



Editorial – referring to the article published on pp. 851–853 of this issue

Penile Transplantation?

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Composite tissue allografts opened a new era of transplantation history. Hand allografts (1998) and, more recently, face allografts (2005) were the origin of a debate in the medical community and in society. The hand and face are not the only composite tissues to be allografted: in 1996, Hoffman reported the first femoral bone and knee joint transplantations, Strome published the first larynx transplantation (1998), and Levi reported 12 abdominal wall allografts (2004); a tongue transplantation was performed in Vienna 2 yr ago although results were not published. All these grafts were not vital, and all of them aimed to repair a severe functional or aesthetic defect. So why not transplantation of the penis?

Composite tissue allografts are not yet in a clinical routine stage. They have to be thoroughly investigated in clinical research before being applied to well-selected cases. At least three challenges must be overcome:

1) *Technical and functional*: The feasibility of a penile allograft is technically demonstrated by the few cases of penile replantation reported in the literature. However, data on the long-term functional results are scarce. The case reported by our Chinese colleagues applied the best microsurgical techniques: anastomoses of the deep and superficial dorsal vein, dorsal artery, and dorsal nerve are sufficient to ensure a satisfactory technical result [1]. Anastomoses of the corpus spongiosum and corpus cavernosum are of the utmost importance for erection. No details are given on the degree of fibrosis observed at the

level of these two structures in the penile stump. Return of sensitivity is well documented after replantation in the only case we have published with Gelet, in which nerve regeneration reached the tip of the penis after 4 to 5 mo.

2) *Immunologic*: There are no experimental data on penile allografts in animals nor on the immunogenicity and rejection profiles of each of its components. However, skin is known as the most immunogenic body tissue with an aggressive rejection profile. Fear of skin rejection probably is the main explanation for the long gap observed between organs and composite tissue allografts. The decision I took to take the plunge of performing the first hand allograft was based on the hypothesis that vascularised stem cells in an anatomic situation in the bones could migrate to the recipient regional lymph nodes or thymus and induce a so-called partial tolerance. This hypothesis might appear as partially confirmed by the long-term studies in our patients. It is the reason that led me to add donor-specific bone marrow infusions to the classical immunosuppression used in the first face transplantation performed in collaboration with the Amiens maxillofacial team. No bone marrow infusion was used by the Guangzhou team; however, their immunosuppression protocol is modern and well-adapted associating monoclonal antibody to cyclosporine, mycophenolate mofetil, and prednisone. This protocol as well as the “ideal histocompatibility” (often observed in Chinese recipients of hand allografts?) might have played a role in the absence of rejection during the

follow-up period. The lifelong need for immunosuppression with its medical risks and costs in a country without generalised health insurance also must be considered. Problems were observed after hand transplantation in China as reported by Pei at the 2006 Hand and Composite Tissue Allograft Society Meeting in Tucson, AZ.

- 3) *Psychological*: Psychological consequences of hand and face allografts show that it is not so easy to use and see permanently a dead person's hands nor is it easy to look in a mirror and see a dead person's face. However, we have demonstrated that the psychological appropriation to the graft was occurring progressively with the return of sensitivity. Two psychological phenomena were well described by our team of psychiatrists: denial (these are not a dead person's hands, there are my hands) and splitting (a part of the brain knows that hands are coming from a dead person and the other that they are the recipient's hands, with the latter being dominant). Clearly, in the Chinese case the failure at a very early stage (14 d) was first psychological. It involved the recipient's wife and raised many questions. We have no information on the initial accident. Curiously in Gelet's case the patient re-severed the reimplanted penis 9 mo after the successful replantation.

The report of the first attempt at penile transplantation raises many questions and has some critics. I cannot imagine what would have been the

reactions of the medical profession, ethics specialists, and the media if a European surgical team had performed the same operation. The only argument to oppose these critics could be: "It would have been impossible to reconstruct the penis with autologous tissues in order to have the patient regaining a normal body image and a satisfactory function." From my personal viewpoint, there are many possibilities for penile reconstruction especially when a significant stump persists (the Chinese team had the possibility of using a tourniquet on the patient's penile stump). In most patients reconstruction is technically feasible with classical techniques. If there is no such possibility, then penile transplantation could be considered.

It is the responsibility of the medical team to completely inform the patient and to ensure he has understood this information. Finally, the decision rests with this well-informed patient and also with the donor's family who must be informed. I guess the number of indications will be very few and this case will long remain isolated in the international registry on hand and composite tissue transplantation run by the Milano La Bocca and Les Hospices civils de Lyon.

Reference

- [1] Hu W, Lu J, Zhang L, et al. A preliminary report of penile transplantation. *Eur Urol* 2006;50:851-3.