Recurrent Ovarian Teratoma with Glial Peritoneal Implant Eight Years After Original Surgical Resection


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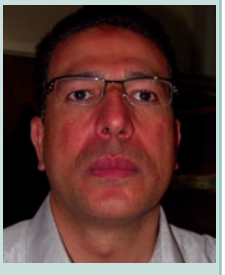
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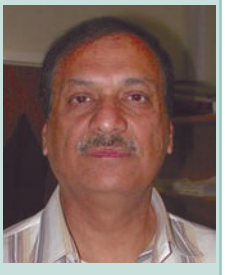
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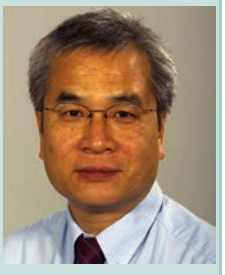
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Abstract

Immature teratomas are largely solid tumours that occur most frequently in the first and second decades. When associated with mature glial implants within the peritoneum, the prognosis is usually good, irrespective of the original tumour grade. However, there is no clear guidance as to how often and for how long these patients should be followed up, and there have been descriptions of cases of mature gliomatosis peritonei that have seemingly evolved into malignant tumours. We present a case of immature ovarian teratoma associated with mature glial peritoneal implants that was treated with surgery alone. The tumour recurred eight years later in the other ovary as a mature teratoma associated with mature glial peritoneal implants.

Introduction

Germ cell tumours constitute ~20% of ovarian neoplasms. Over 90% of these tumours are teratomas, which are derived from the three germ cell layers. While mature teratoma tends to be cystic and behave benignly, immature teratoma (that characteristically contains a mixture of adult/mature and embryonal/immature tissue mainly neuroepithelium) is usually solid and typically malignant [1].

Ovarian immature teratomas usually present in childhood or early adulthood with abdominal or pelvic pain, usually as a consequence of the effect of the tumour mass. This usually leads to investigation by imaging followed by a biopsy to confirm the histological diagnosis. Immatured teratomas may contain yolk-sac elements and secrete alpha-fetoprotein (AFP) and/or beta-HCG (human chorionogonadotrophin), which can be used as a marker of treatment efficacy and the detection of relapse. The treatment of choice for ovarian teratoma is complete surgical resection [1], which allows detailed histological examination regarding its malignant potential. This is may be followed by chemotherapy (either BEP or another platinum-based agent) dependent on the histological diagnosis and the staging [2,3]. Patients can expect 99% overall five-year survival for mature teratoma (92.2% event-free five-year survival) and 95.1% overall five-year survival (85.9% event free five-year survival) for malignant immature teratoma.

Prognosis of immature teratomas are related to size and stage of the tumour. The amount of immature tissue or microscopic grading is related to extraovarian spread [2]. When the teratoma is associated with gliomatosis peritonei (GP), the prognosis is usually better, irrespective of the original tumour grade [3,4]. However, malignant transformation of GP has been reported [1,5-7]. GP is a rare occurrence associated with solid ovarian teratoma, in which nodules composed of glial tissue are studded on the peritoneum, omentum and bowel wall. Although glial implants of GP are metastatic in nature, they occur with both immature and mature ovarian teratomas [8], and the peritoneal implants are mostly mature even when they originate from immature teratomas. Injury to the ovarian solid teratoma capsule may have a role in peritoneal implantation [4]. We report a case of immature ovarian teratoma associated with GP in a 14-year old girl who developed mature solid teratoma in the other ovary associated with GP after eight years of being well and without evidence of peritoneal disease.

