

Phalloplasty – Sensate radial forearm free flap for creation of neourethra and neophallus in gender affirmation surgery: A case report

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Abstract

With an increase in gender affirmation surgery requirements, it is imperative to understand the procedure for phalloplasty. The Radial Forearm Free Flap is one of the most commonly used flaps for the same. We present this case of a 29-year-old patient who underwent phalloplasty by means of a radial artery forearm free flap. Surgical technique has been described including flap design, harvest, recipient site preparation, anastomosis of vessels and nerves, and post-operative care. The patient developed a small area of partial necrosis which was the dorsoulnar border of the flap. The rest of the neophallus and neourethra were viable, sensate and the patient was able to void urine through the neourethra while standing. The radial forearm free flap is a good option for phalloplasty in gender affirmation surgeries. However, surgeons need to be wary of the possibility of necrosis of the dorsoulnar aspect which may be exceeding the radial artery territory.

Keywords: Phalloplasty, Gender affirmation surgery, Radial forearm flap, Neophallus, Penile reconstruction

Introduction

The radial forearm free flap (RFFF) originated in 1978 in China and was developed and reported to the rest of the world by Ruyao Song [1]. It was used for construction of penis in transgenders by Biemer [2] in the early 1980s who fabricated skin graft within the flap for the neourethra. Chang and Hwang [3] reported tube within a tube by folding the flap in order to for a vascularized neourethra within the neophallus in 1984. With a growing number of requests for gender affirmation surgery, it is imperative to understand the intricacies of the same. The aim of phalloplasty is to construct an aesthetically acceptable neophallus, ability to void urine while standing, tactile and erogenous sensation and rigidity sufficient for sexual activity [4]. The RFFF is considered a good option as it can achieve these goals. For these reasons, we chose the RFFF with certain modifications for our case. Several modifications have been made to the flap design as described by Chang [5]. We have fashioned it with a centrally placed urethra with distal extension to create a neoglans. Including coaptation of sensory nerve would also provide good tactile and erogenous sensation.

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Informed Consent

The authors stated that written consent was taken from the patient for the procedure and publication of data including clinical photographs

Conflict of Interest

No conflict of interest was declared by the authors.

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Case presentation

A 29-year-old patient presented after appropriate evaluation and therapy as per guidelines by World Professional Association for Transgender health [6]. Allens test was done to confirm patency of ulnar artery. Written consent was taken from the patient for the procedure and publication of data including clinical photographs. Patient underwent general anesthesia. Simultaneous vaginal hysterectomy was done. Flap was marked with maximum dimensions being 18x14 cm. The distal incision was performed first and the radial artery and cephalic vein were identified and they were ligated and divided distally after confirming patency of ulnar artery. Tourniquet was applied. Around the centrally planned neourethra 1 cm of skin was de-epithelialized on either side (Figure 1).

Flap incisions was harvested suprafascially taking care to include the cephalic vein, basilic vein, the lateral and medial antebrachial cutaneous nerve. Radial artery and its venae comitantes were included in the flap all along its length including the proximal communicating vessel between the cephalic vein and the venae comitantes. A 12 french foleys catheter was placed on the central portion of the flap and was wrapped by the flap by suturing the de-epithelialized portions onto each other in multiple layers forming a tube in tube technique of phallus (Figure 2).

The rest of the flap was then wrapped around itself to create a neophallus. The distal portion of the flap was incised and folded on itself to fashion a neoglans and sutures placed to itself to create a corona. The neophallus is left on the forearm while being perfused by the vascular pedicle until it is ready for transfer (Figure 3).

Figure 1: Flap marked, incised, area around central urethra de-epithelialized and raised

Figure 2: Central neourethra creation (tube in tube) with catheter in situ

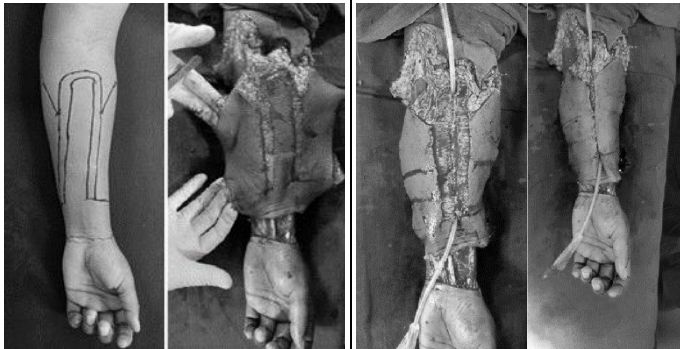
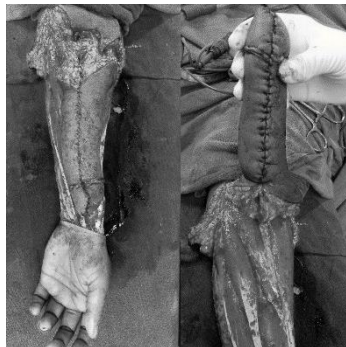


Figure 3: Flap wrapped to form neophallus and distal portion fashioned to neoglans

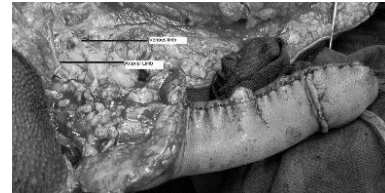


M shaped incision was made over the labia majora and displaced inferiorly. An incision was made on the left thigh and femoral artery and vein identified. The long saphenous vein was dissected and divided at 20 cm distal to its attachment to femoral vein. A temporary A-V Loop fistula was created by

anastomosing the bisected part of the saphenous vein to the superficial femoral artery in an end to side manner.

