ORIGINAL ARTICLE

Penoscrotal degloving and amputation injuries

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Abstract

Background: Penoscrotal degloving and amputations injuries are rare surgical emergencies that result from machinery accidents and after ritual traditional circumcision in our society. These injuries vary from simple lacerations and degloving to complete emasculations. Treatment options must be decided on a case-by-case basis and includes debridement, primary closure and skin grafting where applicable. The amputated part must be reimplanted or reapplied as a composite graft.

Objectives: To evaluate the causes and severity of penoscrotal injuries in our community and their management at Plastic Surgery unit, Hayatabad Medical Complex, Peshawar.

Materials and methods: 25 male patients who presented to our unit with penoscrotal injuries between 2004 and 2009 were evaluated for the cause, type and severity of injury. Treatment and factors determining outcome were also evaluated. Patients were followed up with regular clinical examination to detect late complications.

Results: The mean age of the 25 patients was 18.24 years. 11 cases (44%) were below 12 years and 14 cases (56%) were above 12 years of age. 9 cases (36%) presented within 24 hours after trauma and 16 cases (64%) presented after 24 hours. 32% of injuries resulted from industrial machine belts and 24% of injuries occurred following ritual circumcision. Penile shaft fractures accounted for 16% of injuries. Penoscrotal degloving injuries occurred in 8 cases, including complete avulsion of the penile skin, scrotum and testis in 4 cases; 2 cases involved penile shaft amputations including one donkey bite and 6 cases glans penis amputations. 2 cases of penoscrotal laceration resulted from fall on sharp objects and 1 case from fire arm injury. Main treatment options were debridement and primary closure, split-thickness skin grafting, repair of corpus spongiosum, marsupilization of urethra and penile replantation and glanular composite graft. Complications included wound infection (12%), meatal stenosis (8%), urethral stricture (8%) and proximal penile fistula (1%).

Conclusion: Penoscrotal degloving and amputations injuries are frightening for the patient and formidable to the surgeon. Careful selection of which tissue to debride, along with proper selection of primary closure and grafts for reconstruction, allows satisfactory results to be obtained and minimizes further morbidity. Surgeons must take a rational approach to provide the patient with safe and timely care and produce a favorable outcome.

Keywords: Degloving injury penis, dog bite, graft or flap, penis, scrotum.

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Introduction:

Penoscrotal degloving and amputations injuries are rare surgical emergencies[1]. These incapacitating and psychologically devastating injuries are both physically and mentally traumatic[2]. The common presentations of these injuries are avulsions (degloving), amputations, penile fractures, iatrogenic (post circumcision), lacerations and animal bites[3].

Degloving injuries commonly occur while using rotary-type machines typical in industrial

and farm machinery[4]. Tissues separate along the subdartos plane[5]. Severe injuries lead to penile fracture, hematomas and urethral injury[6]. This injury has potential for significant complications, including infection, incontinence, and erectile dysfunction[7].

Penile amputation is an uncommon injury resulting from self mutilation, felonious assault, or accidental trauma[8]. Management requires resuscitation and stabilization of the patient with particular attention to underlying psychiatric illness[9]. In 1970 in Thailand, an epidemic was seen, of penile amputation as punishment for philandering by humiliated wives[10, 11].

Penile fracture is the traumatic rupture of the tunica albuginea of an erect penis[12]. Patients typically describe immediate detumescence, severe pain, and swelling as a result of the injury[13]. Circumcision remains one of the oldest and commonest operations performed all over the world[14]. The reported incidence of complications varies from 0.1% to 35% the most common being infection, bleeding and glans amputation[15]. Laceration and animal bites are other rare but fatal causes of penoscrotal trauma[7].

Surgical outcome of penoscrotal injuries depends upon the type and severity of the injury, age, time elapsed, causative agent and associated trauma[6]. The goals in managing such injuries are resuscitation, restoration of normal urinary and sexual functions and achieving acceptable cosmesis[8]. The different modalities of treatment are debridement and primary closure, split thickness skin grafting, composite grafts and replantation[16, 17].

Objectives:

To evaluate the causes and severity of penoscrotal injuries in our community and their management at Plastic Surgery unit, Hayatabad Medical Complex, Peshawar.

