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Surgery in Motion

Aesthetic Penoscrotal Resurfacing: Creating Propeller Flaps from Gluteal Folds

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Abstract

Background: Reconstruction of extensive penoscrotal defects is a surgical challenge. Resurfacing defects in highly complex three-dimensional structures and restoring their function are an essential part of the reconstruction of penoscrotal regions.
Objective: We describe a technique using internal pudendal artery perforator (IPAP) pedicled propeller flaps created from the gluteal fold. This could be a reliable surgical option that maintains a natural looking scrotal pouch with minimal donor site morbidity and optimal sexual activity.
Design, setting, and participants: We retrospectively reviewed data for 10 consecutive patients who had undergone penoscrotal reconstruction using IPAP pedicled propeller flaps between January 2011 and March 2015.
Surgical procedure: The IPAP was identified using a hand-held Doppler ultrasound device. This was the pivot around which the flap was internally rotated more than 90° in a tension-free manner. The long axis of the flap was centred on the gluteal fold to provide a better-orientated donor site scar.
Measurements: Complications and patient satisfaction with respect to size, colour match, scar appearance, and sexual activity were evaluated.
Results and limitations: Anatomic and aesthetic penoscrotal reconstruction was performed without any major complications in the follow-up period (mean, 19.7 mo). The mean width of the IPAP pedicled propeller flaps was 6.7 cm, and the mean length was 11.7 cm. Partial distal flap necrosis occurred in only one case, and healed spontaneously. All of the patients were satisfied with the cosmetic and functional results.
Conclusions: On the basis of reliable perforators, donor site morbidity, flap thickness, and a better orientated scar, our technique using IPAP pedicled propeller flaps created from the gluteal fold could be a reasonable surgical option for extensive penoscrotal reconstruction.
Patient summary: The creation of pedicled propeller flaps using an internal pudendal artery perforator could be a reliable surgical option for reconstruction of extensive penoscrotal defects. The approach yields functional and aesthetically acceptable surgical results.

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1. Introduction

The scrotum is the sack of skin that contains the male reproductive organs. It is considered a symbol of masculinity along with the penis. Therefore, a poor and asymmetric scrotal pouch after oncologic ablation or trauma might be detrimental to psychosocial relationships and personal confidence. Reconstruction of the penoscrotal region represents a surgical challenge owing to the highly complex three-dimensional structures and the difficulty in achieving an aesthetic appearance and normal functions. Along with the evolution of reconstructive methods, various techniques have been described, such as skin grafts, myocutaneous flaps, fasciocutaneous flaps, and free flaps, all of which have advantages and disadvantages [1–5].

The perineal region is a perforator-rich area, having an abundant source of perforating arteries and veins. This area is supplied by direct cutaneous perforator branches from the internal pudendal artery [6–8]. Clinical use of internal pudendal artery perforator (IPAP) flaps, such as gluteal fold island flaps, pudendal thigh flaps, and vulvoperineal fasciocutaneous flaps, in vulvovaginal reconstruction has been reported [7,9–12]. The principle involved in reconstruction of extensive defects is the use of IPAP pedicled propeller flaps, which are rotated to a varying extent, with a reliable dominant perforator replacing the defective tissue. Since this flap does not harvest any muscle tissue, there is minimal perforator dissection and no involvement of microvascular anastomosis, which thus reduces donor site morbidity and operation times. To the best of our knowledge, there has been no report on clinical use of IPAP pedicled propeller flaps in penoscrotal reconstruction. Here we describe our experience in reconstruction of penoscrotal defects using IPAP pedicled propeller flaps created from the gluteal fold, with good outcomes in terms of aesthetic appearance and functional reconstruction.

2. Patients and methods

A retrospective chart review was performed for ten patients who had undergone penoscrotal defect reconstruction between 2011 and 2015 at the Samsung Medical Centre (Seoul, Republic of Korea). The defect size ranged from 22.5 to 400 cm^2 (mean, 151.73 cm^2). The defects were caused by tumor excision in nine patients, and traumatic soft scar contracture in one patient. Demographic and clinical data are listed in Table 1.

2.1. Surgical procedure

All operations were performed with the patient in the lithotomy position under general anaesthesia. The gluteal fold had been identified before surgery and demarcated bilaterally with the patient standing. The internal pudendal artery originates from the internal iliac artery in the pelvis, runs through the sacrotuberous ligament, and emerges into the ischiorectal fossa. The ischiorectal fossa is anatomically located in the triangle formed by three points: the ischial tuberosity, the anus, and the scrotum [7]. Doppler tracing was performed using a hand-held device in the thick fatty tissue of the ischiorectal fossa to locate a perforator in the vicinity. Subsequently, the pedicled flap was designed based on the marked perforators, with due consideration given to the required flap volume and donor site closure (Fig. 1). With a view to the closure scar for the donor site, the long axis of the flap was centred on the gluteal fold. An exploratory skin incision was made on one side, and either suprafascial or subfascial dissection was performed until the previously marked perforators emerged. The final single perforator was selected after considering its pulsatility, diameter, and proximity to the defect. After selection of the perforator, the skin paddle design was readjusted, if required, so that the selected perforator was relocated to the pivot point. Following readjustment, the remaining incision was made and the perforator was freed from the connective tissue to gain the required mobility and rotational arc. The flap was internally rotated by more than 90° towards the defect in a tension-free manner. After rotating the flap to its new position, the flow was checked for twisting or kinking using a hand-held Doppler device. If there was no arterial inflow after pedicle dissection and flap rotation, the flap was left in place until the circulation had settled. The flap was transferred with the pedicle so

Table 1 – Demographic and clinical data for the patient cohort

Case	Age (yr)	Etiology	Defect area	Defect size (cm^2)	Reconstruction methods	Flap dimension (cm^2)	Complication	Revision	Follow- up (mo)
1	55	EMPD	L scrotum, penile shaft, inguinal area	8 × 6	L IPAP	8 × 6			18
2	70	EMPD	BL scrotum, penile shaft	10 × 8	BL IPAP, scrotal flap	R 8 × 5 L 8 × 5			42
3	56	EMPD	L scrotum, penile shaft, inguinal area	5 × 4.5	L IPAP, scrotal flap	5 × 4.5			35
4	72	EMPD	L scrotum, penile shaft, inguinal area	8.5 × 7	L IPAP, scrotal flap, STSG	8.5 × 7			12
5	55	EMPD	BL scrotum, penile shaft	20 × 20	BL IPAP, STSG	R 15 × 7 L 15 × 7			17
6	59	EMPD	L scrotum, penile shaft, inguinal area	15 × 15	L IPAP, STSG	15 x 10			18
7	77	EMPD	BL scrotum, penile shaft, inguinal area	20 × 20	BL IPAP, STSG	R 15 × 10 L 15 × 10	Partial necrosis	Debridement	16
8	58	EMPD	BL scrotum, perineal area	12 × 12	BL IPAP	R 12 × 5 L 9 × 5			14
9	74	EMPD	BL scrotum, penile shaft	15 × 12	BL IPAP, STSG	R 15 × 7 L 15 × 7			13
10	36	Scar contracture	BL scrotum, perineal area	R 10 × 5 L 10 × 6	BL IPAP, STSG	R 12 × 5 L 12 × 6			12

EMPD = extramammary Paget's disease; IPAP = internal pudendal artery perforator flap; L = left.; R = right; BL = bilateral; STSG = spilt-thickness skin graft.

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