Bilateral huge ovarian dysgerminoma with torsion: case report

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Background: Bilateral huge ovarian dysgerminoma with torsion is really rare.

Case Description: We reported a 20-year-old girl diagnosed as bilateral huge ovarian dysgerminoma accompanied with adnexal torsion who presented with abdominal mass, pain and recurrent fever. After a series of supportive treatment, we performed the surgery at the best time. Then the patient received 6 cycles of chemotherapy [BEP (bleomycin 15 mg ivgtt d1/d4 + etoposide 100 mg ivgtt d1–5 + cis-platinum 20 mg ivgtt d1/d3/d5, 30 mg ivgtt d2/d4)]. The patient followed up regularly after chemotherapy. Until the article is submitted, the patient is still alive, no significant sign of recurrence was found in her regular follow-up.

Conclusions: Although the prognosis of patients with dysgerminoma is usually good if early surgery with or without chemotherapy, it is difficult to diagnose dysgerminoma with adnexal torsion. For this reason, diagnosis of adnexal torsion must be taken in consideration when a patient with solid adnexal mass and acute abdominal pain. Early surgery is important for patients with dysgerminoma, especially for those accompanied with ovarian torsion. Because a majority of patients with dysgerminoma are young women, preservation of fertility should be considered if it is possible. As ovarian dysgerminoma is highly sensitive to chemotherapy based on platinum, we recommend patients to receive adjuvant chemotherapy, although, for stage 1A dysgerminomas, fertility-preserving surgery without adjuvant chemotherapy or radiotherapy was usually enough. Physical exam and serum tumour marker should be followed up for dysgerminoma within two years, and when patients have been followed up for more than 2 years, only physical exam yearly should be followed up. The prognosis of most patients with dysgerminoma is usually good with long overall survival.

Keywords: Bilateral huge ovarian dysgerminoma; ovarian germ cell tumour; torsion; surgery; case report

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Introduction

Dysgerminoma accounts for 33% of malignant ovarian germ cell tumours, and most of them occur in young women (1). Most patients with ovarian dysgerminomas often present with non-specific symptoms (2), such as pelvic mass with or without abdominal pain, but when ovarian mass is accompanied with torsion, it often leads to drastic and sudden abdominal pain (3), however, some patients may experience only mild and intermittent pains (4). Adnexal torsion of ovary is usually benign (5), it has reported that malignancy rate in ovarian torsion was about 2% (3,6). Bilateral huge ovarian dysgerminoma with torsion is extremely rare. And it is difficult to diagnose ovarian torsion through symptom or imaging examination (4). In this study, we reported a 20-year-old girl diagnosed as bilateral huge ovarian dysgerminoma accompanied with adnexal torsion, missing early surgery,

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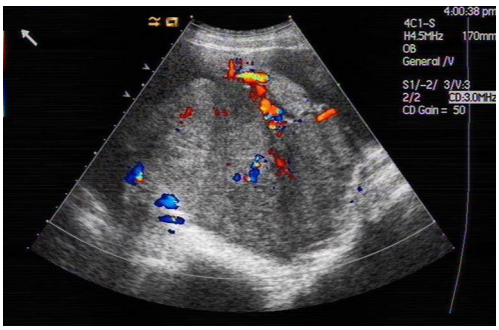

Figure 1 Ultrasound image. Two huge solid masses with irregular, lobulated shape and abundant blood flow around and inside the mass.

presenting as repeated fever and extremely poor general condition. We present the following article in accordance with the CARE reporting checklist (available at https://gpm.amegroups.com/article/view/10.21037/gpm-20-50/rc).

