

Contralateral metachronous recurrence of ovarian mature teratoma following surgery in a child: a case report and literature review

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Research Article

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Abstract

Objective: To investigate the clinical features, diagnostic and therapeutic strategies, and follow-up management of contralateral metachronous recurrence of ovarian mature teratoma (OMT) following surgery in children, with the aim of enhancing clinicians' recognition of this entity.

Methods: We retrospectively analyzed a 10-year-old female patient admitted to the Department of Pediatric Surgery at our hospital in December 2024, who was confirmed to have right-sided ovarian mature teratoma by imaging and surgical pathology. Additionally, in conjunction with a review of the relevant literature, we specifically examined the incidence, risk factors, and long-term follow-up strategies for contralateral recurrence of OMT after surgery in children.

Results: The patient underwent laparoscopic right ovarian tumor enucleation combined with pelvic adhesiolysis. Postoperative pathology confirmed mature cystic teratoma. The patient recovered well, and no abnormalities were detected in tumor markers or imaging studies during the first year of follow-up.

Conclusion: Contralateral recurrence of OMT following surgery in children carries a certain incidence that warrants clinical attention. Rigorous, long-term ultrasound surveillance is essential for the early detection of asymptomatic contralateral recurrent lesions, enabling timely fertility-sparing surgical intervention. Clinicians should thoroughly counsel the family regarding the long-term risk of recurrence and formulate an individualized follow-up protocol.

Introduction

Ovarian mature teratoma (OMT) is a frequent germ cell tumor in clinical settings, with a predilection for women of reproductive age. In the pediatric population, however, it represents only 5.0%–10.0% of all ovarian tumors. The majority of cases are unilateral, with bilateral involvement observed in only 10.0%–17.0% of patients[1]. Although OMT is mostly benign, there remains a risk of ipsilateral recurrence and contralateral metachronous recurrence after surgery. In recent years, with the widespread adoption of minimally invasive techniques and the growing emphasis on fertility preservation, ovarian-sparing enucleation has become the mainstream surgical approach[2–4]. However, the incidence of contralateral ovarian lesions developing after the primary surgery—defined as metachronous contralateral tumors—has been reported to vary widely in the literature, with rates ranging from 2.1% to 23%[5], posing a challenge to the formulation of postoperative follow-up strategies. Currently, there is no unified international and domestic consensus regarding the follow-up time and interval for children after undergoing OMT surgery. To address this gap, we present a case of contralateral recurrence occurring over 4 years after initial OMT enucleation in a 10-year-old patient, and synthesize relevant literature to specifically address the actual incidence, risk factors, and rational long-term surveillance protocols for contralateral recurrence of OMT in children, thereby seeking to inform clinical practice.

Case Presentation

A 10-year-old girl presented with a 1-day history of dull lower abdominal pain and fever (38.7°C). She had undergone laparoscopic left ovarian teratoma enucleation at our institution 4 years earlier; histopathological examination at that time confirmed mature cystic teratoma, and she had recovered uneventfully after the surgery. Two years after the first surgery, a routine ultrasound detected a tiny (0.6 cm) hyperechoic nodule in the right ovary, but the patient was asymptomatic and was subsequently lost to follow-up.

On admission, physical examination revealed mild lower abdominal tenderness without peritoneal signs. Laboratory tests showed an elevated C-reactive protein (59.27 mg/L) but normal tumor markers (AFP, CEA, CA19-9, CA125, β -HCG). Pelvic ultrasound demonstrated a well-defined 2.3 cm $\times$ 1.7 cm hyperechoic mass within the right ovary with a fat-fluid level, suggestive of teratoma (Fig. 1). Contrast-enhanced CT confirmed a mixed-density nodule with fatty attenuation and rim enhancement (Fig. 2).

