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Original article

Vaginal vault metastasis – The new enigma in port site recurrences in gynecological laparoscopic surgeries

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ABSTRACT

Objective: To determine the frequency of vaginal vault recurrences in comparison with other port site recurrences following unplanned laparoscopic surgical treatment for gynecological malignancies.
Design: Retrospective analysis of a prospectively maintained database of eight patients who underwent laparoscopic procedures for different gynecological malignancies.
Results: Eight patients were identified to have port site recurrences. Out of these, seven had undergone laparoscopic surgery for ovarian tumor and were reported to be malignant with the exception of one which was a borderline ovarian tumor. One case had a fibroid uterus, which later turned out to be a leiomyosarcoma. Vaginal vault recurrence was seen in four out of the eight cases, and only one patient could be saved. Whereas out of the four cases with other port recurrences, three patients are in complete remission.
Conclusion: Apart from other port recurrences, vaginal vault is a potential site of recurrence. But it is more significant as it results in greater morbidity and carries a worse prognosis than other port recurrences.

Introduction

Port site metastasis is a well-known phenomenon following laparoscopic surgeries for abdominal malignancies. Gynecological malignancies are not an exception to this. Apart from other port recurrences, vaginal vault is a potential site of recurrence. But it is more significant as it results in greater morbidity and carries a worse prognosis than other port recurrences.

The objective of this study was to determine the frequency and outcome of vaginal vault recurrences in comparison with other port site recurrences following unplanned laparoscopic surgical treatment for gynecological malignancies.

Materials and methods

The study is a retrospective analysis of a prospectively maintained database of all the patients who were referred to us. A total of eight patients were identified from May 2006 to August 2009 with port site metastasis following laparoscopic procedures of varying magnitudes for gynecological malignancies.They were followed-up to date.

This study was conducted in the Department of Surgical and Gynecological Oncology at Lakeshore Hospital and Research Centre in Cochin, India which is a tertiary care center and a leading oncology center in a private set-up. A detailed note of referral documents of patients referred to us was made, followed by thorough clinical examination, radiological reassessment, and tumor marker levels wherever applicable. Histopathological reports were reviewed. Conditions of the patients were optimized and subsequently taken for exploration.

Results

Out of the eight patients, seven patients had undergone laparoscopic surgery for ovarian tumors, and one for fibroid uterus. None of these were performed by a gynecological oncologist. Vaginal vault recurrence was seen in four out of the eight cases. In all these cases, specimens were retrieved through the vagina. No endobags were used in any of these cases. One patient had extensive disease in the abdominal port and contiguous abdominal and

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pelvic masses. In other cases the metastasis occurred in abdominal ports. In two cases it was at the port of the ovariotomy specimen removal, and one at the biopsy removal port.

Seven had ovarian malignancy, six cases of serous cyst adenocarcinoma, and one case of borderline ovarian tumor. The eighth case which was diagnosed as a case of leiomyoma turned out to be a leiomyosarcoma at histopathological examination.

The most common mode of presentation of recurrence was bleeding *per vaginum*. The time duration for recurrence was between 2 weeks and 1 year. Out of the eight patients, four patients underwent laparotomy and cytoreduction. One patient was inoperable. Two patients were given neoadjuvant chemotherapy before surgery. The leiomyosarcoma case received radiotherapy followed by second line chemotherapy.

Out of the four vaginal vault recurrences only one patient could be salvaged. Luckily she did not have any nodal or extra pelvic disease. She is now disease free at 5 years. In spite of extensive surgery and adjuvant treatment two patients died of progressive disease and one case had an inoperable disease.

One patient with abdominal port recurrence also had an inoperable disease (Case 4). Three patients (Case 1, Case 2, and Case 3) are alive after definitive surgeries.