Case presentation

Informed consent was obtained from the patient for publication of this case report and accompanying images. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). The timeline was shown in Table S1. The patient was a-20-year-old student (height: 170 cm, body weight: 55 kg), hadn't had sex, with regular menstruation before. No relevant family history. More than 3 months ago, the patient touched a mass in the right lower abdomen by herself without special discomfort. One month ago, the patient felt rapid abdominal mass growth accompanied with abdominal distension, abdominal pain, loss of appetite, nausea and vomiting. Then the patient went to the local hospital. The ultrasound suggested two huge solid masses with irregular shape in the pelvic cavity. Other examination showed hemoglobin (HGB) was 80 g/L, alanine transaminase (ALT) was 626 U/L, aspartate transaminase (AST) was 673 U/L, cancer antigen 125 (CA125) was 429.1 U/L, CA199 was 53.57 U/L, beta human chorionic gonadotropin (β-hCG) was 966 mIU/mL). Diagnosis of ovarian cancer was made. Subsequently, the patient received supportive treatment and apatinib mesylate (850 mg qd). During the treatment, transaminase decreased (ALT 81 U/L, AST 22 U/L), but the masses grew extremely rapidly. The weight of the patient had reduced by more than 5 kg during the period.

When the patient was sent to our hospital, she had recurrent fever, up to 39 ℃, with small red papules scattered in the whole body, and vomiting. As *Figures 1*,*2* showed, the ultrasound and computed tomography (CT) suggested two huge solid masses with irregular shape and abundant blood flow, and celiac effusion, pleural effusion and pericardial effusion were also detected. Meanwhile, pneumonia, leucocytes decrease, anemia (HGB 73 g/L), prolonged activated partial thromboplastin time (APTT) (40.7 s), increased d-dimer (DDI) (14.10 mg/L), increased fibrinogen degradation products (FDP) (47.40 ug/mL), decreased antithrombin III (ATIII) (45%) and elevated liver enzymes (AST 84 U/L) and decreased albumin (28.4 g/L) were detected. The diagnosis of ovarian cancer, mild anemia, liver dysfunction, pericardial effusion, bilateral pleural effusion, and right hydronephrosis was made. After a series of supportive treatment, most symptoms eased, but the general condition of the patient was still poor presenting as repeated fever, significant weight loss, cachexia, stage of exhaustion, disseminated intravascular coagulation (DIC) and impaired live function. We were always trying to find the best time for operation and preparing for it. And the patient as well as her parents were particularly eager to do the surgery.

During the surgery, we found about 800 mL of yellowish ascites, enlarged left ovary as a solid mass about 20 cm × 18 cm × 15 cm, rotating 360 degrees, with a cauliflower hyperplasia about 2 cm and a spotty area of congestion on the surface, and enlarged right ovary as a solid mass about 25 cm × 15 cm × 13 cm, rotating 360 degrees, with smooth and purple brown surface (*Figure 3*). The bilateral ovaries were completely destroyed by the masses, no obviously normal ovarian cortex left. Considering abnormal coagulation and extremely poor general condition of the patient, we chose to do the surgery of bilateral salpingo-oophorectomy and omentectomy without pelvic lymphadenectomy. The intraoperative bleeding was about 300 mL. No tumour remained in the naked eye. The light yellow and fish like tissue was seen in the caesarean section (*Figure 4*). And weight of bilateral ovaries was 2,800 g (left) and 3,000 g (right). Intraoperative frozen inspection showed low differentiated malignant tumour and malignant tumour cells in ascites (*Figure 5*). Postoperative pathology showed the bilateral ovarian tissues were dysgerminoma (*Figure 6*), and the bilateral fallopian tubes as well as the omentum were not involved. Immunohistochemistry suggested SALL4+++, OCT3/4+++, placental alkaline phosphatase

