14 Technical Suggestions for Better and Lasting Functional and Aesthetic Outcomes in Creating the Neoclitoris

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14.1 Introduction

Sex reassignment surgery (SRS) is a very complex field of reconstructive surgery. Among many reconstructive solutions already described, urethral and clitoral reconstruction remains one of the most challenging fields. This is a very difficult and demanding step of the intervention, often followed by complications that have a grave impact on long-term results, quality of life and general patient satisfaction.

The expectations of individuals undergoing male-to-female SRS are often very high, especially as regards cosmetics and functionality. To reach these expectations and make the patient satisfied, a great knowledge of reconstructive surgery techniques and aesthetic refinements is required.

Since then many experts, as Rubin, Pandya, Malloy, Perovic, Eldh and so on, are trying to construct a genitalia resembling that of the female with the aim of forming a functioning neovagina that enables patients to have sexual intercourses, a patent and stenosis-free urethral neomeatus and a sensitive neoclitoris [1–5].

The standard procedure for neoclitoral reconstruction in male-to-female sex reassignment surgery is generally considered as the use of the dorsal portion of the glans penis with a pedicled island neurovascular flap. This flap was initially described by Hinderer for intersex anomalies and later by Brown specifically for neoclitoroplasty in transsexuals. The neoclitoris is usually exposed through a small cutaneous incision at the midline of the posteriorly advanced penopubic area, the latter being the pedicle of the skin flap [6, 7].

Hage et al. described a new technique applying Eicher's method using a free glandular graft and a shortening of the neurovascular bundle. The neoclitoris is created using a free graft of the tip of the glans incorporating the urethral orifice [8].

Giraldo et al. proposed a modification of clitoroplasty based on the possibility of elevating a bifid coronal flap from the glans penis for configuration of the neoclitoris. The authors called this method the "corona glans clitoroplasty" to differentiate it from the well-known "dorsal glans clitoroplasty" [9].

Some authors evaluated the sexual function results in patients after 3 months from surgery. Selvaggi et al. measured neoclitoral orgasmic sensitivity 4 years after male-to-female sex reassignment surgery demonstrating that sexual

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arousal is not present in all patients. The authors suggest that keeping the pedicled, reshaped and replaced glans for creation of the clitoris is fundamental for preservation of sensitivity. They also supposed that pain during sexual intercourse (due to unlubricated neovagina) could cover sexual sensation coming from the stimulation of the neoclitoris [10].

In this chapter, we minutely describe two different techniques that permit to construct a functional and aesthetically pleasing neoclitoral complex emphasising the most important and critical steps.

The two techniques have been applied in Italy in a great series of patients by two different surgical equipment in Trieste and Bologna.

Both techniques entail the use of a small part of the dorsal aspect of the glans penis, with preservation of the dorsal neurovascular bundle (DNVB). The main features that distinguish these two techniques are the modality of the DNVB dissection (with or without the preservation of the underlying tunica albuginea) and the utilisation of the urethral tissue.

The first technique is *the neourethroclitoroplasty with microsurgical dissection of the DNVB*; the urethral flaps are used in continuity with the previously spatulated urethral plate in order to surround the neoclitoris and construct a neourethroclitoris covered by the urethral neoprepuce. On the contrary, in the second technique, *the dorsal part of the tunica albuginea is preserved*, acting as a framework for the attached DNVB. The neoclitoris is configured maintaining the inner foreskin mucosa attached to the glans and the remaining subglandular urethral part is used for the creation of the epithelial lining between the neoclitoris and the urethral neomeatus.

14.2 Surgical Technique

14.2.1 Neourethroclitoroplasty with Microsurgical Dissection of the DNVB: "Trieste Technique"

This technique can be clearly explained in three main steps: the dissection of the neurovascular bundle, the preparation of the urethra and the urethral plate formation; the construction of the neomeatus; and the assembly of the neoclitoral hood.

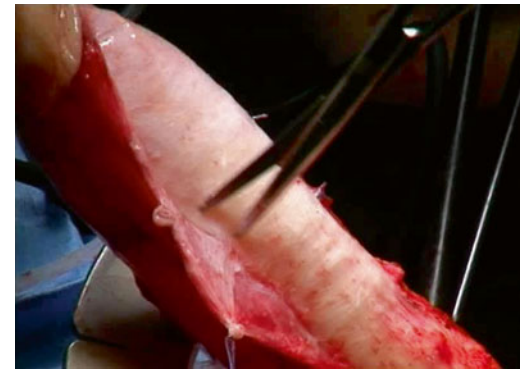

Fig. 14.1 DNVB dissection from the underlying tunica albuginea is performed starting from the sides of the urethra bilaterally

14.2.1.1 Neurovascular Bundle Dissection and Neoclitoris Formation

The neoclitoris is created from the dorsal part of the glans penis. A glans island should be carefully isolated preserving the neurovascular bundle that contains nerves and blood vessels.

