vault cytology is helpful in the early detection of primary and recurrent atypical and malignant lesions in post hysterectomy patients. Early detection, along with timely and appropriate treatment, will aid in prolonging patient survival rates and can prevent distant metastasis.

**Keywords:** Post Hysterectomy, Vault smear, Cytology, Follow up

## **INTRODUCTION:**

Papanicolaou cytology smears of the vaginal vault are a means of detecting recurrent invasive or preinvasive disease of the lower female genital tract in women who no longer have a cervix. Vault cytology testing may also be undertaken on asymptomatic women who have had no abnormal cervical pathology, to screen for emergence of any new primary neoplasm. There is no international consensus on the appropriate extent of cytological screening in women who have undergone hysterectomy, as evidence for the appropriate use of vaginal vault smears post hysterectomy and the optimum period of follow-up is sparse. The opinion regarding the role of the vault smear has changed over time.

The main aim of post-treatment surveillance in post hysterectomy patients is to improve survival through early detection of recurrent tumors. The majority of hysterectomies were performed for noncancerous conditions, including leiomyomas, menstrual disorders, and endometriosis.[1] Rate of hysterectomies done for benign disease was 4.81 per 1,000 women-years. [2] Abnormal cytology is found in less than 2 percent of smears after hysterectomy for benign disease. [3]

Research has indicated that between 6 and 10% of hysterectomies are carried out due to cancer or precancerous lesions. The cytopathologic examination is one of the most valuable methods for detecting the early recurrence of malignancy or a new primary carcinoma during the follow-up of patients after the treatment of a different cancer. [4] By using a cytobrush or Auer's spatula, an adequate sample is obtained for the pap smear preparation and for subsequent cytological evaluation. [5]

Recent reports indicate a declining trend for vault cytology in developed nations. This is because the available evidences indicate a very low positive predictive value of this test when used as a screening tool in the absence of symptoms and clinical signs. Though the women treated for cervical cancer are advised regular follow-up by vault cytology, first at 6 months and then yearly for 10 years, to detect recurrences of cervical cancer; there is no defined follow-up schedule for cases operated for benign indications.

In the absence of a proper call and recall system for follow-up and because of poor patient compliance in our facility, vault cytology testing continues to be offered to whoever returns for follow-up. This results in the waste of resources and unwarranted anxiety for the women, as in many cases, the test might not be required. This study was undertaken to assess the utility of vault cytology in the follow-up of hysterectomized women.

## **MATERIAL AND METHODS:**

All vaginal vault smears for cytological examination were collected during the period from May 2022 to November 2023 at Saveetha Medical College and Hospital. The records of these women were retrospectively analyzed, and data was collected on the age of the patient, indication for hysterectomy and/or radiation/chemotherapy, stage of the tumor, interval of vault cytology from treatment received, results of the cytology, and biopsy. The women presenting with various benign conditions had been treated by hysterectomy alone, while cases of cervical cancer or other gynecologic malignancies were treated by surgery, radiation, and chemotherapy in different combinations depending upon the stage of the tumor, the operative risk, and the patient's preference. The smears were stained with Papanicolaou stain and classified as inconclusive, benign, infectious, and malignant.

## RESULTS:

150 hysterectomies were performed in total during the study period. The patient age ranged from 45 to 75 years, with a median age of 55. Out of 150 patients, 77.5% were from rural areas. Hysterectomy was done on 126 patients (84%) secondary to benign indications and on 24 patients (16%) for atypical and malignant lesions.

The most common benign cause for hysterectomy was fibroid/Leiomyoma followed by post menopausal bleed. Post menopausal bleed was the next common cause, followed by UV prolapse, chronic PID and adenomyosis.(Figure 1)

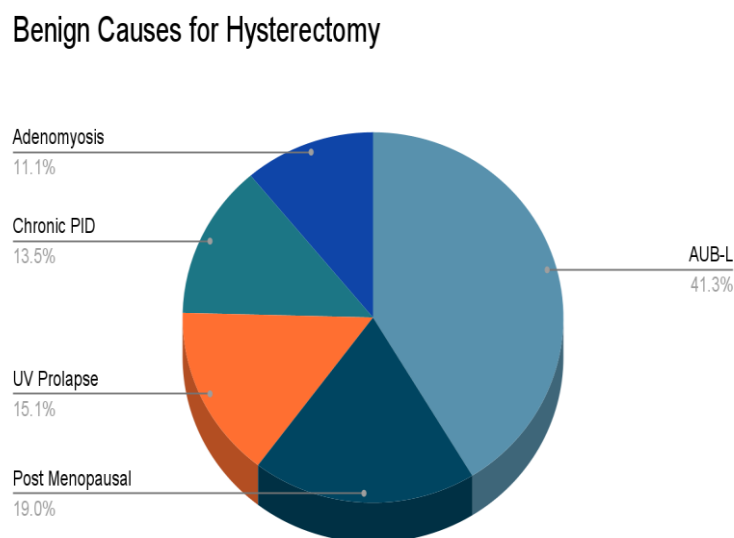


Figure 1 - Benign Causes for Hysterectomy.