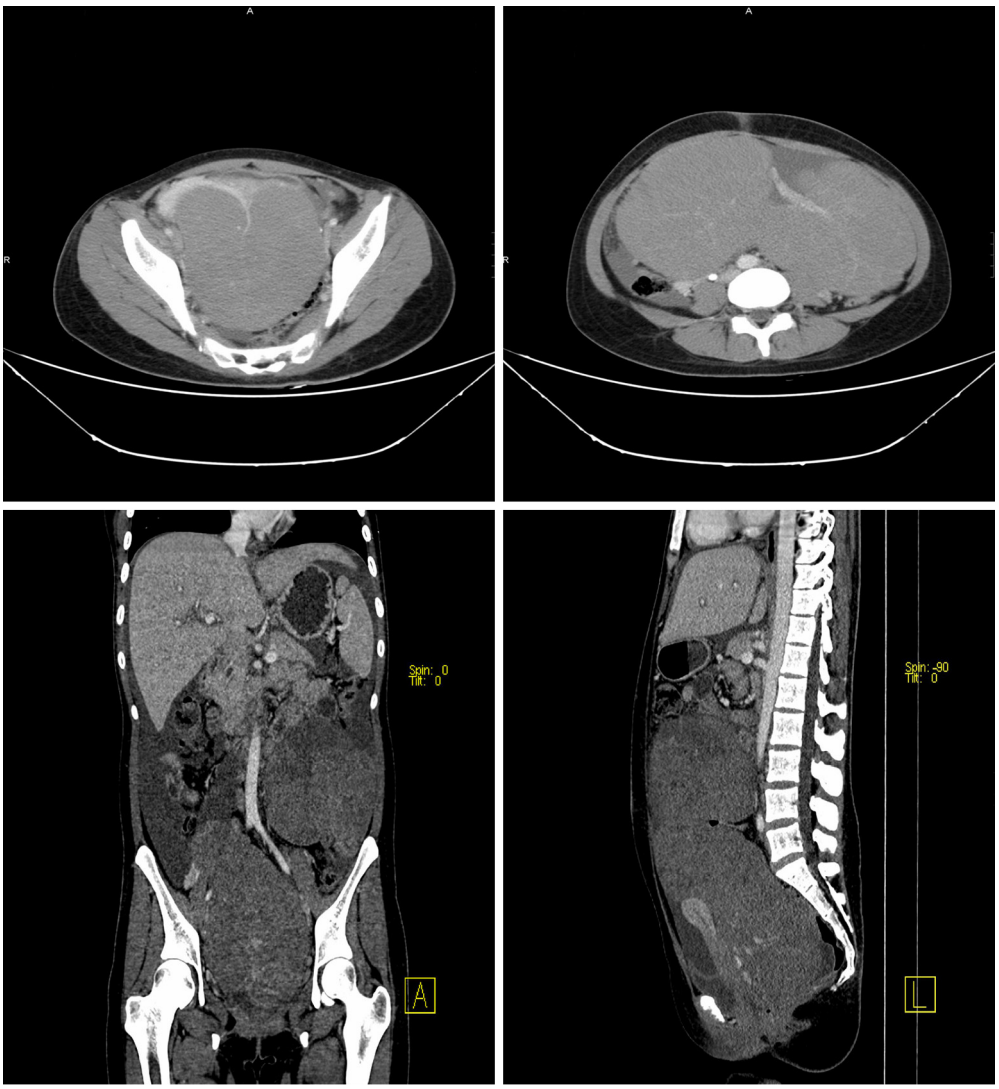

Figure 2 CT image. Two huge irregular mass in the abdominal cavity, about 12.2 cm × 13.6 cm × 23.8 cm, 18.0 cm × 13.5 cm × 16.6 cm, with unclear boundary and abundant blood flow inside the mass. CT, computed tomography.

(PLAP)+++, CD117+, epithelial membrane antigen (EMA)–, leukocyte common antigen (LCA)–, Ki67 80%. Diagnosis of dysgerminoma (stage IC) was confirmed. As soon as the surgery was performed, DIC, pleural effusion and ascites took a turn for the better.