After multidisciplinary discussion involving the pediatric, gynecology, anesthesiology and pediatric surgery teams, laparoscopic right ovarian teratoma enucleation with pelvic adhesiolysis was performed. Intraoperatively, the right ovary was enlarged (4.5 cm $\times$ 3.5 cm), and a 3.0 cm $\times$ 2.0 cm cystic-solid mass was completely enucleated with preservation of healthy ovarian tissue (Fig. 3). Frozen section and final pathology both confirmed mature cystic teratoma (Fig. 4). The patient recovered well and was discharged on postoperative day 3. At 1-month and 1-year follow-up, ultrasound and tumor marker levels were normal.

Discussion

Ovarian mature teratoma (OMT) is the most common benign ovarian neoplasm in children. Contralateral metachronous recurrence, defined as a newly diagnosed mature teratoma in the opposite ovary during postoperative surveillance after initial unilateral excision, has drawn increasing clinical attention. Although OMT is benign, the overall recurrence rate in the pediatric population is estimated at 2.5%–8.3% [4, 6, 7], with contralateral recurrence rates ranging from 2.1% to 7%, and some reports even suggest rates of 10%–20% [5, 8, 9]. The true incidence of contralateral metachronous recurrence remains debated. Specifically, Taskinen et al. followed 22 pediatric patients for a median follow-up of 4.4 years and reported a contralateral recurrence rate of 23%, with a Kaplan–Meier estimated 5-year risk of 14% $\pm$ 8% and a cumulative 10-year risk of 66% $\pm$ 26% [10]. In contrast, Malik et al. conducted a single-center 20-year retrospective study involving 45 pediatric patients, with a median follow-up of 2 years, and identified only one case (2%) [11]. However, wide variations in reported incidences exist, largely due to differences in follow-up duration, screening protocols, loss to follow-up, and sample sizes [5]. This discrepancy between the two studies underscores that short-term or intermittent surveillance may substantially underestimate the true recurrence rate, whereas regular long-term imaging follow-up is essential for detecting asymptomatic contralateral testicular lesions.

Herein, we report a 10-year-old girl who developed a metachronous mature teratoma in the contralateral (right) ovary more than 4 years after initial enucleation of the left-sided tumor. The clinical value of this

case lies not in its rarity, but in its clear warning regarding follow-up management. At 2 years after the initial surgery, routine ultrasonography had already detected a tiny suspicious lesion of approximately 0.6 cm in the right ovary. However, because the patient remained asymptomatic, follow-up was unfortunately discontinued. Consequently, she did not present again until she developed abdominal pain, at which point color Doppler ultrasonography showed that the lesion had grown to 2.3 cm. This timeline illustrates two important points: (1) The lesion was detected by color ultrasound two years after the surgery. This should be regarded as imaging evidence of recurrence, but the follow-up was interrupted due to the absence of symptoms. And (2) the subsequent progression to a symptomatic mass after interruption of surveillance highlights the potential consequences of inadequate monitoring. Thus, even when a very small lesion is discovered, it should not be dismissed; rather, it mandates continued close surveillance, and loss to follow-up is unacceptable.

For pediatric ovarian mature teratoma (OMT), surgical resection is currently the only curative treatment. In recent years, ovarian-sparing tumor enucleation has become the preferred approach, aiming to maximize preservation of long-term reproductive and endocrine function [2, 3]. Laparoscopic surgery offers the advantages of minimal trauma, rapid recovery, and excellent visualization, which makes it the first-line technique for benign ovarian tumors in children. Moreover, the risk of malignant transformation in OMT is extremely low (0.17%–2%), which further reinforces the safety of conservative surgery[12, 13]. In the present case, both the primary and secondary operations were performed laparoscopically with meticulous suturing and repair to the residual ovarian tissue, and the patient had an uneventful recovery, which confirms the safety and feasibility of this approach even in repeated procedures.

At the second surgery, laparoscopic enucleation was successfully performed, preserving the ipsilateral ovarian tissue, and no recurrence was observed at the 1-year follow-up. Given this success, the favorable outcome reinforces the feasibility of ovary-sparing repeat surgery. Nevertheless, the optimal timing for intervention upon detecting a tiny lesion (e.g., 0.6 cm) remains uncertain. It is unclear whether immediate re-operation or watchful waiting with frequent imaging and clinical assessment is preferable. Although our case could not answer this question, it clearly demonstrates that discontinuing surveillance based solely on absence of symptoms is hazardous.

