



Full restoration of spermatogenesis and male fertility after post-traumatic ectopic testis implant

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Full restoration of spermatogenesis and male fertility after post-traumatic ectopic testis implant

AIM: To restore testicular functional competence after traumatic avulsion of the scrotum, accompanied by penile decortication, by means of ad hoc surgery and post-surgical medical treatment.

MATERIALS AND METHODS: A 26 years old patient underwent a on the job perineal trauma that resulted in loss of one testis while the other one was rescued together with the deferential duct. The spared testis was buried in a subcutaneous thigh pocket after creating a tunnel from the inguinal area. Because of post-traumatic ensued hypogonadism, the patient was treated with corticosteroids, phosphodiesterase 5 inhibitors and anti-oxidizing agents.

RESULTS: Hypogonadism related clinical findings in terms of oligospermia, erectile dysfunction and alterations of the pituitary-testis axis, with low testosterone levels progressively improved along the post-traumatic months. Preservation of testis vascular supply associated with ad hoc medical therapy restored erectile dysfunction and spermatogenesis, and in the end at 6 months of the trauma the patients was able to regain fatherhood capability.

DISCUSSION: The obtained results demonstrate that an appropriate testis burying in the subcutaneous thigh region, upon traumatic scrotum avulsion, followed by an ad hoc medical therapy may rescue male fertility. This is unlikely to happen in the clinical routine and previous published reports negate restoration of the testis function, that completely vanishes within 1 year of the intervention.

CONCLUSION: Full restoration of testis and penile functions resulted in induction of spontaneous pregnancy in the patient's female partner may occur only if good reconstructive surgery is coupled with an efficient medical therapy.

KEY WORDS: Burying, Fertility, Scrotum, Testis

Introduction

When the scrotum is completely avulsed and the remnants are insufficient or totally absent, a possible solution may consist of lodging the testis in a subcutaneous thigh pocket. Unfortunately, this approach often is associated with testis atrophy. We report on our first, well documented case, where successful spontaneous pregnancy, preceded by full restoration of spermatogenesis, upon superficial burying of the residual testis in a thigh pocket, following severe perineal trauma, was accomplished.

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Case report

A 25-year-old man presented to the Emergency Room of our University Hospital for a severe on-the-job perineal trauma. Physical examination showed complete loss of the scrotum, left testis and distal penile tunica, while the right testis was spared with an intact epididymis and spermatic cord (Fig. 1, panel A). In the Plastic Surgery Unit a subcutaneous pocket was prepared, by proximal-distal ungluing, in the right inguinal region. To allow transfer of testis, epididymis and spermatic cord onto the pocket, an artificial tunnel was created by distal skin incision (about 6 cm.) at the antero-medial root of the right thigh. The missing penile tunica was replaced by skin grafts obtained from the left thigh (Fig. 1, panel B). Six days after surgery, the patient was admitted to the Andrology and Reproductive Endocrinology Unit.

FSH and LH tested normal, while total testosterone (T) serum levels (235 mg/dL) were low. The grafted testis was reduced in volume (9.2 mL) with normal blood supply and an intact epididymis. Penile vascular rehabilitation with tadalafil (5 mg daily at bedtime for 3 months) and an anti-inflammatory treatment with prednisone (25 mg daily for one month) were prescribed.

Seven days after surgery, the patient complained for erectile dysfunction and absent ejaculation, with only sporadic nocturnal erections. Laboratory tests indicated increasing FSH (8.9 mU/ml) and LH (6.9 mU/ml), and decreased (T) levels (213 mg/ml). One month after surgery, the patient had his sperm parameters examined by WHO criteria (2010): sperm concentration ($15 \times 10^6/\text{ml}$) and count (50.7×10^6) were normal, with 4% normal sperm morphology, while sperm viability was reduced (38%) and all spermatozoa resulted immotile.

