The Value of Peritoneal Washing Cytology During Intra-Abdominal Surgery for Female Genital Tract Neoplasms

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Abstract

The aim of this study was to evaluate peritoneal washing cytology (PWC) utility in presumed benign and malignant female genital tract neoplasms by comparing the results of peritoneal cytology and corresponding histopathological specimens. The results indicate that this technique remains a useful procedure for staging malignant genital tract neoplasms and, in some instances, can detect rare occult malignancies.

Background: Peritoneal washing cytology is a technique performed during surgery for genital neoplasms to detect subclinical intraperitoneal metastases from these tumors. The aim of this study was to evaluate PWC utility in presumed benign and malignant female genital tract neoplasms by comparing the results of peritoneal cytology and corresponding histopathological specimens. **Patients and Methods:** The 305 cases of female genital lesions with available staging (International Federation of Gynecology and Obstetrics) were considered. In cases with positive cytology, without neoplastic involvement of the ovarian and uterine surfaces, the salpinx was accurately examined to reveal primary malignant fallopian tubal neoplasms. For malignant ovarian neoplasms, the correlation rate between cytological and histopathological findings was statistically evaluated using the Fisher exact test. Statistical significance was defined as $P < .05$. **Results:** Histopathological diagnosis revealed that of 32 cases with positive cytology, 21 examples corresponded to primary ovarian serous carcinomas (65.625%). Moreover, the serous carcinoma was the subtype that most frequently revealed neoplastic elements on PWC (21 examples in 22 cases, 95.4%). Only 1 of these malignancies with positive cytology and pT1a stage presented simultaneous invasive and in situ serous carcinoma of contralateral tubal fimbria. Only 1 of serous endometrial carcinomas that involved an endometrial polyp was associated with positive cytology and with simultaneous carcinoma of tubal fimbria. **Conclusion:** In conclusion, PWC remains a useful procedure for staging malignant genital tract neoplasms and can be necessary to detect occult fallopian tube malignancies.

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Introduction

Peritoneal washing cytology (PWC) is a technique in which the pelvic cavity is irrigated ("washed") to detect cancer cells that have migrated beyond a cancer's point of origin. Fluid is instilled into the abdominal cavity and washed around the abdominal organs, then withdrawn and analyzed for the presence of abnormal cells, on cytological examination. A positive result might indicate that the cancer has begun to spread (metastasize).

Usually, PWC is performed during surgery for pelvic neoplasms. Cytological analysis of peritoneal washing is incorporated in the International Federation of Gynaecology and Obstetrics (FIGO) staging for ovarian and endometrial carcinoma. The presence of malignant neoplastic cells in ovarian carcinoma at stages Ia and Ib or IIa and IIb increases to Ic and IIc; and for endometrial carcinoma, positive findings in washing cytological examination increase an otherwise stage I or stage II to stage IIIa, considering postoperative therapy.

This retrospective clinicopathological study of PWC was performed in presumed benign and malignant pelvic neoplasms by comparing the results of peritoneal cytology and corresponding histopathological specimens, to establish the PWC value.

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Table 1 Results of PWC in Cases of Uterine Malignacies

Histological Subtype	All Cases	Number of Cases Positive on PWC	Number of Cases Negative on PWC
Endometrioid Adenocarcinomas	45	0	45
Serous Carcinoma	1	1	0
Cervical Squamous Carcinoma	5	0	5
Cervical Adenoarcinoma	1	0	1
Metastatic Biliary Carcinoma	1	0	1
All	53	1	52

Abbreviation: PWC = peritoneal washing cytology.

Patients and Methods

Cytological reports on all pelvic washings obtained in 305 patients surgically treated for pelvic genital neoplasms, between 2010 and 2012, were retrieved from the computerized database of the Department of Biomedical, Biotechnological and Translational Sciences, Pathological Anatomy and Histology Unit, at Parma University. Cytological samples obtained from patients with ascites were not included in this analysis.

The results of peritoneal cytology were compared with corresponding histopathological specimens.

