Scrotal Reconstruction Using Thigh Pedicle Flaps: Long-Term Follow-up of 12 Cases

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Abstract

Introduction: Genital skin loss in men may be caused by avulsion injuries of the penis and scrotum or by gangrene of the male genitalia. Reconstruction of the scrotum after complete loss of the overlying skin is a challenging problem. We report our experience on the management of this problem.

Material and Method: Medical records of all male patients with massive scrotal skin loss and exposed testes treated at Ramathibodi Hospital and Noparat Rajthanee Hospital from 1990 to 1999 were reviewed. The etiologies of scrotal skin loss, technique of treatment, post-operative consequence as well as complications were noted.

Results: Twelve patients were described in this study. Nine patients had avulsion injuries of the penile and scrotal skin secondary to agricultural machinery accidents. Three patients were after extensive debridement of Fournierís gangrene. The exposed testes had been placed in thigh pouches and scrotal reconstruction using thigh pedicle flaps was done 4-6 weeks later. No immediate and delayed complications were detected in all of the patients. They recovered without any sequelae and had a satisfactory cosmetic result.

Conclusion: Extensive scrotal skin loss should be immediately treated surgically. Implantation of the exposed testes in the upper thigh pouch and delayed reconstruction of the scrotum using thigh pedicle flaps can provide excellent results

Key word : Genital Skin Loss, Scrotal Reconstruction, Thigh Pedicle Flap

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Extensive genital skin loss in men may be caused by avulsion injuries of the penis and scrotum or by gangrene of the genitalia[1,2]. Most of the accidents are from agricultural machinery work with the penis and scrotum often entrapped in the patients' trousers and literally ripped from the patients' bodies [1]. In such accidents the shaft of the penis and the testes are usually undamaged[1]. Fournier's gangrene is another cause of scrotal skin loss due to its extensive and serious infection. Testicular exposure is a common problem after extensive debridement[2]. Immediate coverage of the exposed testes from both injury and genital skin infection is required to prevent testicular damage[3]. Reconstruction of the scrotum after skin loss becomes a challenging problem due to its functional and cosmetic results. We present our experience of this difficult entity with the long-term follow-up.

MATERIAL AND METHOD

The medical records of all male patients who had been treated at Ramathibodi Hospital and Noparat Rajthanee General Hospital with scrotal skin loss from 1990 to 1999 were reviewed. The causes of scrotal skin loss, immediate and delayed management, complications and results were noted. In avulsion injury patients, those with partial scrotal skin loss who could be treated with only primary suture were excluded from this study. The diagnosis of Fournier's gangrene was established from the patients' medical history and physical examination. Criteria utilized to establish the diagnosis were rapid fulminant progression infection of the genitalia and perineum or gangrene of the scrotal tissue.

Surgical technique:

After the perineal wound, testis and adjacent tissue were cleaned, the testes were placed in thigh pouches that were developed with sharp dissection on the medial aspect of the thighs. To preserve fertility, the testes should be placed as close to the skin as possible with little or no intervening subcutaneous tissue. The testes can be kept in a slightly lower temperature than that of the body core. Skin defects at the penis and perineum were covered with a split-thickness skin graft. Scrotal reconstruction was begun approximately 4-6 weeks later by incising the flaps. The flap was superiorly and medially based, and its medial aspect constituted the edge of the perineal wound. The inferior margin of the flap was rounded and created a sac-like structure when brought together with the opposite flap and sutured in the midline. When the flaps were raised the testicles were seen to be viable and the tunic covering was pliable. The flaps were raised by incising through the skin to the level of the superficial fascia of the thigh. The flaps were raised so that there was no subcutaneous tissue overlying the testes and that which was present was beyond the confines of the testicles. The flaps were rotated medially and sutured together in the midline. Closure of the thigh wounds primarily and placement of a drain beneath the scrotal flaps completed the procedure[4].

