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SHORT COMMUNICATION

Negative pressure wound therapy - case report

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ABSTRACT

The postoperative wound dehiscence is a rare complication of surgical procedures. It is more common among geriatric patients and those undergoing chemotherapy. A more frequent complication is a postoperative bowel obstruction, which also occurred in the presented case. One of the advanced therapeutic techniques in wound infections and complex wound failure (CWF) is the use of negative pressure on the wound surface to improve healing. It is sometimes combined with implantation of monofilament mesh to reconstruct the abdominal wall. A 76-year-old woman diagnosed with ovarian cancer (IV FIGO stage), after chemotherapy, was referred to the Department of Obstetrics, Gynecology and Oncological Gynecology in Bytom for surgical treatment. Postoperative course was complicated by intestinal obstruction and abnormal wound healing with extensive necrosis and fascial dehiscence. Patient required multiple relaparotomies with wound revisions, during which vacuum dressing and monofilament, polypropylene mesh filling the gap in the fascia were implanted. At intervals of 3-4 days, the wound was examined and the dressing was replaced. The mesh was gradually cut, what allowed to bring the fascia edges closer together. During the tenth intervention, the dressing was removed and the skin was sewn. The case illustrates that the combination of using non-absorbable synthetic materials and vacuum assisted closure therapy is highly effective in the treatment

of complex wound failures with extensive dehiscence of abdominal wall. The gradual cutting technique of the implantation mesh allows the fascia edges to completely close the wound.

Keywords: Complex wound failure, ovarian cancer, vacuum dressing, mesh-mediated fascial traction

1. INTRODUCTION

A postlaparotomy wound dehiscence is a common problem in surgery, which leads to longer hospitalization and increase in expenses. It is associated with significant morbidity and mortality. Complex wound failure (CWF) is a condition when skin edges are no longer apposed, and there is space between them after the incision. The dehiscence can be incomplete (superficial), where skin and subcutaneous tissue are separated, or complete, in which also fascia and peritoneum are involved. The therapy of complete dehiscence should be based on two pillars: negative pressure wound therapy (NPWT) and mesh-mediated fascial traction. The combination of both techniques is called vacuum-assisted wound closure and mesh-mediated fascial traction (VAWCM) [Fig. 1]. According to a study using just one of the therapeutic methods is not efficient and do not ensure high rate of delayed fascial closure. NPWT seems to be a bit more effective on this matter than mesh-mediated fascial traction (31% vs. 26%) [1]. However, the combination of the two methods is far more resultful. VAWCM is said to lead to 90% rate of delayed fascial closure [2].

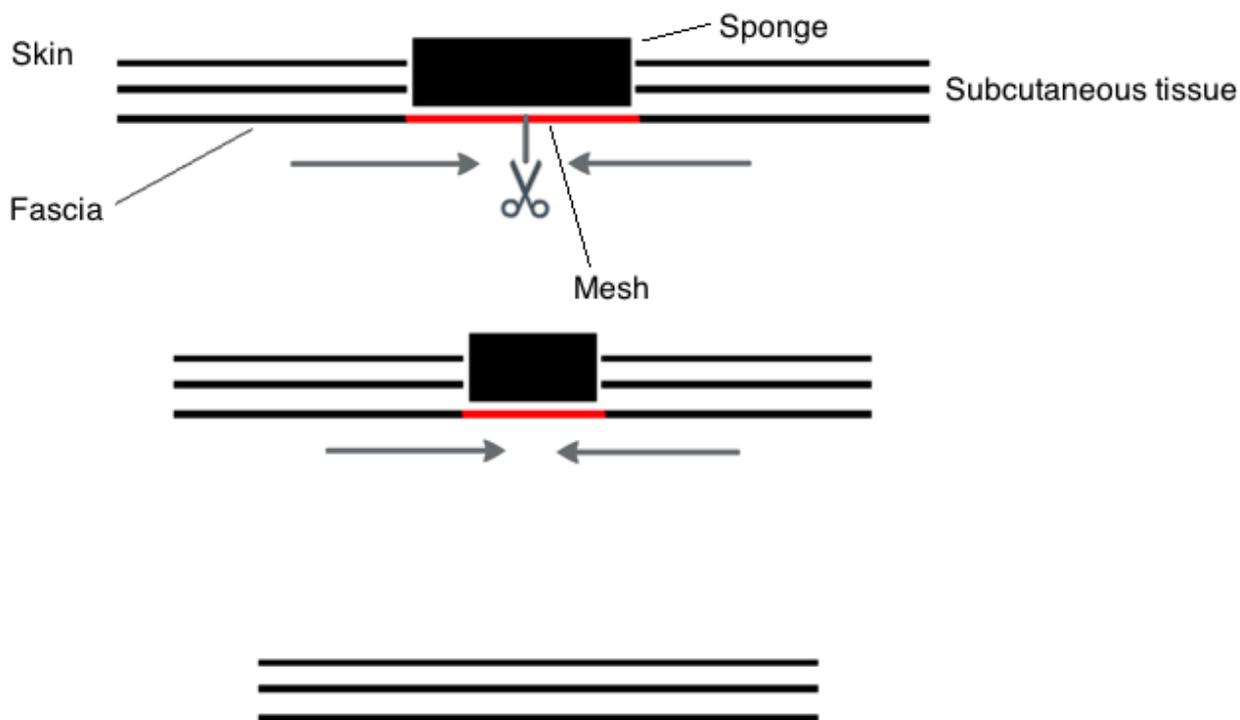


Figure 1. The scheme of VAWCM.