Twenty days after the operation, the reexamination of chest and abdomen CT suggested the lymph nodes of abdominal aorta and left common iliac vessel were significantly increased, partly integration, considering inflammation or metastasis of lymph node, and alpha-fetoprotein (AFP) <1.3 ng/mL, carcinoembryonic antigen (CEA) <0.5 ng/mL, CA199 18.8 U/mL, total human chorionic gonadotropin (ThCG) <2.0 mIU/mL, CA125 185.6 U/mL. At that time, the patient started the first chemotherapy. We adopted the chemotherapy regimen of BEP (bleomycin 15 mg ivgtt d1/d4 + etoposide 100 mg ivgtt d1 d1–55 + cis-platinum 20 mg ivgtt d1/d3/d5, 30 mg ivgtt d2/d4), after 4 courses of this chemotherapy regimen, the reexamination of CT suggested the lymph nodes of abdominal aorta and left common iliac vessel were still increased, part integration, but obviously reduced combined with before. The patient totally received six courses of this chemotherapy regimen, after that, the tumour markers kept normal. After 5 months of the surgery, the patient

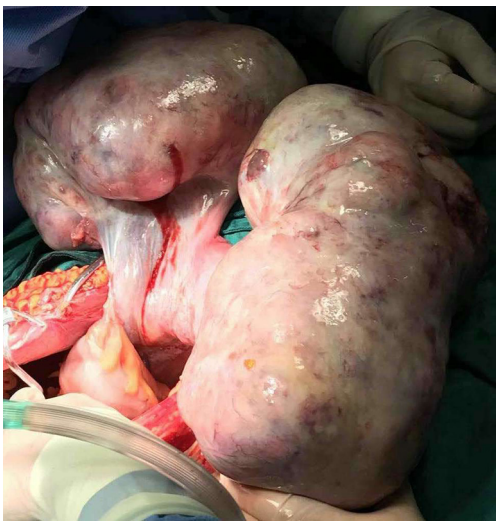

Figure 3 The tumours had been detorsion 360 degrees. Enlarged left ovary as a solid mass about 20 cm × 18 cm × 15 cm, with a cauliflower hyperplasia about 2 cm and a spotty area of congestion on the surface, and enlarged right ovary as a solid mass about 25 cm × 15 cm × 13 cm, with smooth and purple brown surface. Weight of bilateral ovaries was 2,800 g (left) and 3,000 g (right).

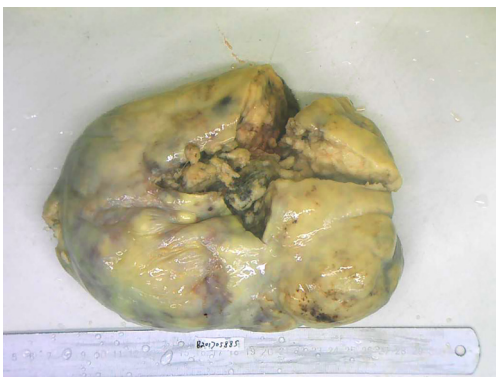

Figure 4 The right ovary was 25 cm × 15 cm × 13 cm, with smooth and purple brown surface. The light yellow and fish like tissue was seen in the caesarean section, and the part of the right ovarian mass was black necrotic tissue.

had received the positron emission tomography-computed tomography (PET-CT), the results indicated that several lymph nodes were found beside the abdominal aorta and left common iliac vessels, partly integration, but no increase in glucose metabolism, no tumour metastasis or recurrence was demonstrated. As for this, the second surgery for explosion was not performed.

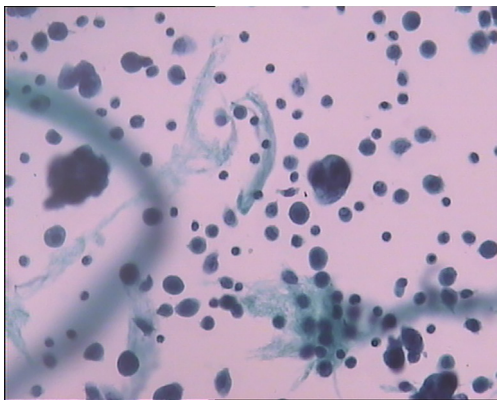

Figure 5 There were malignant tumour cells in ascites (haematoxylin and eosin staining). Magnification: 200×.