Among the malignant causes, the most common was High Grade Squamous Intra Epithelial Lesion (HSIL), followed by Low Grade Squamous Intra Epithelial Lesion (LSIL). Two cases were diagnosed pre operatively as Atypical Squamous Cells of Undetermined Significance

(ASCUS) which were later confirmed on biopsy to be LSIL.(Figure 2)

### Malignant causes for Hysterectomy

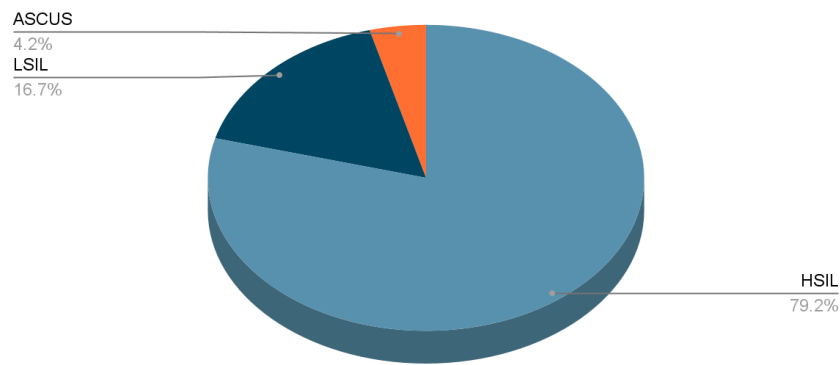


Figure 2 - Malignant Causes for Hysterectomy

## DISCUSSION

According to WHO, Cervical cancer is the fourth most common cancer among women globally.[6] Benign indications account for more than 90% of hysterectomies<sup>[9]</sup>. Collecting data from more than 6,000 women, Stokes-Lampard et al reported that, subsequent to hysterectomy for benign indications, 1.8 percent of women had an abnormal vaginal vault smear.

Our data suggests that the cytobrush is a more efficient sampling device than the traditional Ayre's spatula to collect samples from the vaginal vault which was also seen in the study by Lino et al. [5] However, while vaginal vault cytology is considered as an important screening procedure, its efficacy is low for the early detection of recurrent atypical or malignant vaginal lesions in post-hysterectomy patients.

For more than 40 years, the Papanicolaou smear has been extensively used to screen for cervical carcinoma. Based on aggregated data from studies identified by a systematic review of the literature, Stokes-Lampard *et al.* reported that 1.8% of women who had had a hysterectomy for a benign indication had an abnormal smear, and no cancers were detected. [3]

Similar to our study in a study done by Stokes-Lampard et al. [3], subsequent to benign indications ( $n = 6543$ ), 1.8% (117) of women had an abnormal smear, 0.12% (eight) had an abnormal biopsy, and no cancers were identified. Subsequent to CIN I or II, 3.1% had an abnormal vault smear, 1.3% had an abnormal biopsy, and no cancers were detected. Subsequent to CIN III, 14.1% of women had an abnormal smear, 1.7% an abnormal biopsy and one vaginal cancer (0.03%) was detected.

Although not widely used, vault cytology is an important tool for the early detection of primary and also the detection of secondary malignancies which was also seen the study done by Nakamura K et al, McKenzie DC et al and Grace et al. [7,8,9]

The findings of the present study suggest that vault cytology is a useful and accurate tool to detect local recurrences. In fact, in some asymptomatic cases, it may first alert the clinicians to the possibility of recurrence. On the basis of our results, we speculate that, all treated cases of cervical cancer should undergo vault smear screening by cytology at intervals of 1 year until three results come back negative, by which point no further screening is required. However given the low popularity of the vault cytology testing, more studies are required to come to a proper testing protocol.

## CONCLUSION

In conclusion, our data revealed that there is a good correlation between cytological and histopathological findings due to the availability of trained technicians and experienced pathologists who can give accurate reports. Our data revealed that in women with a previous history of gynecological cancers, vaginal vault cytology is helpful in the early detection of primary and recurrent atypical and malignant lesions in post hysterectomy patients. Early detection, along with timely and appropriate treatment, will prolong patient survival rates and can prevent distant metastasis.

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