



Case report

Treatment of cervical cancer metastatic to the abdominal wall with reconstruction using a composite myocutaneous flap: A case report

Dalia Khalife^a, Alaa El Housheimi^a, Ali Khalil^b, Salim C. Saba^c, Muhieddine Seoud^b, Rayan Rammal^d, Ibrahim Elias Abdallah^e, Reem Abdallah^{b,*}

^a Department of Obstetrics and Gynecology, American University of Beirut Medical Center, Lebanon

^b Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, American University of Beirut Medical Center, Lebanon

^c Division of Plastic and Reconstructive Surgery, Department of Surgery, American University of Beirut Medical Center, Lebanon

^d Department of Pathology, American University of Beirut Medical Center, Lebanon

^e Faculty of Medicine, American University of Beirut Medical Center, Lebanon



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ABSTRACT

A 43-year-old woman treated with radical hysterectomy 1 year ago for cervical cancer presented with a suprapubic abdominal mass. A 15 cm necrotic mass from the abdominal wall along with 2 small bowel loops and the dome of the bladder were resected. The peritoneal defect was reconstructed with a pedicled anterolateral thigh and Vastus Lateralis muscle composite flap. Pathology showed invasive non-keratinizing moderately differentiated squamous cell carcinoma, consistent with metastatic cervical cancer, involving urinary bladder, bowel and soft tissue. With advancement in reconstructive surgery, extensive resection with defect closure in properly selected cases of metastatic cervical cancer to the abdominal wall may be considered in an attempt at improving quality of life and overall survival.

1. Introduction

Cervical cancer is the most common cancer in developing countries. Squamous cell carcinoma of the cervix (SCC) accounts for around 75 to 85% of the cases (Yousefi et al., 2006; Moshkovich et al., 2015). Despite early detection, invasive diseases are still occurring. It is associated with multiple risk factors including multiple sexual partners, immunosuppression, smoking, early age at first intercourse and HPV infection (Mayer and Carlson, 2010). The association with oral contraceptive use is inconsistent, with some studies showing a significantly increased risk among ever users, whereas in others this association was only mild or non-significant, nonetheless the majority concur that the risk increases with the duration of use and declines after cessation (Roura et al., 2016; Gierisch et al., 2013; International Collaboration of Epidemiological Studies of Cervical Cancer et al., 2007; Hannaford et al., 2007; Smith et al., 2003).

Cervical cancer spreads locally via lymphatics during the early stages, and infrequently via blood to the lungs, bone and liver (Nagarsheth et al., 2000). Postoperative recurrent cervical cancer tends to recur in the pelvis (parametrium, lymph nodes) and vagina (Arora et al., 2014). Cutaneous metastasis from cervical carcinoma is rare with

a reported incidence of 0.1 to 2% (Copas et al., 1995). It carries a very poor prognosis with a survival rate ranging from 1 week to 7 months (Franciolini et al., 1990). Metastasis to skin is mostly seen in breast cancer, followed by carcinoma of large bowel, melanoma and ovarian cancer (Hayes and Berry, 1992). Furthermore, abdominal wall metastasis to trocar sites has been described after laparoscopic surgeries for ovarian and endometrial cancer, but it is rare in squamous cell carcinoma of the cervix (Naumann and Spencer, 1997).

We describe the case of a 43-year-old woman with a primary cervical cancer metastatic to the abdominal wall. The present case was challenging since the removal of the lesion has resulted in a large soft tissue defect. However, a successful rotational flap using a well vascularized tissue was possible in the treatment of this case.

2. Case report

This is a case report of a 43-year-old woman who was diagnosed with stage IB2 SCC of the cervix in September 2015. A radical hysterectomy, with bilateral salpingo-oophorectomy and pelvic lymph node dissection was performed at a different institution. The patient did not receive any adjuvant treatment, although she is considered at

* Corresponding author at: Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, American University of Beirut Medical Center, Lebanon.

E-mail addresses: dk41@aub.edu.lb (D. Khalife), alaahusheimi@gmail.com (A. El Housheimi), ak27@aub.edu.lb (A. Khalil), ss192@aub.edu.lb (S.C. Saba), mike@aub.edu.lb (M. Seoud), rr52@aub.edu.lb (R. Rammal), iea00@mail.aub.edu (I.E. Abdallah), ra102@aub.edu.lb (R. Abdallah).

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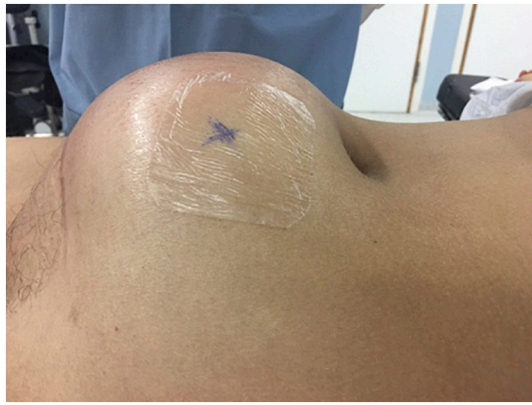


Fig. 1. Abdominal mass at the time of surgery.



