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Pathology

Expression of mesothelin, fascin, prostate stem cell antigen in primary ovarian mucinous tumors and their utility in differentiating primary ovarian mucinous tumors from metastatic pancreatic mucinous carcinomas in ovary

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Background: Metastatic pancreatic carcinomas in the ovaries can be difficult to distinguish from primary ovarian mucinous neoplasms because the former simulate the latter grossly and histologically and both tumor types share the same cytokeratin 7/cytokeratin 20 immunoprofile. Recently several new pancreatic markers have been identified, including mesothelin, fascin and prostate stem cell antigen (PSCA). Their expression in primary ovarian mucinous neoplasms and utility in distinguishing these ovarian neoplasms from metastatic pancreatic carcinomas has not been established.

Design: Immunohistochemical expression of mesothelin, fascin, PSCA and Dpc4 was analyzed in 28 atypical proliferative (borderline) mucinous tumors, 7 primary ovarian mucinous carcinomas and 10 metastatic pancreatic mucinous carcinomas in the ovaries using formalin-fixed, paraffin-embedded archival tissues. Staining was semi-quantitatively scored based on the percentage of positive tumor cells (negative = <10%, focally positive = 10-50%, positive = >50%).

Results and conclusions: Primary ovarian mucinous tumors express mesothelin (14.3%), fascin (28.6%), and PSCA (42.8%) less frequently than metastatic pancreatic adenocarcinomas (70% for each marker); (2) Expression of all three markers (table 1) was seen only in metastatic pancreatic adenocarcinomas (40%) and coexpression of any two markers was significantly more frequently observed in metastases (50% for each combination of two markers) compared with primary ovarian mucinous tumors (coexpression of mesothelin and PSCA 8.6 %, fascin and PSCA 2.9%, mesothelin and fascin 2.9%). Our results indicates that an immunohistochemical panel including Dpc4, mesothelin, fascin, and PSCA is recommended for evaluating difficult mucinous tumors in the ovary when the differential diagnosis includes metastatic pancreatic adenocarcinomas.

Table 1. Coexpression of fascin, mesothelin, and PSCA in primary ovarian mucinous tumors and metastatic pancreatic mucinous adenocarcinomas

Tumor type	Mesothelin and PSCA	Fascin and PSCA	Mesothelin and Fascin	Mesothelin, Fascin, and PSCA
Primary atypical proliferative mucinous tumor	2/28 (7%)*	0/28 (0%)*	1/28 (4%)*	0/28 (0%)*
Primary mucinous carcinoma	1/7 (14.3%)*	1/7(14.3%)*	0/7(0%)*	0/7(0%)*
Primary mucinous tumors ^a	3/35(8.6%)*	1/35(2.9%)*	1/35(2.9%)*	0/35 (0%)*
Metastatic pancreatic adenocarcinoma	5/10 (50%)*	5/10 (50%)*	5/10 (50%)*	4/10 (40%)*
P value ^b	0.008	0.001	0.001	0.001

*: Percentages combine the number of cases showing focal and diffuse positivity

^a: = primary atypical proliferative mucinous tumors and primary mucinous carcinomas

^b: P value is calculated with Fisher exact test regarding percentage of positive staining for two or three markers between primary mucinous tumors (atypical proliferative and mucinous carcinomas) and metastatic pancreatic mucinous carcinomas.