Case Report

Revisiting Mesh-Cancer: An Unusual and Devastating Complication of Chronic Mesh Infection

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Abstract

Background: The degeneration of chronic mesh infection into squamous-cell carcinoma (SCC) of the abdominal is related to a continuous inflammatory response against infection. The treatment is challenging and requires radical tumor resection and simultaneous reconstruction of the abdominal wall. Adjuvant radiation and chemotherapy are necessary to improve the outcomes. The objective of this report is to address rare, but devastating complication of mesh infection.

Case presentation: We report the case of a patient presenting with an extensive SCC of the anterior abdominal wall, related to a longstanding polypropylene mesh infection. The surgical approach included the resection of the tumor including the right rectus muscle and the small bowel, invaded by the tumor. The reconstruction of the abdominal wall required an intraperitoneal repair with a synthetic coated mesh. He was submitted to adjuvant chemotherapy with Cisplatin and Paclitaxel, and a secondary radiation therapy were necessary to control metastatic disease.

Conclusions: SCC of the abdominal wall is related to chronic mesh infection. Local treatment requires complete tumor excision, along with a challenging reconstruction of the abdominal wall. In this case, the use of a coated synthetic mesh allowed a reliable reinforcement and the closure of an extensive defect, after tumor resection. Adjuvant chemotherapy and radiation therapy were necessary to control metastatic disease.

ABBREVIATIONS

SCC: Squamous Cell Carcinoma; CT: Computed Tomography

INTRODUCTION

Chronic mesh infection is a devastating complication of the modern hernia repair armamentarium. The degeneration of mesh infection into squamous cell carcinoma (SCC) of the abdominal wall has been reported in two patients, in a previous publication [1] and it is possibly related to the persistence of a long-term inflammatory response. The association of mesh infection, invasive cancer with bowel involvement and destruction of the anterior abdominal wall is unusual and represents unique technical and tactical challenges. The association of mesh infection and the need for simultaneous bowel resection are usually considered absolute contraindications to performing the necessary repair using synthetic mesh [2]. SCC of the abdominal wall is extremely aggressive and, adjuvant radiation and chemotherapy are required to improve the outcomes.

CASE PRESENTATION

A 39 years old white male was a victim of a penetrating abdominal gunshot in the year 2000. At that time, he was submitted to five emergency operations, and he was left with a polypropylene mesh peritoneostomy on a second-intention wound healing process. During the subsequent years, he reported continuous purulent discharge from multiple draining sinuses and the development of an increasing bulge at the operation site. At the moment he was admitted, in June 2014, he had a fourteen-year history of mesh infection and an enormous ulcerated tumor of the anterior abdominal wall, along with extrusion of pieces of polypropylene mesh and multiple draining sinuses (Figures 1, 2). According to the patient, the tumor had grown progressively during the last three years, as he could not find proper medical care. The physical examination revealed enlarged lymph nodes in both groins and armpits. A CT scan revealed a large tumor of the anterior abdominal wall with an invasion of the right rectus muscle and areas of the small bowel invaded by the tumor (Figures 3, 4). The cultures obtained from the draining sinuses revealed the growth of Morganella morganii.

Operation

Despite having an advanced and spread disease, we decided to perform a hygienic resection of the tumor and submit him to adjuvant therapy. The operation comprised an R0 resection of the tumor, involving the skin, the infected mesh, the right rectus muscle and areas of the small bowel invaded by the tumor.
Additional workup of the abdominal cavity included a cholecystectomy, an appendectomy and the resection of an enteric fistula found between the duodenum and the transverse colon. The midline could not be restored, and an intra-peritoneal bridged repair with Sepramesh® (BARD, Davol) was used to close the abdominal wall (Figures 7,8). The skin was closed with a local zetaplasty. The post-operative was uneventful, except for a minor skin breakdown which healed with wound dressings. Pathology revealed a well-differentiated squamous cell carcinoma invading the small bowel serosa; 1 over 12 dissected mesenteric lymph nodes had metastatic disease. A video record of the operation is available at: https://www.dropbox.com/s/271ziyrcoruwubq/H%C3%A9lio.mov?dl=0

**Adjuvant therapy**

From August through September 2014, he was submitted to three cycles of chemotherapy with Cisplatin 75mg/m² and Paclitaxel 175 mg/m², and between December 2014 and January 2015 he was referred to radiation therapy in his left armpit and groin. A CT scan in February 2015 revealed the progression of the disease in both sites. From February through June 2015, he was submitted to a secondary chemotherapy scheme with five cycles of Cisplatin 80mg/m² and Fluorouracil 1000mg/m². As the disease continued to progress in his left groin, chemotherapy was suspended, and a palliative radiotherapy was carried out in July 2015. Once again, the disease was unresponsive to the treatment and progressed with extensive ulceration and infection in his left groin. The patient was placed in palliative support and died in November 2015, after 17 months of follow-up. By the time he passed away, there were no signs of local tumor recurrence or herniation at the abdominal wall (Figures 9-11).

**DISCUSSION**

This patient is the third case reported in the literature, in which long-lasting mesh infection degenerated into aggressive squamous cell carcinoma of the abdominal wall. Our previous
A report of two cases was published earlier in 2014 [1]. One of those patients is currently under surveillance with no evidence of cancer recurrence after more than three years of follow-up, despite having an advanced disease at the time of his diagnosis. The other patients died after 10 and 17 months of follow-up, showing the aggressiveness of the disease. Both patients in our previous publication had explanted meshes made of polyester; this patient had an exposed mesh made of polypropylene, showing evidence that the degeneration into malignancy is caused by a chronic inflammatory response to the infection, and not by the material of the mesh itself.

The role of chronic infections leading to persistent inflammation and degeneration into squamous cell carcinoma was recently addressed in a comprehensive review published by Gajanan and cols [3]. Their publication reports the association of SCC with chronic infections caused by bacteria, fungi, parasites, and viruses. This seems reasonable in chronic mesh infection patients, considering that long lasting infections of the mesh are commonly associated with positive cultures for both bacteria and fungi, together with an extensive and persistent inflammatory response, as the body tries to eliminate unincorporated mesh remnants.

Invasion of the bowel by SCC seems to be common, and two of three cases had bowel involvement. This condition plays an additional challenge since the affected bowel needs simultaneous resection, and despite favorable publications [4] many authors are still not comfortable with the use of mesh in the contaminated and infected settings [5]. In this case, we opted to use a large coated mesh (Sepramesh®, BARD, Davol Inc.), placed intraperitoneally [6]. A large part of the right anterior abdominal wall was resected to allow adequate oncological resection, and it was not possible to close the muscle layer. Despite performing open bowel procedures and the positive cultures for M. morganii, the post-operative was uneventful regarding wound infection, presenting evidence that it is safe to use coated mesh in the contaminated/infected clinical setting, an approach that has never been reported, despite favorable experimental data [7].
At the time of the diagnosis, the disease was already considered disseminated. The role of adjuvant therapy must be evaluated, and in this particular case, the disease was controlled for one year. The recurrence in the left groin was unresponsive to treatment and became the principal cause of his death. A late radical surgical lymphadenectomy was not considered, due to the involvement of the lymph nodes in both groins and armpits.

CONCLUSION

The development of aggressive SCC of the abdominal wall is related to chronic mesh infection. Local treatment requires complete tumor resection along with a challenging reconstruction of the abdominal wall. The use of a coated synthetic mesh allowed a reliable closure and reinforcement of an extensive defect after tumor resection, even in the presence of local infection. Adjuvant chemotherapy and radiation therapy were necessary to control metastatic disease.

REFERENCES