A tourniquet is placed at the base of the degloved penile shaft and hydraulic erection is established. The DNVB dissection from the underlying tunica albuginea is performed starting from the sides of the urethra bilaterally (Fig. 14.1). The use of microsurgical loupes may help the surgeon during this manoeuvre. The neurovascular bundle is meticulously dissected within Buck's fascia along the entire penile shaft. It sometimes happens that the DNVB appears particularly hypotrophic and thin due to prolonged hormonal therapy. At this point, the risk of injury is high, so it is preferred to perform a partial microsurgical dissection of the DNVB. The glans penis is entirely dissected from the corpora cavernosa of the penis maintaining continuity with the DNVB (Fig. 14.2). At this point, the neoclitoris' shape is outlined and dissected from the dorsal part of the glans penis along the previously marked lines. The amount of spongiosal tissue may be greater than a real female clitoris, thus avoiding postoperative loss of sensitivity. The urethral tissue should be removed from the neoclitoris flap ventrally.

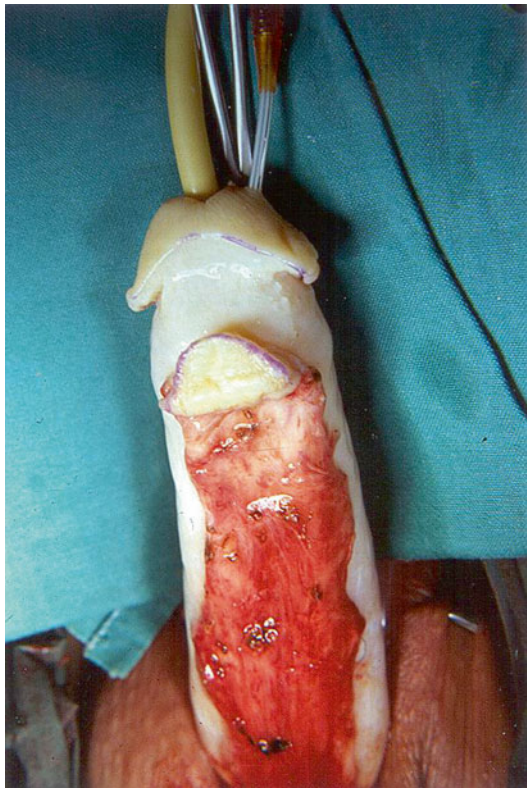

Fig. 14.2 The glans penis is entirely dissected from the corpora cavernosa of the penis maintaining continuity with the DNVB

14.2.1.2 Urethral Dissection and Spatulation of the Urethral Plate with Removal of the Bulbs

The urethra is carefully dissected from the corpora cavernosa within Buck's fascia and shortened approximately 7 cm distally from the bulbous urethra. It is then spatulated ventrally all down to the bulb where the neourethral meatus will be formed (Fig. 14.3a, b). The spongiosal tissue of the bulbous urethra is carefully removed, in order to prevent bulking sensation during sexual arousal and consequently difficult and painful penetration [11]. For this step the utilisation of Ligasure or a similar surgical instrument is a good solution since profuse bleeding can be difficult to control. The urethral plate is further incised dorsally on the distal end following the median line to form a forking (Fig. 14.4a, b). It is very important to avoid damage of the urethral circulation which runs laterally on both sides of the urethral plate.

14.2.1.3 Urethral Neomeatus Construction and Neourethroclitoral Complex with Neoclitoral Hood Assembly

The neoclitoris is unified with the urethral plate at the level of the bifurcation, between both urethral flaps. The neoclitoris is joined with urethral flaps in two layers: spongiosum tissue of the urethral flap is sutured with the spongiosal tissue of the neoclitoris and the urethral mucosa is sutured with the neoclitoris epithelium (Fig. 14.5a, b). Urethral flaps are fixed around the neoclitoris (Fig. 14.6a, b). At this point the newly created neourethroclitoris complex is transposed ventrally through the incision in the penile skin flap, which runs above it. The urethral plate with the urethra-clitoris complex is joined and sutured to the surrounding penile skin flap.

