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REVIEW

Primary yolk sac tumor of the endometrium: a case report and review of the literatures

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Abstract

Purpose Yolk sac tumor (YST) is a malignant tumor derived from germ cells and usually occurs in the gonads. Extra-gonadal YST is most commonly seen in the vagina of children, but rarely in the cervix, vulva and endometrium. Primary YST of endometrium was extremely rare, standard treatment was still controversial and no guideline was established so far. The aim of the present study was to provide a comprehensive understanding and systematic thought for the management of primary YST of endometrium.

Methods A systematic research of the literature was conducted in Scopus, PubMed database and Cochrane Library, including case reports and case series. We summarized clinical characteristics, treatments and prognosis of all collected cases. We collected data regarding patients, serum AFP level, initial symptoms, surgical information, postoperative chemotherapy and radiotherapy. A new case was also discussed.

Results We found only 26 cases have been reported previously. We reported a new case of primary endometrial YST in a 27-year-old woman, and in this case, we creatively performed bilaterally ovarian preservation and used DC (docetaxel and carboplatin) regimen of postoperative chemotherapy, we achieved a relatively good prognosis during the follow-up period of 14 months.

Conclusion Primary YST of endometrium, kind of highly malignant germ cell tumors, was extremely rare, of which initial symptom is usually abnormal vaginal bleeding. Standard treatment was still controversial and no guideline was established so far. Surgery combining with postoperative chemotherapy was considered effective for treatment of primary endometrial YST. Decision on whether to preserve ovaries in young patient with early stage needs careful consideration, comprehensive preoperative assessment and full communication. Intraoperative biopsy and strict postoperative follow-up are recommended. However, standard chemotherapy regimen and feasibility of postoperative radiotherapy remains to be discussed.

Keywords Yolk sac tumor · Endodermal sinus tumor · α-Fetoprotein · Ovarian preservation · Endocrine function preservation · Endometrium

Introduction

YST, also known as endodermal sinus tumor (EST), is a kind of highly malignant germ cell tumors (GCTs). It is considered to be with poor prognosis of these neoplasms and takes up 14.5% of malign germ cell tumors as a third most frequent histologic type inferior to dysgerminomas and malignant teratomas [1]. YSTs usually arise from gonads, extra-gonadal YSTs were rarities in female population, taking up approximately only 10% of all YSTs [2]. Serum AFP, as a specific protein produced by all YSTs wherever the original sites, could be significant diagnostic and follow-up indicators of certain patients. The localizations of extra-gonadal YSTs were diverse, including sacrococcygeal region, retroperitoneum, mediastinum, pineal gland, stomach, vagina, vulva, liver, omentum, pelvis, endometrium and other sites. Within genital system, vagina could be the most common localization of extra-gonadal YSTs [3]. Furthermore, primary YSTs originate from vagina developed exclusively in children under 3 years of age [4]. Primary

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YST of endometrium is very rare, and there is no guideline established for treatment. To the best of our knowledge, only 26 cases have been reported in the literatures (Table 1). We carried out systematic the literature review and reported a new case of primary endometrial YST in a 27-year-old woman who underwent comprehensive staging surgery with ovarian preservation and adjuvant chemotherapy, discussing management on treatment of this rare disease.

Case report

In June 2018, a 27-year-old woman presenting with a history of abnormal vaginal bleeding for 2 months was admitted to our department. Transabdominal ultrasound suggested endometrial hyperplasia, and a diagnostic curettage specimen revealed endodermal sinus tumor of endometrium. She had a history of medical abortion for unplanned pregnancy 6 years ago and endometrial polyp 3 years ago. Abdominal and vaginal gynecological examination indicated no obvious abnormity except an enlarged uterus. Smear of cervix was normal. Gynecological ultrasonography showed an enlarged uterus measured 10.8 × 7.1 × 5.9 cm with a 5.4 × 3.9 cm heterogeneous mass at fundus in the uterine cavity (Fig. 1). CT scanning of chest and abdomen revealed no abnormal findings except mild pulmonary fibrosis. Pelvic-enhanced MRI showed mild to moderate enhancement of the lesion, and the enhancement was lower than the normal myometrium, and the lesion seemingly invaded deep muscular layer (Fig. 2). No apparent imaging evidence presented that the bilateral ovaries, gastrointestinal tract, bladder or any other abdominal and pelvic organ was involved. Baseline tumor markers for germ cell tumors were obtained and serum AFP level elevated largely at more than 800 ng/ml (normal < 20 ng/ml) while the serum β-HCG, CA125, CA199 and CEA level were normal.