Materials and methods:

This descriptive study was carried from Jan 2004 to Dec 2009, at the department of Plastic Surgery, Hayatabad Medical Complex, Peshawar. All patients with penoscrotal trauma were admitted through accident and emergency department after initial resuscitation. Detail history including mechanism & time of injury was asked, and through examination of penoscrotal area was done. Routine investigations were performed and informed consent was obtained. Patients were optimized for surgery and the definitive reconstructive procedure was performed. Patients were followed at one week then after 3 and 6 months. Photographs were taken preoperatively and postoperatively at each follow-up visit.

Results:

25 male patients who presented to our unit with penoscrotal injuries were evaluated for the cause, type and severity of injury. Treatment and factors determining outcome were also evaluated. Patients were followed up with regular clinical examination to detect late complications. The mean age of the 25 patients was 18.24 years. 11 cases (44%) were below 12 years and 14 cases (56%) were above 12 years of age. 9 cases (36%) presented within 24 hours after trauma and 16 cases (64%) presented after 24 hours. 32% of injuries resulted from industrial machine belts while 24% of injuries occurred following ritual circumcision. Penile shaft fractures accounted for 16% of injuries. Penoscrotal degloving injuries occurred in 8 cases, including complete avulsion of the penile skin, scrotum and testis in 4 cases; 2 cases involved penile shaft amputations including one donkey bite and 6 cases glans penis amputations. 2 cases of penoscrotal laceration resulted from fall on sharp objects and 1 case from fire arm injury (fig.1). Main treatment options were debridement and primary