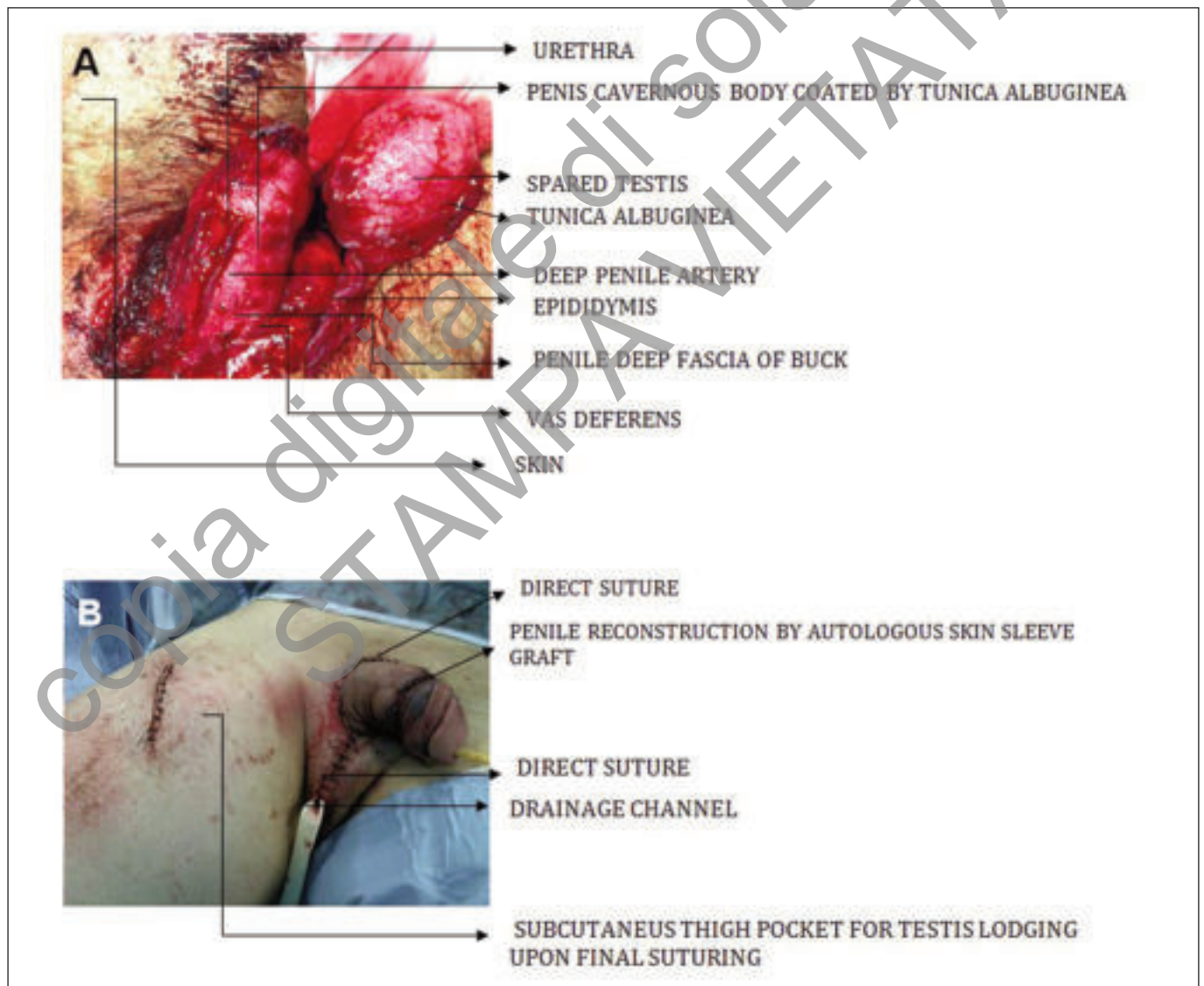


Fig. 1: Surgical reconstruction of the scrotum. A: Pre-operative view ; B: Post-operative view.

TABLE I - Semen parameters throughout eleven month post-surgery follow-up

	Sperm concentration	Count	Sperm Viability	Progressive Motility	Normal Morphology
One Month	15x10 ⁶ /ml	50.7x10 ⁶	38%	0%	4%
Six months	19.6x10 ⁶ /ml	58.8x10 ⁶	90%	46%	8%
Eleven months	24.4x10 ⁶ /ml	73.2x10 ⁶	90%	52%	35%

At this time, FSH (13.7 mU/ml) and LH (9.1 mU/ml) were high, with increasing T (339 ng/ml) and normal inhibin B (143.2 pg/ml) plasma levels.