14.2.2 Neoclitoroplasty with the Preservation of the Tunica Albuginea: "Bologna Technique"

Here, the two longitudinal incisions are made directly onto the tunica albuginea, without the need of isolation of the DNVB. The albuginea is incised longitudinally parallel to the urethra, care being taken to reduce the width of its terminal by 2 cm. By this way, a strip of albuginea is prepared, running from the glans to the common portion of the corpora cavernosa, carrying the neurovascular bundle on it (Fig. 14.7). This surgical step is completed by the resection of the residual cavernous tissue from the ventral aspect of the albugineal strip.

The neurovascular bundle and the underlying albuginea is bended on itself and fixed in the suprapubic area in order to create the mons veneris. According to the technique proposed by Perovic, the neoclitoris is configured/built maintaining the inner foreskin (mucosal) attached to the glans [12]. The urethra is divided 4–5 cm proximally from the meatus and the glans is opened ventrally. Glans reduction is done medially, leaving its sides intact, in order to preserve the vascular support of both the neoclitoris and the foreskin that will become the neolabia minora.

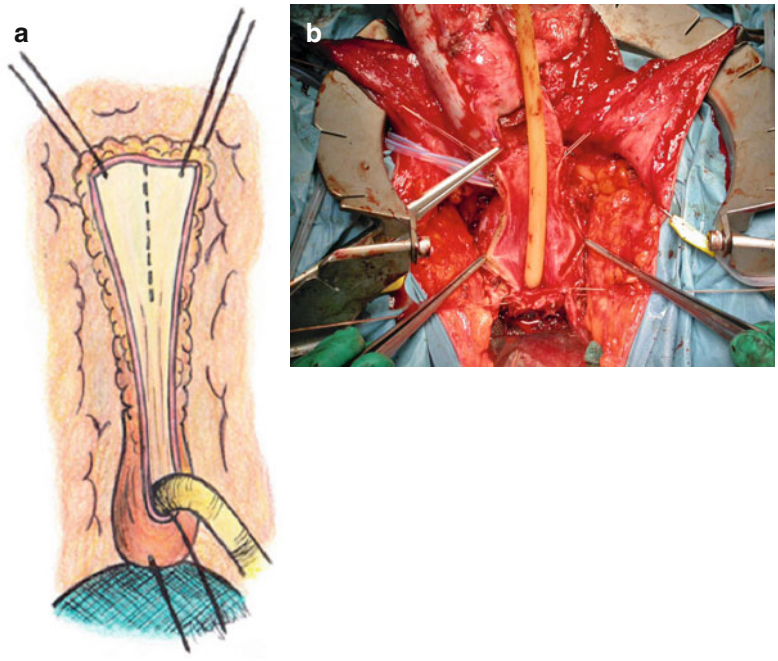

Fig. 14.3 (**a**, **b**) The urethra is shortened approximately 7 cm distally from the bulbous urethral and it is spatulated ventrally

