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Pathology

DIAGNOSTIC UTILITY OF IMMUNOHISTOCHEMICAL MARKERS CK7,CK 20 AND CEA IN SURFACE EPITHELIAL TUMORS OF OVARY

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ABSTRACT

BACKGROUND: Immunohistochemistry is confirmatory test in that cases where definitive diagnosis is not made on morphological & histological basis.IHC helpful in classification of tumors.It also helpful in resolving diagnostic dilemma in closely mimicking and poorly differentiated tumours.

MATERIAL AND METHODS: We received 100 biopsy of different cases of surface epithelial tumors of ovary in period of 2 years.3 immunomarker were included in the study.

RESULT: Out of 100 case 70% are benign and 30% are malignant.Serous cystadenoma was most common benign lesion(60%)& among malignant lesions Serous cystadenocarcinoma was most common(60%).83.33% cases of serous carcinoma showed positivity for CK7 & 100% negativity for CK20 & CEA.

CONCLUSION: IHC is helpful in classification & confirmation of the histological diagnosis. IHC is particularly helpful in resolving diagnostic dilemma in closing mimicking and poorly differentiated ovarian tumors.

KEYWORDS : ovarian tumor,immunohistochemistry,diagnostic dilemma.

INTRODUCTION:

Ovarian cancers account for total 3% of all cancer in women and 30% of all cancers of the female genital system. Among cancers of female genital tract, the incidence of ovarian cancer ranks below – the only carcinoma of the cervix and the endometrium.[1] Immunohist ochemistry is the application of immunologic principles and techniques to the study of cells and tissues.[2] Several procedures are available, the most commonly used at present being the peroxidase-antiperoxidase immunocomplex method;biotin-avidinimmun oenzymatic technique and fluorophore-antibody conjugates Method utilizing enzyme conjugated antibodies.[3] IHC is particularly important in differentiating primary ovarian carcinoma from metastatic adenocarcinomas to the ovary from the colon which resemble endometrioid adenocarcinoma of ovary, and mucinous carcinomas of the appendix and large bowel, which mimic primary mucinous carcinomas of ovary. The main approach to seperating these tumors from each other, is to exploit the differential expression of two important cytokeratins, CK7 and CK20.[4]

MATERIALAND METHODS:

100 Cases of surface epithelial tumors over a period of two years (july 2017 to September 2019) were included in the study.The specimen were collected in 10% formalin/buffered formalin.Each specimen was inspected grossely and all relevant details were noted.Following this,specimrn were routinely processed and sections were stained by Hematoxylin and Eosin.For immunohistochemistry,paraffin blocks were subjected for relevant immunostain in automated immunostainer(Biogenex i6000) and the detection system was Biogenex Super Sensitive Streptavidin Biotin Kit.Various immunostains along with 3 primary antibodies CK7,CK20 and CEA were included in the study.

RESULTS:

0ut of 100 cases,70%(70/100) were benign lesions and 30% (30/100) were malignant lesions.

According to our study on Histological basis serous cystadenoma was most common benign tumor constituting 60%(42/70).Serous cystadenocarcinoma was most common malignant tumor constituting 60%(18/30). 71.42% of benign lesions were presented below the age of 40 years. Maximum incidence of malignant lesions were in age group of 41-50 years (46.66%). Mean age for serous carcinoma was 40.5 years and for mucinous carcinoma was 45.5 years. CK7 was analysed in all 18 cases of serous carcinoma and was positive in 15 cases (83.33%). Out Of total 15 positive cases,12 cases showed diffuse cytoplasmic positivity (80%) and 3 case showed weak focal cytoplasmic positivity (20%). CK7 was positive in all 6 cases (100%) for mucinous carcinoma.Out of 6 cases, Ck20 was positive in 2 case(33.33%) and 4 cases (66.66%) were positive for CEA. Endometrioid carcinoma showed diffuse positivity for CK7 in all 3 cases and negativity for CK20 and CEA. Two cases of Transitional carcinoma showed diffuse positivity for CK7,focal positivity for CEA in both cases and negativity for CK20. 0ne case of seromucinous carcinoma showed diffuse cytoplasmic positivity for CK7,focal positivity for CEA and negativity for Ck20.