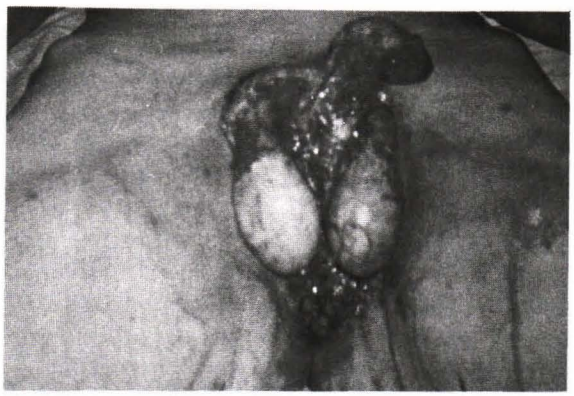

Fig. 1. Shows a patient who has an extensive genital skin avulsion injury secondary to agricultural machinery accident. Exposed testes are noted.

Fig. 2. Shows a patient with Fournier's gangrene with exposed testes.

RESULTS

Twelve patients were found in this study with the mean age of 42 years old (range 10-62). Nine patients had avulsion injuries of the scrotum and genitalia from agricultural accidents with complete scrotal skin loss and exposed testes. (Fig. 1) The mean time to presentation at the emergency room was 4 hours from the accident. (range 1-7 hours) Three patients came after debridement of the scrotal skin and genitalia secondary to Fournier's gangrene. (Fig. 2) Split- thickness skin grafts were performed to treat the skin loss of the penis immediately in the injury group and after subsided infection in the Fournier's gangrene group. It was often difficult to apply a split thickness skin graft to the exposed testes so they were placed in thigh pouches. Four to six months later the testes were transposed along with random flaps as described by McDougal in 1983[4]. (Fig. 3, 4) No immediate and long-term complications were detected. The mean follow-up time was 12 months (range 8-24). All of the patients recovered without any sequelae and had excellent cosmetic results. (Fig. 5) Semen analysis was done in five patients 6 months after completing the procedure (four from the injury group and one from Fournier's gangrene group). All patients in the injury group showed normal findings and one patient from Fournier's gangrene group had oligospermia.

DISCUSSION

Genital skin loss in men may be caused by avulsion injuries of the penis and scrotum or by gangrene of the male genitalia[1,2]. All of the patients need emergency intervention to cover the exposed testicles[3]. Free skin graft provides an excellent method of covering the penile shaft but it is often difficult to apply a split thickness skin graft to the exposed testes because of its movable round structure[1]. The testis should be placed in thigh pouches created on the medial aspect of each thigh. The skin and subcutaneous tissues are dissected from the thigh fascia to create a pocket for the testicle. These subcutaneously constructed pockets increase testicular temperature, which would impede spermatogenesis over the long-term. To preserve fertility, one should make an attempt to implant the testes as close to the skin as possible, with little or no intervening subcutaneous tissue, thus, the testicle will be kept at a lower temperature than the body core temperature[4,5]. Delayed scrotal reconstruction can be

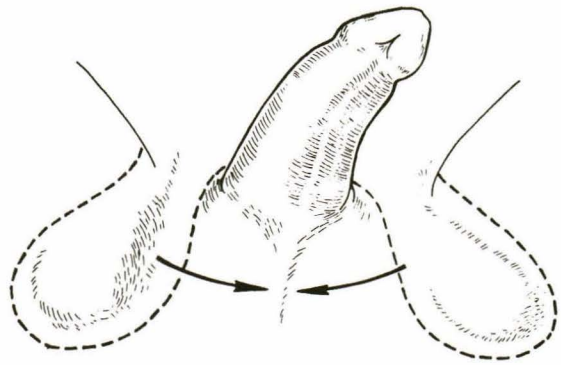

Fig. 3. Shows technique described by McDougal for placement of testicles in thigh pouches.