Given the risk of both contralateral and ipsilateral recurrence, long-term postoperative follow-up is paramount. Specifically, Taskinen et al. recommended annual ultrasound surveillance until the patient reaches reproductive age or adulthood, which enables early detection and timely ovary-preserving surgery [10]. In line with this, the 2018 UK Children's Cancer and Leukaemia Group (CCLG) guidelines advise annual ultrasound examinations for 10 years postoperatively in patients with normal preoperative tumor markers [14]. In our case, a multidisciplinary team (MDT) comprising specialists in pediatric surgery, gynecology, and anesthesiology collaboratively developed an individualized plan for the second surgery, ensuring precision and safety. We advocate broader application of this MDT model in complex or recurrent cases.

Conclusions

In summary, contralateral metachronous recurrence after pediatric ovarian mature teratoma is not negligible and may manifest several years after the initial surgery, frequently as a small asymptomatic lesion that can progress if follow-up is interrupted. Clinicians should thoroughly counsel families about the long-term recurrence risk and adhere to standardized long-term ultrasound surveillance to enable early diagnosis and timely re-intervention, with the goal of preserving ovarian function. Future multicenter prospective studies are warranted to determine the true incidence and risk factors for metachronous contralateral recurrence in Chinese pediatric patients and to establish evidence-based follow-up guidelines.

Abbreviations

OMT

ovarian mature teratoma

CCLG

UK Children's Cancer and Leukaemia Group

MDT

multidisciplinary team

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The study protocol was submitted to the Ethics Committee of Suining Central Hospital which granted a formal waiver of ethics approval (Reference No. KYLLMC20260052), as the study was a retrospective case report based on previously collected clinical data and did not require full ethical review. All patient information has been de-identified.

Consent for publication

Written informed consent for participation and for publication of the case details and images was obtained from the patient's legal guardian.

Data availability

All data generated or analysed during this study are included in this published article.

Competing interests

Not applicable.

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Authors' contributions

Jia Yin wrote the first draft of the manuscript. Jia Yin and Qiang Chen participated in the surgical treatment and case collection. Ping Yang supervised the study and critically revised the manuscript.

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Not applicable.

