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Report of a case



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The use of biological mesh to repair one large, contaminated abdominal wall defect due to neoplastic invasion. Report of a case

We hereby report a case of use of biological mesh to repair one large, contaminated abdominal wall defect due to a sigmoid tumour presented as an abscess infiltrating the abdominal wall. Our patient was a 48 years old woman. Her medical history was negative for any previous disease or surgical procedure. Because of the absence of neoplastic secondarism an en-bloc resection of the interested sigmoid colon and of the infiltrated abdominal wall was performed, thus resulting a large wall defect in the left inguinal region. In order to close the wall defect a biological porcine collagen mesh was used. In our case we used a Permacol mesh made of porcine acellular dermal collagen.

Reconstruction of complicated abdominal wall defects is a challenging surgical problem and primary repair is often difficult to achieve without excessive tension in the abdominal wall. The use of a synthetic mesh in this patient could have been inappropriate due to the possibility of creating adhesions with intra-abdominal viscera and fistula formation. We chose to use a biological mesh because of its safer properties in case of infected, inflamed or infiltrated surgical fields, as demonstrated in the literature.

KEY WORDS: Abdominal wall, Bioprosthesis, Mesh.

Introduction

Abdominal wall defects caused by trauma, tumour resection or incisional hernias are quite common ¹. Reconstruction of complicated abdominal wall defects is a challenging surgical problem and several techniques have been described. Primary repair is often difficult to achieve without causing an increase in the tension of

the abdominal wall. Most surgeons therefore agree that defects larger than 4 cm should be repaired with a tension-free technique using a prosthetic mesh implant ². However, reconstructive surgery of the abdominal wall still represents a substantial challenge for both general and plastic surgeons. Synthetic meshes such as polypropylene are commonly used to repair wall defects but they cannot be placed in direct contact with the peritoneum because they cause adhesions to intra-abdominal viscera and enterocutaneous fistula formation ³. Moreover, they are quite prone to develop infections, even in case of composite meshes, and therefore their use is avoided in case of a contaminated or infected field ⁴. A possible solution for the repair of an abdominal wall defect following contaminated mesh removal or wall defect on

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infected fields could be the use of a biologic mesh implant.

In the following case report we describe an unusual presentation of an adenocarcinoma of the sigmoid colon with invasion of the anterior abdominal wall leading to an abscess formation. In such situation the repair of the wall defect using a synthetic mesh seemed inappropriate since the patient could undergo postoperative radiotherapy that could cause problems to the integration of a graft of polymeric structure. So, following the tumour excision the abdominal wall was repaired using porcine acellular dermal collagen (Permacol[®]: PADC), a biologic material derived from processing porcine dermis cross-linked with disocyanate ⁵.

Case report

A 48-year-old woman was referred to another surgical unit due to the appearance of a mass in her lower left abdominal quadrant. The mass was diagnosed as an inguinal hernia. During the hospitalisation an abscess appeared in the site of the mass and was treated by incision and evacuation of the infected content. The cytological examination of the content revealed the presence of a colon adenocarcinoma metastasis. Colonoscopy was performed and a stenosing mass of the sigmoid-rectum junction was found. The patient was discharged from the surgical unit and referred to our attention. At the time of our first visit a palpable mass of increased consistence, painful and with pus leakage was present in the lower left abdominal quadrant. The patient had no fever and a blood sample revealed an elevated PCR (1.96 mg/dl) and CEA (15,50 ng/ml). The medical history was silent for any previous disease or surgical intervention. A CT scan revealed a voluminous mass causing stenosis of the proximal sigmoid colon with infiltration of the bowel wall, the surrounding tissues and the abdominal wall. Multiple intra-abdominal enlarged lymph nodes were evident but no distal metastases were found. The routine preoperative exams were normal. The patient underwent an explorative laparotomy that confirmed the CT scan findings. A lozenge incision with en-bloc excision of the infiltrated wall was performed. Colon resection was made at the level of the left colon-sigmoid junction with left colon-sigma end-to-end anastomosis. The peritoneal gap was repaired using a biological porcine mesh 10 X 5 cm. The muscles of the abdominal wall were replaced using a second porcine mesh, 15 X 10 cm, fixed to the edges of the incision using non-absorbable stitches. Both the peritoneal and muscular meshes were fixed in order to give tension to the structure. By doing so, the lower layer was in a peritoneal situation while the upper edge was used as a substitute for the loss of parietal tissue. Two suction drainages were placed between the two meshes and a third drainage was placed in the left parietocolic space.