The patient followed up regularly in the outpatient department every 4–6 months after chemotherapy. Until the article is submitted, the patient is still alive, with normal level of serum tumour markers and physical exams, although CT also indicated increased lymph node, however, it obviously decreased compared with before.

Discussion

Although dysgerminoma accounts for only 2% of all ovarian tumours, it accounts for 33% of malignant ovarian germ cell tumours (1,2). In addition, three-fourths of dysgerminomas arise in young adults and adolescents (1,7), especially women under age 30, however, they can be found in all ages, even found during pregnancy (7,8). Most patients with ovarian dysgerminomas often present with non-specific symptoms (2), they came to hospital because of rapidly growing pelvic mass (9), but when ovarian mass is accompanied with torsion, it often leads to drastic and sudden abdominal pain (3), however, some patients may experience only mild and intermittent pains (4). In our case, the patient presented as abdominal pain and pelvic mass. Ovarian torsion is a rare gynecological emergency, usually caused by an ovarian mass twisted along the ovarian vascular pedicle (4). When ovarian torsion occurs, edema and inflammation can lead to the expansion of the ovary (6). It has been reported that adnexal torsion of ovary is usually benign (5), malignancy rate in ovarian torsion was about 2% (3,6), and most of them were in stage I (6). And bilateral huge ovarian dysgerminoma with torsion is pretty rare. So, we try to sum up some experience through this case to serve the clinical diagnosis and treatment.

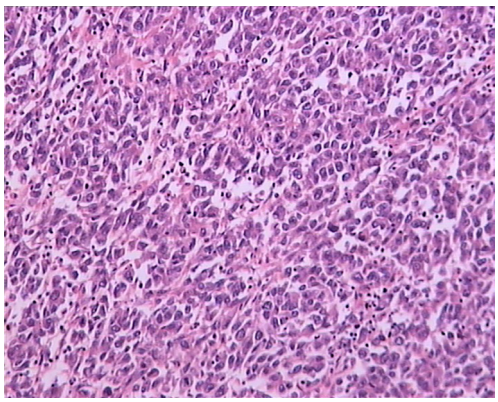

Figure 6 The tumour consisted of massively gathered cells with uniform and round shape, with the features that lymphocytes infiltrating connective tissue stroma. The cells had large nucleoli and prominent clear cytoplasm (haematoxylin and eosin staining). Magnification: 200×.

The most common and convenient used preoperative imaging diagnostic method is ultrasound (2). After searching extensive literature, it indicated that the typical sonographic appearances of ovarian dysgerminoma were huge, solid, adnexal mass with lobulated and irregular echogenicity within it, accompanied with abundant blood flow signals (2). Moreover, magnetic resonance imaging (MRI) and CT may also provide auxiliary diagnosis basis. Typical appearances of CT were a low-density area with no enhancement, and the non-necrotic part with obvious enhancement (9-11). In our case, just as *Figures 1*,*2* showed, the results were in consistent with the typical characteristics of dysgerminoma. Sometimes, ultrasound guided needle cytology may also assist the diagnosis (7). However, it is difficult to diagnose ovarian torsion through symptom or imaging examination (4). Typical CT and MRI appearances of ovarian torsion are thickening of the fallopian tubes, ascites, and the displacement of the uterus to the twisted side (4,12). When lacking the contrast of enhancement, it suggested complete torsion (13), however, it is impossible to use the agents in patients with pregnancy or severe renal insufficiency (14). Recent literature had reported that susceptibility-weighted imaging (SWI) could show hemorrhagic contents and vascular pedicle thrombosis without the presence of agents, which is helpful in diagnosing ovarian torsion. However, the diagnostic value of distinguishing malignant tumour from ovarian torsion is still limited (15).

