

# Port-site metastasis after laparoscopic surgery for mature cystic teratoma

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## Summary

In this case, a 27-year-old nulliparous woman with a pelvic multiple cystic mass was treated and found with ovarian mature cystic teratoma associated with port-site metastasis (PSM). Suspecting recurrence of mature cystic teratoma, a second laparoscopic surgery found a small mass, on the right under abdomen's peritoneal membrane, at the laparoscopic port sites of the initial operation. Pathological report of the peritoneal mass and left ovarian tumor confirmed a mature cystic teratoma. To the best of the authors' knowledge, this is the first reported PSM in associated with benign ovarian tumor.

*Key words:* Mature cystic teratoma; Port-site metastasis.

## Introduction

Port-site metastasis (PSM) is a recurrent disease of the port sites followings laparoscopic procedures in women with malignant disease. The etiology of PSM is still unknown. With a rate of 1~2% [1] in the gynecologic oncology procedures, PSM incidence is low.

## Case Report

### Initial operation

A 24-year-old Japanese nulliparous female was admitted with abdominal discomfort. Transvaginal ultrasonography showed a bilateral ovarian tumor. The right ovarian tumor was 7.0×4.0 cm, with multiple cystic with solid part (it was assumed to be dermal tissue), and the left ovarian tumor was a 7.0×6.0 cm monocular cystic mass.

Preoperative tumor marker tests revealed elevated CA19-9 (1,390.0 U/ml, normal < 35 U/ml), and normal levels of SCC, AFP, and CA125 (< 1.0 ng/ml, 1.6 ng/ml, 17.8 U/ml, respectively). MRI revealed a pelvic multiple cystic mass of 7.2×7.5 cm in the left ovary, and 9.0×5.2 cm monocular cystic mass in the right ovary, T2 and T1 imaging was high, and fat suppression was positive.

The initial laparoscopic procedure found the uterus to be normal and without ascites. Bilateral ovary multiple cystic mass was noted. An adhesion between normal ovary and ovarian tumor required a small amount of time to achieve surgical synechotomy. Both unruptured ovarian tumors were collected in a plastic bag and morcelated in the bag. At the time of catheter removal, no residual tissue on the peritoneal membrane was observed (Figure 1). The tumor contained hair, fat, and skin, and the pathological report indicated mature cystic teratoma for bilateral ovarian tumor (Figure 2). The patient recovered well, and was discharged after four days.

### Second operation

No signs of relapse appeared until three years from the initial operation. At that time, a gynecological exam of the uterus and

ovary using ultrasonography revealed a cystic mass proximal to the left ovary of 3.1 cm. Over a six-month period, the tumor grew at a rapid rate of 12.0 cm, and the patient was admitted to the hospital experiencing abdominal discomfort.

Physical examination revealed a palpable left pelvic mass. The uterus and right ovary appeared normal by ultrasonography. The left tumor mass was 9.3 × 7.5 × 12.0 cm, with multiple cystic and high echoic areas suggesting no intra-abdominal ascites. Preoperative laboratory results were normal. Tumor marker tests revealed elevated levels of CA125 (87.1 U/ml) and CA19-9 (40.5 U/ml). MRI defined a left ovarian tumor, T1 low / T2 high with fat suppression. A diagnosis of mature cystic teratoma and recurrence of the initial tumor was assigned (Figures 3A, B). A post-operative MRI defined a 2.0 cm peritoneal mass, T1 low/ T2 high with no fat suppression (Figure 3C).

Laparoscopy showed normal uterus and right ovary and tube. A 12.0 cm left ovarian mass was noted in the anterior aspect of uterus on the left side, without excrescences. There was a 2.0-cm cystic peritoneal mass at the placement site of a five-mm second trocar during the initial operation (Figure 4). The ovarian tumor and peritoneal mass were excised. At the time of peritoneal mass' resection, serous yellow effusion within the mass was found and soft tissue was resected. The pathology report was mature cystic teratoma for both the left ovarian tumor, as well as the peritoneal mass (Figures 5, 6). No further therapy was given. The patient's recovery was uneventful and she was discharged after four days.

