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# ORIGINAL ARTICLE

## Assessment of Ki-67 expression in ovarian tumors

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***ABSTRACT:***

**Background:**Ovarian tumors are abnormal growths that develop in the ovaries, which are part of the female reproductive system. The present study was conducted to assess Ki-67 expression in ovarian tumors. **Materials & Methods:**Imprint cytology was performed on 42 ovarian tumors and compared with histopathological diagnosis. Ki-67 immunohistochemistry was also performed. **Results:** Benign lesions were serous cystadenoma in 8, mucinous cystadenoma in 5, thecoma in 3 and fibroma in 4 cases. Malignant lesions were mucinous cystadenocarcinoma in 9, serous cystadenocarcinoma in 10, small-cell carcinoma in 2 and dysgerminoma in 1 case.The difference was significant (P< 0.05). The mean Ki-67 index in benign tumors was 3.5 and in malignanttumor was 34.2. The difference was significant (P< 0.05). **Conclusion:** Advanced stage cancers have a higher Ki-67 index; as a result, a higher Ki-67 index is indicative of aggressive behavior and worse clinical outcomes.

**Keywords:** immunohistochemistry, Ki-67, Ovarian tumors

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## INTRODUCTION

Ovarian tumors are abnormal growths that develop in the ovaries, which are part of the female reproductive system. These tumors can be benign (non-cancerous) or malignant (cancerous).[1] Ovarian tumors can arise from various types of cells in the ovary, including the cells that produce eggs (germ cells), the cells that cover the outer surface of the ovary (epithelial cells), and the cells that produce hormones (stromal cells).Benign ovarian tumors are typically non-cancerous and do not spread to other parts of the body.[2] They may cause symptoms such as pelvic pain, pressure, or discomfort, especially if they grow large or if they cause the ovary to twist (ovarian torsion). However, many benign ovarian tumors are discovered incidentally during routine pelvic exams or imaging tests and may not cause any symptoms.[3]Malignant ovarian tumors, on the other hand, can be more serious and may spread (metastasize) to other organs in the pelvis or abdomen. Symptoms of malignant ovarian tumors may include abdominal bloating or swelling, pelvic pain, difficulty eating or feeling full quickly, changes in bowel habits, and frequent urination.[4]

One economical method that can be added to the frozen section analysis is imprint cytology. When utilized independently, it offers a quicker diagnosis with better accuracy rates than the frozen section. Only proliferating cells express a nuclear antigen, which the monoclonal antibody Ki-67 reacts with.[5] The prognosis and other established clinicopathological characteristics of the tumor are correlated with the high proliferation rate, which has been linked to tumor aggressiveness.[6]The present study was conducted to assess Ki-67 expression in ovarian tumors.

## MATERIALS & METHODS

The present study was conducted on 42 ovarian tumour cases. All were informed regarding the study and their written consent was obtained.

Data such as name, age, etc. was recorded. Fresh, unfixed specimens were used to make imprint smears on both plain and poly-l-lysine-coated slides. Hematoxylin and eosin (H and E) stain and Papanicoloau stain were applied to two slides right away after they were fixed in 95% ethanol. Giemsa was used to stain the remaining streaks after they had air dried. Using the peroxidase antiperoxidase method, smears on poly-lysine-coated slides were kept below –80°C for Ki-67 immunocytochemistry. The slides were wrapped in aluminum foil.Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## RESULTS

**Table I Assessment of parameters**

| Parameters | Variables | Number | P value |
|---|---|---|---|
| Benign | Serous cystadenoma | 8 | 0.04 |
| | Mucinous cystadenoma | 5 | |
| | Thecoma | 3 | |

| | | | |
|---|---|---|---|
| | Fibroma | 4 | |
| Malignant | Mucinous cystadenocarcinoma | 9 | 0.05 |
| | Serous cystadenocarcinoma | 10 | |
| | Small-cell carcinoma | 2 | |
| | Dysgerminoma | 1 | |

