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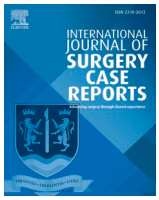

Case report

Rare massive thoracic metastasis of endometrial cancer: Chest wall demolition and reconstruction. A case report

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ABSTRACT

Introduction: Distant recurrences are a major problem after surgical treatment for endometrial carcinoma; metastases to the bone are usually restricted to the axial skeleton, cases of costal localization are few. We present a case of a massive costal metastases successfully treated in our department.
Case presentation: A 60-year-old woman underwent bilateral hysteroannessectomy followed by adjuvant radiotherapy for endometrial adenocarcinoma pT3a FIGO IIIA. Follow-up was uneventful until an occasional chest x-ray was made: a lesion of 7,5 × 5,4 × 5,6 cm in dimension was found at the left sixth rib, compatible with endometrial origin after biopsy. Despite chemo and radiotherapy the lesion incremented in size showing no response to treatment: 20 × 22 × 22 cm. Once she came to our attention, surgical treatment was planned after multidisciplinary discussion: we performed a left ribs V-IX en-block resection with the mass. We restored the chest wall using a biological prothesis in association with 3 titanium rib bars. The chest wall defect was covered with a myocutaneous flap (latissimus dorsi, serratus anterior, pectoralis major and obliquus externus).
Clinical discussion: bone metastases from endometrial carcinoma are reported with a mean diameter of 5 cm; in our report the huge lesion represents a high-risk scenario for post-operative complications. In this setting surgical resection with complex multimodality reconstruction is needed.
Conclusions: This case is characterised by the rare localization and giant dimension of an endometrial metastasis. This report aims to describe the decision-making process, the successful demolition and reconstruction of the chest wall.

1. Introduction

Endometrial cancer is the most common gynaecological tumour in developed countries and its prevalence is increasing [1,2]. Patients' prognosis is optimistic at early stages; in patients with high risk of progression, multimodal treatment should be considered [3,4].

The prognosis in patients with advanced disease is poor with metastasis being the main cause of death [5].

The main pathway for metastatic spread is lymphatic, followed by excoriation and intraperitoneal seeding; less frequently is the hematogenous way. Typical sites of recurrency are pelvic and para-aortic lymph nodes, vagina, peritoneum, and lungs; atypical and less common sites are intra-abdominal organs, bones, brain, abdominal wall, muscle and ribs [6].

Recurrent disease can be treated with cytoreduction surgery, but for unresectable disease the initial therapy will be chemotherapy with carboplatin and paclitaxel. For those with potentially endocrine-sensitive tumours, a progestin-based therapy is appropriate. [7].

In cases of massive chest wall metastases, surgical en-bloc excision is the treatment of choice. Adequate resection margins must be guaranteed to avoid local recurrence. After surgical resection, chest-wall reconstruction is necessary, with the aim of restoring anatomical defects and reducing skeletal instability, paradoxical respiratory motion, respiratory failure, and infection diseases. Currently there are no guidelines that fully describe the indications for chest-wall reconstruction; therefore, there are several surgical procedures that often depend on the knowledge and preferences of the surgeon.

2. Case report

We present a case of a 60 years old woman who underwent bilateral hysteroannessectomy surgery for endometrial adenocarcinoma pT3a;

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FIGO IIIA followed by adjuvant endocavitary radiotherapy (RT).

The patient refused adjuvant chemotherapy treatment proposed after multi-disciplinary team (MDT) evaluation. The three-years follow-up was uneventful until a chest X-Ray was made due to chest pain: a mass of 7,5 × 5,4 × 5,6 cm in size was found at the level of left sixth costal arch and confirmed by computed tomography (CT).

A biopsy was performed and the lesion was compatible with endometrial origin. After a new MDT evaluation chemo-immunotherapy with Carboplatin and Taxol was performed. Unfortunately there was no response and after 4 cycles the disease was in evident progression affecting the ribs from the fifth to the eighth, with maximum dimensions of 17 × 17 cm and in close relationship with the pericardium and spleen. It also determined compressive atelectasis of the contiguous lung parenchyma without evident infiltration.

The patient was followed by another institute and only at this moment the patient came to our MDT attention and surgical indication was confirmed (Fig. 1A, B).

Before surgery, the patient underwent an updating CT scan: the dimension of the lesion increased with maximum dimension of 20 × 21 × 22 cm (Fig. 2A, B, C).

3. Surgical act

Patient in right lateral decubitus, the skin incision was made circularly to the mass. The plans were carefully dissected until the rib level was reached. The anterior and posterior arches of the infiltrated ribs from the fifth to the tenth rib were cut transversely to allow an adequate resection margin.

A double wedge resection was performed at the level of the upper lobe and the left lower lobe because of its infiltration.