The patient was then assessed for surgical fitness and treatment protocols at multidisciplinary tumor board. In consideration of the rarity and poor prognosis of this disease, comprehensive staging surgery including total hysterectomy, bilateral salpingo-oophorectomy, pelvic and para-aortic lymph nodes dissection combining with postoperative platinum-based chemotherapy was planned. The treatment plan was approved by the patient herself and her authorized relatives, they agreed to have both fallopian tubes resected but urged to preserve bilateral ovaries and accepted the relevant risks, so we finally decided to performed bilateral ovarian biopsies during operation to exclude metastasis as much as possible. Intraoperative exploration revealed no obvious abnormalities in the appearance of bilateral ovaries, omentum magus and any other pelvic or abdominal organs. Both fallopian tubes were completely excised, wedge-shaped resection of both ovaries and omentum multipoint biopsy were performed to exclude metastasis, and intraoperative frozen rapid pathological examination revealed they were all normal tissues. Therefore, ovarian preservation was performed in consideration of age and under full communication again with authorized relatives of patients during operation. The patient finally underwent total hysterectomy, bilateral salpingectomy, pelvic and para-aortic lymph node dissection. The histological report confirmed the diagnosis of pure endometrial YST with areas of hemorrhage and necrosis in the cavity of uterus, the depth of muscle invasion was less than 1/3 with no cervical stromal invasion, and both fallopian tubes, omentum and bilateral ovary biopsies were all normal tissues. Totally, 15 pelvic lymph nodes and 2 para-aortic lymph nodes were dissected, and none of them showed tumor involvement. According to the latest FIGO (International Federation of Gynecology and Obstetrics) staging classification for cancer of the corpus uteri [5], this patient belongs to stage IA.

The serum AFP was measured at 1584 ng/ml on the second day after operation, and 1265 ng/ml on the fourth day. Six course of adjuvant chemotherapy, docetaxel (75 mg/m^2 intravenously for 1 day) and carboplatin (AUC = 5), was taken every 3 weeks since the fifth day after surgery. At the final cycle of chemotherapy, the patient suffered sudden breathing difficulties and rash during intravenous infusion of carboplatin, and she was recovered after immediate use of dexamethasone, promethazine and diphenhydramine, etc.

The serum AFP, chest X-ray examination and pelvic ultrasound were regularly examined on each course of postoperative chemotherapy. The serum AFP and abdominal and pelvic MRI were monitored per 3 months after chemotherapy. A comprehensive evaluation including symptoms of recurrence, serum AFP, CT scanning of chest, pelvic ultrasound, abdominal and pelvic MRI was conducted every 6 months after surgery to determine if the disease has recurred. We also had a monthly telephone follow-up. The serum AFP had finally fallen to normal after the second cycle of chemotherapy. The patient remained free of disease 14 months after surgery.

Pathologic findings

Gross appearance

The uterus measured 11.5 × 9.5 × 5 cm. A soft grayish-white tumor measured 7 × 5.8 cm with areas of hemorrhage and necrosis was located primarily at the fundus of uterus. There was no cervical involvement (Fig. 3). The depth of muscle invasion seemed about 1/3. Totally, 15 pelvic lymph nodes and 2 para-aortic lymph nodes were dissected, and none of them showed obvious enlargement.

Table 1 Summary of clinicopathologic features of primary endometrial YSTs

Case	Age	Initial symptoms	AFP (ng/ml)	Primary surgery	FIGO stage	Postoperative pathological	SD body	Ovarian metastasis	Chemotherapy	Radiotherapy	Follow-up time (mo)
1 [3]	24	Abd pain	[a]3600	CISH + BSO	IVA	Ret, Pap, Eosinophilic hyaline bodies	Yes	Yes	VAC[a]6	Yes	DOD, 24
2 [6]	28	AVB, Abd pain	380	TAH + BSO	IB	Ret, So, Pap	Yes	No	VCR, VLB, CTX, ADR, MDX, 5-Fu, MPA	No	REC, 2; DOD, 8
3 [7]	42	AVB	18,530–[a]7100	TAH + BSO	IA	Tub-pap, Ret, So	Rare	No	PVB[a]4	No	NED > 24
4 [8]	27	AVB	1580	TAH + BSO + OMT	IA	Ret	Yes	No	VAC	No	NED > 14
5 [9]	49	AVB	Normal	TAH + BSO + PLND	IA	Tub-pap, So	Yes	No	No	Yes	NED > 28
6 [10]	59	Abd pain	25,385 (27,670 U/ml)	TAH + BSO + OMT + PLND	NA	Pap	YES	NA	BEP[a]4 + EP[a]2	No	REC, 16; AWD > 16
7 [11]	65	AVD	2306	Modified RH + BSO + PLND	IIIC	Gld-pap, So, hyaline globules	Yes	No	TP[a]5	No	NA
8 [12]	64	Abd distension	15,918	NA	IVB	Ret, Gld, Pap	Rare	NA	NA	No	DOD, 2.5
9 [13]	30	AVB	1762–[a]759.5	TAH	II	Ret, So	Yes	OP	BEP[a]3	No	NED > 72
10 [14]	57	Abd pain	29,214 (31,844 IU/ml)	TAH + BSO + OMT + PLND + PALND	IVB	Tub-pap, So	Yes	Yes	BEP[a]2	No	DOD < 2
11 [14]	44	AVB	27,522 (30,000 IU/ml)	TH + BSO + OMT + PLND + PALND	IB	Ret, So, myxomatous changes	Yes	NA	BEP[a]3	No	NED > 6
12 [15]	29	AVB	3593.4	Modified hysterectomy + left adnexa + PLND + PALND	II	NA	Yes	No	BEP[a]4 (P, carboplatin)	No	NED > 39
13 [16]	28	AVB	[a]1522 (after first course of chemotherapy)	TAH + BSO + OMT + PLND + appendectomy + partial resection of the sigmoid colon with anastomosis	IV	NA	NA	No	PTX, ADM, CDDP, CBDCA, MTX, Act-D, VP-16, BLM, pingyangmycin, VCR, FUDR, oxaliplatin, CPA	No	AWD, 10
14 [17]	31	AVB	222 (242.3 IU/ml)	TAH + BSO + OMT + PLND + PALND	IA	Similar to gonadal YST	NA	No	BEP[a]4	No	NED > 24