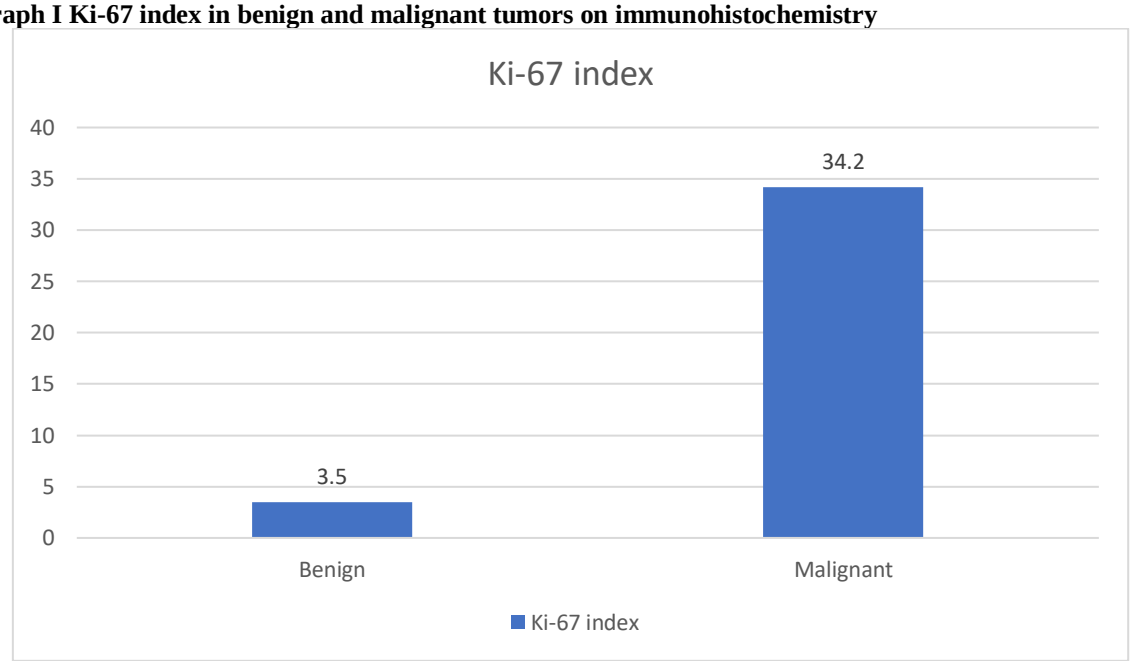
Table I shows that benign lesions were serous cystadenoma in 8, mucinous cystadenomain5, thecoma in 3 and fibroma in 4 cases. Malignant lesions were mucinous cystadenocarcinoma in 9, serous cystadenocarcinoma in 10, small-cell carcinoma in 2 and dysgerminoma in 1 case.
The difference was significant (P< 0.05).

**Table II Ki-67 index in benign and malignant tumors on immunohistochemistry**

| Parameters | Ki-67 index | P value |
|---|---|---|
| Benign | 3.5 | 0.01 |
| Malignant | 34.2 | |

Table II, graph I shows that the mean Ki-67 index in benign tumors was 3.5 and in malignant tumor was 34.2. The difference was significant (P< 0.05).

**Graph I Ki-67 index in benign and malignant tumors on immunohistochemistry**




## DISCUSSION

The diagnosis of ovarian tumors typically involves a combination of imaging tests (such as ultrasound or MRI), blood tests (such as CA-125 levels), and sometimes biopsy or surgical removal of the tumor for further examination.[7,8]Treatment for ovarian tumors depends on several factors, including whether the tumor is benign or malignant, its size and location, and the woman's overall health and preferences.[9,10] Treatment options may include surgery to remove the tumor (either through minimally invasive techniques or traditional open surgery), chemotherapy, and radiation therapy. In some cases, a combination of these treatments may be recommended.[11,12]The present study was conducted to assess Ki-67 expression in ovarian tumors.

We found thatBenign lesions were serous cystadenoma in 8, mucinous cystadenoma in 5, thecoma in 3 and fibroma in 4 cases. Malignant lesions were mucinous cystadenocarcinoma in 9, serous cystadenocarcinoma in 10, small-cell carcinoma in 2 and dysgerminoma in 1 case. Choudhuri et al[13]investigated the biological significance of Ki-67 antigen expression in benign and malignant ovarian tumors and correlate it with histological type, grade, and stage of malignant tumor. A total of 50 cases including 25 prospective and 25 retrospective cases were studied. Imprint cytology was performed on 25 ovarian tumors and compared with histopathological diagnosis. Ki-67 immunohistochemistry was performed on all 50 cases. On immunohistochemistry, benign tumors had a mean Ki-67 index of 3.2 ± 3.7 while malignant tumors had a mean Ki-67 index of 33.1 ± 16.7, the difference being statistically significant. Significant correlation was observed between the Ki-67 index and stage of the tumor; however, there was no correlation between the grade of differentiation and histological type of tumor with the Ki-67 index.

We observed that the mean Ki-67 index in benign tumors was 3.5 and in malignanttumor was 34.2. Harlozinska et al[14]in their study the expression of the Ki-67 proliferation antigen and its relationship to the p53 protein were evaluated immunohistochemically in malignant and benign ovarian neoplasms. Additionally, p53 and Ki-67 in corresponding cyst and/or ascitic fluid cells were compared in tissue sections. There was a noticeable staining heterogeneity. Nonetheless, it was clear that there was a connection between p53 and Ki-67 activity in tissue slices and loose cells from specific patients. Also, there was a strong correlation between the p53 protein and the presence of the Ki-67 antigen. Compared to endometrioid and mucinous carcinomas, there was a tendency showing that serous carcinomas had greater levels of p53 and Ki-67 positivity. It was not statistically significant, though. Stages III and IV of ovarian carcinomas had considerably higher p53 content and growth fraction as determined by Ki-67 staining than stages I and II (P<.05and P<.05, respectively). Benign ovarian neoplasms showed very little Ki-67 staining and no p53 reactivity. Our findings demonstrated that p53 is not a characteristic of benign epithelial ovarian tumors and suggest that elevated cell proliferation may be associated with immunohistochemically discernible p53 gene mutations that aid in the development of ovarian carcinoma.

The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that advanced stage cancers have a higher Ki-67 index; as a result, a higher Ki-67 index is indicative of aggressive behavior and worse clinical outcomes.

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