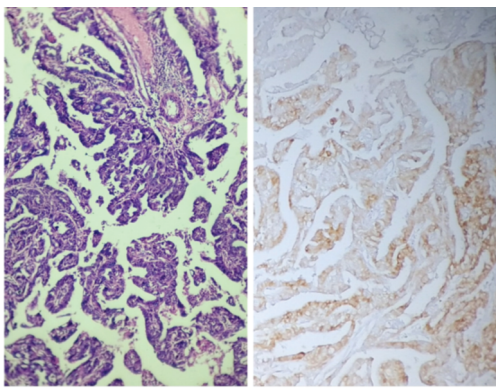

Figure1a Figure1b

Figure1a:serous adnocarcinoma showing papillary architecture (H&E,10x)

Figure1b:Serous carcinoma showing diffuse CK7 cytoplasmic positivity(IHC for Ck7)

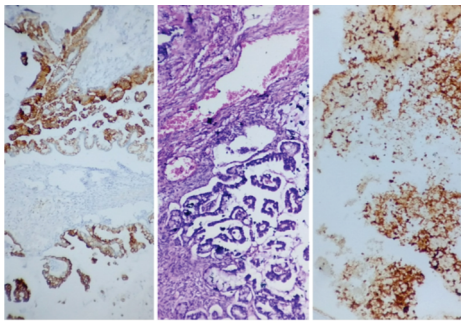

Figure 2a Figure 2b Figure 2c

Figure 2a:Mucinous carcinoma showing diffuse positivity for CK7(IHC for Ck7)

Figure 2b:Mucinous cystadenocarcinoma showing small clusters of atypical cells floating in the mucin pool(H&E,10x)

Figure 2c:Mucinous carcinoma showing diffuse cytoplasmic positivity for CEA (IHC for CEA)

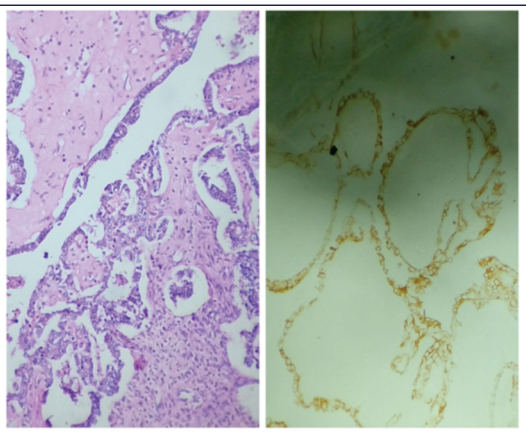

Figure 3a Figure3b

Figure 3a:Endometrioid carcinoma showing glandular structure lined by atypical cells(H&E,10x)
Figure 3b: Endometrioid carcinoma showing diffuse positivity for CK7 (IHC for Ck7)

DISCUSSION:

