Case Report

Port-site metastasis following robotic-assisted radical hysterectomy for squamous cell cervical cancer

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Case report

The patient presented as a 35 year old G1P1 with irregular vaginal bleeding. She was noted to have a friable cervical mass. She was diagnosed with stage 1B2 squamous cell cervical cancer. Preoperatively, the patient had a CT of the abdomen and pelvis that demonstrated a cervical mass measuring 6.0 × 7.6 cm as well as pelvic and paraaortic lymphadenopathy. After counseling on various options the patient underwent a robotic-assisted laparoscopic radical hysterectomy, bilateral salpingectomy, bilateral pelvic and para-aortic lymph node dissection, and bilateral ovarian transposition. The patient had a BMI of 38 and no history of prior abdominal surgery. An exam under anesthesia confirmed a seven to eight cm cervical mass. Five ports were placed without difficulty (see Fig. 1); none of the ports required replacement during the procedure. The fascia of the 12 mm ports was closed with the assistance of an Endoclose device. The skin of all port sites was closed using 4-0 Vicryl. There was no evidence of intraperitoneal disease at the time of surgery. A pelvic washing was not performed. The operative time after docking was 5 h and 44 min. The uterus, cervix, and fallopian tubes were removed through the colpotomy. The lymph nodes were also removed through the colpotomy after being placed in three separate Endocatch bags. Intraabdominal irrigation with sterile water was utilized at the end of the procedure. Estimated blood loss was 300 ml. The patient did not require blood transfusion and was discharged home less than 24 h after the completion of the procedure. Her final pathology report revealed poorly differentiated invasive squamous cell carcinoma without lymphovascular space invasion with negative lymph nodes. The specimen contained an 8.5 × 6.5 × 5.5 cm fungating cervical mass as well as 5 parametrial, 15 pelvic, and 6 paraaortic lymph nodes which were all negative for metastatic disease. Invasion of the upper third of the vagina was noted. All margins were negative, with the closest being 7 mm at the anterior vaginal margin. She received chemosensitization with cisplatin and whole pelvic radiation beginning approximately 6 weeks after this procedure. The patient subsequently presented with abdominal pain and an abdominal wall mass located at the umbilicus approximately 5 months after her surgery. Imaging demonstrated a mass measuring 10.5 × 7.5 × 10.4 cm crossing the midline and extending into the pelvis. A PET scan confirmed likelihood of malignancy of this mass and also suggested central necrosis. This imaging study also demonstrated a suspicious right pelvic lymph node. She underwent excision of this mass (see Fig. 2), measuring approximately 15 cm, with abdominal wall reconstruction with mesh. The mass involved the rectus fascia, rectus...
muscles and had an intraperitoneal component. During abdominal exploration a suspicious 3–4 cm right sided lymph node seen on PET scan was also resected. A bilateral oophorectomy was also performed. Pathology evaluation of the abdominal wall specimen revealed moderately differentiated squamous cell carcinoma with negative margins (see Fig. 3); the lymph node was also described as a moderately differentiated squamous cell carcinoma and noted to have extranodal extension.

Discussion

Many theories exist regarding the development of port-site metastases in laparoscopic surgery for gynecologic malignancies. Healing tissue is known to enhance and accelerate tumor growth (Kadar, 1997), perhaps through regulation of vascular endothelial growth factor (VEGF) by means of hypoxia induced expression of interleukin-8 (IL-8) (Martinez-Palones, 2005). It has also been proposed that smaller incisions support tumor growth better than larger ones (Kadar, 1997). With regard specifically to laparoscopy, it is thought that there may be an increase in tumor cells at the port sites caused by leakage of carbon dioxide gas along the trocars, a phenomenon referred to as the “chimney effect” (Yenen et al., 2009). This theory has not been supported by studies involving gasless laparoscopy, as there was no decrease in port site metastases when laparoscopy was performed with a mechanical abdominal wall elevator rather than with gas insufflation (Iwanaka et al., 1998). It is also theorized that introduction and removal of laparoscopic instruments and ports lead to port-site metastases through direct inoculation of tumor cells to the site (Nagarsheth et al., 2004). Tumor spread to port-sites may occur through direct contact of the sites with the removed specimens (Nagarsheth et al., 2004).

