

## Case Report

# Port-site recurrence in a patient undergoing robotic hysterectomy and lymph node dissection for endometrioid adenocarcinoma of the uterus <sup>☆</sup>

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## Introduction

The use of minimally invasive surgery has been incorporated into the surgical management of gynecologic malignancies. The benefits associated with minimally invasive surgery in gynecologic oncology include shorter hospitalization, increased patient satisfaction, and decreased blood loss and postoperative infections. The introduction of robotic surgical systems has provided improved visualization and precision allowing the performance of more complicated procedures. The possibility of recurrent disease at the port site after minimally invasive surgery for gynecologic malignancy has been well documented in the literature (Childers et al., 1994). There have been reports of ovarian adenocarcinomas, squamous cell cervical carcinomas and uterine adenocarcinomas metastasizing to the laparoscopy ports and the incidence of port site metastasis after laparoscopy is about 1% which is comparable to the risk of metastases to drain sites and surgical incisions post-laparotomy. The data on port site recurrence after robotic surgery are limited. Recently, a case of port site recurrence after robotic hysterectomy and staging for uterine papillary serous carcinoma was reported (Rauff and S.Ng, 2012). Here we report the first case of port site recurrence after robotic hysterectomy and lymph node dissection for endometrioid adenocarcinoma of endometrioid histology.

## Case

A 72-year old, multiparous woman presented with a history of postmenopausal bleeding for one year. Clinical examination revealed a

12 week size uterus and no adnexal masses. Two firm vaginal lesions measuring 1 cm each were noted at the vaginal fornix, in the 3 and 9 o'clock positions. A third similar lesion was noted in the lower third of the vagina in the 7 o'clock position. An endometrial biopsy showed a FIGO grade I endometrioid adenocarcinoma in a background of complex hyperplasia with atypia. CT abdomen and pelvis showed no evidence of extrauterine disease or lymphadenopathy. The patient was taken to the operating room for a robot-assisted laparoscopic hysterectomy with bilateral salpingo-oophorectomy, pelvic and paraaortic lymphadenectomy and excision of the lesion at the lower third of the vagina. A V-care uterine manipulator was placed. The da Vinci® surgical system (Intuitive Surgical) with 3 arms was used. A 12 mm supra-umbilical camera port and two 8 mm instrument ports were placed 10 cm lateral to the umbilicus and a 12 mm assistant port was placed at the right upper quadrant.

CO<sub>2</sub> pneumoperitoneum of 15 mmHg was maintained throughout the procedure. The first specimen included the uterus, fallopian tubes and ovaries and was removed intact through the vagina. The lymph nodes were removed through the assistant port. Specimen bags were not used. The operative time was 2.5 h and the estimated blood loss was 50 cm<sup>3</sup>. The final pathology was that of endometrioid type adenocarcinoma, FIGO Grade III (Fig. 1). The tumor size was 13 cm and the depth of invasion was 2 of 2.1 cm of myometrium (98%). No lymphovascular invasion was seen. The vaginal lesion was positive for metastatic endometrioid adenocarcinoma. Lymph nodes were negative.

The patient was assigned a FIGO (2009) stage IIIB (Creasman, 2009).

The postoperative treatment plan included whole pelvis radiation and interstitial brachytherapy followed by chemotherapy with Carboplatin and Taxol. The patient received external beam whole pelvic radiation therapy followed by interstitial brachytherapy. The port sites were outside the radiated field. At the completion of radiation, complete regression of the metastatic vaginal lesions was achieved. Three weeks later the patient reported pain on the abdominal wall at the site of the right lateral instrumental port.

The clinical exam revealed a 2 × 3 cm tender mobile subcutaneous nodule at the port site. A CT abdomen and pelvis was obtained and revealed tissue density in the abdominal wall at the site of the right lateral 8 mm port and no evidence of intraabdominal disease (Fig. 2). Chest X-ray was unremarkable. A local excision was performed in the operating room and the pathology confirmed recurrent endometrial adenocarcinoma of endometrioid type (Fig. 3). The peritoneal cavity was not breached during the excision of the port site tumor. One week later the patient presented to the emergency room with abdominal pain,

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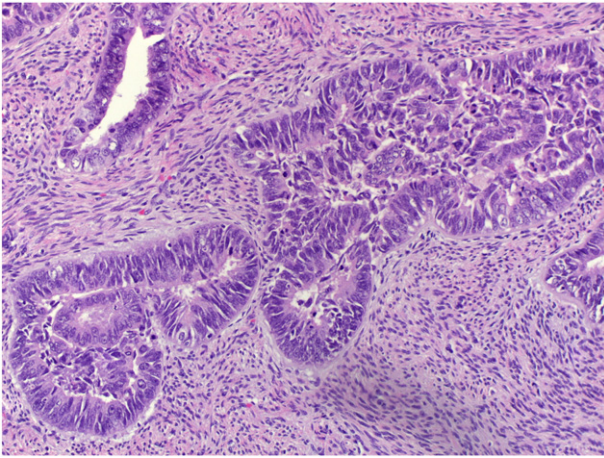


Fig. 1. Primary endometrial adenocarcinoma of endometrioid histology.

