Malignant Transformation of Ovarian Dermoid Cyst

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Abstract

Mature teratomas, also known as dermoid cysts, are one of the most common benign ovarian tumours and account for 15 - 53.5% of all ovarian neoplasms. Complications of dermoid cysts include torsion, rupture, infection and more rarely, malignant transformation. Malignant transformation of dermoid cysts occur in only 1 - 2% of cases, with squamous cell carcinoma (SCC) being the most common type of malignant change.

This report describes the case of a 66-year-old patient diagnosed with Stage 1A, Grade III squamous cell carcinoma of a dermoid cyst. It also summarises the available guidance on the use of adjuvant chemotherapy in ovarian cancers and in particular discusses the available evidence from a literature review regarding its role in the treatment of SCC arising from dermoid cysts.

We sit on the precipice of a genetic revolution which may have further beneficial implications for colorectal cancer patients.

Keywords: Ovarian Dermoid Cyst; Mature Cystic Teratoma; Malignant Transformation; Squamous Cell Carcinoma

Abbreviations

SCC: Squamous Cell Carcinoma; NICE: National Institute for Health and Clinical Excellence; RMI: Risk of Malignancy Index

Introduction

Mature teratomas are one of the most common benign ovarian tumours and account for 15 - 53.5% of all ovarian neoplasms [1]. Being a form of germ cell tumour, they contain multiple cell types which originate from one or all of the germ cell layers. These different cell types can differentiate into any mature tissue found within the human body. The most common form of this tumour is the benign, well-differentiated (mature) cystic ‘dermoid’ variety.

The presenting symptoms of a dermoid cyst are usually non-specific and many patients remain asymptomatic, only being diagnosed after an incidental finding on routine examination or intra-operatively. However dermoid cysts can reach a considerable size and cause symptoms such as abdominal fullness, pain and pressure-related urinary and rectal symptoms. Complications of dermoid cysts include torsion, rupture, infection and rarely, malignant transformation which has been reported to occur in 1 - 2% of all cases [1-3].

A pre-operative diagnosis of a dermoid cyst can easily be made by characteristic ultrasound and CT appearances. Malignant change is very difficult to differentiate from uncomplicated tumours on imaging and is often only diagnosed post-operatively after histological examination.

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The risk of malignant change appears to be related to age, with the highest incidence being in the 5th and 6th decades. Squamous cell carcinomas are the most common form of malignant transformation and account for 90 - 97%. It has been suggested that ovarian dermoids, which contain cells that have differentiated into epidermal and respiratory tissues, are the origin of the transition into squamous cell carcinoma [1].

Case Report

A 66-year-old multiparous woman was referred to Gynaecology services with a 4-week history of a dragging sensation, similar to that of prolapse, lower abdominal pain and some abdominal distension.

Clinical examination revealed a central pelvic mass, measuring around 20 cm in size, rising from the pelvis. An ultrasound scan (Figure 1) revealed a 15.4 cm x 10.8 cm x 16.7 cm left sided ovarian cyst containing hyperechoic areas and blood tests revealed a CA125 of 103. This information was compiled to determine the risk of malignancy using the “risk of malignancy 1” (RMI 1) index. Scores greater than or equal to 200 indicate a higher risk of malignancy and further imaging with a staging CT is recommended. This patient had a calculated RMI 1 score of 309 and was therefore considered to be at a higher risk of malignancy.

A CT scan prior to surgery revealed that the mass contained fat/fluid levels and a 4 cm enhancing murally based nodule with calcific foci (Figure 2). There was no evidence of any significant extra-ovarian pathology; however in light of the enhancement of the solid nodule it was difficult to exclude malignant transformation.

Figure 1: Ultrasound scan revealing 15.4 x 10.8 x 16.7 cm ovarian cyst containing hyperechoic areas.

Figure 2: CT showing ovarian mass. Arrows indicate fat/fluid level. A 4 cm calcific nodule is seen at the base.

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The patient underwent laparotomy, hysterectomy, bilateral salpingo-oophorectomy, peritoneal washings and omental biopsy.

Intra-operatively it was noted that the cyst was multiloculate with a smooth surface, although there was a deposit on the surface. The main other abnormality was a suspicious appearing omentum.

On gross examination, the left ovary was enlarged and weighed 1507 g. It was multi-locular and contained yellow fluid, mucus material and hair (Figure 3). It contained a solid component measuring 40 mm x 30 mm x 20 mm which was seen protruding as a nodular area on the surface however, despite this, the capsule was intact.

![Figure 3: Dissected cyst capsule containing hair and solid component.](image)

On histopathological examination the solid component of the cyst showed infiltration by a malignant tumour and showed squamous differentiation ranging from well to poorly differentiated, with foci of keratinisation (Figure 4). At places the tumour also showed focally sebaceous differentiation and necrosis (Figure 5). Lympho-vascular invasion was also present.