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Figures

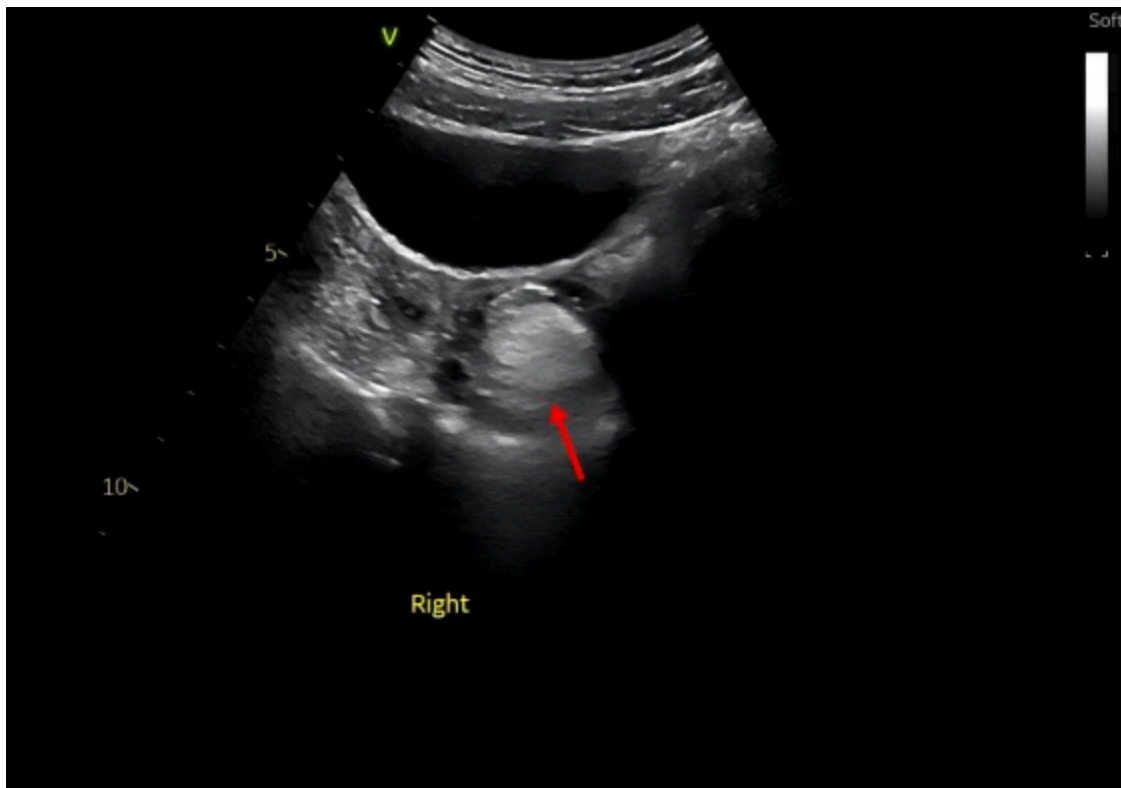


Figure 1

Ultrasound image of the right ovary shows a slightly hyperechoic mass measuring 2.3 cm × 1.7 cm, suggestive of a teratoma (arrow).