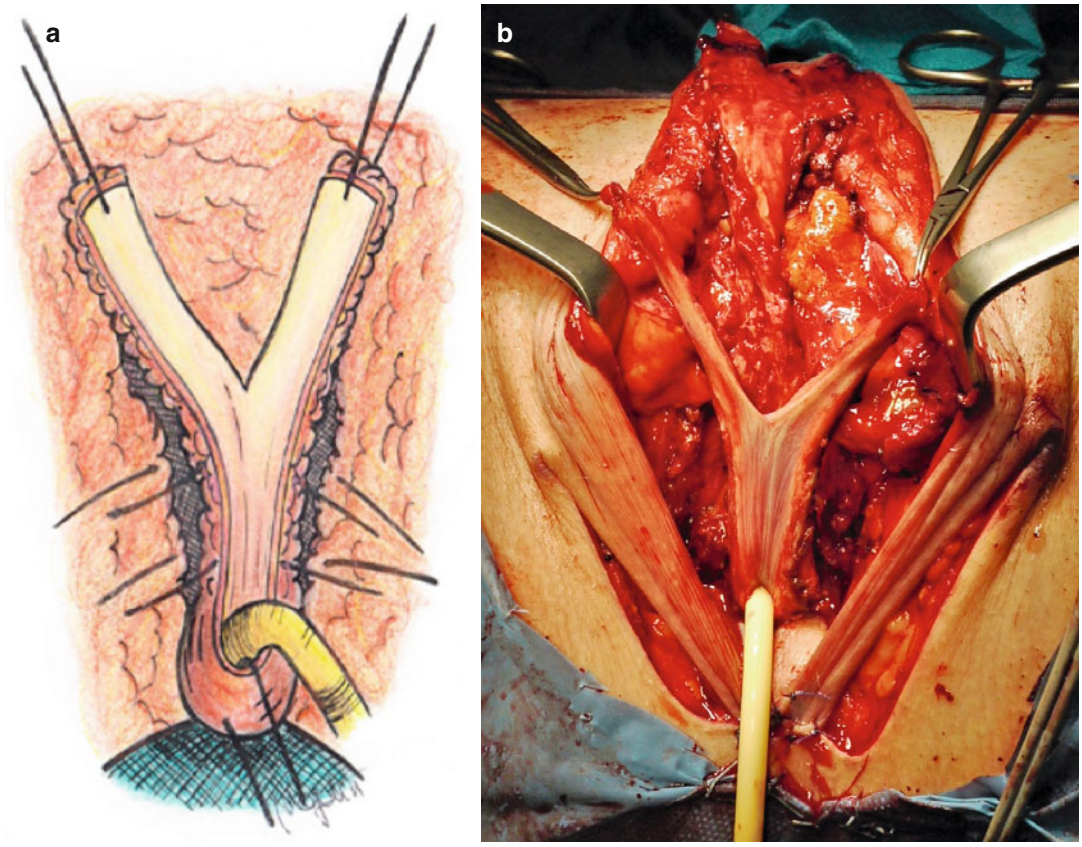

Fig. 14.4 (**a**, **b**) The urethral plate is incised dorsally on the distal end following the median line to form a forking