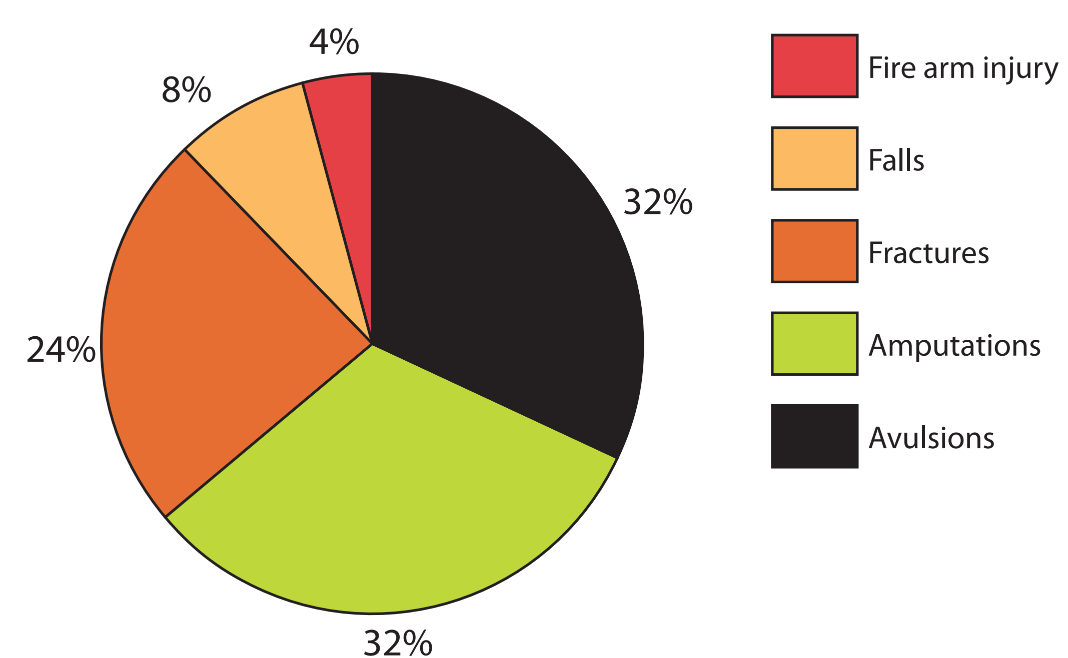

Figure 1: *Causes of penoscrotal injury*

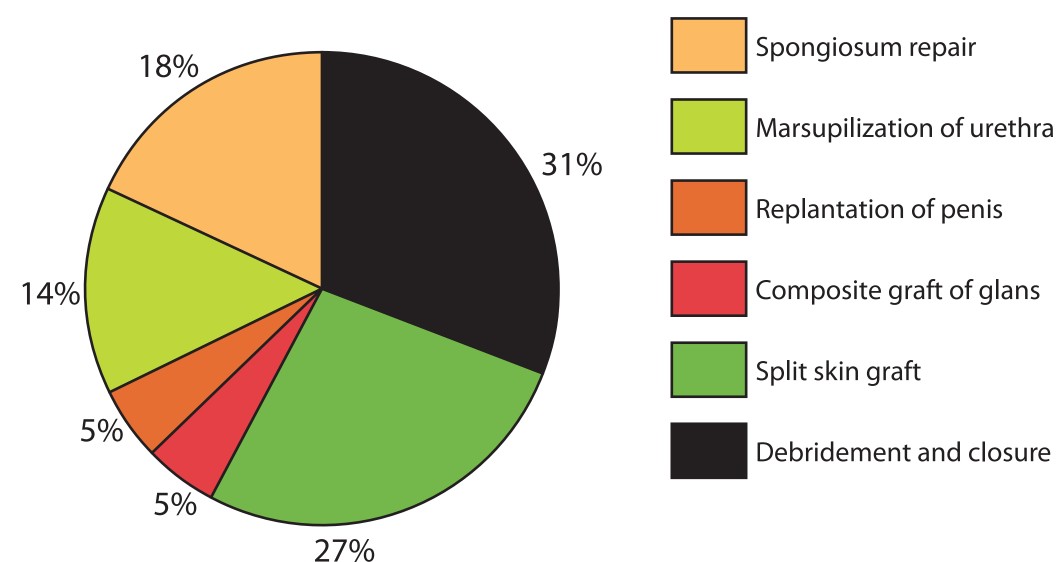

Figure 2: *Treatment modalities*

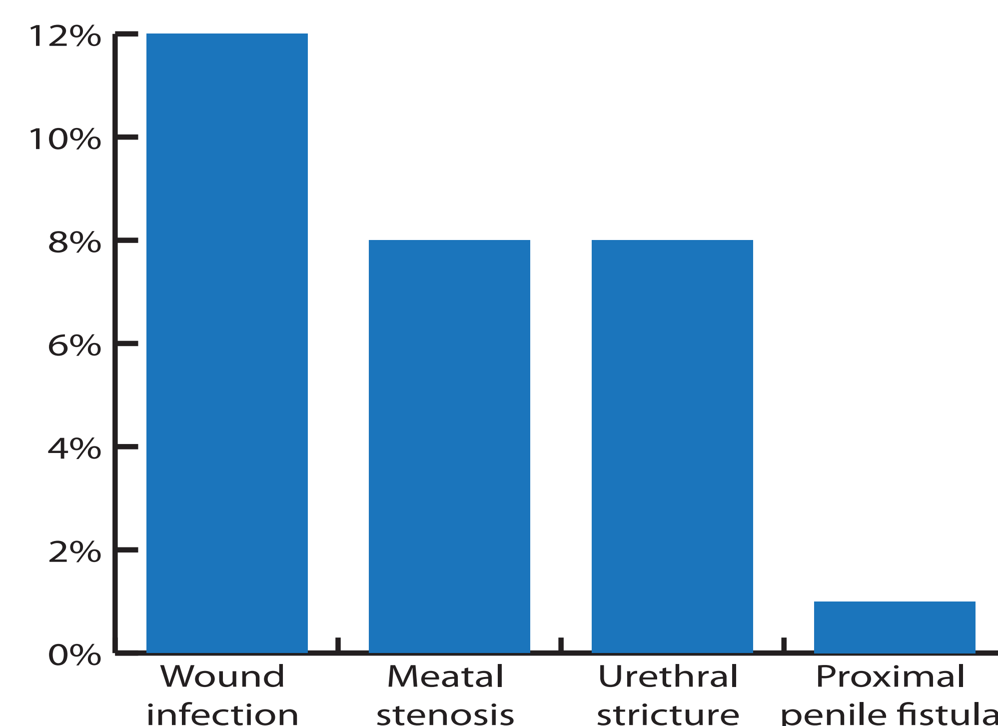

Figure 3: *Complications of treatment*

closure, split-thickness skin grafting, repair of corpus spongiosum, marsupilization of urethra and penile replantation and glanular composite graft (fig. 2). Complications included wound infection (12%), meatal stenosis (8%), urethral stricture (8%) and proximal penile fistula (1%) (fig.3).

Discussion:

Penoscrotal degloving and amputations injuries are rare surgical emergencies[1]. These incapacitating and psychologically devastating injuries are both physically and mentally traumatic[2]. The common presentations are avulsions (degloving), amputations, penile fractures, iatrogenic (post circumcision), lacerations and animal bites[3].