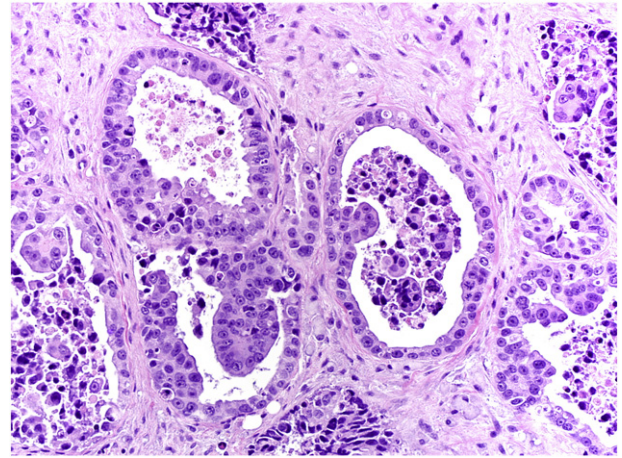


Fig. 3. Excised tumor from the right lateral port site. The histologic appearance is similar to the primary endometrioid adenocarcinoma.

nausea and vomiting. CT abdomen and pelvis was consistent with small bowel obstruction with transition point at the terminal ileum, probably due to radiation enteritis. A 1.7 cm × 1.3 cm hypodense lesion on the surface of the liver, not present on the previous scan was noted. She was admitted and conservative management with nasogastric suction and intravenous fluids was initiated. On the second day of her hospitalization, she was found unresponsive. An attempt for cardiopulmonary resuscitation was not successful. Possible cause of death is pulmonary embolism.

## Discussion

The reported incidence of port-site metastasis after robotic surgery for gynecologic malignancy is around 1% which is comparable to traditional laparoscopic surgery (Nodofo et al., 2011; Zivanovic et al., 2008). Here we describe a case of advanced endometrioid adenocarcinoma (Stage IIIB) with port-site metastasis after robotic hysterectomy and lymph node dissection. To our knowledge this is the first reported

case of port-site metastasis after robotic surgery for endometrial adenocarcinoma of endometrioid type.

A number of factors have been implicated in the development of port-site metastasis including aerosolization of tumor cells, direct contamination and tumor implantation at the port site, local immune response and the surgical technique. Advanced disease with ascites and peritoneal seeding conveys a higher risk (Hopkins et al., 1999; Ramirez et al., 2003). Preventive measures that have been proposed include minimizing tissue trauma at the transfer of instruments, rinsing the trocars and the instrument tips in povidone-iodine, topical treatment of port sites with cytotoxic agents (i.e. 5-FU), the use of specimen bags for retrieval, removing all intra-abdominal fluid before trocar removal, and closure of peritoneal trocar sites of 10 mm or more (Ramirez et al., 2004; Wang et al., 1999).

Despite the numerous hypothetical explanations, the pathogenesis of port site metastasis remains unclear. In our case, the large tumor size (13 cm) and the high metastatic potential as evidenced by the vaginal metastases are possible contributing factors. It is reasonable to assume that large tumor volume is associated with increased risk of spillage of tumor cells during the manipulations of the specimen. High concentrations of angiogenesis and growth factors at the port site due to the healing process can promote the implantation and proliferation of malignant cells with high metastatic potential. In addition, failure of activation of the immune system encourages port-site tumor growth. Preclinical data suggest that the effect of laparoscopic surgery on the antitumor immune response differs from that of open surgery. CO<sub>2</sub> pneumoperitoneum inhibits macrophage and neutrophil function and reduces TNF production. These effects are evident not only on the peritoneal environment but also systemically (Ramirez et al., 2003).