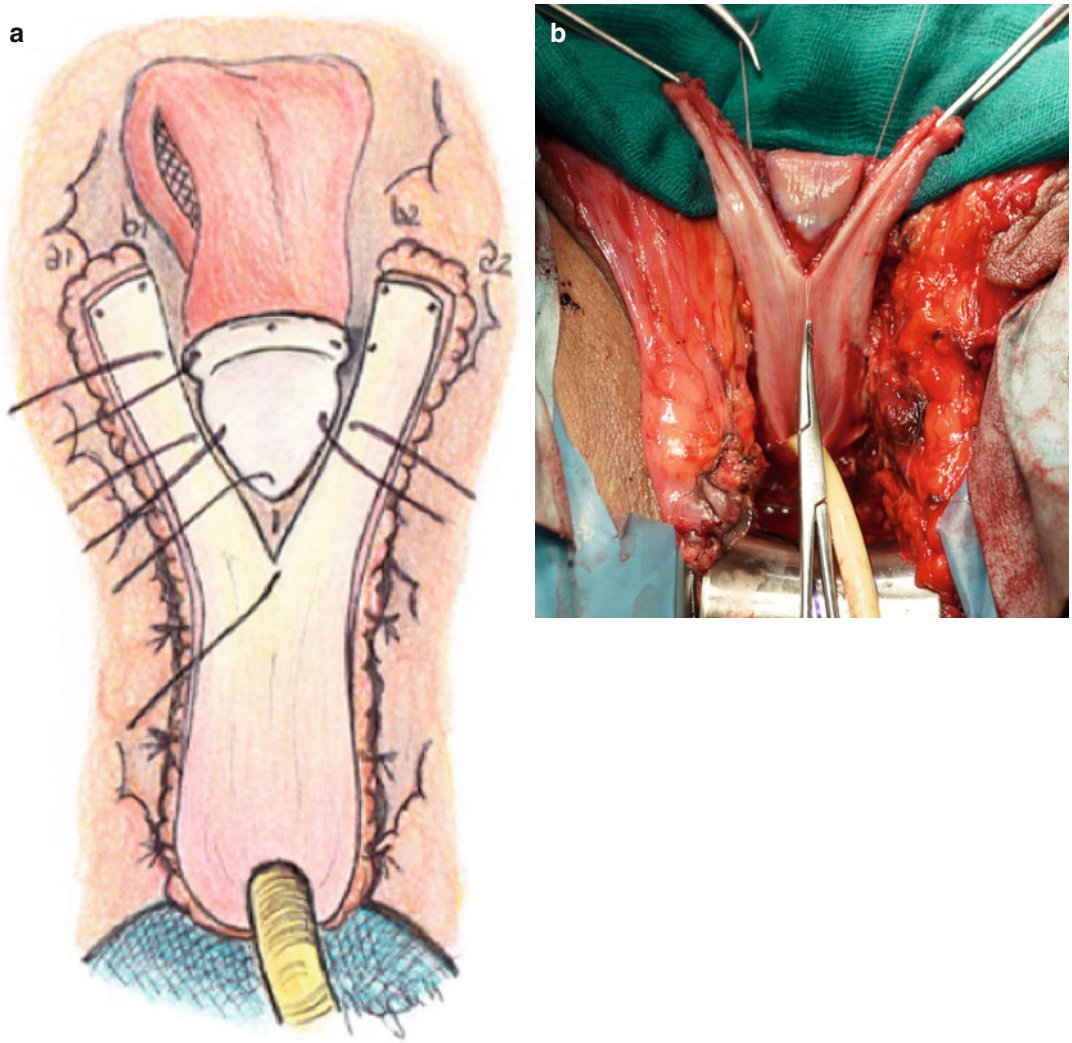

Fig. 14.5 (**a**, **b**) The neoclitoris is unified with the urethral plate at the level of the bifurcation and sutured in two layers

The neoclitoris and its preputial hood are then positioned and fixed in a proper distance from the new urethral meatus. The remaining subglandular urethral part is used for the creation of the epithelial lining between the neoclitoris and the urethral meatus (Fig. 14.2).

14.3 Postoperative Care

In the immediate postoperative period, intensive monitoring of the neourethroclitoris complex is of essential importance. In the absence of major bleeding, the dressing is removed and changed 48 h after surgery. After that the neourethra and neoclitoris area should be adequately medicated at least once a day to maintain adequate hygiene and avoid infections. It is recommended to use antiseptic dressing. The application of antibiotic ointments is not indicated routinely. Prompt discovery of necrotic or infected areas should be followed by surgical therapy with debridement and dressing.

The catheter should be frequently mobilised to avoid formation of decubitus ulcer on the neomeatus and neoclitoris. It should be left in place until the wound edges looked properly closed in order to avoid contact with urine that slows the healing process. Usually the catheter is left in place approximately until the 5th postoperative day.

