

Repair of the Fournier Gangrene Defects with Remnant Scrotum and Adjacent Tissues: Surgical Techniques

Fournier Gangreni Defektlerinin Etraf ve Geride Kalan Skrotum Dokuları ile Onarımı

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Geliş Tarihi/Received: 04.03.2010
Kabul Tarihi/Accepted: 07.04.2010

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ABSTRACT Objective: Many alternative procedures have been used for scrotal reconstruction. Some of them require complex or multiple surgical procedures. Their cosmetic and functional results are controversial. **Material and Methods:** We treated thirteen patients with large scrotal defects by primary closure. All defects included nearly almost scrotum and approximately 1-2 cm remnant scrotal tissue. **Results:** Postoperative periods were uneventful for all patients and the mean hospitalization period was 3 days, ranging between 1 to 5 days. At early postoperative period, strict scrotum relaxed after approximately two months. Superior testes displacement was dropped gradually. At postoperative sixth month, a spermiogram was performed for five patients. Their semen analysis was normal. **Conclusion:** The main conclusion of this study is the primary closure is an effective way to reconstruction of scrotal defect. Approximately 1-2 cm residual scrotum, remaining laterally and posteriorly in most cases, can be used for testes coverage.

Key Words: Scrotum, fournier gangrene

ÖZET Amaç: Skrotal defektlerin onarımı için birçok alternatif yöntem tarif edilmiştir. Bunlardan bazıları karmaşık cerrahi girişimleri gerektirir, kozmetik ve fonksiyonel sonuçları da tartışmalıdır. **Gereç ve Yöntemler:** On üç yaygın skrotal defektli hasta primer onarım yöntemi ile tedavi edilmiştir. Defektlerin tamamı neredeyse sadece bir cm sağlam skrotum bırakacak yaygınlıkta idi. **Bulgular:** Ameliyat sonraları sorunsuz geçen hastaların ortalama yatış süreleri 3 (1-5 gün) gündü. Başlangıçta gergin olan skrotumlar ameliyat sonrası yaklaşık iki ayda kabul edilebilir gevşekliğe ulaştı. Erken dönemde yukarıya doğru itilmiş olan testisler tedrici olarak normal yerlerine indi. **Sonuç:** Skrotal defektli hastalarda az da olsa sağlam kalmış skrotum testis örtüsü için yeterli olabilmektedir. Kompleks cerrahi girişimlerden önce primer onarım akılda bulundurulması gereken bir seçenektir.

Anahtar Kelimeler: Skrotum; fornier gangreni

Türkiye Klinikleri J Urology 2010;1(2):47-50

Scrotal reconstruction after traumatic or infectious disease remains a major challenge. After prompt surgical intervention and medical treatment, majority of cases need reconstructive procedure. Scrotal reconstruction is important for functional and cosmetic reasons. Many alternative techniques have been used for this purpose, such as super thin groin flap, gracilis flap, neurovascular pedicled pudendal flap, anterolateral thigh flap

and skin graft.¹⁻⁴ These methods require local or distant tissue transfer and may lead to donor area morbidity. In this article, we present our experience use of primary repair for large-scale scrotal defects. We believe that majority of the scrotal defects can be repaired using this technique.

MATERIAL AND METHODS

Between 2004 and 2007, thirteen patients (Table 1) with large scrotal defects were treated with primary closure. All defects were caused by Fournier's gangrene. After immediate surgical intervention, local wound care was established by daily saline dressing. All patients' defects included near-total scrotal structure and exposed testes. Remnant scrotum was approximately 1-2 cm. Only one patient had partial scrotal necrosis. Patients were placed on the operation table in stirrups in dorsal lithotomy position. Superficial granulation tissue was removed and then dissection was started on sub-muscular plan on remnant scrotum. Dissection was extended to perineal direction and extended to the medial thigh going through inguinal crisis. After sufficient pouch was obtained for flabby testicular coverage, the dissection was terminated. Medial thigh dissection was performed on supra-facial plan and was on average 4 cm from inguinal crisis. After meticulously performed hemostasis, advancement flaps were medialised and attached to inguinal crisis with absorbable suture. Penrose drain was inserted in a new pouch. Lateral flaps were sutured to the midline like a raphe. In four patients, thick skin graft was used for penis resurfacing.

RESULTS

Initially, the scrotums were deformed but they were assumed to have a normal appearance after two months. Superior testes displacement descended gradually. There were no complications and wound problem at the postoperative period. Mean postoperative hospitalization period was 3 days, ranging between 1 to 5 days. At postoperative sixth month, a spermogram was performed for five patients. Their spermogram was normal. The others did not return to our clinic for follow-up spermogram. Some results are shown in Figure 1-3.

TABLE 1: Patients' Characteristics. All defects were caused by Fournier's gangrene.

Patient	Age	Post-operative period (Day)	Predispositions
1	66	2	DM, Trauma
2	72	4	DM
3	56	5	DM , Alcoholism
4	48	2	Alcoholism
5	61	2	None
6	56	3	DM
7	64	2	DM,
8	58	3	None
9	72	5	Trauma
10	71	4	None
11	55	2	2x45
12	49	2	DM
13	78	5	Poorly hygiene



FIGURE 1: Near-total scrotal loss. The defect may require local or distant flap according to many reconstructive surgeons.

DISCUSSION

Scrotal defects should be repaired as soon as possible after debridement and infection control. Fournier's gangrene often occurs in patients with advance age, diabetes, alcoholism and other preexisting problems, which may increase their operative risk, particularly in cases of longer or multiple procedures. The ideal method of coverage should be technically easy to perform and of low cost.^{5,6}

Many alternative techniques have been described for testes coverage. Simple and prior



FIGURE 2: The defect was repaired with described method and ventral penile shaft was resurfaced with split-thickness skin graft.



FIGURE 3: Postoperative native appearance.

method was skin grafting. Although skin grafts are considered to provide a thin covering, grafting procedure may cause stricture, not ensure a good cosmetic result and require a long postoperative dressing period. Furthermore, the graft may adhere to the testes and cause contracture, which in turn

hinders the cremaster reflex necessary for the testes not to be affected by external conditions.¹

In general, scrotal reconstructions were performed with fasciocutaneous or musculocutaneous flaps, such as neurovascular pedicled pudendal thigh flap, groin flap gracilis musculocutaneous flap, anterolateral thigh flap. Scrotal Reconstruction with these flaps alternatives doesn't ensure optimal cosmetic and functional results because flaps are much thicker than the normal scrotal sac and much lighter than scrotum skin that contains more pigment than that of the surrounding areas.⁵ Additionally, coverage of testes with thick fasciocutaneous and muscle flap could inhibit spermatogenesis.

An important principle of reconstructive surgery is, when possible, to replace like with like. Primary closure of scrotal defects with remnant scrotal tissue ensures the following:

- 1- Similar appearance with original scrotum.
- 2- Testes coverage is achieved by native tissue.
- 3- In this way, inguinal crisis and scrotal raphe could be preserved.
- 4- Because testes are not covered by fasciocutaneous tissue, spermatogenesis is affected minimally.
- 5- There was no donor area morbidity, complex surgical procedure and high complication risk.
- 6- Primary closure of scrotal defects reduces the hospital stay and cost.

In conclusion, from our clinical experience, approximately 1-2 cm residual scrotum, remaining laterally and posteriorly in most cases, can be used for testes coverage. Because of rich blood supply, elasticity, easy expansion capacity and musculocutaneous texture, the remnant tissue provides an ideal coverage with native scrotum skin. Due to this experience, maximum scrotal tissue preservation should be performed during debridement.

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