![Figure 4: Squamous cell carcinoma invading dermoid cyst with foci of keratinization.](image)
Peritoneal washings were negative and despite a suspicious looking omentum; omental biopsies showed no evidence of malignancy. Her histological diagnosis was ovarian carcinoma FIGO Stage IA, Grade III.

**Discussion**

Currently, when a diagnosis of stage 1 ovarian cancer is made, the decision on whether the use of adjuvant therapy is advisable is dependent on the confidence that the disease has been optimally staged following de-bulking surgery [4]. It has been found that patients who have had optimal surgical staging have a significantly better prognosis than non-optimally staged patients. The Action trial revealed that when treated with adjuvant chemotherapy survival rates increase in non-optimally staged patients, whereas those women who have had optimal surgical staging, do not appear to benefit from having adjuvant chemotherapy [4,5].

The current NICE recommendations, on the use of chemotherapy in suspected early stage ovarian cancer, state that adjuvant chemotherapy should not be offered to women who have had optimal surgical staging and have low-risk stage I disease (grade I or II, stage IA or IB). For women with high-risk stage I disease (grade III or stage IC), adjuvant chemotherapy consisting of six cycles of carboplatin is recommended. Women who have had suboptimal surgical staging, but low risk stage 1 disease, should have a discussion regarding the possible benefits and side effects of adjuvant chemotherapy and a decision should be made on an individual basis [6].

Due to the rarity of squamous cell carcinoma of ovarian dermoid cysts, adjuvant treatment has not yet been prospectively evaluated and there exists no published recommendations for the use of adjuvant chemotherapy in this particular group of ovarian cancers.

From a literature review of isolated case reports and case series it appears that the adjuvant treatment of choice in this particular tumour type is platinum-based chemotherapy, due to its activity in cervical SCC rather than epithelial ovarian cancer [7-12]. Reported survival rates following the use of adjuvant chemotherapy for the management of these malignant dermoid cysts are variable. It is, however, apparent from several case series that there are increased survival rates in the higher tumour stages following adjuvant chemotherapy. Hackethal., et al. reported that regimens with alkylating drugs were associated with increased survival in tumour stages later than 1A [10]. Chen. et al. reported significant difference in survival rates for stage III and IV disease following post op chemotherapy and Tseng., et al. reported a 2-year disease free survival of 69% in stage IIB-IIIC disease after platinum based multi-agent chemotherapy, which is considerably higher than previously reported [8,13].

**Figure 5:** SCC of dermoid cyst demonstrating focally sebaceous differentiation and necrosis.

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For Stage 1A disease it has been proposed that optimal debulking and staging are significant factors in improving survival and that after surgical staging, these patients do not require adjuvant chemotherapy. This is based on reports that for Stage 1 disease survival rates did not differ significantly with or without post-operative adjuvant chemotherapy [8]. Regimens with alkylating drugs were associated with increased survival only in tumour stages greater than 1A [10]. Dos Santos., et al. also reported no known recurrences in stage 1A patients regardless of whether they had adjuvant therapy or not and Tseng., et al. reported a 2 year disease free survival of 100% in stage 1A disease after conservative surgery alone [11, 13].

With regards to the primary surgical management of SCC ovarian dermoid cysts, hysterectomy with bilateral salpingo-oophrectomy and lymphadenectomy are associated with better outcomes, however for younger women with stage 1A disease there is a general consensus that these may be managed less radically [8, 10]. Laparoscopic removal has been reported as successful, however, it is recommended the entire tumour be removed in accordance with onco-surgical treatment principles, as there have been reports of up to 100% of stage 1 tumors which have been ruptured and spilled resulting in upgrading to higher disease [8].

As the histological diagnosis in the case presented in this report was Stage 1 Grade III, a careful MDT discussion took place regarding the role of adjuvant chemotherapy, in view of the grade III disease. Based on the available guidelines and literature, it was decided that there was not enough evidence to support the benefits of adjuvant chemotherapy in this case.

3 years after initial diagnosis and primary de-bulking surgery, without any adjuvant chemotherapy, our patient showed no evidence of recurrence and has subsequently been discharged from Gynaecology services.

Conclusion

Although rare, reports of malignant transformation of dermoid cysts are being increasingly reported. Despite this, the role of adjuvant chemotherapy is still largely unknown for this group of malignant ovarian tumours. From the literature, and the outcome of our own case, it appears that adjuvant chemotherapy in stage 1A disease does not impact on prognosis and that optimal debulking and staging is sufficient management alone. Although the use of chemotherapy has varied results in higher stage disease, overall the literature supports the use of platinum-based chemotherapy agents as adjuvant therapy for disease greater than 1A.

Undertaking

This paper has not been submitted for a concurrent publication, and has not been published before in any other journal.

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