Table 1 (continued)

Case	Age	Initial symptoms	AFP (ng/ml)	Primary surgery	FIGO stage	Postoperative pathological	SD body	Ovarian metastasis	Chemotherapy	Radiotherapy	Follow-up time (mo)
15 [18]	63	AVB	NA	TAH + LSO + OMT + appendicectomy	IVB	Pap, Gld	NA	Yes	BEP[a]3	No	NED, 6
16 [19]	71	NA	NA	YES	IIIA	Ret, Pap	No	NA	NA	No	DOD, 19
17 [19]	55	NA	NA	YES	II	So, Ret, Pap	Rare	NA	NA	Yes	DOD, 16
18 [19]	59	NA	NA	NA	IB	Gld, So	No	NA	NA	NA	LTF
19 [19]	68	NA	NA	YES	IV	Gld, So, Pap	Rare	NA	NA	No	DOD, 14
20 [19]	77	NA	NA	NA	IIIC	Gld, So	No	NA	NA	NA	LTF
21 [19]	64	NA	NA	YES	IIIA	Hep, So, Gld	No	NA	NA	Yes	DOD, 23
22 [19]	87	NA	NA	YES	II	Ret, So	No	NA	NA	No	AWD, 7
23 [19]	61	NA	NA	YES	IA	Gld	No	NA	NA	No	AWD, 8
24 [19]	63	NA	NA	YES	IIIC	Gld, Pap, Ret	No	NA	NA	Yes	NED, 5
25 [19]	62	NA	NA	YES	IB	Pap	No	NA	NA	No	AWD, 30
26 [19]	77	NA	NA	YES	IIIC	Gld	No	NA	NA	No	AWD, 17

Abd, abdominal, *AVB* abnormal vaginal bleeding, *AVD* abnormal vaginal discharge, *CISH* classical intrafascial supracervical hysterectomy, *BSO* bilateral salpingo-oophorectomy, *TAH* total abdominal hysterectomy, *RH* radical hysterectomy, *OMT* omentectomy, *PLND* pelvic lymph node dissection, *PALND* para-aortic lymph node dissection, *Ret* microcystic/reticular, *Pap* papillary, *So* solid, *Tub* tubular, *Gld* glandular, *Hep* hepatoid, *SD body* Schiller–Duval bodies, *OP* ovarian preservation, *AWD* alive with disease, *DOD* died of disease, *LTF* lost to follow-up, *NED* no evidence of disease, *NA* not available