Previously reported cases of port site recurrence after robotic surgery, involved multifocal disease with aggressive histology. At the time of recurrence, the disease had spread in multiple sites and the independent prognostic significance of the port site tumor was minimal (Nodofo et al., 2011). Similarly, in our case the abdominal imaging revealed metastatic disease on the surface of the liver and the clinical presentation of small bowel obstruction raises suspicion for peritoneal seeding below the resolution of the CT. Therefore, the impact of the port site metastatic tumor on the outcome may not be significant and the benefit from any preventive measures may be limited.

However, staging for uterine adenocarcinoma of endometrioid histology is the most common indication for robotic surgery in gynecologic oncology and consideration to surgical principles that could decrease the risk of port-site recurrence should be given.



Fig. 2. CT abdomen–pelvis. Hyperdense lesion in the right anterolateral abdominal wall.

Placing all the specimens in plastic endo-bags and removing them vaginally could decrease the possibility of spillage of tumor cells at the port sites. A lower CO<sub>2</sub> pneumoperitoneum pressure and avoidance of subcutaneous emphysema could further decrease the risk of dissemination and implantation of tumor cells in the subcutaneous tissue. Slow and controlled release of the pneumoperitoneum with the trocars in place could limit the contamination of the laparoscopic incisions with tumor cells. Finally, limiting the number of the port sites to four and reserving the third robotic arm for technically challenging cases (i.e. extreme obesity, suboptimal uterine manipulation, multiple adhesions) could be considered.

Robot-assisted minimally invasive surgery is a new advancement in the surgical management of gynecologic malignancies and the evidence with regards to benefits and complications is scant. Staging for uterine adenocarcinoma of endometrioid histology is a very common indication for the use of robotic surgery and has been associated with favorable outcomes especially in the obese population. In agreement with prior experience from conventional laparoscopic staging (Muntz et al., 1999) our case indicates that tumor spread at the port site is possible. Although the recurrence at the port site is frequently an indicator of widespread disease and the impact of any preventive measures on survival is questionable, the implementation of surgical practices that decrease the risk of this complication without significantly affecting operative time and blood loss should be encouraged.

#### Conflict of interest statement

The authors declare that there are no conflicts of interest.

#### References

- Childers, J.M., Aqua, K.A., Surwit, E.A., Hallum, A.V., Hatch, K.D., 1994. Abdominal-wall tumor implantation after laparoscopy for malignant conditions. *Obstet. Gynecol.* 84, 765–769.
- Rauff, S., S.Ng, J., 2012. Port-site recurrence in a patient undergoing robot-assisted gynecologic cancer surgery for endometrial cancer – a case report. *Gynecol. Oncol. Case Rep.* 2, 127–129.
- Creasman, W., 2009. Revised FIGO staging for carcinoma of the endometrium. *Int. J. Gynaecol. Obstet.* 105 (2), 109.
- Nodofor, B.T., Soliman, P.T., Schmeler, K.M., Nick, A.M., Frumovitz, M., Ramirez, P.T., 2011. Rate of port-site metastasis is uncommon in patients undergoing robotic surgery for gynecological malignancies. *Int. J. Gynecol. Cancer* 21 (5), 936–940.
- Zivanovic, O., Sonoda, Y., Diaz, J.P., Levine, D.A., Brown, C.L., Chi, D.S., Barakat, R.R., Aburustum, N.R., 2008. The rate of port-site metastases after 2251 laparoscopic procedures in women with underlying malignant disease. *Gynecol. Oncol.* 111 (3).
- Hopkins, M.P., Dulai, R.M., Occhino, A., Holda, S., 1999. The effects of carbon dioxide pneumoperitoneum on seeding of tumor in port. *Am. J. Obstet. Gynecol.* 181, 1329–1333.
- Ramirez, P.T., Wolf, J.K., Levenback, C., 2003. Laparoscopic port-site metastases: etiology and prevention. *Gynecol. Oncol.* 91, 179–189.
- Ramirez, P.T., Frumovitz, M., Wolf, J.K., Levenback, C., 2004. Laparoscopic port-site metastases in patients with gynaecological malignancies. *Int. J. Gynecol. Cancer* 14 (6), 1070–1077.
- Wang, P.H., Yuan, C.C., Lin, G., Ng, H.T., Chao, H.T., 1999. Risk factors contributing to early occurrence of port site metastases of laparoscopic surgery for malignancy. *Gynecol. Oncol.* 72, 38–44.
- Muntz, H.G., Goff, B.A., Madsen, B.L., Yon, J.L., 1999. Port-site recurrence after laparoscopic surgery for endometrial carcinoma. *Obstet. Gynecol.* 3 (5/2), 807–809.