Surgical outcome of penoscrotal injuries depends upon the type and severity of the injury, age, time elapsed, causative agent and associated trauma[6]. In our series, we came across mostly with degloving and amputation injuries as reported elsewhere[5, 18]. Fifty-six percent of our patients were above the paediatric age (>12 years) and presented mostly after 24 hours (64% versus 36%). This is of great clinical significance.

The goals in managing such injuries are resuscitation, restoration of normal urinary and sexual function and achieving acceptable cosmesis[8]. Treatment depends on type and severity. The different modalities of treatment are debridement and primary closure, split thickness skin grafting, composite grafts and replantation[16],[17]. A thorough debridement and irrigation are a mandatory part of the operation[5].

Penile degloving injuries commonly occur while using rotary-type machines typical in industrial and farm machinery[4, 5]. The penoscrotal area is particularly susceptible to degloving injuries[19]. Thirty two percent of our patients suffered from degloving injuries of the penis and scrotum (fig.4, 5). The mechanism in the majority of cases was the same as mentioned in the literature[3]. The rotatory mechanism can catch loose clothing and in the process can catch and tear-off the redundant skin of the genitalia in what is referred to as a power take-off injury[17, 18]. Tissues separate along the subdartos plane5. Severe injuries lead to penile fracture, hematomas and urethral injury[6]. In 1958, Kubacek presented the first case report of this type of injury[20].

In traditional treatment, after cleaning and debridement of devitalised tissues, the exposed tissues are covered with viable flaps from the remaining skin. When there is no available skin, penile burial in the scrotum or in the suprapubic region is performed[3]. The use of posterior scrotal skin for primary closure of the scrotum is also supported by Finical and Arnold[2]. Other techniques, such as banking of the testicles in the inner thighs or reconstruction of the scrotum by tissue expansion, as described by Still and Goodman[21], bear the disadvantage of time delay. Conley[22] has recognised the disadvantages that accompany multistage operations, namely, the negative psychological effects experienced by the patient of losing his sexual apparatus. We treated these patients mostly by primary approximation of the degloved skin and skin grafting in few cases. The most frequent complications of avulsion injuries are postoperative infection,