[a]Postoperative serum AFP level

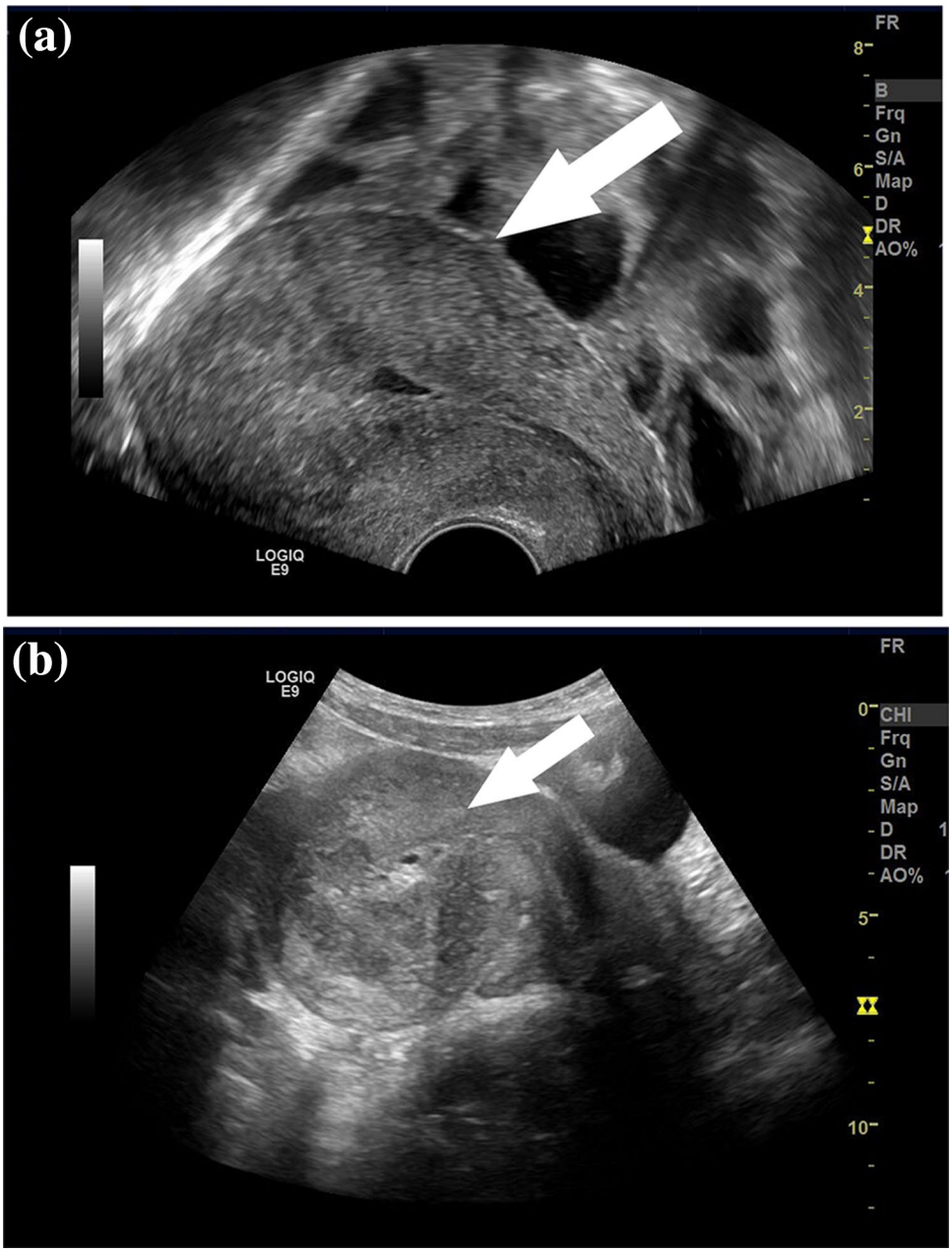

Fig. 1 Gynecological ultrasonography showed an enlarged uterus measuring 10.8 × 7.1 × 5.9 cm with a 5.4 × 3.9 cm heterogeneous mass at fundus in the uterine cavity

Light microscopic appearance and immunocytochemistry

The tumor showed a pure YST measuring 7 × 2.5 cm without any other type of germ cell tumor or somatic carcinoma components. The depth of muscle invasion was less than 1/3 with no cervical stromal infiltration. Microscopically, the tumor cells showed microencapsulated, labyrinthine structures and endodermal sinusoidal (Schiller–Duval body). In addition, red-stained eosinophilic droplets can be seen (Fig. 4). Immunohistochemical staining of the tumor showed patchy positive for AFP, positive for SALL-4 and CK, 50% positive rates for Ki67, and negative for ER, PR, P53 and CD30 (Fig. 5). Biopsy of ovaries, tubes and omentum were normal tissues and none of pelvic or para-aortic lymph nodes showed metastasis.

Literature review

In a systematic literature, search of the databases Scopus, PubMed and Cochrane Library (search data 20-04-2019) using the search terms Yolk Sac Tumor[All Fields] OR Endodermal sinus tumor[All Fields] AND ("primary, endometrium, endometrial"[MeSH Terms] OR ("primary"[All Fields] AND "endometrium"[All Fields])

