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Ovarian small cell carcinoma of pulmonary type appearing in ante-mortem ascites: An autopsy case and review of the literature☆

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Abstract Ovarian small cell carcinoma of pulmonary type (OSCCPT) is an extremely rare and aggressive disease. The diagnostic significance of cytology of ascites for OSCCPT, however, has not been shown so far. Here, we report the diagnosis of this carcinoma in an autopsy case with ante-mortem cytology of ascites. A 75 year-old woman was detected with bilateral ovarian cancer by radiological imaging. Although operation was planned, massive ascites was discovered a few weeks later. Ascites was removed with abdominocentesis, which cytologically diagnosed presence of carcinoma, suspicious of adenocarcinoma. A few days later, she died. From autopsy samples, we diagnosed this case as bilateral OSCCPT, showing neuroendocrine differentiation by immunohistochemistry. We reviewed ante-mortem cytology of ascites and found scattered small atypical cells. Immunocytochemical study of the cell block of the ascites showed neuroendocrine differentiation of the atypical cells in an identical manner as the autopsy specimens. Since small atypical cells of OSCCPT often exist with other histological tumor components, careful screening of all cells on the preparation is advisable to accurately diagnose OSCCPT by cytology of ascites.

1. Introduction

Ovarian small cell carcinoma (OSCC) is a rare tumor with neuroendocrine differentiation and has been classified into two types: hypercalcemic type (OSCCHT) and pulmonary type (OSCCPT). OSCCHT predominantly occurs in young women with hypercalcemia [1,2]. OSCCPT typically occurs in postmenopausal women and histologically resembles pulmonary small cell carcinoma (PSCC) [1,3]. OSCCPT is an extremely rare and aggressive disease. As far as we know, only 25 cases including a study of 11 cases and some case reports have been reported in the English literature (Table 1) [3–16]. In the literature, cytological study has been reported

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Table 1 Previous reports on ovarian small cell carcinoma of pulmonary type.

Reference	Age	Stage	Postoperative chemotherapy	Outcome	Other component	Immunohistochemistry	
						Chromogranin A	Vimentin
[3]	62	Ia	None	DOD, 4 mo	BT	Focally (+)	(−)
[3]	59	Ia	Unknown	Unknown	BT	(−)	(−)
[3]	55	Ia	Unknown	Unknown	ECa	(−)	(−)
[3]	28	Ic	Unknown	AWD, 6 mo	None	Unknown	Unknown
[3]	85	IIb	None	DOD, 1 mo	ECa	(−)	(−)
[3]	76	IIIb	Aggressive (agent not known)	DOD, 12 mo	None	Unknown	Unknown
[3]	50	IIIb	Unknown	DOD	None	(−)	Not done
[3]	72	IIIb	CPA, CDDP	DWD, 12 mo	ECa	(−)	(−)
[3]	64	IIIb	CPA, CDDP, DXR	AWD, 8 mo	None	Focally (+)	(−)
[3]	49	IIIb	CPA, CDDP, DXR, MTX, 5-FU	DOD, 13 mo	None	(−)	(−)
[3]	46	IIIc	CPA, CDDP, DXR, ETP, VCR	ANED, 7.5 y	None	(−)	(−)
[4]	22	Ia	CPA, CDDP, DXR	ANED	MCT	(−)	(−)
[5]	22	Ia	CBDCA, CPA	DOD, 3 mo	MCa	(+)	Unknown
[6]	64	IIIa	CPA, CDDP	DOD, 10 mo	ECa + MBT	(+)	(−)
[7]	28	IV	CDDP, ETP, BLM [a]	ANED	MCT	(−)	(−)
[8]	54	IIIc	CDDP, IFM, ETP	DOD, 14 mo	ECa + BT	Weakly (+)	Not done
[9]	56	IIIc	CDDP, ETP	AWD, 7 mo	None	(+)	(−)
[9]	39	IIIa	CDDP, ETP, TXL	DOD, 16 mo	None	(−)	(−)
[10]	49	Ic	TXL, CBDCA	ANED, 36 mo	None	(+)	(−)
[11]	32	Ia	CDDP, ETP	ANED	MBT	Focally (+)	(−)
[12]	55	IIIc	CPT-11, CDDP	ANED, 12 mo	None	(−)	Not done
[13]	79	IIb	Unknown	Unknown	None	Focally (+)	Not done
[14]	55	IIIc	CBDCA, ETP	ANED, 21 mo	None	(+)	Not done
[15]	68	Ia	None	ANED, 10 mo	MCT	Focally (+)	Not done
[16]	54	IIIa	TXL, CBDCA	ANED, 22 mo	None	Focally (+)	(−)
Present case	75	IV	None	DOD, 2 mo	None	(+)	(−)

BLM, bleomycin; CBDCA, carboplatin; CDDP, cisplatin; CPA, cyclophosphamide; CPT-11, irinotecan; DXR, doxorubicin; ETP, etoposide; IFM, ifosfamide; MTX, methotrexate; TXL, paclitaxel; VCR, vincristine; 5-FU, 5-fluorouracil; ANED, alive with no evidence of disease; AWD, alive with disease; DOD, dead of disease; DWD, dead with disease; BT, Brenner tumor; ECa, endometrioid adenocarcinoma; MBT, mucinous borderline tumor; MCa, mucinous carcinoma; MCT, mature cystic teratoma.

[a] With CPA and CDDP before surgery.

in only one case with urine cytology, but cytology of ascites has not been shown so far [13]. Here, we report an autopsy case of OSCCPT with ante-mortem cytological and immunocytochemical analyses of ascites.

2. Clinical history

A 75-year-old woman (gravida 2, para 2) consulted the digestive department of our hospital with lower abdominal and back pain late in May 2013. Her past history included appendicitis in her teens, intraductal papillary mucinous neoplasm of the pancreas, hypertension and diabetes mellitus. No family history of benign or malignant tumor was indicated. She smoked 10 cigarettes a day for 23 years. Tumor markers were high: serum carcinoembryonic antigen (CEA) level was 74.5 ng/ml (normal < 5.0) and serum carbohydrate antigen 125 (CA125) level was 1055 U/ml (normal < 37). No hypercalcemia was found: serum calcemic level was 7.9 mg/dl (normal: 8.2–10.2) and the corrected calcemic level based on the serum albumin level was 8.9 mg/dl. Computed tomography (CT) and magnetic resonance imaging (MRI) revealed bilateral ovarian tumors. She was referred to the department of gynecology in the middle of June 2013. MRI findings suggested stage IIIc ovarian cancer. Although operation was planned for the beginning of July, two weeks later, massive ascites was discovered with significant inflammatory findings: white blood cell count was 23500/μl and serum C-reactive protein (CRP) level was 37.5 mg/dl, thus, she was admitted to the hospital for an emergency. Ascites was removed with abdominocentesis, which cytologically diagnosed presence of carcinoma, suspicious of adenocarcinoma. Her general status subsequently deteriorated rapidly with decrease of blood pressure, and a few days later (2 months after her initial consultation), she died.

2.1. Cytological findings

In the ante-mortem cytology of ascites, atypical cells with large and eccentric nuclei were seen on the side of the preparation where the smear examination started, and some of them were multinuclear with bizarre morphology. Since some of them formed piled-up structures, we diagnosed this case as