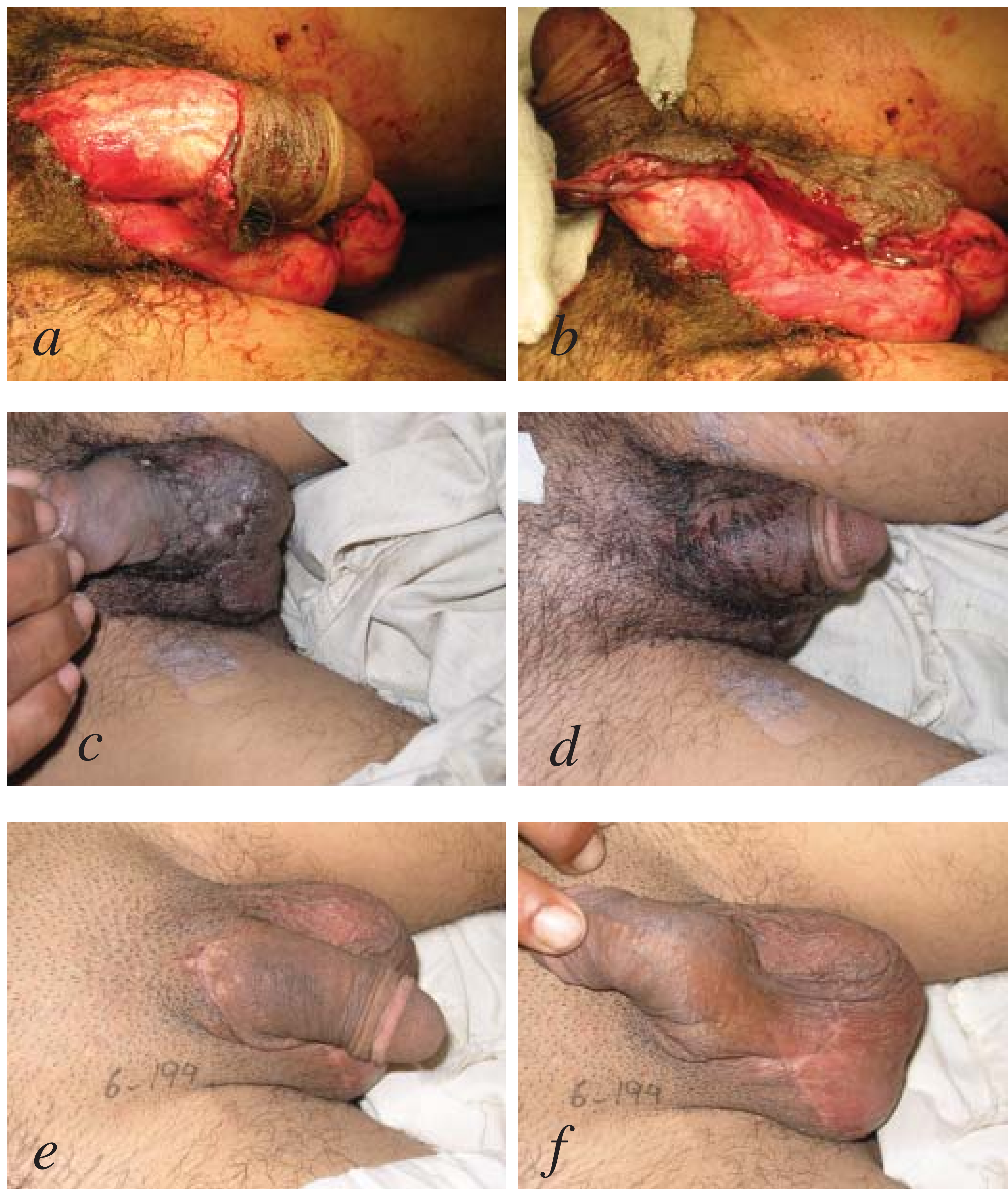

Figure 4: *(a, b) Penoscrotal degloving injury. (c, d) Immediate and (e ,f) Late post operative results after primary closure*