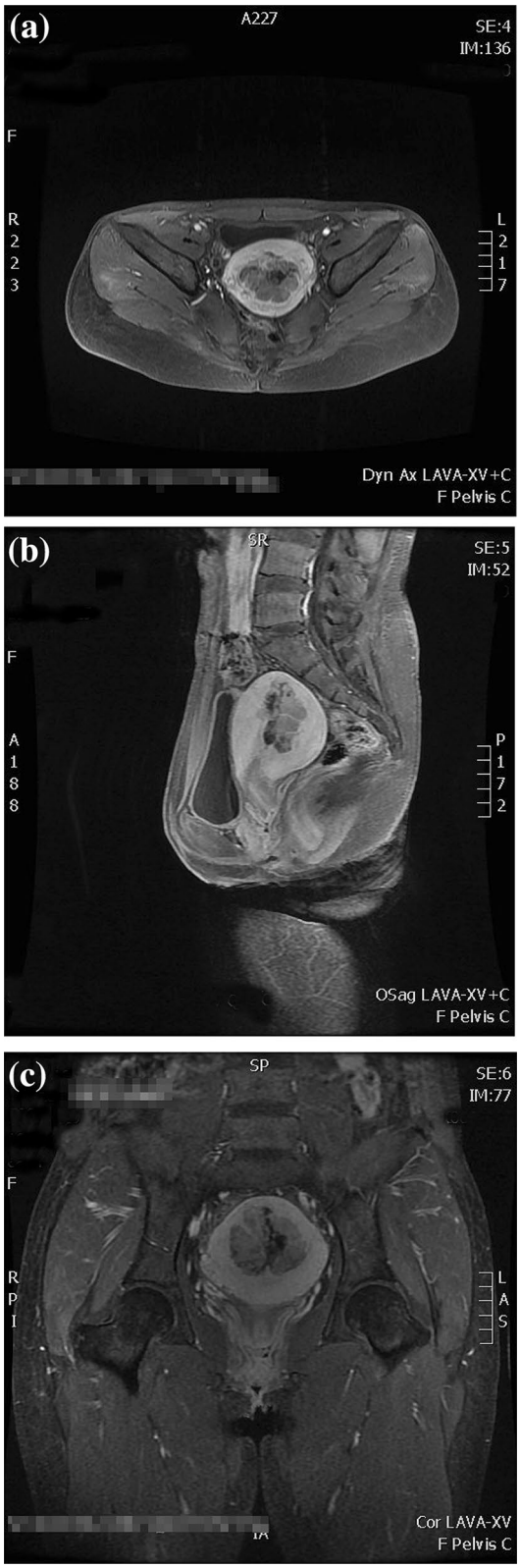

Fig. 2 Pelvic-enhanced MRI showed mild to moderate enhancement of the lesion, and the enhancement was lower than the normal myometrium, the lesion seemingly invaded deep muscular layer (**a** horizontal plane, **b** sagittal plane, **c** coronal plane)

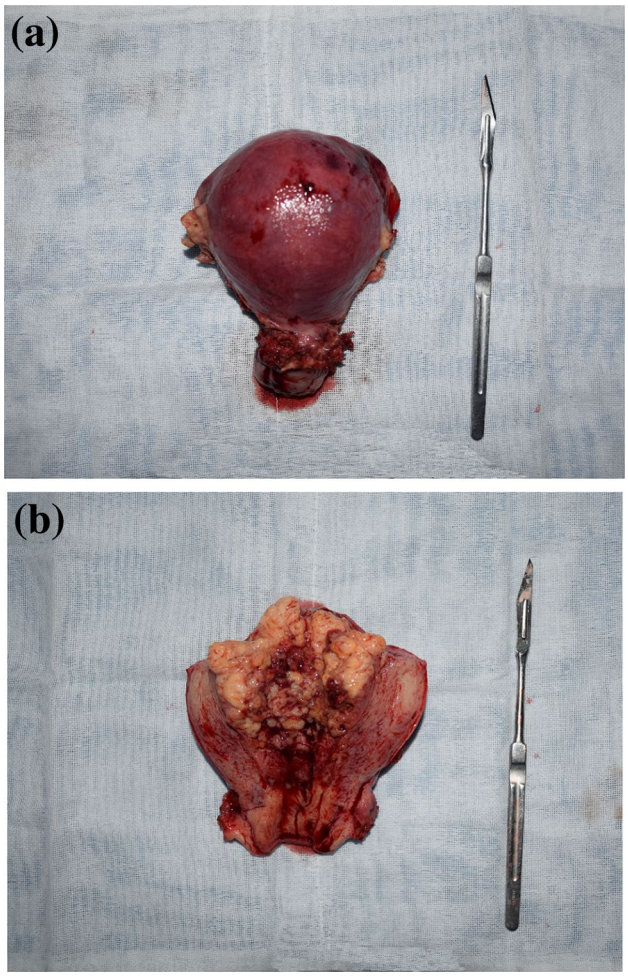

Fig. 3 Gross appearance: the uterus measured 11.5 × 9.5 × 5 cm. A soft grayish-white tumor measuring 7 × 5.8 cm with areas of hemorrhage and necrosis, located primarily at the fundus of uterus, was seen originating from the endometrium to the internal ostium of cervix

OR "endometrial"[All Fields]). 44 citations were identified. After screening all abstracts, 14 citations finally were selected reporting on patients with primary yolk sac tumor of the endometrium, defined for the purpose of this review to summarize and discussed the clinical features and treatment of this kind of rare disease [3, 6–18]. Studies not reporting on YSTs that originated from the endometrium, not reporting on pure YSTs and duplicated publications were excluded. The 14 identified studies were retrieved in full and cross-reference searches were performed identifying a further 1 study reporting on primary YSTs of the endometrium [19]. Therefore, in summary, 15 studies were included and analyzed for this review (16 when including the present case report). Figure 6 shows a flow diagram of the literature search algorithm. Among the 15 studies published previously, we found 13 case reports and 2 case

