

Reconstructive Urology

Long-term outcome of forearm free-flap phalloplasty in the treatment of transsexualism

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Accepted for publication 14 September 2007

Study Type – Therapy (outcomes research)
Level of Evidence 2c

RESULTS

The mean follow up was 110 months; 53 of the 56 patients (95%) currently have a neophallus, after a mean of six surgical procedures. Satisfaction was assessed in 53 patients using a specific questionnaire: 51 (93%) of the patients reported that the phalloplasty allowed them to accord their physical appearance with their feeling of masculinity. There were flap complications in 14 patients (25%); three (5%) flaps were lost, with one each due to early haematoma, cellulitis and late arterial thrombosis. The other 11 flap complications were all transitory, e.g. infection, haematomas and vascular thrombosis. There were prosthesis complications in 11 of 38 patients (29%). Moreover, seven of 19 patients (37%) who had a urethroplasty presented with complex

strictures and fistulae that led to perineal urethrostomy.

CONCLUSION

Our study shows that phalloplasty with a forearm free-flap leads to good results in term of flap survival and patient satisfaction. However, there was a high rate of complications. Patients must be clearly informed that the procedure can seldom be achieved in one stage.

KEYWORDS

transsexualism, gender identity, surgical flap, penis surgery, urethra surgery, penile prosthesis

OBJECTIVE

To assess the long-term outcome of forearm free-flap phalloplasty in transsexuals, as obtaining a satisfying neophallus in female-to-male transsexuals is a surgical challenge.

PATIENTS AND METHODS

We analysed retrospectively 56 transsexuals who had a phalloplasty using a radial forearm free-flap in our department from 1986 to 2002. The complication rate was assessed by regular examination. Patient satisfaction was evaluated by a questionnaire about cosmetic aspects, sexual life and overall satisfaction.

INTRODUCTION

Phalloplasty is the cornerstone of the medical management of gender dysphoria [1]. Once transsexualism [2] is diagnosed, according to the Diagnostic and Statistical Manual of Mental Disorders IV [3], patients are followed in specialized multidisciplinary medical units [4], where hormonal therapy and psychological follow-up are initiated. After at least 2 years (usually 5–10 years for most patients), and after modification of the

administrative sexual identity, patients undergo surgery consisting in mammectomy, hysterectomy and phalloplasty if requested.

Patients are offered two kinds of phalloplasty, performed in our team, i.e. the abdominal phalloplasty in three stages with an expansion balloon, a procedure that lasts 6–9 months; or the forearm free-flap phalloplasty (FFFP) initially described by Chang and Hwang [5], which is reported to give the best cosmetic results with fewer complications [6]. The FFFP

also allows a one-stage urethroplasty using the 'tube within the tube' strategy.

Thus the aim of the present study was to assess the long-term outcome of FFFP in transsexuals, and to estimate the effective benefit to these patients.

PATIENTS AND METHODS

We conducted a retrospective study in one centre of transsexuals treated from January

1986 to December 2002; 56 had a FFFF according to the technique described previously [5], with some modifications. The mean (range) age at surgery of the patients was 30 (20–44) years. All patients had a mammectomy and radical total hysterectomy (laparoscopic or vaginal approach) before phalloplasty. All patients were under androgen therapy and regularly followed by a psychiatrist. The indication for phalloplasty was established during a multidisciplinary board assessment.

The same team (one urologist, A.L. or N.M.J.) and one plastic surgeon (A.B.) performed all the procedures. A fasciocutaneous forearm flap was removed from the subordinate upper limb. It was pedicled on the radial artery, musculocutaneous nerve, basilic vein and either cephalic vein or forearm medial vein. Vascularization of both the palmar and dorsal carpal arterial arch of the hand by the ulnar artery was assessed using the Allen test before surgery. When the test was doubtful, patients had Doppler ultrasonography of the forearm (eight). The 'tube within the tube' technique was used to create a neourethra in the flap [7]. The initial urethra was systematically prolonged using the anterior part of the vagina, which was dissected and tubularized. The flap was implanted anterior to the pubis, the radial artery was anastomosed with the inferior epigastric artery, and the veins were anastomosed with the inferior epigastric vein and internal saphenous vein. The musculocutaneous nerve was anastomosed with the dorsal clitoridian nerve. An optical microscope was used for vascular and neural anastomoses.

The glans was sculpted in a second stage by a circumferential cutaneous plasty. A mesh skin graft (from the gluteal or femoral region) was used to cover the donor site.

A penile prosthesis was implanted in 38 patients (68%), according to their wish, 3–9 months after phalloplasty. During the study period, various types of penile prosthesis were used (a prototype was designed for this specific indication, which had a flat and enlarged proximal extremity, but is no longer available, or a standard penile prosthesis, e.g. Ambicor, AMS 600 and AMS 700S; American Medical Systems, Minnetonka, MI, USA). The prosthesis was inserted through a basal lateral incision of the phalloplasty.