Case report

A 14-year old Caucasian girl was seen by the Paediatric Services in Nottingham in December 2002, complaining of a two-week history of abdominal distension and vomiting. Examination revealed a large pelvic mass with mixed solid and cystic components extending 5cm above the umbilicus. Blood tests showed an elevated level of alpha fetoprotein (AFP, 111μg/L; normal level <10μg/L) and the tumour marker CA-125 (840kU/L; normal <60kU/L), whereas β-HCG and CEA were within the normal range. During laparotomy the left ovary had beenreplaced by a 20cm cystic/solid mass. The right ovary had a 1cm plaque of an indeterminate nature and there was no gross peritoneal/omental spread of disease. The patient underwent a left oopherectomy with right ovarian and peritoneal biopsy. Histology of the left ovarian mass showed immature teratoma with a wide variety of elements, including squamous and glandular epithelium, smooth muscle, fat, cartilage and bone. Abundant neural tissue was present, with foci of immature neuroepithelium sufficient to be regarded as a high grade (grade 3) tumour [2]. No yolk sac elements were found. The right ovarian plaque and peritoneal biopsy showed multiple glial microscopic deposits which, although predominantly of low cellularity, contained several foci of increasingly immature cellularity consistent with immature teratoma or gliomatosis peritonei. The consensus of opinion was that these foci were mmature teratoma rather than gliomatosis peritonei alone. Subsequent to surgical excision, the AFP and CA125 fell to the normal level within three weeks and have remained within normal limits to date.

The patient was considered suitable for a, 'watch and wait' programme of active surveillance without adjuvant chemotherapy. This was because the patient's tumour markers resolved to normal levels after the tumour was resected and this, therefore, represented a stage 1 tumour with complete removal of the malignant tissue. She remained under active surveillance for five years until 2007 when she was discharged from clinic.

In July 2010, the patient presented with a history of increasingly irregular periods over the previous nine

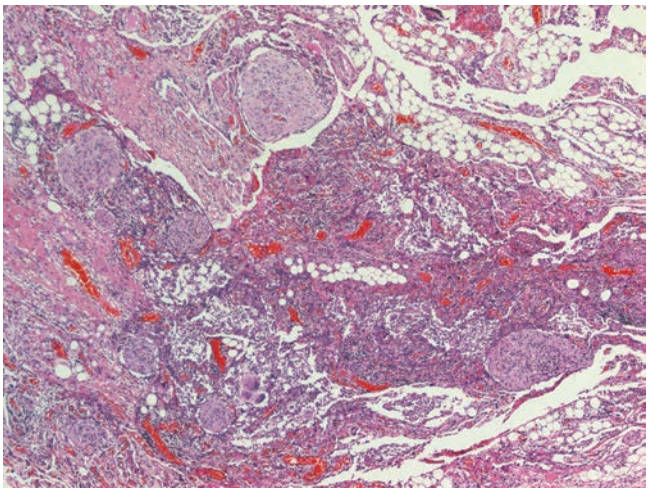

Figure 1: Ovarian immature teratoma with predominance of primitive neuroepithelial elements.

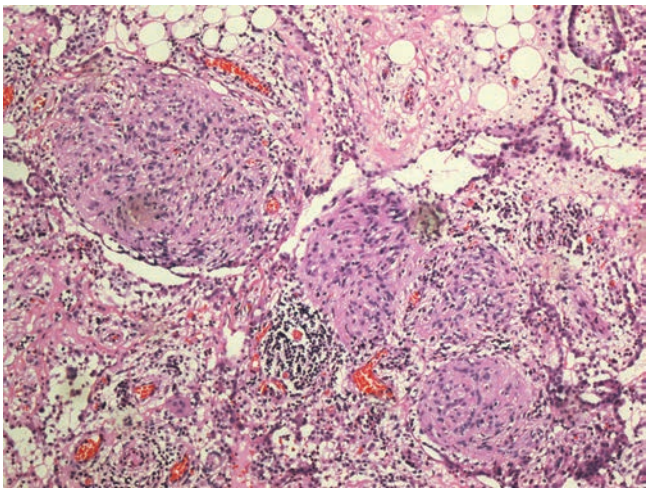

Figure 1B: Peritoneal implant of mature glial tissue secondary to the primary immature ovarian teratoma (Figure 1) and showing no evidence of immature elements, necrosis, nuclear atypia or abnormal mitotic activity. No epithelial elements present.