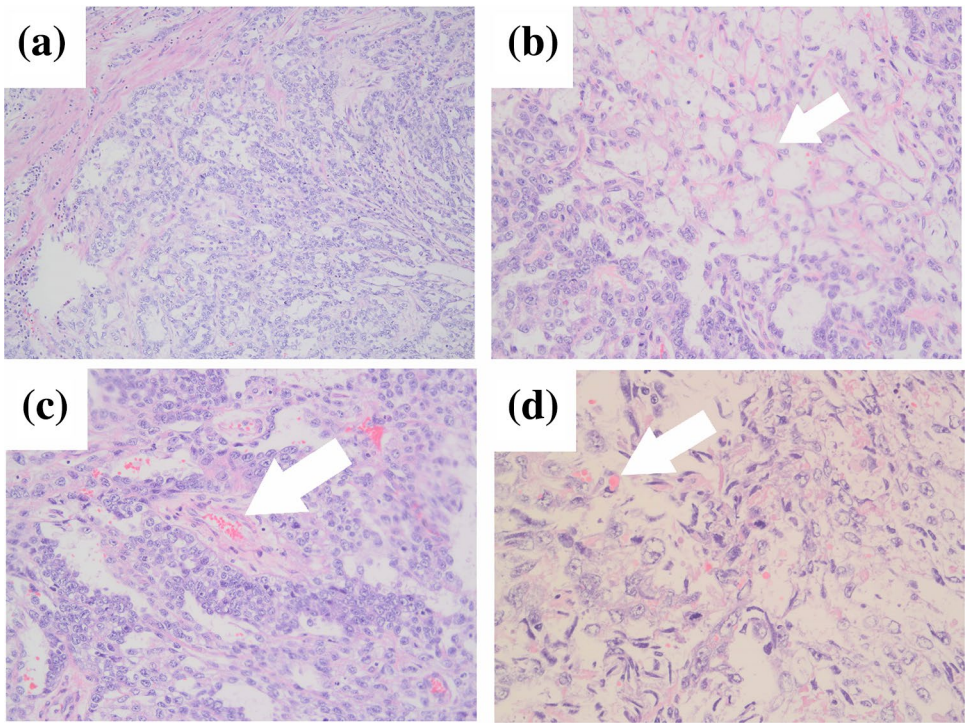

Fig. 4 Light microscopic appearance of YST. **a**, **b** Yolk sac tumor (H and E, ×10 and ×20). Loose micro-capsules formed by tumor cells with many empty spaces (arrow). **c** Yolk sac tumor (H and E, ×20). Schiller–Duval body (arrow). **d** Yolk sac tumor (H and E, ×10×40). Red-stained eosinophilic droplets, extracellular PAS-positive hyaline globules (arrow)

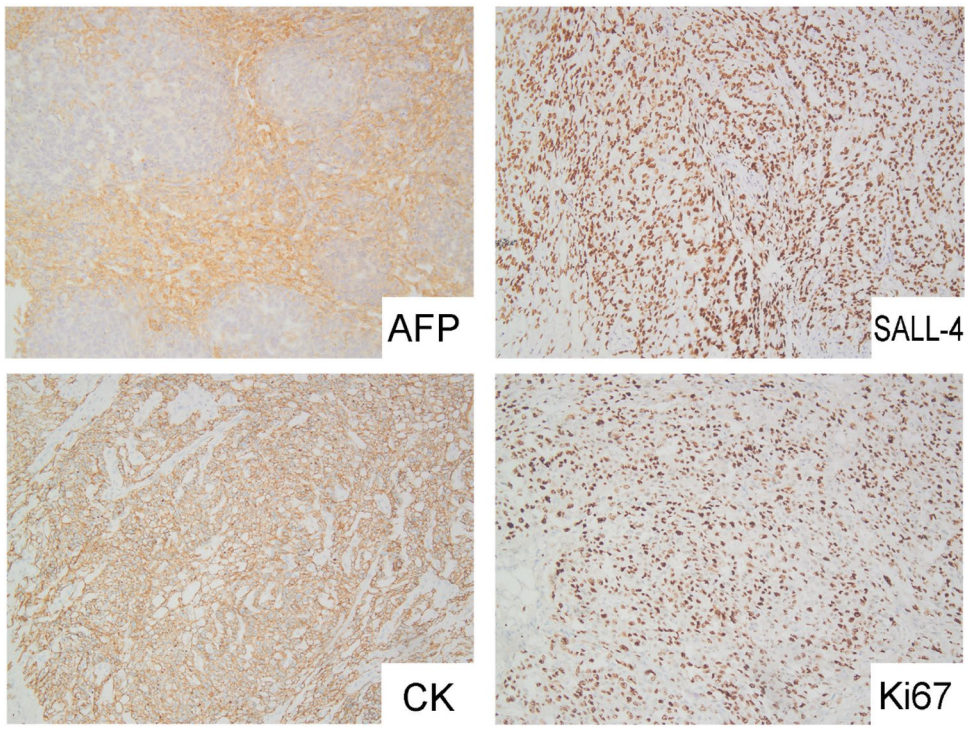

Fig. 5 Immunocytochemistry of YST. Yolk sac tumor (× 10). Immunohistochemical staining showed positive for AFP, SALL-4, CK and Ki67, respectively

series describing in summary 26 patients with primary YST of the endometrium.