Complication	N (%)
Flap	
Loss	3
Cephalic vein thrombosis	1
Arterial ischaemia	1
Infection	5
Distal limited necrosis	2
Haematoma	2
Total	14 (25)
Prosthesis and urethra	
Urinary fistula requiring perineal urethrostomy	7
Urinary fistula with conservative treatment	8
Urinary retention	3
Prosthesis change	8
Prosthesis explantation	3
Total	29 (55)

TABLE 1
Complications of the flap, prosthesis and urethra

After surgery all patients had a regular physical examination, and none were lost to follow-up. All complications were treated in our department. For this specific study, we designed a questionnaire to assess the patients' cosmetic and sexual satisfaction, the cutaneous sensitivity of the flap, and the following social data: celibate, married or living with the family, in employment, or professional changes occurring after surgery, the use of antidepressant medication, suicide attempts, and need for psychotherapeutic consultation. Sexual satisfaction was defined as the ability to have painless sexual intercourse with penetration. Patients were also asked if they had an erogenous sensitivity of their phalloplasty. To estimate overall satisfaction with the procedure, patients were asked if they estimated that the phalloplasty procedure allowed their body a sexual appearance that fitted with their feeling of masculinity. This 'satisfaction study' was conducted during 2004; most (47) of the questionnaires were given during a medical evaluation, and the others were sent by confidential regular mail.

RESULTS

The mean (range) follow up was 110 (11–204) months; one patient died at 120 months from acute myocardial infarction. The mean hospital stay was 20.2 days and the mean number of procedures per patient was 6 (2–24), which included implantation of the penile prosthesis as well as surgical management of complications (e.g. urethral strictures dilatation) under local or general anaesthesia. The complications are detailed in Table 1. We separately assessed flap

complications and urethral or prosthesis complications. The flap survival rate was 95%, as two flaps were lost soon after surgery (one compressive haematoma and one cellulitis) and one was lost 7 weeks after surgery, secondary to venous thrombosis. There was also one cephalic vein thrombosis treated with heparin, antiplatelet adhesion drugs and leeches, and one arterial thrombosis which required a repeat anastomosis using the contralateral inferior epigastric artery.

Among the 19 patients who had a urethroplasty because they wished it, seven (37%) had a subsequent urinary fistula, with unsuccessful conservative treatment, that finally required a perineal urethrostomy, a mean of 72 months after phalloplasty. Eight (42%) other patients with a urinary fistula were treated conservatively, either surgically or with prolonged catheterization. The four (21%) remaining patients only had auto-dilatation of the urethra to improve their voiding condition, in the first months after the initial surgery. Among the 12 patients with a functional urethroplasty, three have a satisfactory voiding status with no dysuria, incontinence or postvoid residual.

Of those with a penile prosthesis, 11 (29%) had mechanical or infective complications, leading to changing the prosthesis up to three times; three (8%) subsequently had the prosthesis explanted.

Of the 56 patients, 53 answered the satisfaction survey. For the statistical analysis we considered that all 55 patients alive at the time of the study should be included. All patients who refused to answer the

questionnaire were considered as having an unsatisfactory result. Fifty patients (90%) were satisfied of the cosmetic aspect of their phalloplasty, which was a mean of 125 mm long. Among the unsatisfied patients, one had a retractile scar on the forearm. The cutaneous sensitivity of the phalloplasty was significant in 46 patients (83%) but only five (9%) had obvious erogenous sensitivity when touching their phalloplasty. Sexual satisfaction was investigated among the 35 patients with a functional penile implant; 18 (51%) declared that they had satisfactory sexual intercourse with penetration.

During the follow-up there was one (2%) suicide attempt (by a patient with a functional phalloplasty whose girlfriend left him), 15 (27%) patients had a temporary need for antidepressant drugs, but only three (6%) had psychotherapeutic care. In all, 49 patients (89%) were living in a couple and, of these, 15 (27%) had children (the partner's children, or adopted). According to 22 patients (40%), phalloplasty and the medical and surgical treatment of gender dysphoria allowed them to finally obtain a job that they were unable to apply for as a female. Fifty-one patients (93%) stated that FFFP allowed their body the sexual appearance that fitted with their feeling of masculinity.

DISCUSSION

In our experience, as in previous reports [8], the FFFP is the best choice for total phalloplasty in transsexuals, over various other techniques; it allows a vascularized large-sized flap [1] in a one-stage procedure [9]. Urethroplasty is easy, using the 'tube within the tube' technique, with the smooth ulnar face of the flap forming the neourethra and the hairy face (radial part) forming the phallic skin.

