



A scanning electron microscopical study of the two sides of polypropylene mesh (Marlex[®]) and PTFE (Gore Tex[®]) mesh 2 years after complete abdominal wall reconstruction. A study of 15 cases[☆]

Alain M. Danino^{a,b,*}, Gabriel Malka^b, Marc Revol^a, Jean-Marie Servant^a

^a*Department of Plastic and Reconstructive Surgery and The Department of Electron Microscopy at the Saint-Louis University Hospital of Paris, Paris, France*

^b*Department of Plastic and Reconstructive Surgery, Dijon University Hospital, General Hospital, 3 rue Faubourg Raine, 21000 Dijon, France*

Received 4 May 2004; accepted 3 June 2004

KEYWORDS

Abdominal wall;
Polypropylene;
Polytetrafluoroethylene

Summary The use of biomaterials for the repair of abdominal wall defect is becoming common and safe. It has been 20 years since the senior author developed a method to reconstruct the very large transfixing abdominal wall defect with a combination of two biomaterials (Gore Tex[®] PTFE as a neo peritoneum and polypropylene superficial to this in order to give rigidity to the abdominal wall) and a superficial flap. An observation at the electron microscopy level of the two sides of the implants' surfaces was performed. At the time of a late abdominal wall surgical revision on 15 patients, the prosthesis fragments have been analyzed at the electron microscopy level. The aim of our study was to analyze the late evolution of the different sides of these prostheses.

Our results showed, for the first time in vivo, that there is an impressive stability of the deep side of PTFE ultra structure after implantation, a significant difference of the two sides of PTFE at the ultrastructural level and the creation of an intermediate tissue between the two meshes. In contrast, the polypropylene invariably gave rise to adhesions and colonisation by the surrounding tissues. Findings confirmed that the structure and porosity of a biomaterial play a key role in the appearance of adhesions and their consistency.

© 2004 The British Association of Plastic Surgeons. Published by Elsevier Ltd. All rights reserved.

[☆] Presented in part at the 45th Annual Meeting of the French Society of Plastic and Reconstructive Surgery in Paris, France, October 2001.

*Corresponding author. Address: Department of Plastic and Reconstructive Surgery, Dijon University Hospital, General Hospital, 3 rue Faubourg Raine, 21000 Dijon, France.

E-mail address: alain.danino@chu-dijon.fr

Complex abdominal wall defects challenge both general and plastic surgeons. This problem results from a variety of causes including trauma, previous surgery, tumour resection and congenital defect. The reconstructive goals are to protect abdominal contents and provide functional support. The use of biomaterials for the repair of complete abdominal

wall defects is becoming increasingly common today and these procedures pose no problem in terms of biocompatibility. Yet its placement at a tissue interface, especially at the level of the peritoneum, is associated with complications such as the formation of adhesions or intestinal fistulae.¹⁻⁴ Several previous studies in animals models evaluated the behaviour of different biomaterials at the interface formed with the visceral peritoneum. Bellon et al.⁵ demonstrated that the best results were achieved at this site when laminar prostheses (of the e-PTFE type) were employed. These gave rise to a linear, perfectly organised neo peritoneum. In contrast, when a reticular prosthesis (polypropylene type) was used to repair an abdominal wall defect, peritoneal regeneration was uneven and invariably gave rise to adhesions.⁶ For more than 20 years the senior authors developed a method to reconstruct the very large transfixing abdominal wall defect with a combination of two biomaterials and a superficial flap (Fig. 1), with a total of 70 patients operated upon. The Gore-Tex[®] prosthesis is positioned in contact with internal organs to form a neo peritoneum, the suture is edge-to-edge without any fold and the polypropylene prosthesis is sutured just above as an overlay with running suture from the residual abdominal wall muscles to give rigidity. The present investigation was designed to demonstrate the utility of two separate prostheses creating a physiologic new abdominal wall. We compared the different sides of the two prostheses in scanning electron microscopy, thanks to a late surgical revision in 15 patients at less than 2 years after implantation. As we excluded haematoma and infectious problems

because we wanted to study normal evolution of these biomaterials, we think that the explanted meshes adequately represent the larger group of 70 patients operated upon by the senior author without hernia.