Ovarian cancer is 4. of the most common cancers among women, and second most common (after the endometrial cancer) of female reproductive system. It is more often observed in peri-and postmenopausal women and its incidence increases with age [3]. The risk grows among women who ovulated more: nulliparas, those who started ovulation earlier and reached menopause later [4].

Other risk factors are: obesity and hormone replacement therapy in opposite to hormonal birth control which cuts the risk of disease. Mutations in the genes *BRCA1* or *BRCA2* are proved to be another risk factor - there is a 50% chance that woman with the mutation will develop cancer [5]. Ovarian cancer, unfortunately, is usually diagnosed in III or IV FIGO (Federation of Gynecology and Obstetrics) clinical stage. The therapy is based on debulking surgery and then several cycles of chemotherapy. In some cases the chemotherapy is administered before the cytoreductive surgery, usually after the exploratory laparotomy or laparoscopy, when the tumor is difficult to resect [6].

2. CASE REPORT

A 76-year-old patient after a staging exploratory laparotomy was diagnosed with ovarian cancer in IV clinical stage according to FIGO, and had undergone 9 cycles of chemotherapy. Patient also suffered from hypertension, hypothyroidism and glaucoma. On physical examination, a tumor (about 10cm in diameter) was found in lesser pelvis. The uterus was immobile. Computed tomography scan revealed a progression of primary lesions in ovaries, but a complete regression of metastatic tumors in the liver. In positron emission tomography there were two metabolically active lesions in projection of ovaries, and a few active but not enlarged lymph nodes of paraaortic and pelvic region.

The patient was qualified for the debulking surgery. Intraoperatively, a 20 cm-long dehiscence of the fascia was observed. In the lesser pelvis, a conglomerate of ovarian tumors, the uterus, the sigmoid colon and the rectum was present. After dissecting the rectum and sigmoid colon, the tumor was excised en bloc with the uterus.

The omentectomy, appendectomy, pelvic and paraaortic lymphadenectomy were performed. The abdominal cavity was carefully inspected.

Multiple swabs and samples were collected from the typical locations. The drain was inserted. The fascia, subcutaneous tissue and the skin were sutured. During the 14 days of postoperative period, the patient developed adhesion-related obstruction two times. Basing on clinical symptoms surgical revision of abdominal cavity was administered. Two relaparotomies were performed and the adhesions were released. After the second intervention, due to extensive necrosis, it was impossible to suture the fascia, the subcutaneous tissue and the skin.

VAWCM therapy was administered [Fig. 2]. The subatmospheric pressure of 150-200 mmHg was used. Every 3 days the wound was inspected and cleaned, the mesh was shortened and the dressing was changed [Figs 3, 4 & 5]. After the tenth dressing change it was possible to suture the fascia, skin and subcutaneous tissue were dissected, mobilized and sutured. The patient was dismissed home in 60th day after the primary surgery.



Figure 2. Vacuum dressing.



Figure 3. Vacuum dressing changing.



Figure 4. Vacuum dressing changing.



Figure 5. Vacuum dressing changing.

3. DISCUSSION

According to different studies CWF can be observed in 0,5% - 3,4% patients undergoing abdominal surgery [7,8]. Shanmugam, et al. proves that it is substantially more frequent among patients with chronic co-morbidities, like chronic obstructive pulmonary disease heart failure, hypertension, diabetes or obesity. Other risk factors are: male sex, undergoing chemotherapy or steroidtherapy, age (<65y), sepsis and poor nutritional status (hypoalbuminemia) [9]. The vacuum dressing plays a significant role in many aspects of wound healing. It increases the blood flow in the incision site, reduces the exsudation, toxins (wound healing inhibitors - e.g. metalloproteinases), bacteria growth and edema. Moreover, negative pressure boost the secretion of vascular endothelial growth factor (VEGF), fibroblast growth factor (FGF), interleukin-8 (IL-8) and collagen [10]. There are only a few contraindications for NPWT, such as bone and marrow inflammation, presence of neoplastic cells in the wound, allergies and congenital collagenosis [10]. The dressing itself consist of a few elements: non-adhesive foil, which is placed directly on peritoneal organs, sponge, self-adhesive foil and a port, which connects the vacuum environment to the negative pressure generating device. The mesh used for fascial traction is gradually cut to ensure that the fascia is under constant tension, which allows the fascia edges to get closer and finally be closed with stitches.

The ovarian cancer operation itself is a radical hysterectomy, omentectomy, appendectomy, pelvic and paraaortic lymphadenectomy. When other organs are infiltrated it is recommended to perform other partial or holistic resections, like colectomy, cystectomy, partial ileectomy, splenectomy, cholecystectomy, partial hepatectomy, gastrectomy, diaphragm and peritoneal stripping. Such an invasive procedure causes many complications. One of them is bowel obstruction. A study of Mooney, et al. says that it happens in 17,6% of patients previously diagnosed with ovarian cancer [11]. Another study proves that in 93% of patients after gynecological surgery developed substantial peritoneal adhesions, which are the most common cause of obstruction [12]. Moreover, radical hysterectomy seems to be carry the highest risk of adhesion-related bowel obstruction. The obstruction occurred in 5% of the patients who had undergone the operation [13].

4. CONCLUSIONS

The presented case indicates the high effectiveness of the use of vacuum therapy in combination with non-absorptive synthetic materials which are implanted in fascia. Above-mentioned method is recommended in therapy of abdominal wound dehiscence. The gradual cutting of the implantation mesh allows the approach of the fascia edges and final closure of the abdominal integument. This therapy is long-lasting and effective.

ABBREVIATIONS

CWF - complex wound failure

NPWT - negative pressure wound therapy

VAWCM - vacuum-assisted wound closure and mesh-mediated fascial traction

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