Fig. 2. Reconstruction using myocutaneous flaps.



Fig. 3. Flaps at the end of surgery.

intermediate risk by Sedlis criteria (size of 4 cm and deep stromal invasion). Fifteen months later, she presented to the gynecologic oncology clinic at the American University of Beirut Medical Center with a painful suprapubic rapidly growing mass (Fig. 1). Abdominal examination revealed a tender fixed 15 cm mass reaching the umbilicus. Pelvic and rectovaginal examination were all normal. MRI of pelvis showed a $13 \times 11 \times 9$ cm mass involving the anterior abdominal wall, adherent to the dome of the bladder and to small bowel with enlarged right pelvic lymph nodes. Fine needle aspiration of the mass revealed necrotic tissue on two occasions. PET/CT scan showed a hypermetabolic abdominal wall mass, non-hypermetabolic enlarged right pelvic lymph node with no evidence of intra-abdominal or distant metastases. After a multidisciplinary discussion, decision was for surgical resection. Intra-operatively, the mass was involving the full-thickness of the anterior abdominal wall, extending to the pelvis, adherent to the bladder and bowel. The mass was removed en bloc, with removal of the rectus abdominis muscles, 2 segments of small bowel and a portion of the bladder (Supplementary Fig. 1). In addition, right pelvic lymph node debulking and appendectomy were performed. The resultant infra-umbilical abdominal wall defect measured 20×15 cm. It was reconstructed with a pedicled anterolateral thigh and Vastus Lateralis muscle composite flap (Fig. 2). The flap dissection was carried out in standard fashion based on the descending branch of the lateral femoral circumflex artery, and brought into the defect through a tunnel created below the rectus femoralis and then subcutaneously through the right inguinal region (Fig. 3). The flap was passed completely underneath the Rectus femoris muscle, so that it was entirely delivered into the abdominal wall defect above the inguinal ligament. De-epithelialization of the distal two thirds of the flap (located on the proximal aspect of the abdominal wall defect) was performed such that once the flap was

rotated into the defect, the de-epithelialized portion was buried underneath the skin of the proximal two thirds of the defect. The abdominal wall fascia was sutured to the tensor fasciae latae (TFL) which was harvested with the composite flap on one side of the defect, and to the Vastus Lateralis muscle fascia on the other side. A schematic drawing of the flap, the blood supply and the tunneling is available in the supplementary document of the Manuscript. (Supplementary Figs. 1–3, 5 and 6).

The patient received two units of packed red blood cells intra-operatively. The postoperative period was uneventful. The patient was then referred to medical oncology for adjuvant treatment. Adjuvant treatment was delayed for 3 months to allow for complete healing after further postoperative de-epithelialization of the rest of skin flap because of venous congestion. She received 6 cycles of Carboplatin, Paclitaxel and Bevacizumab over 4.5 months. The plan was to proceed with radiation therapy, however the patient was lost to follow up for 4 months. Her clinical exam and a CT scan at that time were negative, and decision was to proceed with radiation therapy. She was again lost to follow up for 6 weeks, when she presented with hematuria and a 5 cm mass in the left pelvis. PET/CT revealed a hypermetabolic 5 cm mass in the left pelvis invading into the bladder. After multidisciplinary discussion, concurrent chemo radiation was recommended, which she is currently receiving at another institution. Written informed consent has been provided by the patient for publication of the case details. Institutional approval was not required to publish this Case Report.

3. Pathological features

A frozen section was sent at the time of the surgery and gross examination revealed a large cystic necrotic mass $8 \times 8 \times 7.5$ cm, 4 cm below the skin with viable tumor along the periphery. The margins appeared clear. The weight of the mass was 1.2 kg.

Microscopic examination reveals a tumor involving urinary bladder, bowel, soft tissue and one of ten right pelvic lymph nodes. The tumor is arranged in solid nests which are composed of tumor cells with high nuclear-to-cytoplasmic ratio, dense eosinophilic cytoplasm, significant nuclear pleomorphism and frequent mitotic activity. No keratinization was noted. The malignant cells stain positively for CK5/6 and p40 confirming their squamous differentiation. Positivity for p16 immunohistochemical stain further supports HPV-induced uterine cervical carcinoma. (Supplementary Fig. 4).

4. Discussion

Squamous cell carcinoma of the cervix accounts for 75 to 85% of invasive cervical cancer (Yousefi et al., 2006; Moshkovich et al., 2015).