Three months later, the patient reported improvement of his erectile function with normal ejaculation. FSH (10.0 mU/ml) and LH (6.9 mU/ml) decreased, with normal T (600 ng/ml) and inhibin B (127.5 pg/ml) levels. Treatment with tadalafil, supplemented with bromelain (40.0 mg/day), and food integrators (L-carnitine etc.) was confirmed.

Five months after accident, fully normal functional sperm parameters were observed, while increase of the testis volume (16.0 ml) was observed.

At six months, the patient reported full restoration of his erectile function, ejaculation and libido, and announced that his wife was pregnant.

Eleven months after surgery, normal sperm parameters were confirmed with further improvements (Table I).

Discussion

Severe scrotum trauma can be treated by several approaches of reconstructive surgery. Some of these procedures, such as primary wound wrapping¹ or split thickness grafts², may be applied when the remnants are insufficient for testis coverage. However, these approaches cannot apply if the scrotum has been completely avulsed. This being the case, the most common solutions are to create skin flaps or bury the testis in the thigh. The skin flaps approach often results in impairment or blockade of the spermatogenesis due to the higher temperatures which the testis is exposed to, as compared to normal³. In the only reported case where blockade of the spermatogenesis was minimal, a very long two thin-trimming procedure was applied to the flaps in two different surgical runs, throughout 2 years term. Unfortunately at that time, the patient showed no full restoration of the fertility with a persistent, severe oligo-azoospermia³.

Burying the testis in the thigh, a very safe and rapid surgical procedure, would be disadvantageous for at least two main reasons: 1) persistent pain at the implant site for local compression of the testis; 2) high prevalence of testis atrophy⁴. It is well known that the testis temperature, in the reconstructed scrotum should be normal, as under physiological conditions. A very important and historical paper⁵ had clearly shown, in a num-

ber of 15 patients, that the temperature was equal in the abdominal cavity and the deep thigh, while only the superficial thigh site matched the temperature of the normal scrotum. Nevertheless, although these findings suggested that the testis should be ectopically buried just beneath the thigh skin, to avoid temperature-linked alterations of the spermatogenesis, this goal was actually missed by the majority of the published trials⁶⁻⁸.

For the first time, we have demonstrated that, the patient clinical, biochemical and instrumental strict monitoring, coupled with an "ad hoc" tailored medical therapy can result in rapid, full and stable restoration of spermatogenesis, associated with induction of spontaneous pregnancy in the female partner, upon superficial burying of testis in thigh pocket, with no pain or other adverse events.

Conclusions

However, an appropriate medical therapy regimen induced progressive improvement of both semen parameters, and erectile function, while successful autologous skin grafts reconstituted the penis integrity. Full restoration of testis and penile functions resulted in induction of spontaneous pregnancy in the patient's female partner.

Riassunto

Viene qui riportato il caso di un giovane che subì un grave trauma sul lavoro caratterizzato dalla pressoché completa avulsione dello scroto con decorticazione delle guaine peniene. Un testicolo, completamente asportato non era stato reperito, l'altro ancora connesso al deferente era stato recuperato. L'intervento di ricostruzione scrotale prevedeva un impianto eterotopico dell'unico testicolo disponibile nei piani superficiali della regione supero-esterna della coscia, previa preparazione di un tunnel di trasferimento trans-inguinale dello stesso testicolo oltre ad epididimo e dotto deferente, nella sede finale di posizionamento. Nel contempo si provvedeva a rivestire l'asta peniena con innesti cutanei autologhi. Come sequela funzionale del trauma, e nonostante non si rilevasse alterazioni vascolari del testicolo neo-impiantato, si registrava la comparsa di ipogonadismo, con sofferenza dei compartimenti testicolari tubulare ed interstiziale, documentato da evidenti alterazioni degli ormoni

dell'asse ipofisi-testicolo, e disfunzione erettile. Una terapia medica *ad hoc*, anti-infiammatoria, vasodilatatrice ed anti-ossidante portava ad una progressiva normalizzazione della funzione testicolare, con ripristino ormonale e ripresa della funzione erettile ed eiaculatoria. A distanza di sei mesi dall'intervento, la completa normalizzazione della funzione ormonale e gametopoietica del testicolo residuo, impiantato nella coscia, restituiva al paziente la piena capacità di procreare, consentendogli di diventare padre.

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