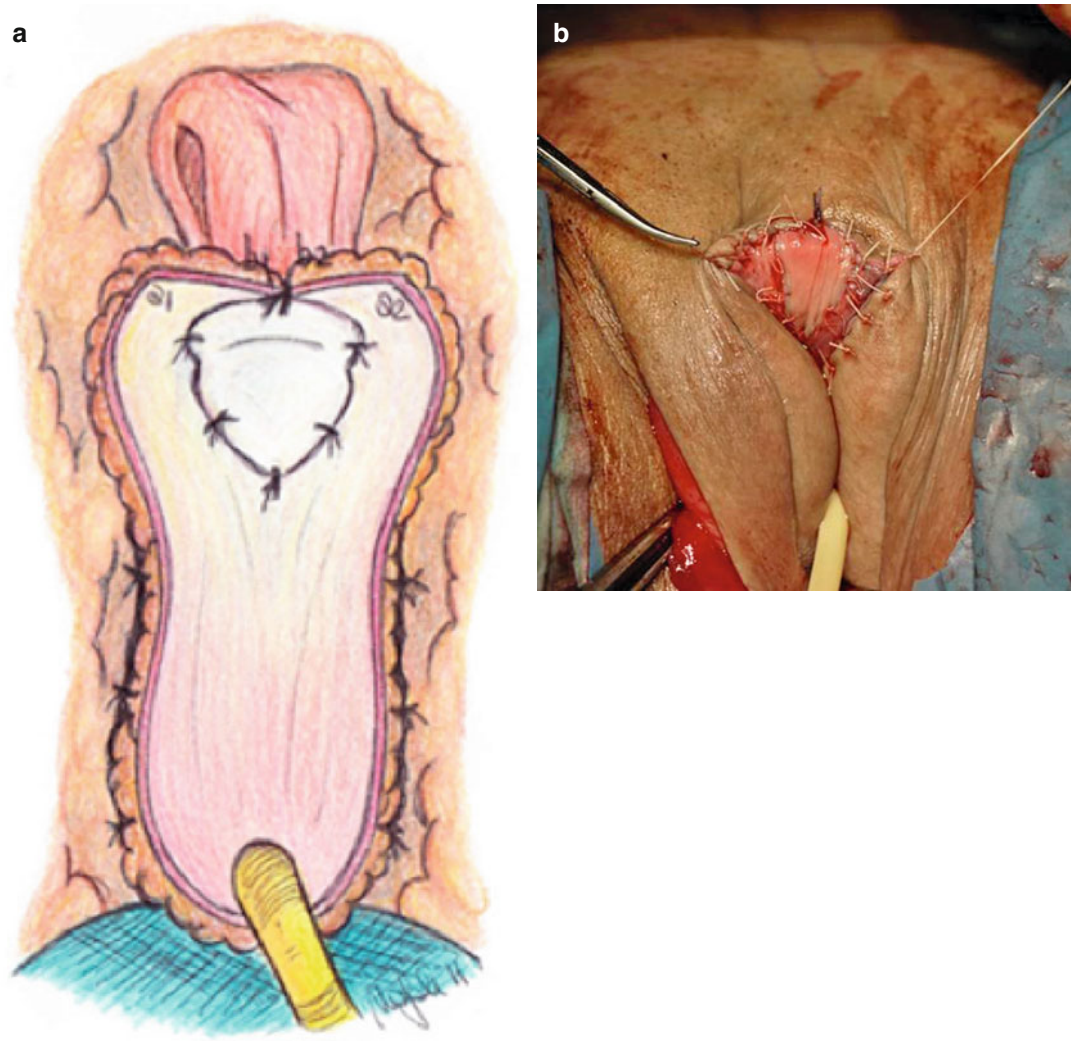

Fig. 14.6 (**a**, **b**) Urethral flaps are fixed around the neoclitoris

Some patients may experience pain due to hypersensitivity of the neoclitoris. In that case, lidocaine ointments can be useful.

A psychosexological support is essential since the first postoperative day to start learning about new anatomy, function and appearance of the genitalia. In the past a group of patients have been evaluated by means of preoperative and postoperative biothesiometry [13].

14.4 Complications

Complications can be divided into intraoperative (lesion of the neuromuscular bundle, lesion of the urethra, haemorrhage), early postoperative (partial or total neoclitoris, urethral plate and skin flap necrosis) and late postoperative (urethral stenosis, neoclitoral atrophy, hyposensitivity or insensitivity).

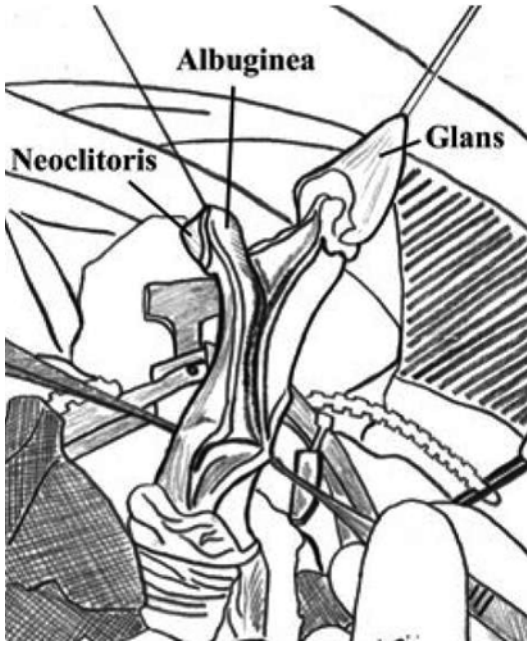

Fig. 14.7 Neoclitoroplasty with the preservation of the tunica albuginea; a strip of albuginea carrying the neurovascular bundle is prepared

14.4.1 Intraoperative Complications

Neoclitoris ischaemia is possible but avoidable with meticulous technique of dissection and in selected cases with partial microsurgical dissection of the DNVB. When ischaemia occurs, it is usually recognised early intraoperatively. A clitoris that becomes pale during the isolation of the neurovascular bundle or during the fixation means that probably there is an ischaemia. The most common sites of neurovascular bundle injuries are the site of insertion into the glans, the origin at the level of ligamentum suspensorium and between the crura of the corpora cavernosa. It is extremely important to maintain as much as possible the blood supply of the urethra while making the dissection between the urethra, bladder and rectum and also during the detachment of corpora cavernosa. At the same time, an accurate haemostasis of the potential sources of significant bleeding is mandatory. The surgeon may decide to put a soft drainage if considered necessary.