The diaphragm was also connected to the mass in a centimetric part, a small resection was performed. The surgical piece was removed en-bloc from the skin to the rib level and the diaphragm without damaging the mass. A biological prosthesis of acellular porcine dermis (Permacol™) was used to restore the thoracic cavity. Three titanium rib bar and a titanium mesh were used to restore the integrity and rigidity of the ribcage (STRATOS™ system).

Soft tissues reconstruction was carried out in collaboration with the plastic surgeons. A muscle flap was created from the latissimus dorsi, the serratus anterior, the pectoralis major and the obliquus externus in order to create a multi-layered covering to close the fracture. A skin flap was used to close the wound (Fig. 3). The patient had an uneventful post-operative course and completely regained upper limb function and proper respiratory movements (Fig. 1C).

4. Discussion

Local and distant recurrences continue to be a major problem in high-risk patients after surgical treatment of primary endometrial carcinoma [8]. The median time of recurrence is 2–3 years and 75–80 % of recurrences are extra-pelvic. 64 % of recurrences occur within 2 years and 87 % of all recurrences occur by the third year after primary treatment [9].

For FIGO stage IV disease, 5-year overall survival is 19–26 %. 5-year disease-free survival is estimated at 60–70 % in those with pelvic lymph node metastasis, and 30–40 % in those with para-aortic lymph node metastasis [1,10].

Endometrial metastases to the bone are generally restricted to the axial skeleton, including the pelvis and thoracolumbar vertebrae [11].

Clinical series about bone metastasis and their treatment are very few: 13 bone metastasis (0.8 %) in a series of 1632 cases were reported by Uccella et al. from the Mayo Clinic [12]; in an autopsy study done by Abdul-Karim et al. [13], however, it is reported that bone metastases were present in at least 25 % of subclinical cases.

There is still not consensus in the optimal treatment of distant metastases but in the case of chest-wall metastases, surgical resection should prolong the overall survival and improve the quality of life [11].

Our patient presented a massive costal metastasis resulted infiltrating the lung and the diaphragm. Necrotic and colliqued material was present inside the lesion.

The tumour has been removed en-bloc with a skin incision on the site of the previous biopsy, with at least 3-cm free margin on the affected ribs proximally and distally, confirmed by the histologic result.

While the mean diameter of the reported cases of bone metastases in the literature was 5 cm, this lesion was found to be 20 × 21 × 22 cm.

In this scenario, surgical resection of chest-wall tumours with possible prosthetic reconstruction is a primary treatment; currently there are no guidelines or consensus that fully describes the indications for chest-wall reconstruction. According to Gonfiotti et al. [15] indications for reconstruction could be: chest-wall defects larger than 5 cm in diameter or total area $> 100\ cm^2$; removing >3 ribs from the anterior chest wall; removing >4 ribs from the posterior chest wall.

It is important to carefully plan the surgery involving other professionals in the MDT discussion like plastic and reconstructive surgeons and anaesthesiologists due to the necessity of using musculocutaneous flaps to complete the reconstruction and because of the effects on respiratory mechanics due to deep demolition of the chest wall. There are multiple materials available for chest wall reconstruction and stabilization such as synthetic materials, alloplastic, and biologic materials. According to Azoury et al. [16] in the case of small defects (<5 cm or < 2 ribs resected), it is enough to use muscle flap or soft-tissue coverage alone; if the portion to be repaired is bigger (>5 cm; >2 resected ribs or > 10 cm back), it is possible to use synthetic mesh with soft tissue or muscle flap.

We used a biologic prosthetic tissue: decellularized porcine dermis materials have demonstrated effective in surgical applications, it promotes recellularization as the material represents an optimal scaffold for supporting an excellent fibroblast infiltration and collagen production. It is so gradually revascularized and integrated into autologous tissue; finally, it is more resistant to infections [17–19].

Fig. 1. A: Dimension of the lesion before surgery. B: The size of the lesion does not allow proper function of the upper limb. C: Post-surgical back image.

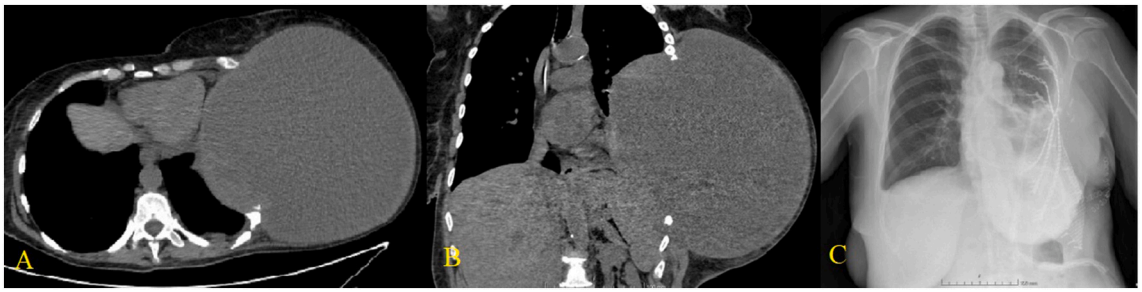

Fig. 2. A: Updating CT scan before surgery axial plane. B: Updating CT scan sagittal plane of the lesion. C: Post-surgery chest x-ray.

