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Immunosuppression and Abdominal Wall Defects: Use of Autologous Dermis

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Abstract. *Aim: The purpose of the present study was to analyze the use of autologous dermis compared to non-biological meshes in repair of abdominal wall defects in patients with redundant skin and immunosuppression. Patients and Methods: Eighteen patients with abdominal wall defects, immunosuppression and with redundant skin were divided into two groups: Group A consisted of 11 patients treated with autologous dermis. In these patients, autologous dermis was isolated from the amount of skin resected from the inferior abdominal region that was used as a reinforcement of fascial margins above the defect. Group B consisted of seven patients treated with non-biological meshes We evaluated the infection rate of these groups. Results: The infection rate was significantly lower in group A patients. Conclusion: The transplantation of autologous dermis as a reinforcement for the reconstruction of abdominal wall defects is reasonable for highly selected patients. The use of the dermis was proven useful and we found a lower rate of infection and recurrence.*

Abdominal wall defects are one of the largest subjects of general abdominal surgery. There are several predisposing factors that may lead to the formation of an abdominal wall defect, such as pregnancy and obesity. These defects can be predisposing to the development of abdominal hernias. One of the most frequent defects that occur in obese and post-bariatric patients is the muscular diastasis of abdominal muscles.

In all cases, the discovery of a symptomatic abdominal wall defect must be treated in order to try to restore the normal anatomy. For example, in cases of simple muscular diastasis of the rectus muscle of the abdomen, the suture of the muscle margin can effectively solve the problem.

Sometimes re-positioning of the edge of the diastasis results in excessive tension and surgeons need to resort to the use of mesh for the reconstruction. It is also true that the use of mesh is often necessary in the repair of post-incisional hernias.

Ramdomized studies have demonstrated better outcomes for incisional hernia repair reinforced with mesh compared to repairs without reinforcement (1, 2).

In particular conditions, such as immunodepression, however, the use of non-biological meshes may even be discouraged due to the high risk of infection.

In the present study, we compared autologous dermis transplant with the application of meshes in highly selected patients with abdominal wall defects. All patients were immunosuppressed with abdominal dermolipodystrophy.

Patients and Methods

At our Unit of Plastic and Reconstructive Surgery, we treated 18 immunosuppressed patients in 12 years (from the year 2002 to 2014): six liver transplanted patients, nine oncological patients, and three HIV-positive patients.

All patients were under treatment with immunosuppressive drugs or chemotherapy drugs according to standard protocols and all of them had an acquired lipodystrophy caused by significant previous weight loss.

We defined two groups: Group A consisted of 11 patients treated with autologous dermis. In these patients, autologous dermis was isolated from the amount of skin resected from the inferior abdominal region and this was used as a reinforcement of fascial margins above the defect. Group B consisted of seven patients treated with non-biological meshes.

In group A, four transplanted patients (post-incisional hernia), five oncological patients (three with post-incisional hernia, one with muscular diastasis and one with hernia) and two HIV-positive patients (muscular diastasis) were treated with abdominoplasty and correction of abdominal wall defect with autologous dermis. The dermis was taken from the portion of skin removed during the abdominoplasty with the aid of a dermatome.

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In group B, two transplanted patients (post-incisional hernia), four oncological patients (two with post-incisional hernia and two with hernia), and one HIV-positive patient (muscular diastasis) were treated with abdominoplasty and correction of the abdominal wall defect with a non-biological mesh of prolene (Ethicon - Johnson and Johnson, Pratica di Mare, Pomezia (RM), Italy).

All patients were subjected to a strict follow-up in the subsequent months. Examinations included: serological tests for infectious diseases conducted in the two weeks following the operation; imaging studies to assess the failure of reconstruction or the recurrence of the abdominal defect: one echography two months after and one computed tomography one year after.

Results

In group A, after two months, one patient developed an infection of the surgical site followed by surgical wound diastase. An antibiogram showed the presence of *Staphylococcus aureus* and *Enterobacter cloacae*. An antibiotic therapy was prescribed and a vacuum-assisted device was applied. After 3 months, the wound had closed. The remaining patients had normal postoperative recovery.

Group B included patients treated with mesh. We recorded three infections within three weeks after surgery, and in one of these three patients, we also highlighted a recurrent diastasis. The infected patients were treated with broad-spectrum antibiotic therapy, while the patient with recurrence underwent re-operation with replacement of the mesh with an autologous dermis graft. Microbiological tests were conducted on the mesh removed from one of these patients and they showed numerous colonies of *Acinetobacter*. This patient was re-evaluated and followed-up over time and showed no signs of infection or recurrence in the examinations after one year.

Discussion

Historically, hernias have been repaired without the use of mesh. Results of this kind of surgery were not satisfactory on the whole, with a recurrence rate of 35-42% (3, 4). Over the years, surgical strategies have changed and the use of mesh has been a veritable revolution. Currently, it is possible to repair defects of the abdominal wall in laparoscopy. Meshes are often used as first choice, as supported by several authors (5-8).

Infection is a major complication that can lead to the development of incisional hernia (1, 9, 10). The management of incisional hernia and muscle diastasis in immunosuppressed patients certainly requires more care than in patients without specific clinical conditions. In the surgical patient who is immunocompromised, all of the comorbidities present should always be considered.

Such meshes are in any case a foreign body that needs to be integrated into the tissue where it is applied and potentially they are a source of bacterial colonization. This aspect in immunosuppressed patients must be carefully evaluated. In cases of infection of meshes in contaminated environments, the replacement of mesh is suggested (11).

The use of autologous dermis for the correction of defects in the abdominal wall dates from the second decade of 1900. Hagström *et al*., in 1976, described the use of autografts of dermis to repair defects in the anterior abdominal wall, with optimal outcomes at 4 years' follow-up (12). The advantages of autologous dermal graft are availability, substitution of firm fibrotic tissue and endurance against infection (13, 14).

The recurrence rate is estimated to be around 10%, but the implanted tissue is fully integrated and revascularized, so it is better protected from infection (15).

Rozen *et al*., in 2012, used autologous dermis sourced from the redundant overlying abdominal skin for reconstruction of ventral abdominal wall defects. Short-term complications were notable, with five patients requiring postoperative intensive care unit admission, and seven patients requiring respiratory support (16).

In our study, despite the low number of patients taken into account, the proportion of infections that occurred in the postoperative period was much higher in the group of patients treated with prosthetic mesh (3/7, 43%) rather than the group of patients treated with autologous dermal graft (1/11, 9%).

Conclusion

The transplantation of autologous dermis as a reinforcement for the reconstruction of abdominal wall defects is reasonable for highly selected patients. The withdrawal of autologous dermis is easy to perform in patients with acquired lipodystrophy and at the same time very cost-effective. The lower rate of infection is explained by the fact that the autologous dermis (similarly to biological meshes) integrates with the surrounding tissue and is re-vascularized. In our experience, the use of dermis has proven valuable and we found a lower rate of infection and recurrence.

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Disclosure

The Authors have nothing to declare

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