14.4.2 Early Postoperative Complications

Early postoperative complications associated with bleeding and necrosis of the urethral flaps surrounding the neoclitoris are rare. Necrotised tissue should be removed and appropriate dressing applied. Complications associated with wound or urinary tract infections are more common and are often successfully treated with appropriate antibiotic therapy. Rarely there is a prolonged bleeding from the operative site (neourethra, neovagina), and occasionally blood transfusion is needed.

14.4.3 Late Postoperative Complications

Neoclitoris atrophy and loss of sensation are serious but fortunately rare complications. It can be avoided with a good surgical technique and preservation of a neoclitoris of adequate size.

Stenosis of the urethral neomeatus is also rare because of the large spatulation of the urethra.

14.5 Discussion

The configuration of a neoclitoris with good aesthetic and functional results is mandatory to achieve complete postoperative satisfaction in transgender patients. Unfortunately a surgical technique that enables to construct a neoclitoris and neovulva that are indistinguishable from female's does not exist until now. A long learning curve and a high dexterity of the surgeon positively influence the outcome of the intervention.

Since the first surgical procedures of male-to-female SRS, many surgeons have used the glans penis to create a neoclitoris. Edgerton et al. and Marten Perolino et al. suggested preserving all the glans penis and the neurovascular bundle with the overlying penis cutis placed at the bottom of the neovagina [14, 15]. Some authors prefer to leave the glans penis intact, with excision of the urethral tissue ventrally. The risk of postoperative atrophy and loss of sensation is lower, but the size of the neoclitoris is aesthetically unacceptable

[1]. A solution to avoid this problem is a wide disepithelisation of the glans penis, with exclusion of the neoclitoris area. In this way, the skin can be sutured around the neoclitoris area previously disepithelisated, hiding the remaining part of the glans penis underneath [16]. The glans pedicled flap is accepted to be the most important key point in maintaining erogenous sensations and its use becomes the standard procedure for clitoroplasty in male-to-female SRS [17, 18].

The techniques for clitoral reconstruction in transsexuals with glans reduction we've described above are relatively widely used and safe [19, 20]. Postoperative complications as neoclitoral atrophy and loss of sensation are not frequent but can occur. We described two modalities of DNVB dissection that can be chosen considering the habits and the preferences of the surgeon. DNVB dissection preserving the tunica albuginea may offer some advantages in certain cases: it is time saving, in fact the reduction in operating time is about 30 min and a further reduction to about 45 min can be obtained if the albuginea is cut without isolating the Buck fascia, it is safer because there are less possibilities to damage the DNVB and it offers a satisfactory appearance of the pubic area that mimics a natural mons veneris. The microsurgical dissection of the DNVB is a more time-consuming procedure, but in our experience it does not significantly change the overall time of the intervention if it is performed by two surgical teams simultaneously, one operating on the penis and one on the perineum. The use of loupes may reduce the risk of DNVB injury and increase the dissection accuracy. In cases of hypotrophic DNVB due to prolonged hormonal therapy, the surgeon should take into consideration the partial microsurgical dissection.

The urethral tissue can be utilised in different ways. It can be used to increase the diameter of the neovagina and provide more moisture, as proposed by Passerini in paediatric intersex surgery [21]. The same principle was then applied to male-to-female reassignment surgery described by Perovic [12]. Pain sensation during sexual intercourse is often referred by patient who underwent this kind of surgery.

In most "standard" SRS techniques, a wide portion of the penile urethra is removed. The urethral neomeatus is then performed simply by suturing the urethral stump to a preformed hole in the penile skin flap. This is a relatively simple approach but is usually associated with postoperative meatal stenosis, urinary dysfunction and unnatural appearance. The creation of the urethral meatus combined with a wide spatulation of the urethra, like we've described above (neourethroclitoroplasty with microsurgical dissection of the DNVB), decreases the risk of postoperative meatal stenosis. In this way the newly created urethral meatus is anatomically correctly positioned and aesthetically acceptable.

With neourethroclitoroplasty the urethral flaps surrounding the neoclitoris form a prepuce that covers the neoclitoris. The urethral flaps around the clitoris provide some moisture, and there is no hair growth around the clitoris.

The urethral flaps can be sometimes damaged during urethral plate incision and suturing. The midline incision has to be done very carefully and precisely in order to preserve as much as possible the urethral vascularisation that runs laterally. During suturing, as less as possible tissue should be damaged with tension-free sutures. It is also very important to preserve the vascularisation of the urethral plate during the removal of the spongiosal tissue. A complete removal avoids difficult and painful penetration during sexual intercourses [11].