After ligating and dividing the pedicle, the neophallus was detached and brought to recipient site. Urethral anastomosis was done between native and neourethra with the catheter in situ. The sapheno-femoral AV loop was divided and anastomosed to radial artery and cephalic vein respectively to arterial and venous limbs with microvascular technique. Basilic vein was anastomosed to a tributary of saphenous vein (Figure 4).

Figure 4: Arterial and venous anastomosis

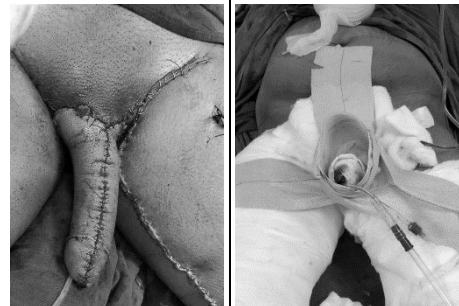


The left ilioinguinal nerve was coapted with the lateral antebrachial cutaneous nerve. The clitoris was de-epithelialized and placed at the root of the neophallus. The flap inset was completed and the vagina closed (Figure 5).

The forearm donor site was covered with skin graft. Drain was placed in the left thigh and dressing was done using cylindrical saline bottle to support the neophallus (Figure 6).

Figure 5: Flap inset completed

Figure 6: Dressing of neophallus

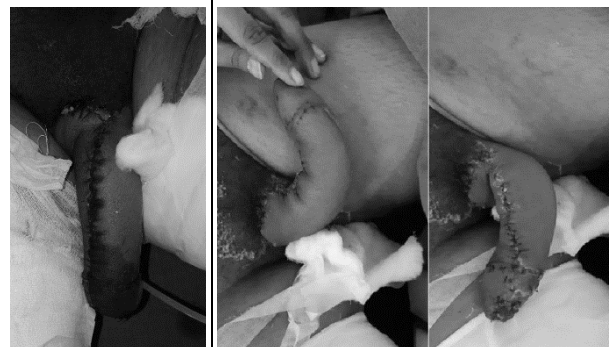


Post-operative care

The flap was monitored regularly. Small portion of skin that was the dorso-ulnar aspect of forearm was found to undergo necrosis (Figure 7). Hence patient was taken up for debridement of that portion and secondary suturing was done after 14 days (Figure 8). At 1 month follow up, the neophallus was intact and a retrograde urethrogram was done which showed a patent urethral anastomosis and catheter was removed. Patient was able to void urine through the neourethra. Erogenous sensation was present at the root of neophallus. Gross tactile sensation was gained at 4 months postoperatively. The planning for penile prosthesis was discussed with the patient to be done at a later stage.

Figure 7: Partial necrosis of dorsoulnar portion of flap

Figure 8: One month postoperatively after debridement and secondary suturing



Discussion

Patient presented to plastic surgery department as a biological female after hormone therapy and psychological consultations for penile construction and the authors chose RFFF for the same. The RFFF has been used for penile reconstruction with several modifications added later on. It has been divided into two stages with phalloplasty and urethroplasty separately [7]. The neourethra has also been fashioned by pre lamination with skin graft and catheter to the forearm [8]. This may in authors opinion cause ulceration and stenosis. We folded the flap on itself to form neourethra provides a well vascularized neourethra. Nerve coaptation of has provided tactile and erogenous sensation in the neophallus up to 98.4% and 71.4% respectively according to a review done by Morrison et al. [9]. In our case, tactile sensation was achieved with the lateral antebrachial cutaneous nerve coapted to the ilioinguinal nerve. The dorsal clitoral nerve could not be identified hence the clitoral skin was de-epithelized and placed at the root of penis which would provide erogenous sensation upon its stimulation. Common complications that can occur in the procedure are partial necrosis, urethrocutaneous fistula and urethral stenosis [10]. We encountered partial necrosis at the dorsoulnar aspect which was excised and secondary suturing was done. Hence it is in authors opinion to conduct further studies to estimate the exact extent of radial artery territory for this flap which may exclude the dorsoulnar border.

Conclusion

With increasing number of transgender patients requesting for gender affirmation surgery, it is vital to understand intricacies of phalloplasty. Among the various options we believe the radial artery forearm free flap is a good option as was demonstrated in our case report where creation of a viable, sensate neophallus and neourethra was possible with this flap. However extent of radial artery territory may require exclusion of the dorsoulnar border.

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