## Discussion

With the expansion of laparoscopy in cancer patients, reports of PSM have been made all over the world. The first reported case of PSM was in 1978 by Debronte *et al.* [1]. In the Gynecological field, the first case of PSM after laparoscopic staging, for an advanced cervical cancer, was reported in 1992 [2].

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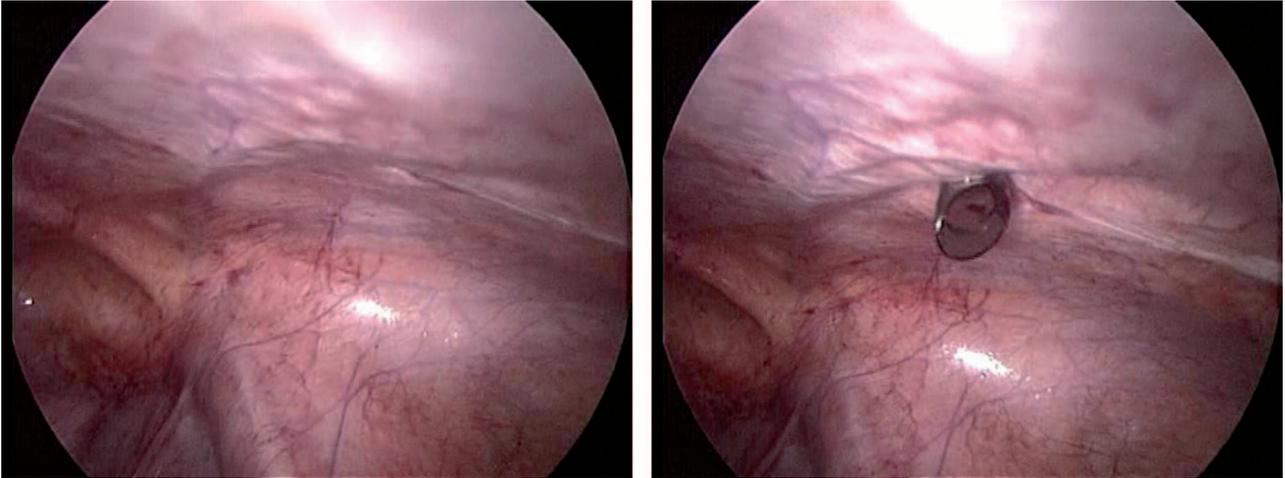


Figure 1. — No ovarian tumor tissue is observed at the peritoneal membrane when the trocar is removed in the initial operation.



Figure 2. — Ovarian tumor in the initial operation: mature cystic teratoma (Hematoxylin and Eosin).

PSM have been reported after surgery for ovarian cancer [3, 4], endometrial cancer [3, 5], cervical cancer [1, 3], fallopian tube cancer [3, 4], vaginal cancer [6], and retroperitoneal lymphadenectomy for endometrial cancer [7]. PSM after gynecologic oncology procedures have a reported incidence of 1~2% [1]. Although cases of ovarian cancer of borderline malignancy have reported PSM [8], cases of PSM associated with benign ovarian tumor have not previously been reported. To the best of the present authors' knowledge, this case is the first report of PSM of mature cystic teratoma.

The etiology of PSM is poorly defined and largely unknown. Abdominal wall metastasis is not limited to laparoscopy, and can be observed with similar frequency after open surgical procedures as tumor implants in open incision sites [9]. Several mechanisms have been proposed to explain PSM. The most commonly reported potential eti-