Elevation of serum tumour markers are additional diagnostic methods of patients with ovarian dysgerminomas. A large amount of literature demonstrated that elevation of serum neuron-specific enolase (NSE), PALP, β-hCG, lactate dehydrogenase (LDH) and serum CA125 were the valuable additional diagnostic methods of patients with ovarian dysgerminomas (11,16). However, there were some literatures indicated that CA125 levels were not raised in patients with ovarian dysgerminoma (2,11,16-18). In our case, increased CA125 (429.1 U/L), CA199 (53.57 U/L) and hCG (966 mIU/mL) were detected. Recent studies reported that IL-6 levels might be a novel marker to diagnose ovarian torsion (19), it might be necessary for these who were suspected of diagnosing adnexal torsion.

The same with other tumours, diagnosis of dysgerminomas is confirmed by postoperative pathology. As showed in *Figure 6*, the tumour consisted of massively gathered cells with uniform and round shape, with the features that lymphocytes infiltrating connective tissue stroma. And cells had large nucleoli and prominent clear cytoplasm. Moreover, immunohistochemical staining is a very effective method to diagnose dysgerminomas, CA125, S-100 protein, cytokeratin 18, PALP, NSE and β-hCG were usually positive in dysgerminomas (17). As malignant cells usually express CD117, OCT3, and OCT4 (20), and syncytiotrophoblastic giant cells secrete LDH, they also can be considered as diagnostic characters.

Treatment of dysgerminoma is mainly based on surgery, with or without chemotherapy (21), and early surgery is quite important for patients with dysgerminoma. With laparoscopic techniques becoming more and more mature, controversy still exists (9,21). Scanning latest literatures, only one patient received laparoscopy (18). As many literatures reported, salpingo-oophorectomy with adequate staging is performed, including pelvic and abdominal exploration, peritoneal washings, lymph node sampling and biopsies of suspicion areas (9). But in our case, considering the extremely poor general condition of the patient, properly reducing the scope of surgery in order to shorten the operation time was required, so we performed the surgery of peritoneal washings, bilateral salpingo-oophorectomy and omentectomy without pelvic lymphadenectomy. Many patients with dysgerminoma are young women, preservation of fertility should be considered if it is possible (21). In our case, as for the huge tumours destroyed almost the entire ovarian tissue, and multiple torsion-induced necrosis lesions on the surface of bilateral ovaries, bilateral salpingo-oophorectomy should be performed. Recent reports indicated that although bilateral

dysgerminoma accounts for 10% to 20% in dysgerminoma cases (22), if the contralateral ovary appears normal, biopsy of the contralateral ovary is not required (23). And it is reported surgical removal of the residue is required if there is a residual tumour after postoperative chemotherapy (21). For adnexal torsion, it is generally believed it would lead to obstruction of veins and lymphatic vessels, then the ovarian artery is paralyzed, and ovarian infarction resultantly. There are conservative and radical options for adnexal torsion treatment. However, it is controversial to choose detorsion or salpingo-oophorectomy, recent reports indicated that although the cortex of ovary looked similar to necrosis, most patients recovered ovulation after detorsion without thrombosis (24). But for malignant ovarian masses, it hasn't been advised to choose detorsion, this is worth studying in the future.

Ovarian dysgerminoma is highly sensitive to chemotherapy based on platinum. 75% of patients with dysgerminoma present with stage I (25). Although all dysgerminomas are malignant, for stage 1A dysgerminomas, fertility-preserving surgery without adjuvant chemotherapy or radiotherapy was usually enough (21). The cure rate for stage 1A patients who received surgery was >90% (9). If patients of stage 1A relapsed, chemotherapy or radiation were the effective methods to cure them, although the recurrence rate for stage 1A is only 20% (26). But as International Federation of Gynecology and Obstetrics (FIGO) and some studies proposed, higher FIGO scores must receive chemotherapy (21). As the stage of our patient was IC, adjuvant chemotherapy was required. National Comprehensive Cancer Network (NCCN) suggested 3 cycles of BEP (bleomycin, etoposide, and cisplatin) for patients of stage IA who received completely resection, while 4 cycles for poor risks, and for patients of stage IB–III after resecting tumours, 3 cycles of etoposide/carboplatin can be used (21). In our case, the patient totally received 6 cycles of BEP. When dysgerminoma mixed with other malignant tumours, the determined chemotherapy hasn't been recommended. A few reports gave their programs, three patients of mixed malignant germ cell tumour (MGCT) received chemotherapy, two of them received etoposide, ifosfamide, cisplatin (VIP), and the other one received BEP (9,10). Patients with residual lesions after cytoreductive surgery also had long-term outcome after receiving cisplatin-based chemotherapy, with overall survival of 80–90% (27). Furthermore, reported had indicated that most women whom followed up could resume normal ovarian function after received chemotherapy, while the older patients might have adverse effect on reproductive function (28). However, accurate surgical staging and early surgery are important, although surgery is not the only therapeutic method (29).