Materials and methods

Unused prosthesis examination polypropylene mesh (Marlex[®]) and PTFE (Gore Tex[®])

The unused specimens taken for comparison were taken off the shelf at the time of the study. A 1 cm² fragment of each mesh was cut and used for study by scanning electron microscopy. The fragments were cleaned with ultrasound then put on slides and coated with gold under a vacuum (Sputter coating JEOL[®] JFC 1100 E). The examinations were performed with a JEOL[®] JSM 5200 scanning electron microscope. Pictures were taken with a Polaroid[®] 545 camera and then digitised. The planimetry analyses were performed with NIH[®] Image 1.9 software.

Prosthesis examination at least 2 years after implantation

A clinical study was performed on 15 patients in two plastic and reconstructive departments between January 1998 and September 2002, in order to collect 15 samples of each side of the biomaterials studied (Table 1). All the patients had undergone a complete abdominal wall reconstruction following

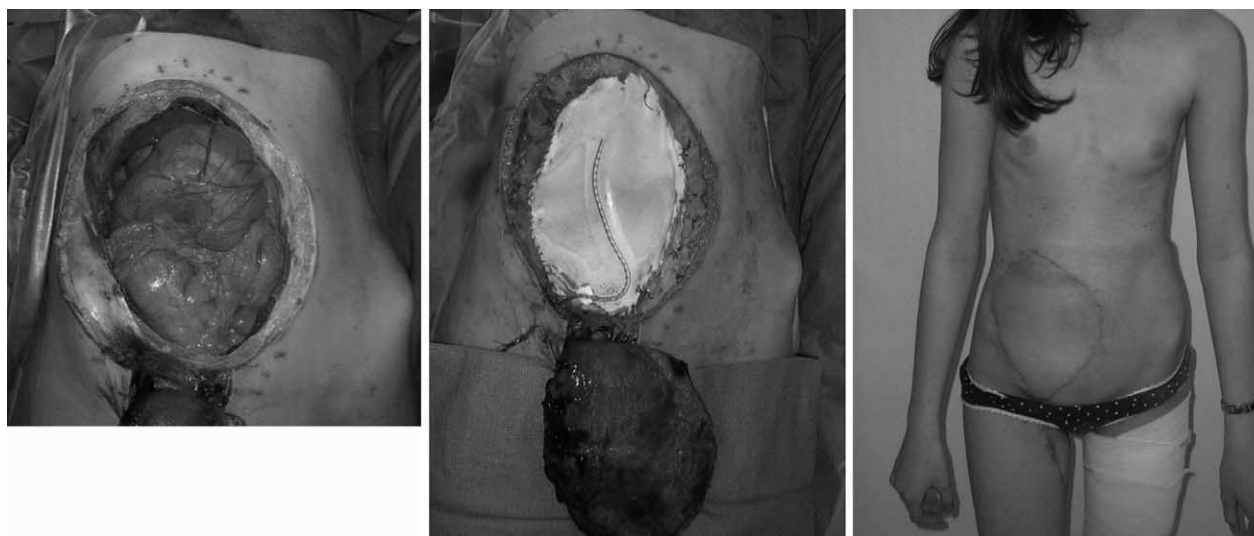


Figure 1 (Left) Full thickness abdominal wall defect after surgical excision of dermatofibrosarcoma protuberans. (Middle) Sandwich reconstruction with Gore-Tex[®], Marlex[®] and a superficial Latissimus dorsi free flap. (Right) Post operative result.

Download English Version:

<https://daneshyari.com/en/article/10087164>

Download Persian Version:

<https://daneshyari.com/article/10087164>

[Daneshyari.com](https://daneshyari.com)