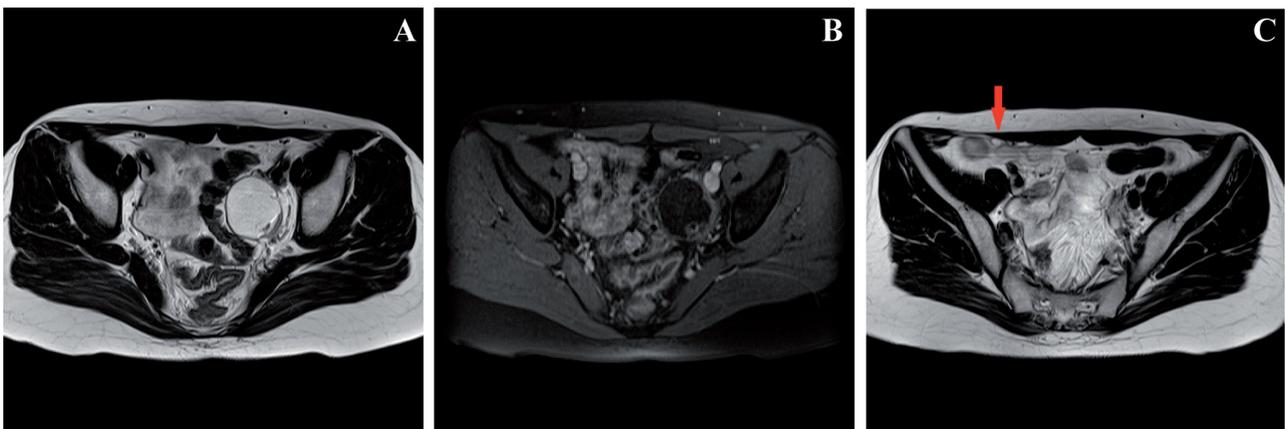


Figure 3. — A: MRI showing a multiple cystic mass within the left adnexa. B: T2 weighted axial MRI images low. Fat suppression within the left adnexal mass. C: T2 weighted axial MRI demonstrating the peritoneal mass.

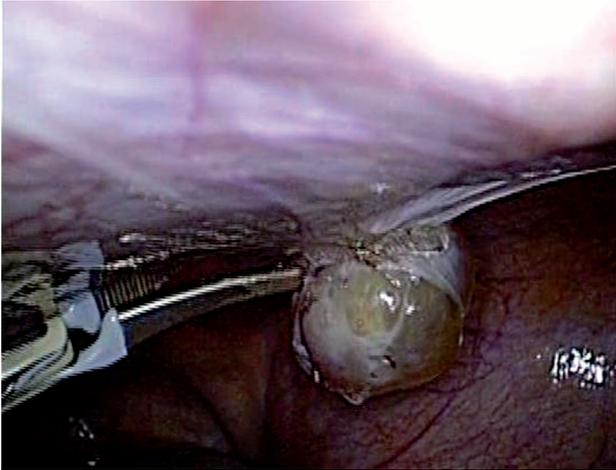


Figure 4. — Peritoneal mass on the peritoneum at the site of the five-mm trocar in the initial operation.

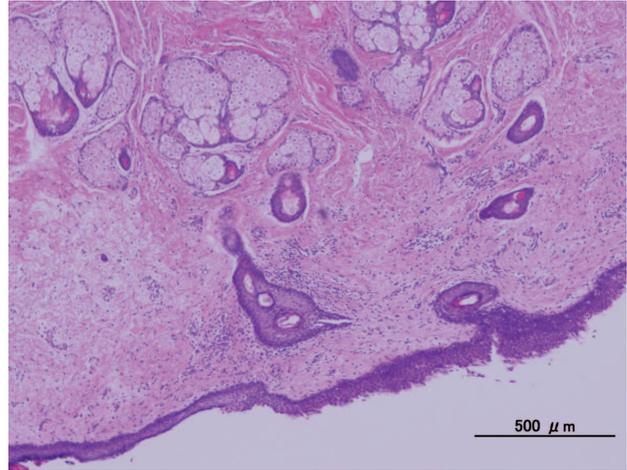


Figure 5. — Left ovarian tumor showing teratoma made of mature thyroid, skin, bone, and fat tissue (Hematoxylin and Eosin).

ological factors include the effects on the pneumoperitoneum and gases used for insufflation [10-12], local tumors properties, local environmental aspects, and surgical technique. Another proposed mechanism for the development of PSM include hematogenous spread: direct wound implantation due to tumor contamination of instrument. There is a growing literature on experimental studies [13-17] evaluating different theories to explain PSM.