IHC is helpful in confirming the histological diagnosis, to know the histogenesis of ovarian tumours. It is particularly helpful in resolving the diagnostic dilemma in closely mimicking and poorly differentiated ovarian tumours. Out of the 80 cases of ovarian tumours, benign ovarian lesions were more common (75%) than malignant lesions (25%). Serous cystadenoma was the commonest benign tumor (45%). Overall surface epithelial carcinomas were responsible for 70% of all malignant lesions among which serous cyst adenocarcinoma was most common (45%). 88.8% cases of serous carcinomas showed diffuse positivity for CK7 100% were negative for CK20. 100% cases of mucinous carcinoma showed positivity for CK7, 66.66% showed positivity for CEA.[5] expression patterns of CK7, CK20, were sufficient for classification in most cases, whereas expression of CEA may help in supporting the diagnosis. Revision of the H&E stained slides of the studied group revealed all the twenty cases had undifferentiated ovarian carcinomas Eighteen cases from all studied group were positive for CK7 antibody. The intensity of the reaction ranged from moderate to intense. The distribution of the staining was diffuse and the pattern was cytoplasmic, frequently associated with a "pericellular" pattern, which characterizes the epithelial tumors. All the studied cases were CK20 negative in comparison with the positivity of external control (colon).[6] IHC leads towards making an accurate diagnosis, thereby translating into better management option in 2001 CK7 and in 2012 CK7, CEA immunopenal is used for diagnosis of surface epithelial tumor of ovary. In 2001, out of 49 cases of surface epithelial tumours, 81.6% cases presented in 4th to 6 th decades. In 2012, 17 out of 23 (74%) surface epithelial tumours presented in 4th to 6th decade, Among surface epithelial tumours , serous papillary carcinoma remained the commonest in 2001.[7] about two third of ovarian tumors occurs in women between the age of 20 – 50 years and 80–90% of them in women between the ages of 20 – 65 years. They also mentioned that 60–70% of benign tumors occurs in women under the age of 40 years in contrast, 80–90% of ovarian malignant tumors are detected after 40 years.[8] benign serous tumors occurs at any age but are most common in women in reproductive age group.mucinous cystadenomas can occur at any age but are diagnosed most often in women in the fourth to sixth decades.[8,9] Among the metastatic ovarian carcinomas, the chief morphological subtype was serous cystadenocarcinoma (6 cases). On IHC CK 7 positive in all 6 of 11 such cases, whereas CK 20 was negative in all three cases. Differential expression of CK 7 and CK 20 is vital in resolving these dilemmas.[10] primary ovarian mucinous tumors were virtually always diffusely positive for CK 7 (98%) and focal to diffusely positive for CK 20(38%). Colorectal mucinous carcinomas were diffusely positive for CK 20 (100%) and lack of expression of CK 7.[11] CEA in the cyst fluid of ovarian mucinous and serous tumors. In the cyst fluid of ovarian mucinous tumors, the amount of CEA was generally high. In contrast, in the cyst fluid of ovarian serous tumors, the CEA amount was low. Immunohistochemically, CEA was stained mainly in the intestinal type epithelium of ovarian mucinous tumor, and CEA revealed a tendency to be stained more frequently and strongly with increasing degree of malignancy.[12] expression of mucin may be low in colonic carcinoma. It is most often confused with an endometrioid carcinoma when metastatic to ovary. Endometrioid carcinoma is positive for CK 7 and negative for CK 20 and CEA. Colon carcinoma shows a reverse pattern. They also mentioned that ovarian serous carcinoma may be differentiated from endometrioid carcinoma with the help of IHC.[4] expression of CK20 and CEA in 15 transition cell carcinoma of ovary. Study shows none of the transition cell carcinoma a very reached to CK 20 and only two expressed for CEA.[13]According to Taylor J et al (2015) there was positive staining with CK7 in 17 cases of seromucinous carcinoma and positive staining with CEA in 8 out of 13 cases of seromucinous carcinoma. Most appropriate categorization of seromucinous carcinoma is uncertain but we believe they are best regarded as distinct type of ovaian epithelial malignancy and similar to endometrioid adenocarcinoma.[14]

Immunohistochemistry helps in confirming as well as supporting diagnosis.We have found antibody CK7 to be the most helpful marker in distinguishing between primary ovarian carcinoma and colorectal adenocarcinoma metastatic carcinoma to ovary.

Thus it was concluded that IHC is helpful in classification and confirmation of the histological diagnosis and to know the histogenesis of ovarian tumors. IHC is particularly helpful in resolving diagnostic dilemma in closing mimicking and poorly differentiated ovarian tumors.

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