Brief case summary

First case

The patient underwent laparoscopy for bilateral ovarian tumor. She was found to be inoperable then, and definitive surgery was abandoned. Only a biopsy was taken. She was referred to us with the biopsy report of papillary serous cysatadenocarcinoma. But on examination the mass was found to be mobile and felt operable. She was taken for laparotomy after complete evaluation. Staging laparotomy was done along with excision of the right iliac fossa port which was studded with metastasis. Postoperatively adjuvant chemotherapy was given.

Cases 2 and 3

These patients had undergone laparoscopic ovariotomy for presumably stage 1 disease. The pathological report of one patient showed a borderline mucinous tumor. After 1 year she presented with a huge suprapubic port recurrence and was taken for cytoreductive surgery. Optimum cytoreduction could be achieved including excision of the port recurrence. Prolene mesh repair was performed at the site of port recurrence excision. She was given adjuvant chemotherapy with paclitaxel and carboplatin since the histopathology report showed mucinous adenocarcinoma. However, she was found to have locally progressive disease.

The other patient who had undergone laparoscopic ovariotomy had a pathological report showing a serous cyst adenocarcinoma and underwent restaging laparotomy with port excision 1 month after laparoscopy.

Cases 4 and 5

Both patients had undergone total laparoscopic hysterectomy with bilateral salpingo oopherectomy for unilateral ovarian tumor. In one of these patients, part of the tumor was left behind as it was adherent to bowel serosa. She had received three courses of adjuvant chemotherapy and was found to have recurrence at the port site. Hence, she was referred to us for surgery. On examination she had a left iliac fossa mass (port site) with other intra-abdominal and fixed pelvic masses which were unresectable. Only the port site could be excised completely and the pathology report confirmed recurrence.

The other patient underwent total laparoscopic hysterectomy with the removal of an ovarian tumor vaginally. She had received six cycles of adjuvant chemotherapy with paclitaxel and carboplatin. After 1 year she presented with severe vaginal and perineal pain. On examination, a huge vault recurrence was seen causing a rectovaginal fistula. As it was inoperable, she was given three courses of chemotherapy. Later she was re-evaluated and was subsequently taken for surgery with resection of the mass, resection anastomosis, and covering colostomy. She received three more cycles of chemotherapy and the colostomy closure was performed after completion of her treatment.

Cases 6 and 7

These two patients had undergone laparoscopic assisted vaginal hysterectomy and removal of ovarian tumors vaginally. Histopathology report showed an adenocarcinoma, and adjuvant chemotherapy was given. One of these patients presented with bleeding *per vaginum* after 6 months of chemotherapy. Examination showed a huge recurrence at the vault. The mass was infiltrating the rectal wall and extensive nodal disease was present. She underwent excision of the recurrence and infiltrated rectal wall, along with nodal dissection. She died of progressive disease 1 year later.

The other case, a postmenopausal patient, had undergone laparoscopic assisted vaginal hysterectomy and removal of an ovarian tumor vaginally. She had been given three cycles of adjuvant chemotherapy followed by completion surgery (omentectomty and lymph node dissection). She then received three more cycles of chemotherapy. Six months later she presented with profuse bleeding *per vaginum*. On examination she was found to have a highly vascular vaginal vault metastasis. The vaginal vault had not been re-excised during completion surgery. She received palliative radiotherapy followed by second line chemotherapy. Later she developed an abdominal recurrence also and succumbed to death after 2 years.

Case 8

A 44 year old female underwent total laparoscopic hysterectomy for multiple fibroids and a specimen was removed with morcellation using the morcellator. Histopathology report confirmed leiomyoma. After 6 months of surgery, she presented with bleeding *per vaginum* and on examination a huge vaginal vault recurrence was seen which was infiltrating the bladder. Trucut biopsy from the mass was taken which showed a high grade lieomyosarcoma. She was re-evaluated and re-analyzed. She said that she had noticed a recent sudden increase in the size of the fibroid and told the laparoscopist this during the initial consultation. The slides of initial Histopathological examination (HPE) could not be brought for review. The patient was given chemotherapy with ifosfamide and adriamycin, and was later taken up for surgery. Partial cystectomy and removal of the tumor was performed followed by adjuvant radiation. Despite all these, her disease progressed and she succumbed to death in a year.