Mature cystic teratoma of the ovary is often diagnosed in women of reproductive age and account for 5-25% of all ovarian tumors [18]. Teratomas are derived from germ cells and may contain structures from all three embryonic germ layers. Teratomas may occur at other sites within the body, referred to as parasitic dermoid cysts, usually as midline or paramedian structures. These sites may be sacral, testicular, mediastinal or retroperitoneal [19]. Parasitic dermoid cysts are extremely rare entities, and their actual incidence is unknown. Several theories exist to explain their occurrence. The first theory proposes the development within a supernumerary or ectopic ovary, which may occur after implantation of ovarian tissue after surgical procedure or inflammation such as pelvic inflammatory disease. Supernumerary ovaries may occur as a result of abdominal arrest of germinal cells in the dorsal mesentery during their embryonic migration to the genital ridge. Another theoretical mechanism is autoamputation and reimplantation of the dermoid cysts as a result of torsion. As torsion occurs subacutely, an inflammatory response may occur which enables the tumor to become adherent to surrounding structures and neovascularization may follow. The tumor may become parasitic by detaching itself from its original blood supply. Dermoid tumors have a potential for parasitic implantation after surgery and inflammation, as a parasitic dermoid cyst. In this case, the peritoneal mass presentation was localized to where the five-mm trocar was

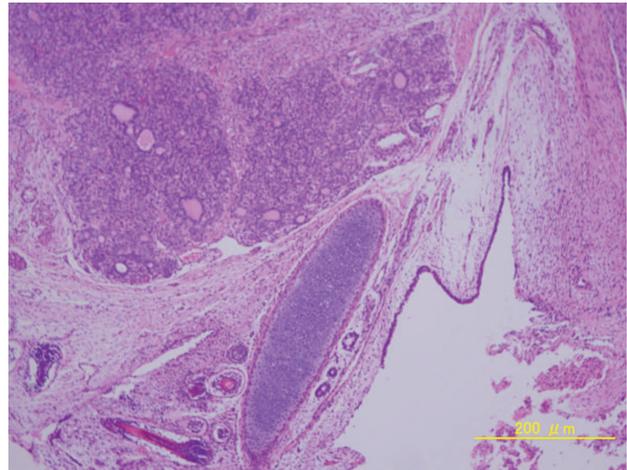


Figure 6. — Peritoneal tumor containing mature thyroid, cartilage, keratinizing epithelium, and mature gliomatous tissue (Hematoxylin and Eosin).

set in the initial laparoscopic operation for bilateral ovarian dermoid cyst. There was no ovarian tissue on the peritoneum of the port-site at the end of initial operation, so the present authors do not consider this tumor as a parasitic dermoid cyst.

Gliomatosis peritonei (GP) is the implantation of mature glial tissue on the peritoneal surfaces, usually in association with solid ovarian teratomas. In 1982 Truong *et al.* [19] reported two new cases and reviewed the world's literature, which at that time consisted of 30 cases. Since that time, several more cases have been reported. Although the mechanism of implantation is unknown, it probably occurs most commonly from extrusion of mature glial tissue through capsular defects in the tumor. In this case, because the orig-

inal ovarian tumors were mature cystic teratoma, not solid and malignant tumor, this case likely does not apply to GP. The present authors simply defined the peritoneal mass only as PSM.

Although the influence of the initial operation technique was unclear, surgery for mature cystic teratoma was likely a key factor behind the appearance of a peritoneal parasitic mass. The present authors predict a direct wound to the peritoneal membrane or similar procedural event influenced implantation of dermoid tissue. To conclude, this case was uncommon, but it demonstrates the real possibility of PSM occurring in association with laparoscopic surgery for dermoid cyst. Furthermore, not only cancer patients, but patients with benign ovarian tumor may have PSM.

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