The prognosis of patients with dysgerminoma is usually good with long overall survival (9,18). Only 28% of patients had lymph node metastasis, which was a predictor of poor survival (30). Reports had indicated that the median follow-up was 127 months to 15.9 years (31). Extensive literatures had described that all recurrences of dysgerminoma occurred within 9–19 months (32), they suggested that ovarian dysgerminoma should be followed up for about 2 years, but there was another literature suggested that it may relapse after 2 years from primary diagnosis (33). NCCN suggested that physical exam (every 2–4 months) and serum tumour marker (every 2–4 months) should be followed up for dysgerminoma within two years, and when patients have been followed up for more than 2 years, only physical exam yearly should be followed up. In our case, as she received the surgery of bilateral salpingo-oophorectomy, regular detecting of sex hormone levels, bone mineral density and some other examinations are necessary. If tumour residue or recurrence was suspected, re-surgical exploration is necessary. But in our case, for the sake of PET-CT indicating no tumour metastasis or recurrence, the second surgery for explosion was not performed. Until the article is submitted, the patient is still alive without suspicious physical exams, tumour makers or obviously abnormal imaging exams.

As for our patient, preoperative examinations, such as ultrasound, CT, tumour markers, had indicated it was malignant ovarian tumour, but torsion of ovarian masses was not considered at that time. For more accurate diagnosis, IL-6 and SWI may also be detected when the diagnosis of adnexal torsion was considered. What's more, she received chemotherapy in other hospital instead of early surgical treatment. These caused the patient to miss the timing of early surgery, which was part of the reason of her extremely poor general condition. This reminded us that diagnosis of adnexal torsion should be considered when a patient with solid adnexal mass presents with acute abdominal pain. And complete surgery should be considered at the beginning, instead of preoperational chemotherapy without determined diagnosis. However, the key point for us was to find the best time for surgery. As soon as the surgery was performed, DIC, pleural effusion and ascites took a turn for the better. It also demonstrated the necessity of early surgical treatment.

Although dysgerminomas with adnexal torsion is

extremely rare, the diagnosis should be taken in consideration when a patient presents with solid adnexal mass and acute abdominal pain. ultrasound, CT, MRI and tumour markers may provide some auxiliary diagnosis basis, among them, SWI and IL-6 may play an important role. Early surgery is necessary for dysgerminomas, especially for these with huge dysgerminoma accompanied with torsion. Patients with dysgerminoma usually have long overall survival.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist (available at https://gpm.amegroups.com/article/view/10.21037/gpm-20-50/rc).

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://gpm.amegroups.com/article/view/10.21037/gpm-20-50/coif). XZ serves as an Editor-in-Chief of *Gynecology and Pelvic Medicine*. The other authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Informed consent was obtained from the patient for publication of this case report and accompanying images. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013).