Laparoscopic port-site metastases in gynecologic cancers tend to occur in the setting of additional disease recurrence (Zivanovic et al., 2008). Presence of intraperitoneal disease at the time of laparoscopy for cervical cancer may be a risk factor for port-site metastases (Martinez-Palones, 2005). In one study, whose primary focus was ovarian and primary peritoneal carcinoma, presence of ascites conferred a significantly increased risk of port-site metastases; no cases of port-site metastases were noted in patients who did not have ascites in this study (Nagarsheth et al., 2004). Another study suggested that including the port-sites in the radiation field resulted in a lower rate of port-site metastases in gynecologic cancers in general (Kadar, 1997). With regard to prognosis, it has been noted that a shorter interval from original laparoscopy to port-site recurrence is associated with a worse prognosis. Specifically, port-site recurrence less than 7 months from the original surgery for any gynecologic cancer has been shown to significantly shorten overall survival when compared to port-site recurrence at or greater than 7 months from the original surgery (Zivanovic et al., 2008). It is believed that port-site metastases should be viewed as advanced disease rather than as an isolated recurrence (Zivanovic et al., 2008).

Robotic-assisted laparoscopic surgeries are being performed with increased frequency for gynecologic malignancies. The rate of port-site metastases in such cases is unknown as few reports exist. One case of port-site metastasis following a robotic-assisted laparoscopic radical hysterectomy with bilateral pelvic lymph node dissection for a cervical adenocarcinoma has been described (Sert, 2010). To our knowledge, this is the first case of port-site metastasis following a robotic-assisted laparoscopic radical hysterectomy with pelvic and para-aortic lymph node dissection for a squamous cervical carcinoma. The recurrence was treated approximately 6.5 months after the original surgery. At the time of her original surgery, the patient had no evidence of intraperitoneal disease, ascites, or positive lymph nodes. The size of the patient’s tumor, depth of invasion, and close vaginal margin did put her at an increased risk of local, regional or distant recurrence. It remains unknown whether these characteristics also put patients at an increased risk of port site metastases.

It has been suggested that fascial closure of all laparoscopic port sites greater than 5 mm may reduce the risk of port site metastases (Zivanovic et al., 2008). The peritoneum and fascia were only closed

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Fig. 1. Diagrammatic representation of port placement.

Fig. 2. Gross appearance of abdominal wall lesion.

Fig. 3. Microscopic appearance of abdominal wall lesion.
on the two 12 mm port sites in this case. This patient's recurrence occurred at one of those 12 mm port sites which was closed. It has also been suggested that a reduction in risk of port site metastases may be seen if the port sites are in an adjuvant radiation field (Kadar, 1997). Our patient's recurrence occurred outside the radiation treatment field. Intentional placement of ports within an anticipated adjuvant radiation field might be a reasonable strategy to reduce recurrence risk for those patients in whose postoperative adjuvant radiation seems likely. Other suggested strategies to reduce the risk of port site recurrence include resection of the lesion en bloc, placement of the specimen in a retrieval bag, irrigation of the peritoneal cavity, slow deflation of the pneumoperitoneum, and irrigation of port site wounds with povidone–iodine (Tjalma, 2003). Some of these strategies were utilized in this case and some were not. It is difficult to determine with any degree of certainty whether this recurrence could have been delayed or prevented altogether if they had been utilized. The patient's survival from time of original surgery was approximately 14 months. This case supports prior data which demonstrated a decrease in overall survival for patients with port-site metastases detected less than 7 months after the original surgery. This case also illustrates the risk of port-site metastases in robotic-assisted laparoscopic surgery for squamous cell cervical carcinoma despite negative lymph nodes and negative margins and in the absence of intraperitoneal disease.

Conflict of interest statement
The authors have no conflict of interest to report.

References