The postoperative period was characterized by the resumption of the intestinal motility and oral alimentation was introduced on the fifth day after surgery. The patient was discharged on the eight postoperative day. Histology confirmed the diagnosis of colon adenocarcinoma infiltrating the bowel wall, the surrounding soft tissues and the abdominal wall. The edges of the resection were not infiltrated and all 17 lymph nodes removed were negative (pT4N0Mx). After adjuvant chemotherapy and a six month follow up period the patient is disease free. She went back to her job and the abdominal mechanical physiology is normal.

Discussion

Colon cancer is the second most frequent neoplasm in the Italian population. Its incidence is low in people younger than 40 years of age and peaks between the fifth and sixth decades of life. About two thirds of the tumours are in the recto-sigmoid area ⁶. Approximately 30% of patients with colon-rectal cancer have locally advanced or metastatic disease at the time of initial diagnosis that cannot be treated by surgery alone ⁷. The most common sites for colon cancer metastases are the regional lymph nodes, the liver, the lungs and the peritoneum ⁸. Colon carcinoma very rarely presents with subcutaneous, retroperitoneal or abdominal wall abscess or subcutaneous emphysema. Abscess of the anterior abdominal wall developing as a result of direct invasion and perforation of the colon by cancer has been rarely described ⁹. This patient showed a direct adhesion of the colonic neoplasia to the anterior abdominal wall with abscess formation. The prognosis of patients with carcinoma of the colon depends largely on the presence or absence of involved lymph nodes. When the cancer extends through the entire colonic wall but lymph nodes are not involved, as in our case, the 5-year survival rate is approximately 50%. However, when there is extension through all layers of bowel wall and lymph nodes are involved the 5-year survival falls to 20% ¹⁰. Abdominal wall invasion does not mean that the tumour is not resectable. It is potentially curable despite the extension of the infiltration. The use of a wide incision of all involved structures is recommended in the literature, especially when lymph nodes are disease free, since the presence or absence of lymph node metastases influences the prognosis more than the depth of invasion by the tumour ¹¹. We believe that an en bloc excision of the full thickness of the anterior abdominal wall, including the abscess, is the most appropriate procedure. We performed this procedure on the patient thus creating a large defect in the anterior abdominal wall. The regional abdominal wall, the groin channel, the Poupart ligament and the preperitoneal fat were included in the en-bloc excision of the cancer. The procedure required us to decide on how to repair the defect. The ideal mate-

rial for the repair of abdominal wall defects is required to provide strength, flexibility, tissue incorporation, and be resistant to infections. There are a wide variety of mesh materials available for abdominal wall reconstruction¹². Multiple permanent meshes are commercially available for repair of abdominal wall defects, including polypropylene, polyester and polytetrafluoroethylene. Such materials allow tissue ingrowth but they may be associated with development of foreign body reaction, small bowel obstruction, intestinal fistula formation, erosion of adjacent abdominal viscera, and mesh shrinkage or migration. These risks are particularly high when permanent mesh is placed in direct contact with the abdominal viscera¹³. These materials are also intolerant to infection and their use in the presence of potential contamination, infection or enteric fistulae is limited¹⁴. Furthermore these polymeric materials might be subjected to structural alterations in case of radiotherapy. In our case we encountered a contaminated field and the mesh would have been in direct contact with viscera. We decided to use a biological graft instead to close the abdominal defect. Some authors showed that PADC induces a milder inflammatory response and lesser formation of adhesions¹⁵. It has less propensity to infection, erosion, extrusion or rejection¹⁶. Moreover, there is no intra-abdominal adhesion formation and/or fistula formation. Autologous tissue grafts have also been used to reconstruct defects in the presence of contaminated wounds where prosthetic materials were contraindicated¹⁷. In our case we have shown that successful closure of a large wall defect is possible with the use of PADC, especially in a contaminated field. Despite this advantage, biological meshes are not always available in sufficient quantities, the cost of the implant material is significant and there is no evidence in the literature of long-term results.

Riassunto

Riportiamo il caso di un tumore del sigma presentatosi come un ascesso infiltrante la parete addominale. A seguito dell'assenza di secondarismi neoplastici è stata eseguita una resezione del tratto di sigma interessato e della porzione di parete addominale infiltrata. La ricostruzione chirurgica di grossi e complicati difetti di parete è difficile e spesso ardua da ottenere senza una eccessiva tensione di parete. L'uso di una protesi sintetica in tale situazione potrebbe essere inappropriato a causa della possibilità di formazione di adesioni viscerali e di fistole. Per la ricostruzione chirurgica di tale difetto di parete è stata quindi utilizzata una protesi biologica di collagene porcino, scelta per le sue migliori capacità di integrazione tissutale in caso di utilizzo in tessuti infetti, infiammati o infiltrati.

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