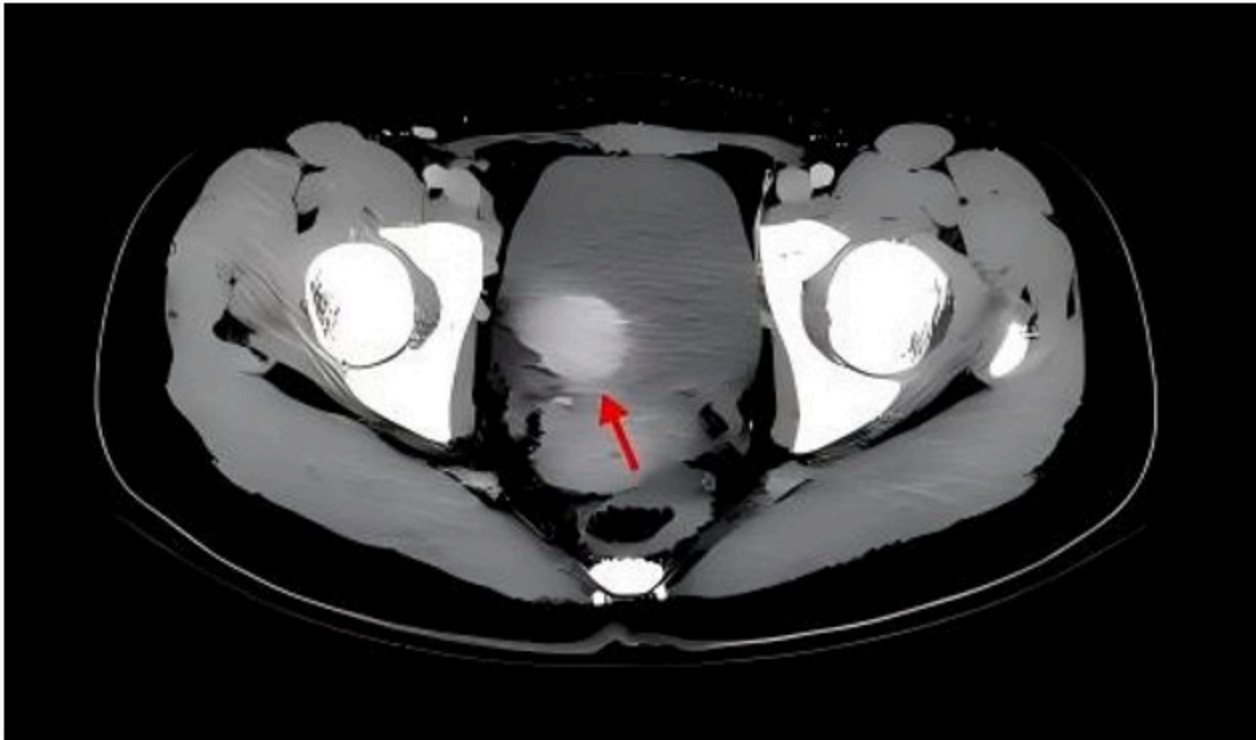


Figure 2

Contrast-enhanced abdominal CT. A mixed-density mass in the right adnexal region demonstrates peripheral enhancement on post-contrast images, suggestive of a teratoma (arrow).

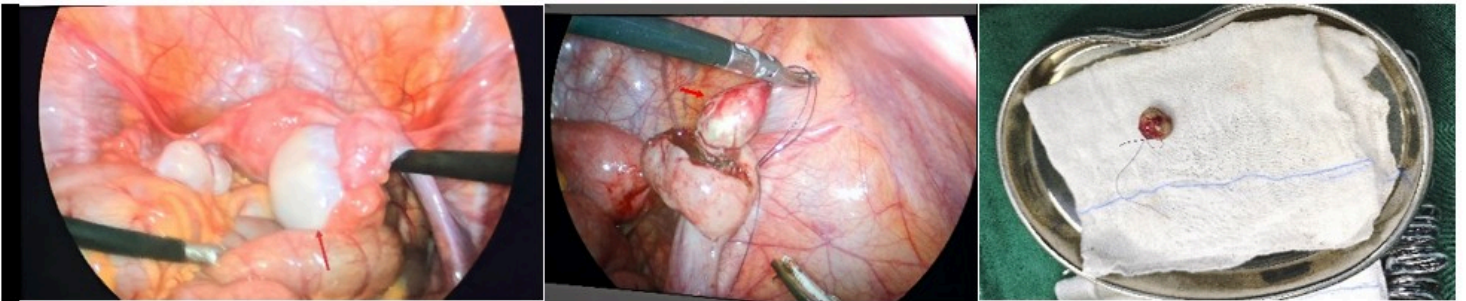


Figure 3

Intraoperative view of the right ovary and the ovarian mass. (a) Enlarged right ovary (arrow); (b) the tumor enucleated from the right ovary (arrow); and (c) the resected tumor specimen.

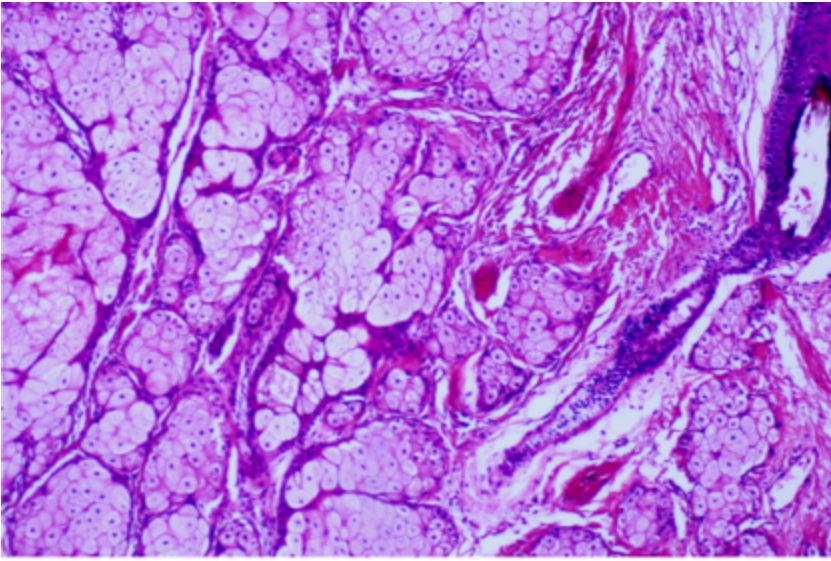


Figure 4

Histopathological examination of the ovarian mature teratoma (H&E staining, ×100).