Discussion

The current study was a retrospective analysis of a prospectively maintained database. All the above cases were referred cases. All these cases were either not worked up properly or were taken up for laparoscopy with the assumption that they were all benign. Also, because of the lack of facilities for frozen sections, intraoperative conversion of laparotomy and completion of staging were

also not done. None of these specimens were retrieved through endobags. All were retrieved through culdotomy incision.

Ever since the emergence of laparoscopy, there has been a paradigm shift in the management of almost all abdominal surgeries including gynecological surgeries. This is applicable to oncosurgeries as well. More and more procedures are being carried out laparoscopically day by day. However, apart from the learning curve effect of the procedures, inappropriate evaluation, approach, and technical misadventures have led to a new spectrum of port site recurrences including vaginal vault recurrence.

Port site recurrence is a well described phenomenon in human malignancies and was first reported in 1978 by Döbrönte et al.[1,2] The author reported implantation of a malignant ovarian cystic adenoma in penetration sites of the verres needle and trocar.

The incidence of port site recurrence is further compounded by the fact that it usually leads to recurrence at other sites and such a concern is well reported in the literature.[3,4] Thus port site metastasis is an obstacle for a good long term outcome.

Major concerns in the management of gynecological malignancies by laparoscopy are risk of port site recurrence, accuracy and adequacy of surgical staging, and risk of tumor rupture leading to intraperitoneal dissemination of malignant cells especially solid tumor. Incidence of port site metastasis in patients with ovarian cancer varies from < 1% to 16% in the literature.[5]

Raymond et al[6] in 1998 defined portsite metastasis as an early tumor recurrence that develops locally in the abdominal wall, within the scar tissue of one or more trocar sites, or an incision after laparoscopy or thoracoscopy for cancer, and these implantations are not associated with peritoneal carcinomatosis. Certain theories have been put forward to explain metastatic developments at laparoscopic port sites.[7] The factors for port site metastasis can be divided into three categories: (1) tumor related; (2) wound related; and (3) surgical technique related.

Surgical technique related manipulation is the principal factor acting in tumor dissemination. Extraction of surgical specimen is determined by the surgeon.[8,9] Morcellation of the specimen increases tumor seedling. The direct dissemination of tumor cells from contaminated material or extraction with an unclosed bag is well documented.[10] This is influenced to some extent by the expertise of the surgeon and the team.[8,11]

The risk of rupturing the ovarian cyst and spillage of its content is higher with laparoscopy compared with open surgery. Haverilesky et al[12] reported an overall rupture rate of 25% during laparoscopy for adnexal mass. In a study of 1600 adnexal masses managed laparoscopically, Canil et al[13] reported that 10.11% invasive cancers and out of 67.6% borderline tumors were punctured for diagnostic purpose. The turbulent gas flow during operative laparoscopy may favor embolization of exfoliated malignant cells.[14]

In our study, four patients had abdominal port site recurrence and four patients had vaginal vault recurrences. All patients were documented as stage 1 disease during the initial surgery and uterine fibroid as benign leiomyoma.

We want to focus on another site of recurrence—vaginal vault. In our series of patients, a significant number of (50%) patients had vault recurrence and in all these specimens were removed through the vagina which led to implantation of malignant cells. In vaginal vault recurrences, all the patients presented with locally advanced tumors.

Prevention of direct contact of tumors with the port by the use of endobags has been proven to reduce port recurrence, which means tumor load at the port is an important factor in recurrences. So even in vaginal retrieval, tumor removal in the endobag should be strictly adhered. Early postchemotherapy recurrences portray a dismal outcome. However, regular vaginal examinations in such cases may detect early recurrences which might lead to better outcomes in such cases. Great caution has to be applied in deciding laparoscopy for relatively chemoresistant tumors and early disease where chemotherapy may not be required at all. One has to balance between life and few more centimeters of incision.

