

Port Site Metastases after Minimally Invasive Gynaecologic Cancer Surgery – ‘Prevention is better than Cure’

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Prevention of Port Site Metastases – Pearls and Pitfalls

“Care is an absolute. Prevention is the ideal.” - Christopher Howson.

Introduction

The last three decades have witnessed laparoscopy being used in cancer surgeries. Initial reports date back to 1970s [1-3]. The use of laparoscopy has been established in oncologic surgeries with innumerable advantages [4] such as being safe, less invasive, preservation of oncologic and immunologic functions and shorter intervals to start of adjuvant treatment if needed [5]. However, minimally invasive onco-surgeries may have complications like vascular injuries, bowel injuries, genitourinary injuries and port-site metastases (PSMs) [6,7]. PSM is a strong risk factor for peritoneal dissemination [8]. PSMs are associated with poor outcome of patients and represent significant patient morbidity and end-of-life care issues. PSMs can significantly increase patient morbidity and are associated with poor outcome.

Historical Perspectives

“History gives answers only to those who know how to answer them” – Hajo Holborn.

The first paper describing the case of developing local tumor metastases after laparoscopy was presented by Döbrönte et al. [9] in 1978. The exact incidence of port-site metastases among patients with a gynecologic malignancy who undergo laparoscopic surgery is unknown [10]. Zivanovic et al. reported the overall incidence of PSM as 1.18% and 1.25% in cervical cancer cases [11]. Robotic-assisted laparoscopic surgeries are being performed with increased frequency for gynecologic malignancies. The rate of PSM in such cases is unknown as only few case reports exist [12].

How do Port Site Metastases Develop?

Initially, aerosolization of tumor cells and peri-port gas leakage (chimney effect) were reported to be the possible mechanism that can lead to tumor cell dissemination and PSM. However, it has been shown now that the quantity of tumor cells needed for port site metastasis formation was extremely high [13,14]. A recent study has shown that once hematogenous seeding of circulating tumor cells occur, they colonize in an organ where microenvironments (soil) is conducive for their growth. CO₂ pneumoperitoneum has shown to significantly decrease lymphocytes and cytokines during the early postoperative period thus promoting the migration of tumor cells to the trocar site wound during laparoscopic surgery. The trauma caused at port insertion site leads to creates a premetastatic niche or fertile soil for the tumor cells to lodge there and grow [15].

Although there is no proven strategy to decrease the risk of PSM, all efforts should be made to prevent PSM. Proper tumor handling keeping in mind the oncological principles is essential. Proper selection of women for minimally invasive surgeries in gynecologic cancers is the key. The use of minimally invasive approach should be avoided in the presence of ascites or histological risk factors such as high grade, the presence of positive peritoneal cytology or peritoneal studding or carcinomatosis. The use of gasless laparoscopy in prevention of PSM is controversial. Surgical skills and expertise of the gynaecologic oncologist in performing minimally invasive procedures is a prerequisite.

Technically, minimal tumor manipulation, avoiding uterine manipulation, use of endobag for controlled ovarian cyst aspiration or tissue retrieval, avoidance of sudden deflation, use of heated and humidified CO₂, extensive peritoneal lavage with heparin or cytotoxic agents, port site irrigation with heparin or povidone iodine solution before removal, placement of drains if needed before deflation, exsufflation of peritoneum before removal of ports, suturing of the 10mm ports and early initiation of adjuvant treatment are some of the measure that may be used to prevent PSM [16].

Conclusions

The incidence of port site metastasis (PSM) in the setting of minimally invasive gynecologic oncology surgery is low. The main concern is whether PSM is iatrogenic or influenced by tumor biology and genetic factors. Multiple factors to their development have been linked to tumor seeding; however, tumor grade and stage seem to be the most important factors. Standardized oncologic techniques and preventive measures might help decrease the incidence of tumor seeding and therefore PSM. The use of strict preoperative criteria for triaging women to undergo minimally invasive gynecologic oncologic procedures, along with cautious intraoperative judgment and technical skills, will minimise the occurrence of port site metastasis in the future. Prospective multi-center data collection about PSM in the future may provide a better understanding of the risk factors and surgical techniques that increase risk of port-site metastasis.

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