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Supplementary

Table S1 Timeline

Date	Relevant past medical history and interventions (with no relevant personal, family and psychosocial history including important past interventions, outcomes, and follow-up)		
	Summaries from initial and follow-up visits	Diagnostic testing (including dates)	Interventions
2017.4	Symptoms: abdominal mass, abdominal distension, abdominal pain, loss of appetite, nausea, vomiting Diagnosis: pelvic mass: ovarian cancer? mild anemia, liver dysfunction, pericardial effusion, bilateral pleural effusion, and right hydronephrosis	2017.4 The ultrasound suggested two huge solid masses with irregular shape and abundant blood flow around the mass, alanine transaminase (ALT): 626 U/L; aspartate transaminase (AST): 673 U/L; cancer antigen 125 (CA125): 429.1 U/L; cancer antigen 199 (CA199): 53.57 U/L; human chorionic gonadotropin (hCG): 966 mIU/mL; hemoglobin (HGB): 80 g/L	2017.5 The patient received supportive treatment and apatinib mesylate (850 mg qd) in other hospital
2017.5	Symptoms: recurrent fever, abdominal mass, abdominal distension, abdominal pain, loss of weight, loss of appetite, nausea, vomiting, small red papules scattered in the whole body Diagnosis: pelvic mass: ovarian cancer? mild anemia, liver dysfunction, pericardial effusion, bilateral pleural effusion, and right hydronephrosis	2017.5 The ultrasound suggested two huge solid masses with irregular shape and abundant blood flow around the mass, celiac effusion, pleural effusion, pericardial effusion; computed tomography (CT) suggested two huge irregular mass in the abdominal cavity, about 12.2 cm × 13.6 cm × 23.8 cm, 18.0 cm × 13.5 cm × 16.6 cm, with unclear boundary, accompanied with right hydronephrosis. Chest CT suggested pneumonia, blood examinations showed blood leucocytes decrease, anemia (HGB 73–88 g/L), prolonged activated partial thromboplastin time (APTT) (40.7–43.8 s), increased d-dimer (DDI) (11.62–14.10 mg/L), increased fibrinogen degradation products (FDP) (29.90–47.40 μg/mL), decreased antithrombin III (ATIII) (45–56%) and elevated liver enzymes (AST 65–84 U/L), decreased albumin (28.4–31.0 g/L)	2017.5 Recombinant human granulocyte colony-stimulating factor for elevating leukocyte, ademetionine and polyene phosphatidyl choline for reducing transaminase, red blood cell suspension for correction of anemia, fibrinogen, vitamin K1 (VK1), fresh frozen plasma for correction of abnormal coagulation, albumin for correction of hypoproteinemia 2017.6 Surgery of bilateral salpingo-oophorectomy and omentectomy without pelvic lymphadenectomy 2017.6 Six cycles of BEP (bleomycin 15 mg ivgtt d1/d4 + etoposide 100 mg ivgtt d1–5 + cis-platinum 20 mg ivgtt d1/d3/d5, 30 mg ivgtt d2/d4)
2017.7	Follow-up visits: alive with normal physical exams; no significant sign of recurrence was found	2017.7 CT suggested the lymph nodes of abdominal aorta and left common iliac vessel were still increased, part integration, but obviously reduced combined with before, tumour markers kept normal	None
2017.11	Follow-up visits: alive with normal physical exams; no significant sign of recurrence was found	2017.11 Positron emission tomography (PET)-CT indicated several lymph nodes were seen beside the abdominal aorta and left common iliac vessels, partly integration, but no increase in glucose metabolism, tumour markers kept normal	None
2018.5	Follow-up visits: alive with normal physical exams; no significant sign of recurrence was found	2018.5 CT suggested the lymph nodes of abdominal aorta and left common iliac vessel were still increased, part integration, but obviously reduced combined with before, tumour markers kept normal	None
2018.9	Follow-up visits: alive with normal physical exams; no significant sign of recurrence was found	2018.9 CT suggested the lymph nodes of abdominal aorta and left common iliac vessel were still increased, part integration, but obviously reduced combined with before, tumour markers kept normal	None
2019.3	Follow-up visits: alive with normal physical exams; no significant sign of recurrence was found	2019.3 CT suggested the lymph nodes of abdominal aorta and left common iliac vessel were still increased, part integration, but obviously reduced combined with before, tumour markers kept normal	None
2019.3	Final outcome for this episode of care	Alive and well 22 months after surgery	None

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