Another concern is the removal of multiple and large fibroids in pieces which can lead to incorrect pathology by sampling errors. Anupama et al[15] reported a case of disseminated peritoneal recurrence where the patient did not have a history of rapid growth. All literature regarding this stress the fact that all efforts must be made to rule out malignancy before going ahead with key hole or no hole surgery. One of our patients was able to recognize the sudden growth of the tumor and passed on this information to the laparoscopist. Even then she was taken up for laparoscopy, that too was with the use of a morcellator and not an endobag for specimen retrieval. The policy of cent percent laparoscopy among some laparoscopists will prove detrimental in the long run. So great care has to be taken in deciding laparoscopic surgery in such cases. Further thorough evaluation if necessary is with magnetic resonance imaging and/or positron emission tomography, and the use of endobags would result in a much more favorable outcome.

Our concern is well documented in world literature. Several reports of port site metastasis and tumor seedling have been published. Morice et al[16] reported six cases of port site metastasis after laparoscopic surgery for gynecological cancer. Cormio et al[17] reported nine cases of skin metastasis in ovarian cancer. Anupama et al[15] reported a case of disseminated peritoneal leiomyosarcoma after laparoscopic myomectomy and morcellation.

In our study four patients had intra-abdominal port site recurrences and four patients had vaginal vault recurrences. One patient with laparoscopic hysterectomy with removal of the specimen vaginally for fibroid uterus and three patients with removal of ovarian mass vaginally had vault recurrence. None of the 10 women with metastatic ovarian cancer developed such recurrence in a retrospective study conducted by Kadar.[18] He conducted a study to determine the frequency of port site recurrence following laparoscopic surgical treatment of gynecological malignancies metastatic at the time of surgery. With a total of 25 patients (22) primary malignancies (cervix 12, ovary 7, endometrium 3, and 2 in recurrent ovarian cancer), one women with stage 3c ovarian cancer was disease free at the completion of *N-acetyl cysteine* following surgery by a general surgeon was included in the study, she had developed scalene node metastasis 8 months after definitive laparoscopic surgery. Twenty-four women had metastatic disease at the time of laparoscopic surgery. All women received adjuvant pelvic or extended field radiation, chemotherapy, or both. Four women (16%) developed port site recurrence in endometrial and cervical carcinomas with two patients each. While none of the 10 women with metastatic ovarian cancer developed such recurrence, vagina vault recurrence were also not observed even though malignant disease was extracted through the vagina in many cases. All recurrences were associated with abdominopelvic and or distant metastasis and all occurred at untreated trocar sites. He concluded that port site recurrences are local manifestations of disseminated disease that results from enhancement of tumor growth characteristics of healing tissues and can be prevented by appropriate postoperative therapy.

In our study, all port site recurrences were associated with disease at other local sites; isolated port site recurrences were not found. Vaginal vault recurrence was also seen when the specimen was extracted through the vagina and most of the patients had pelvic recurrence. These findings were consistent with observations done in laparoscopic resections of colorectal malignancies which showed that 50% abdominal wall recurrence occur at the tumor extraction site.[19–31]

Port site recurrences can be prevented by appropriate measures taken during surgery by avoiding rupture of cyst, avoiding spillage of contents, handling of the specimen, taking out the specimen in an endobag, and full thickness closure of port sites and post-operative therapy.

Conclusion

Port site recurrence in laparoscopic gynecological malignant surgeries occur because of the immense complexity of the procedure and problems of preferring an adequate surgery. Furthermore, port site metastasis were not lone sites of recurrence and were associated with local recurrence of disease. But unlike other port recurrences, vault recurrence poses great difficulty in management and results in greater morbidity, as well as considerably reducing the chance of survival.

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