While sectioning the centrum tendineum and advancing the dissection between the rectum and urethra and also while removing the corpora cavernosa from their attachments, care should be taken not to injure the urethral arteries that run laterally at the base of the bulbar part of the urethra.

References

1. Rubin SO (1993) Sex-reassignment surgery male-to-female. Review, own results and report of a new technique using the glans penis as a pseudoclitoris. Scand J Urol Nephrol Suppl 154:1–28
2. Pandya NJ, Stuteville OH (1973) A one-stage technique for constructing female external genitalia in male transsexuals. Br J Plast Surg 26(3):277–282

3. Malloy TR, Noone RB, Morgan AJ (1976) Experience with the 1-stage surgical approach for constructing female genitalia in male transsexuals. J Urol 116(3): 335–337
4. Perovic SV, Stanojevic DS, Djordjevic ML (2000) Vaginoplasty in male transsexuals using penile skin and a urethral flap. BJU Int 86:843–850
5. Eldh J (1993) Construction of a neovagina with preservation of the glans penis as a clitoris in male transsexuals. Plast Reconstr Surg 91(5):895–900; discussion 901–3
6. Hinderer UT (1989) Reconstruction of the external genitalia in the adrenogenital syndrome by means of a personal one-stage procedure. Plast Reconstr Surg 84:325
7. Brown J (1976) Creation of a functional clitoris and aesthetically pleasing introitus in sex conversion. In: Marchac D, Hueston JT (eds) Transactions of the sixth international congress of plastic and reconstructive surgery. Masson, Paris, pp. 654–655
8. Hage JJ, Karim RB, Bloem JJ, Suliman HM, van Alphen M (1994) Sculpturing the neoclitoris in vaginoplasty for male-to-female transsexuals. Plast Reconstr Surg 93(2):358–364
9. Giraldo F, Esteva I, Bergero T, Cano G, González C, Salinas P, Rivada E, Lara JS, Soriguer F, Andalusia Gender Team (2004) Corona glans clitoroplasty and urethropreputial vestibuloplasty in male-to-female transsexuals: the vulval aesthetic refinement by the Andalusia Gender Team. Plast Reconstr Surg 114:1543–1550
10. Selvaggi G, Monstrey S, Ceulemans P et al (2007) Genital sensitivity after sex reassignment surgery in transsexual patients. Ann Plast Surg 58:427–433
11. Karim RB (1991) The importance of near total resection of the corpus spongiosum and total resection of the corpora cavernosa in the surgery of male to female transsexuals. Ann Plast Surg 26(6):554–556
12. Perovic S (1993) Male to female surgery: a new contribution to operative technique. Plast Reconstr Surg 91:703–711
13. Buttazzi L, Trombetta C, Liguori G, Bucci S, Belgrano E (2001) Valutazione della sensibilità del neoclitoride in seguito ad intervento di conversione androginoide. Atti del 74° Congresso della Società Italiana di Urologia (S.I.U.), Cagliari, 9–12 maggio 2001, pp 40–41, abstract book
14. Edgerton MT, Knorr NJ, Callison JR (1970) The surgical treatment of transsexual patients: limitations and indications. Plast Reconstr Surg 45:38–46
15. Marten-Perolino R, Cocimano V, Marino G (1990) Male-female transsexualization with glandular preservation. Arch Ital Urol Nefrol Androl 62(1):101–105
16. Spehr C (2007) Male-to-female sex reassignment surgery in transsexuals. Int J Transgenderism 10(1):25–37
17. Fang RH, Chen CF, Ma S (1992) A new method for clitoroplasty in male-to-female sex reassignment surgery. Plast Reconstr Surg 89(4):679–682
18. Rubin SO (1980) A method of preserving the glans penis as a clitoris in sex conversion operations in male transsexuals. Scand J Urol Nephrol 14(3):215–217
19. Trombetta C, Liguori G, Benvenuto S, Petrovic M, Napoli R, Umari P, Rizzo M, Zordani A (2011) Neourethroclitoroplasty according to Petrovic. Urologia 78(4):267–273
20. Soli M, Brunocilla E, Bertaccini A, Palmieri F, Barbieri B, Martorana G (2008) Male to female gender reassignment: modified surgical technique for creating the neoclitoris and mons veneris. J Sex Med 5(1):210–216
21. Passerini-Glazel G (1989) A new procedure for clitorovaginoplasty in severely masculinized female pseudohermaphrodites. J Urol 142:565–568, 572