months associated with a brown vaginal mid-cycle discharge. A 48mm right adnexal complex mass was detected. All germ cell tumour markers remained within the normal limits. A staging CT scan of the chest, abdomen and pelvis confirmed a pelvic mass and located an isolated 2cm diameter serosal deposit on the liver surface. The patient underwent a laparotomy with right ovarian cystectomy and removal of a sub-diaphragmatic mass. Macroscopically, the right ovarian tumour contained hair and had the typical appearance of a mature cystic teratoma. The ovarian tumour had mature respiratory mucosa, skin and skin adnexa, and thyroid tissue with a focus of mature glial tissue. The histology of the sub-diaphragmatic mass also showed adnexal structures and ciliated epithelium. The final recommendation was to continue active monitoring, thus sparing the patient from the possibility of chemotherapy-induced infertility, with regular AFP measurement and yearly CT scans for the first two years. The patient remains well to date with normal menses and has no evidence of further recurrence of her teratoma. CA-125, AFP and β-HCG remain within normal limits.

Discussion

This is an unusual case of second primary mature cystic teratoma in the ovary associated with GP following a grade 3 immature solid teratoma in the other ovary with GP after eight-year history of complete recovery with no evidence of residual peritoneal disease. The patients did not receive chemotherapy, which is known to be associated with maturation of metastatic deposits of immature teratoma (chemotherapeutic retroconversion) [9]. The origin of GP remains controversial and its metastatic nature is widely accepted however, the occurrence of GP in association with mature solid teratomas questions the hypothesis of its metastatic nature. In the current case, GP occurred in association with mature cystic teratoma with the intact capsule. The ovarian teratoma was rich in mature glial tissue, but there was no evidence of peritoneal deposits following removal of the implants associated with initial immature teratoma of the left ovary. The possibility exists that the second mature cystic teratoma is a recurrence of the immature tumour in the other ovary, as supported by the presence of glial implants over the surface of the right ovary with the assumption of maturation of the recurrent teratomatous components of the right ovary. However, the synchronous recurrence of teratoma in the other ovary and glial tissue peritoneal implants in the upper abdomen after this long interval is a remote possibility. Therefore we believe that the diaphragmatic glial implants are most likely to be related to the right ovarian teratoma, despite being mature and cystic, and that the right ovarian teratoma is a second primary tumour rather than a recurrence of the primary tumour. Consistent with our observation, Gocht et al [8] reported the development of a mature teratoma associated with GP nine years following teratoma in the other ovary. However, the initial tumour was amature teratoma not associated with GP. Song et al [10] found that the overall recurrence rate after conservative treatment of mature teratoma was 2.5% after a mean period of eight years.

In our case, the raised AFP tumour marker associated with the first teratoma in 2002 would support the diagnosis of a malignant teratoma. The fact that the marker returned to a normal level after the left oopherectomy would suggest a stage 1a disease or at least the immature elements were contained within the surgically removed ovarian tissue. The adjuvant treatment of immature ovarian teratoma remains controversial, with little evidence to support the use of adjuvant chemotherapy post-surgery. Complete surgical resection gives an overall survival rate of 95.1%; as a result few patients undergo adjuvant chemotherapy, making its efficacy difficult to assess. Worse event-free survival has been noted with incomplete resection, higher stage, non-gonodal tumours, younger age and higher grade, the worse overall survival being noted for those with incomplete resection and higher grade.

Therefore the current recommendation is for close oncological follow-up with repeat AFP measurements to diagnose early relapse. In those who relapse, the decision to treat with adjuvant chemotherapy rests on the histological appearance of the tumour, with high grade immature teratomas most likely to require platinum based chemotherapy. ■

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