The clinical characteristics of all studies are summarized in Table 1. The median age at presentation was 59 years (range 24–87 years). Initial symptoms were missing in 11 cases, available primary symptoms were related to tumor local effect, including abnormal vaginal bleeding (AVB) (10/15), abdominal pain (4/15), abnormal vaginal discharge (AVD) (1/15), and abdominal distension (1/15). While serum AFP level was unknown in 12 patients, preoperative

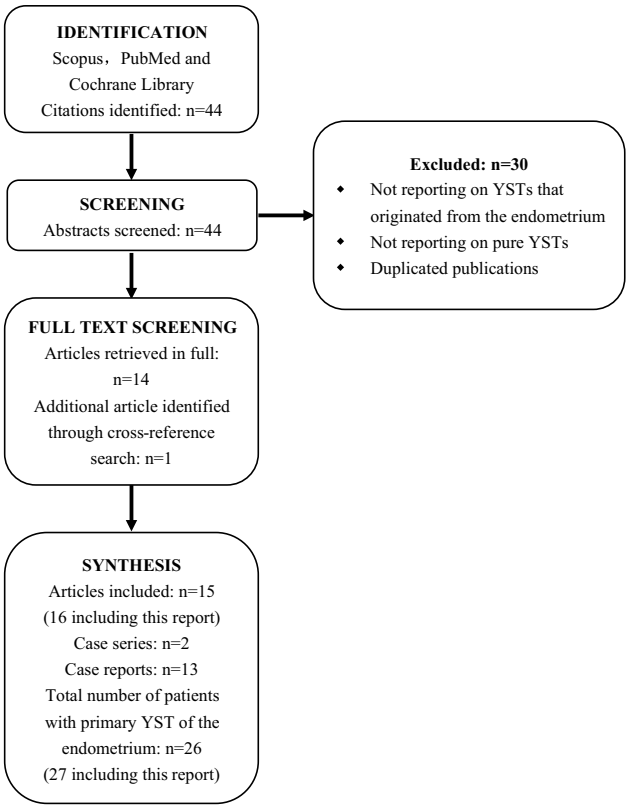

Fig. 6 Flow diagram of the literature search algorithm

serum AFP level of the rest 12/14 patients was elevated significantly except one (normal level). Preoperative serum AFP was not examined in 2/14 patient, but which tested after surgery and after first course of postoperative chemotherapy were 3600 ng/ml and 1522 ng/ml, respectively, that were extremely high. All these 26 patients presented with disease at the following FIGO stages: I (9/26), II (4/26), III (6/26), IV (6/26), and one had missed relevant detail. According to information, surgery details were missing in 3/26 patients, the rest 23/26 patients underwent staging surgery, but certain resection range was not provided in 9/23 cases. Among all the patients who underwent surgery and detailed surgical resection ranges were available, 11/14 cases removed bilateral ovaries, unilateral ovary was saved in 2/14 case while bilateral ovarian preservation was performed in only one case. According to postoperative pathology, only 3 cases had ovarian metastasis. While histologic patterns of 2 cases were unavailable and another one case missed details, the 4 most commonly observed histologic patterns included papillary (13/23), solid (13/23), reticular (11/23), and glandular (6/23). Schiller–Duval bodies were observed in 14 of 23 available cases, but 3/14 were in rarity. Totally, 13 patients underwent postoperative chemotherapy, BEP (Bleomycin, Etoposide and Cisplatin) was the most common chemotherapy regimen that used, taking up 7/13. Since YSTs were not sensitive to radiotherapy, only 5 in 24 (2 unavailable) cases chose to conduct postoperative radiotherapy. Despite of poor prognosis, 9 in 26 patients had no evidence of disease during follow-up time (the longest was over 72 months), while 8 cases died of disease (range 2.5–24 months), 6 patients were alive with disease (range 7–30 months), 2 patients underwent recurrence and last 2 cases were lost to follow-up.

Discussion

YST is usually considered highly aggressive malignancy of germ cell that progresses rapidly, with relatively poor prognosis among all common types of GCT. YST can produce AFP, which could be a sensitive marker for diagnosis and trackable indicator for therapeutic effect evaluation of YSTs. Although most of YSTs originate from ovary or testis, extra-gonadal YSTs are also reported before. Primary YSTs of endometrium were only reported in cases. There existed four hypotheses currently worldwide, and it is traditionally considered that the variation of origin sites of extra-gonadal GCTs is due to aberrant embryonic migration of the primordial germ cells. Some authors attributed primary YSTs of endometrium to arrested germ cell precursors in the basal layer of endometrium during embryogenesis [6, 20]. And there are other three possible mechanisms that may explain why YSTs can originate from endometrium. The first mechanism is the metastasis deriving from an occult ovarian malignancy. The second mechanism is the residual fetal tissues remaining in the uterus because of an incomplete abortion. And the final is the origin from somatic cells that have undergone aberrant differentiation [11].

To the best of our knowledge, our case was the second to save bilateral ovaries of primary endometrial YST patient in the world. We effectively retained the patient's ovarian endocrine function and improved postoperative quality of life. BEP (bleomycin, etoposide and cisplatin), first-line chemotherapy regimen for ovarian malignant germ cell tumors, was mostly used in primary endometrial YST, but the feasibility remained to be discussed. In our case, we discussed on chemotherapy regimen with chemotherapist of our hospital preoperatively and postoperatively on histological report, considering the patient's financial capacity and that her physical condition could not tolerate adequate dose and side effect of BEP regimen, we finally decided to use DC (docetaxel and carboplatin) regimen, which obtained agreement from the patient and her authorized relatives. We achieved response to therapy, and the serum AFP fell to normal after two cycles of chemotherapy. The patient had a relatively high quality of life and did not have any perimenopausal symptoms as yet.