The peritoneal washing was carried out using an installation of approximately 100 to 500 mL of saline solution in the abdominal cavity. The fluid was then aspirated into a heparinized container. Four Cytospin smears were prepared and stained using the Papanicolaou and Giemsa method after fixation in modified Carnoy solution.

For cases that revealed the presence of neoplastic cells on cytological examination, in specimens of hysterectomy and annessiectomy, ovarian and uterine surfaces were accurately evaluated using macroscopic and microscopic examination.

In cases with malignant neoplastic cells without neoplastic involvement of the ovarian and uterine surfaces, the salpinx was examined according to the method of Medeiros et al[1] to reveal primary malignant fallopian tubal neoplasms.

There were serous, mucinous, endometrioid and Brenner subtypes.

Malignant ovarian lesions were serous, clear cell, mcinous endometrioid, undifferentiated carcinoma and metastatic neoplasms.

For borderline ovarian neoplasms, the histological subtypes used were serous, mucinous, and endometrioid tumors. Sex cord/stromal and germinal ovarian tumors were also considered in this analysis.

Table 2 Positive Cytology in Malignant Adnexal Neoplasms on PWC

Histological Subtype	All Cases	Cases Positive on PWC, n (%)
Serous	22	21 (95.4)
Endometrioid	6	3 (50)
Clear Cell Carcinoma	4	1 (25)
Mucinous	2	2 (100)
Undifferentiated	1	1 (100)
Granulose Cell Tumor	2	0 (0)
Immature Teratoma	1	0 (0)
Metastases (Gastric Carcinoma)	2	2 (100)
All	40	30

Abbreviation: PWC = peritoneal washing cytology.

On cytological examination, the cases designated suspicious, or nondiagnostic for paucicellularity were excluded.

For malignant ovarian and uterine neoplasms, the correlation rate between cytological and histopathological findings was statistically evaluated, constructing tables of contingency using the Fisher exact test. Statistical significance was defined as $P < .05$.

Results

In this study, 305 peritoneal washings were performed, for the evaluation of adnexal masses or for presumed endometrial malignancies. The final histopathological diagnoses revealed that 200 cases (63.49%) corresponded to benign or nonneoplastic lesions of the ovaries.

The remaining 105 cases of tumors (34.42%) comprised 45 primary endometrial adenocarcinomas (42.85%), 6 cases of squamous cervical carcinoma (5.71%), 1 case of metastatic biliary carcinoma to the uterus (0.95%), and 53 cases of adnexal neoplasms (50.47%).

In the group of 105 cases of malignant tumors or lesions with low potential malignancy, on PWC, there were 73 cases (63.47%) without malignant neoplastic cells and 32 cases (27.82%) with malignant neoplastic cells.

Of the 73 cases without malignant neoplastic cells, 21 cases were adnexal neoplasms (28.76%), which comprised 1 tubal serous carcinoma, 11 borderline ovarian neoplasms (5 mucinous and 6 serous subtypes), 2 granulosa cell tumors, 3 endometrioid carcinomas, 3 clear-cell carcinomas (mesonephroid carcinomas), and 1 immature teratoma with neuroepithelial component (G2) according to the system developed by Norris et al[2] and modified by Robboy and Scully.[3]

In these cases, histological studies confirmed that no involvement of the ovarian surface by malignancy was present and that the stage of development of the neoplasms was low (pT1a or pT1b).

Table 3 Correlation Between Serous and Other Primary Epithelial Malignant Adnexal Neoplasms on PWC

Histological Subtype	All Cases	Cases Positive on PWC, n (%)	*P* (Fisher Exact Test)
Serous	22	21 (95.8)	.02
Endometrioid	6	3 (50)	
Clear Cell Carcinoma	4	1 (25)	.005[a]
Mucinous	2	2 (100)	.05
Undifferentiated	1	1 (100)	.16
All	35	28	

Abbreviation: PWC = peritoneal washing cytology.
[a]Very significant value.