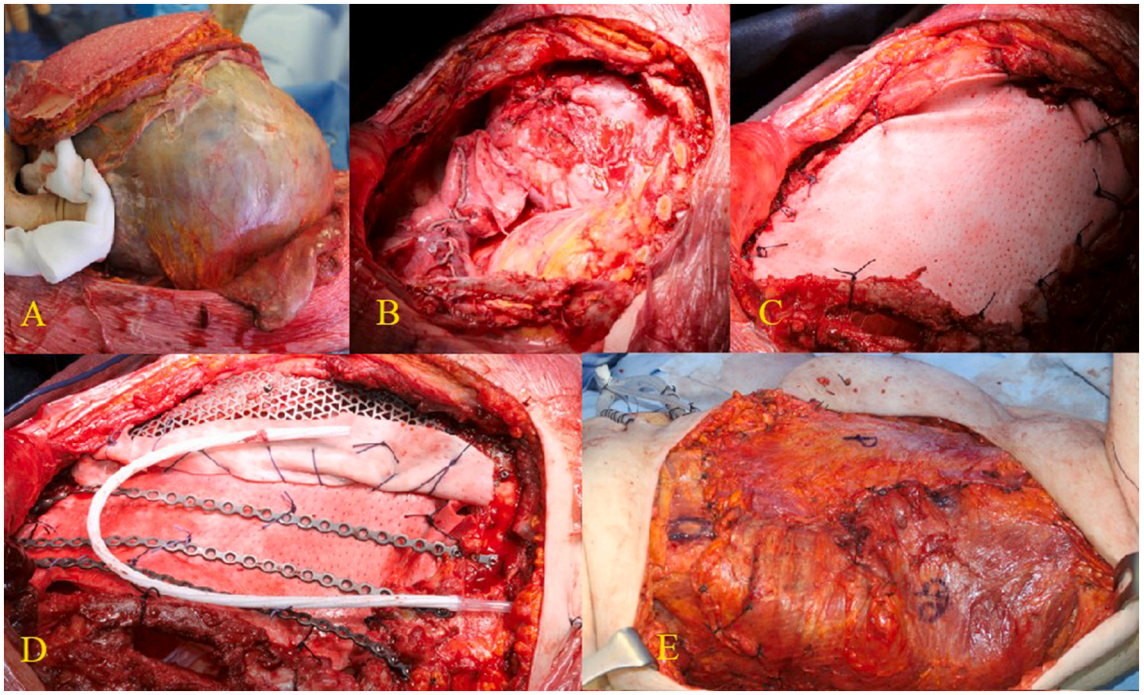

Fig. 3. A: En-bloc excision of the mass. B: Chest wall breccia after the demolition. C: Biological prosthesis anchored to the costal abutments in detached points of Vicryl 2.0. D: Biological prothesis, three titanium rib bars, titanium net and the 14ch drainage. E: Muscle flap made by the plastic and reconstructive surgeons (P: grand pectoralis; G: grand dorsalis; S: serratus; O: external oblique).

We decided to restore the structural integrity of the ribcage using titanium bars and mesh. The osteosynthesis systems are titanium-based, a prosthetic material highly biocompatible, inert, and magnetic resonance compatible. The strong but flexible titanium plate offers several advantages: the curved profile of the plate acts as a continuity of ribs in a physiological way and maintains the respiratory movement [20]. The work has been reported in line with the SCARE criteria [21].

5. Conclusions

Chest wall localization of endometrial metastases is extremely rare and only a few case series have been described. Even more, the mean reported size is usually centimetric (on average 5 cm). This huge lesion occurred in an atypical challenging site and came to our attention late after diagnosis.

A careful and properly planning of the demolitive and reconstructive intervention was possible only after a MDT discussion and pre-operative planning, involving anaesthesiologist, plastic surgeon, physiotherapist and oncologists.

The postoperative course was uneventful and the patient could gradually recover motility of the upper limb with a progressive return to her normal life.

CRediT authorship contribution statement

Antonio Burlone and Simone Tombelli contributed to the study concept, acquisition and interpretation of data. Antonio Burlone and Simone Tombelli wrote the paper. Domenico Viggiano, Sara Borgianni and Alessandro Gonfiotti revising it critically for important content. All authors contributed to manuscript revision, read, and approved the submitted version.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

This article does not contain any study with human participants or animals performed by any of the authors. Our institutional review board granted approval and waived the requirement for specific informed consent for this case report.

Guarantor

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Declaration of competing interest

The author declares that he has no relevant or material financial interests that relate to the research described in this paper. No conflicts of interest were shown.

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