AFP, a special tumor marker elevated in the vast majority of patients with tumors containing an YST component [21],

is essential for diagnosis and monitoring of progressiveness. In this case, AFP was used as a significant follow-up indicator. And as we could see, the serum AFP of this patient fell to normal after the second cycle of chemotherapy, affirming the effectiveness of our therapeutic regimen.

Currently, there is no consensus on the treatment of primary endometrial YST, surgery combining with postoperative adjuvant chemotherapy is main mean of treatment. However, specific resection range remains controversial, whether to preserve ovaries and to perform omentectomy still need study. Lymph node staging is also controversial not only for primary endometrial YST, but also for ovarian germ cell tumors [22]. Some documents had shown the safety of conservative surgery with effective chemotherapy for young patients with ovarian germ cell tumors [23–27]. Extra-gonadal YSTs have similar pathological feature and similar response to chemotherapy with gonadal YSTs. Rouge [27] recommended fertility-sparing surgery for all patients with ovarian YSTs whatever the FIGO stage is in consideration of relatively good prognosis after conservative surgery combining with postoperative chemotherapy. Patients with YST of endometrium are not suggested to save their uterus, however, in view of the young age of these patients and proven efficacy of surgery combining with postoperative chemotherapy in YSTs both in gonadal and extra-gonadal sites, whether to preserve endocrine function in early stage was still in debate and the safety of ovarian preservation remains to be investigated. Among 26 cases we collected, 11 cases removed bilateral ovaries but 2 cases saved unilateral ovary and 1 case saved both ovaries. During the follow-up time, all 3 patient got ovarian preservation showing no evidence of the disease. Rossi [13] reported a 30-year-old women with stage II primary endometrial YST treated with a simple total hysterectomy, preserving bilateral ovary. The patient remained free of disease for more than 6 years after the completion of the therapy. Wang [15] reported a similar case, a 29-year-old women in stage II preserved her right adnexa to maintain endocrine function, and was alive without recurrence for 39 months. And among the 14 cases with bilateral or unilateral adnexectomy, 6 patients [6–9, 14, 17] (all were pure YST) were in stage I, and only 3 of them showed malignancy involvement of ovary. The fact revealed the possibility to treat a young patient in early-stage primary YST of endometrium with a conservative surgery preserving ovaries. In our case, a preoperative pelvic MRI and CT scanning of chest and abdomen did not show any sign of metastasis of either the ovaries or retroperitoneal lymph nodes, and biopsy of both ovaries and tubes during the surgery showed no metastasis in rapid pathology. Considering the young age of the patient and postoperative quality of life, we saved both ovaries of the patient. However, strict postoperative follow-up was extremely necessary due to high risk of recurrence and poor prognosis of this disease. Pileri [6] reported a 28-year-old woman in stage IB treated with TAH and BSO followed by chemotherapy. The patient suffered recurrence only 2 months after surgery with liver metastases, and finally died of disease 8 months after surgery. But it is worth noting that although effective chemotherapy regimen was unclear then, certain regimen took in Pileri's case report was not what we think as the first-line clinical regimen for malignant germ cell tumor currently.

BEP regimen was recommended for patients with all stage ovarian endodermal sinus tumors according to the latest NCCN guidelines [28]. However, standard chemotherapy regimens for YST originating from the endometrium were not established yet. Wang C [15] raised that BEP was the first-line adjuvant chemotherapy regimen for the treatment of ovarian and primary endometrial YST, but convincing evidence was lacking. It was reported in the literature that totally 5 patients had received postoperative adjuvant radiotherapy, but the prognosis of 5 patients was significantly different. Therefore, whether postoperative adjuvant radiotherapy can improve the prognosis of patients remains to be further studied.

Conclusion

Primary YST of endometrium, kind of highly malignant germ cell tumors, was extremely rare, of which initial symptom is usually abnormal vaginal bleeding. Standard treatment was still controversial and no guideline was established so far. Surgery combining with postoperative chemotherapy was considered effective for treatment of primary endometrial YST. Decision on whether to preserve ovaries in young patient with early stage needs careful consideration, comprehensive preoperative assessment and full communication. Intraoperative biopsy and strict postoperative follow-up are recommended. However, standard chemotherapy regimen and feasibility of postoperative radiotherapy remains to be discussed.

Author contributions TL: data collection, data analysis, formal analysis and manuscript writing/editing. LQ: data collection, formal analysis and manuscript writing. YM: paper assessment. GL: formal analysis. XZ: manuscript revising. PL: manuscript revising. Tao Lu and Liping Qi contributed equally.

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Compliance with ethical standards

Conflict of interest The authors report no conflict of interest.

Ethical approval All the procedures performed in studies involving human participants were in accordance with the ethical standards of

Ethics Committee of Qilu Hospital of Shandong University and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The publication of this case report got permission of the patient.

Human and animal rights This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent Informed consent for publication of this case report was received and personally signed from the patient on 2019-4-10.

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