The incidence of cutaneous metastasis ranges from 0.1 to 1.3% (Naumann and Spencer, 1997). However, the rate of metastasis is higher in patients with adenocarcinoma (5.8%) than with squamous cell carcinoma (0.9%) (Imachi et al., 1993). Many mechanisms were proposed for the cutaneous metastasis. One theory deals with the disrupted lymphatic vessels due to the pelvic lymph node dissection and the retrograde spread of tumor (Srivastava et al., 2005). Another theory links the cutaneous metastasis to radiotherapy, which causes endothelial cell damage, leading to tumor cell trapping in the abdominal wall (Bachaud et al., 1990). Recurrence in the scar of the previous tumor resection, which is thought to result from the interaction of microscopic residual cancer with the surgical wound, is another proposed mechanism (Höckel and Dornhoefer, 2005). The metastatic lesion in our patient was not limited to the skin layer, but was also involving the full thickness of the abdominal wall and extending to the internal organs and invading the small bowel, the bladder, and the right pelvic lymph nodes, which suggests an in situ recurrence arising from a possible residual disease due to a non-R0 resection in the previous surgery (Höckel and Dornhoefer, 2005), the lesion can then spread cranially and involve the internal organs and the abdominal wall. This first recurrence might have been avoided had the patient been managed properly with adjuvant chemoradiation given the histological findings. Furthermore, a proper follow up after her first surgery could have led to an earlier discovery of the abdominal wall metastasis with a much smaller mass, a less aggressive procedure, a shorter recovery period postoperatively, and naturally a shorter delay of the chemoradiation.

The prognosis in cutaneous metastasis is generally poor and is inversely proportional to the time interval between initial diagnoses and metastasis (Marwah et al., 2015). Nonetheless, prolonged survival has been reported (Copas et al., 1995). However, the paucity of cases of isolated abdominal wall metastasis like the one we are reporting makes it harder to assume a certain prognosis. The treatment of cutaneous metastasis usually includes a platinum-based chemotherapy, and/or radiotherapy (Arora et al., 2014). In our case, we chose to do upfront debulking surgery followed by combined chemoradiation. Our decision was actually backed by two important facts: 1) the patient presented with an isolated abdominal wall lesion with no distant metastasis, in contrast with the disseminated cutaneous metastatic lesions in the trunk and extremities that were described in many case reports in the literature (Basu and Mukherjee, 2013; Benoulaid et al., 2016; Jindal et al., 2018); 2) the patient had no previous radiation therapy to the lower abdomen or groin area. These 2 factors made an upfront debulking surgery more feasible.

After our surgery, the patient was at high risk despite the negative margins because of the large size of the tumor and involvement of adjacent organs and pelvic lymph nodes, and thus chemotherapy followed by local radiation was recommended, despite the lack of strong evidence that this practice would decrease the risk of recurrence or improve survival in this setting. However, the patient was not fully compliant with the plan of care, and the lack of proper follow-up might have contributed to the second recurrence after only 12 months, which was also discovered at a relatively advanced stage.

Two similar cases of abdominal wall metastasis were previously reported where the abdominal lesion was resected for palliation followed by reconstruction with various muscular flaps (Neven et al., 1993; Boos et al., 2014).

Neven et al. describe a small abdominal wall recurrence 8 months after Wertheim's hysterectomy and adjuvant radiation for a stage IB poorly differentiated adenosquamous carcinoma of the cervix. The patient initially received platinum-based chemotherapy. She also had a pulmonary nodule that was treated with 5-fluorouracil. The abdominal wall mass however grew in size and was then surgically excised for palliation following poor response to radiation. Our patient had a recurrence fifteen month following radical hysterectomy at another hospital.

Although Boos et al. reported a cutaneous abdominal wall

metastasis from a more advanced cervical cancer (stage IIB versus IB in our patient), the mass in our patient was far more aggressive, involving the small bowel, the bladder, and the right pelvic lymph nodes. In Boos's case, the abdominal wall muscles were preserved and a free Latissimus Dorsi muscle flap was an appropriate choice to cover the abdominal wall defect. In our case, the patient had a full thickness abdominal wall defect at the end of the debulking surgery, which meant a flap with more muscle volume was needed to reconstruct the abdominal wall, restore its structural integrity and prevent future hernias (Harpf et al., 1997; Neligan and Buck II, 2014). Therefore, a pedicled anterolateral thigh and Vastus Lateralis muscle composite Flap seemed to be the best choice. The muscle flap was also feasible due to the fact that the abdominal area had never been radiated preoperatively.

The anterolateral thigh flap was first introduced in 1984 by Song et al. (Song et al., 1984). It was used for skin reconstruction in several body parts, from the face to the trunk and the extremities (Zhou et al., 1991). The pedicled vastus lateralis-antrolateral thigh flap proved to be very useful in reconstructing abdominal wall defects with large muscle defect due to the long pedicle length, the large muscle volume of the flap, large vessel diameter and minor donor site morbidity and fast rehabilitation after surgery (Spyriounis and Lutz, 2008; Fukui et al., 2016). Passing the flap underneath the rectus femoris muscle will help achieve additional length of pedicle and cover a large abdominal defect (Tinj et al., 2010).

In conclusion, abdominal wall metastasis from cervical cancer is rare. It is generally treated with radiation therapy and chemotherapy since extensive surgery is challenging, necessitating multidisciplinary approach. However, with advancement in plastic surgery, extensive resection with defect closure seems to be a reasonable option in adequately selected cases in an attempt at achieving a better quality of life and hopefully a prolongation of survival. However, no strong recommendations can be made because of the extreme rarity of this condition.

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Disclosure

None.

Authors' contribution

DK and RA were the principal investigators and contributed in writing the full manuscript. SS, AK, AH, IA and MS revised the final manuscript. RR was responsible of writing the pathology section with revision of the final manuscript.

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