The present study produced contradictory results; there was excellent 'flap survival', with few vascular complications, thanks to the quality of the microsurgical anastomosis and to the ideal disposition of the radial artery in the axis of the inferior epigastric artery without kinking. Moreover, the large venous drainage allowed good haemodynamic conditions and therefore reduced the risk of thrombosis [1]. If there is low-flow flap ischaemia, it is still possible to salvage the phalloplasty by re-establishing radial artery outflow, either by a distal radial anastomosis or with an arteriovenous shunt [10,11].

There was also low morbidity at the donor site; in the long term, only one patient had an aesthetically unacceptable scar and cutaneous retraction on the subordinate arm.

There was a high rate of overall early and late complications (25% and 54%, respectively). The study emphasizes the part played by the urethroplasty in the overall morbidity. Indeed, half of the late complications were urethral strictures and urinary fistulae, mostly associated with the junction between the native and neourethra [12]. Compared to others [1,13], we report a high rate of perineal urethrostomy (13%). This could be explained by the long-term follow-up of our study, as the urethrostomy was performed a mean of 72 months after urethroplasty. Thus, multiple procedures for strictures and fistulae allow the urethroplasty to be conserved for a few years but might lead to a perineal urethrostomy after deterioration, usually at the patient's request. This type of complication was stable for the period of the study, indicating that this is probably a limitation of the FFFP. Because of this we progressively advised patients against urethroplasty. Despite this, 19 of the 56 patients still wanted a urethroplasty, showing that in this type of pathology the desire to 'void while standing' is very strong [7].

Implantation of a penile prosthesis was responsible for 37% of the late complications. We strongly recommend implanting the prosthesis ≥ 3 –6 months after phalloplasty, not only to minimize the risk of infection, but also to ensure the absence of flap ischaemia, mostly in the distal part of the flap (4%). Indeed, limited necrosis of the flap extremity can be easily managed if the prosthesis is not inserted. Moreover, sensitive re-innervation of the flap takes place at 4–9 months after surgery [14], and might be essential before inserting a penile implant, to be sure that patients can sense what the phalloplasty. We systematically inform our patients of the possible risks of prosthesis implantation, and this probably explains why some patients did not request a penile prosthesis. We regret the absence of a specifically designed penile prosthesis for phalloplasty in transsexuals; having appropriate materials might contribute to reducing the morbidity. Another explanation for the high morbidity rate is the smallness of the FFF, compared with other flaps (pedicled suprapubic flap [15] or free anterolateral thigh flap phalloplasty [16]). A larger flap allows easier placement of a

prosthesis and could lower the risk of cutaneous necrosis. The use of free flaps including bone could be a good alternative. Hence, Papadopoulos *et al.* [17] reported very impressive results with a free sensate osteofasciocutaneous forearm or fibula flap. In a subset of their series, they found that all their patients with a fibula flap were able to have satisfactory sexual intercourse (vs only 58% with an osteocutaneous FFF). These promising results should be confirmed in a larger study, also reporting the rate of flap complications.

Despite the high morbidity there was a high (90%) satisfaction rate in the present study. These apparently contradictory results might be explained by the strong motivation of the patients, accumulated after years of administrative stages and medical treatment, which allows them to accept frequent hospitalization, consultations and surgical procedures. It is also possibly a consequence of the considerable time we spend in explaining in detail the various risks of the procedure, and that there were few (5%) serious complications that needed explantation of the phalloplasty.

Both cosmetic and sexual satisfaction were enhanced, although detailed information is hard to obtain from these patients, who no longer consider themselves as transsexuals, but as men [18]. Moreover, phalloplasty clearly seems to improve a patient's quality of life [19], as this procedure allows them to live in a 'normal' relationship fitting with their sexual orientation [20] and their feeling of masculinity. Our results seem to confirm this as, 10 years after the procedure, few patients (5%) required psychotherapeutic care and 89% were living in couples.

In conclusion, the FFFP is still one of the best surgical techniques in gender-reassignment surgery. Flap survival, the cosmetic results and patient satisfaction were very good, but the morbidity and re-intervention rate were high. Most of the complications were secondary to the urethroplasty, the indications for which should be discussed in detail with patients, as they often request that they would like to void while standing. The urethroplasty must be improved, possibly enhanced by the potential of urothelial tissue engineering [21] in the future.

The morbidity associated with penile implants must be balanced against the lack of a

prosthesis specifically designed for phalloplasty. Overall, 18 of 56 (32%) patients had satisfactory sexual intercourse with penetration. The osteofasciocutaneous fibula flap could be an interesting alternative if the reported results are confirmed in prospective studies.

Providing clear information to patients about the risks and morbidity is a major issue in the surgical treatment of gender dysphoria. A strict evaluation using social behaviour scores and psychological follow-up might provide relevant and objective information about the benefits to transsexuals [22].

CONFLICT OF INTEREST

None declared.

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Abbreviation: FFFP, forearm free-flap phalloplasty.