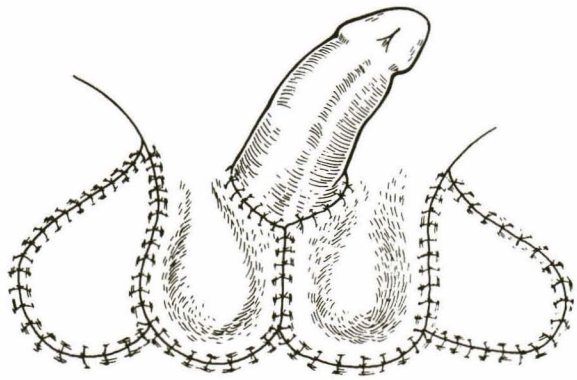

Fig. 4. Shows the transposition of the testes along the random flaps.

Fig. 5. Shows lateral view of a 10 years old boy at 1 year post operation.

done 4-6 weeks later by transposing along the random flaps. This technique was described by Mc Dougal in 1983[4]. Numerous techniques for scrotal reconstruction with thigh flaps have been described but Mc Dougal's technique showed more acceptable results[6]. This flap has advantages of being well vascularized and possesses a neural innervation similar to the normal scrotum. To maintain an excellent vascular and neural supply, thin subcutaneous tissue will be left with the flap. The presence of loose thigh skin will allow primary skin closure on the thigh and skin grafts can be avoided[7]. Finally, the cosmetic result is excellent and the potential for fertility is maintained[7]. Our experience also showed excellent results as described by previous reported series.

SUMMARY

Scrotal reconstruction using thigh flaps has the advantage of simplicity, early closure of the wound, excellent cosmetic appearance and maintenance of testicular function.

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การสร้างถุงอัณฑะใหม่โดยใช้แผ่นหนังจากหน้าขา : ประสบการณ์ในผู้ป่วย 12 ราย

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วัตถุประสงค์ การสูญเสียผิวหนังของถุงอัณฑะพบได้ในกรณีอุบัติเหตุซึ่งมักจะเกิดจากเครื่องจักรกลการเกษตร และอาจเกิดจากการอักเสบติดเชื้อชนิดรุนแรงของอวัยวะสืบพันธุ์รวมถึงถุงอัณฑะ การรักษาและการสร้างถุงอัณฑะใหม่นับว่าเป็นปัญหาอย่างมาก ผู้ศึกษาจึงได้รายงานประสบการณ์การรักษาผู้ป่วยเหล่านี้

วัสดุและวิธีการ ได้ศึกษาเวชระเบียนย้อนหลังผู้ป่วยที่สูญเสียหนังถุงอัณฑะอย่างกว้างขวางเกินกว่าที่จะเย็บซ่อมได้ในโรงพยาบาลรามาธิบดีและโรงพยาบาลนพรัตนราชธานีระหว่างปี 2533–2542 ศึกษาถึงสาเหตุ วิธีการรักษา อาการแทรกซ้อนรวมถึงการติดตามผู้ป่วยเฉลี่ย 12 เดือน

ผลการศึกษา ผู้ป่วยทั้งสิ้น 12 รายโดย 9 รายเกิดอุบัติเหตุจากเครื่องจักรกลการเกษตร และอีก 3 ราย เกิดจากการอักเสบติดเชื้อ Fournier's ทุกรายเห็นลูกอัณฑะที่ขาดสิ่งปกคลุม ได้รักษาผู้ป่วยทุกรายด้วยการฝังลูกอัณฑะไว้ที่ถุงซึ่งสร้างขึ้นมาที่หน้าขา และย้ายถุงมาสร้างเป็นถุงอัณฑะใหม่อีก 4–6 สัปดาห์ต่อมา ไม่พบอาการแทรกซ้อน ผลในระยะยาวเป็นที่น่าพอใจ

สรุป การสูญเสียผิวหนังปกคลุมอัณฑะต้องการการรักษาเร่งด่วน การฝังลูกอัณฑะไว้ที่หน้าขาแล้วยกมาสร้างเป็นถุงอัณฑะใหม่ได้ผลดี

คำสำคัญ : การสูญเสียผิวหนังถุงอัณฑะ, การสร้างถุงอัณฑะ

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