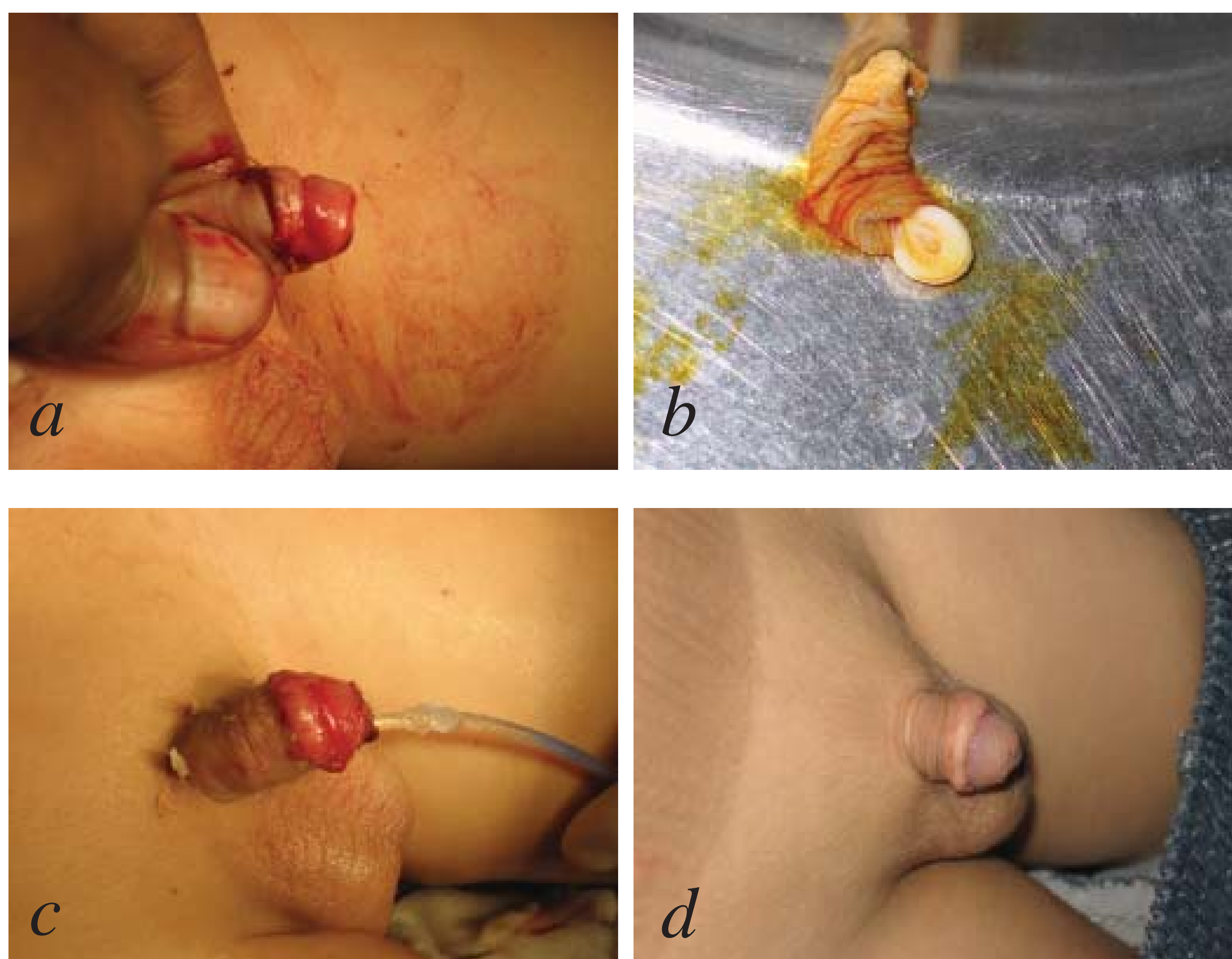

Figure 5: *(a, b) Glans amputation after circumcision, (c, d) Post operative immediate and late results after composite graft*

erectile dysfunction, curvature, and fistula[3,17]. In this series, we encountered mainly with infection and curvature deformity.

Total penile amputation is an uncommon injury[23]; 87% of the patients reported had psychiatric problems[24]. We got one child with penile shaft amputation whose father was a psychiatric patient and one case of distal penile amputation due to donkey bite. The first of them was presented within 6 hours and we replanted the amputated part successfully while the second one presented late (>24hours) and the amputated part was severely crushed and was not replantable. We got six other patients of glans amputation due to ritual circumcision. This is due to the custom use of bone cutter by the quacks and inexperienced physician for circumcision which is practiced in our society. Self-amputation of external genitals is also known as Klingsor syndrome[24,25]. Some cases arise from felonious assault by jealous homosexual lovers[24,26]. In 1970 in Thailand, an epidemic was seen, of penile amputation as punishment for philandering by humiliated wives[11, 23 24]. Microvascular penile replantation offers the best prospect for restoration of micturition function, return of sensations and erectile functions[16]. The first documented case of macroscopic penile replantation was reported in 1929 by Ehrlich[23]. Cohen et al, reported the first microvascular replantation of penis in 1977[27]. The macrosurgical replantation of the penis depends on corporal sinusoidal blood flow with the distal amputated part as a composite graft leading to high complication rates of skin necrosis, fistula formation, loss of sensations and erectile dysfunction[16]. We treated one child of penile amputation with macrosurgical replantation (fig 7). Analysis of our case revealed that the cleanly incised injury with a short duration of cold ischemia was an important factor that influenced the outcome. This patient then developed fistula which was repaired surgically after a period of six months.

Penile fracture specifically refers to a rupture of the corpus cavernosum induced by blunt trauma to the erect penis[12]; in our country, the majority of cases are the result of traumatic coitus, usually

from thrusting an erect penis against the symphysis pubis or perineum. As these patients are mostly referred to general surgeons and urologist and because of patient reluctancy, only 16% of patients presented with penile fracture. Penile fractures are commonly diagnosed from their stereotypical clinical presentation[28]: a cracking sound from the erect penis at the moment of injury rapidly followed by acute swelling, pain, and penile deformity[12]. Current treatment recommendations for penile fractures are immediate surgical exploration and repair; proper surgical repair requires evacuation of the hematoma, identification of the tunica injury, local corpora debridement, closure of the tunica lacerations, and ligation of any disrupted vasculature[29]. Reported long-term complaints after penile fracture repair include penile deviation, painful intercourse, painful erection, erectile dysfunction, priapism, skin necrosis, arteriovenous fistula, urethrocavernous fistula, and urethral stricture[12,29]. There was one patient in our study who developed urethral stricture.

Circumcision remains one of the oldest and commonest operations performed all over the world[14,30]. In our country, circumcision is performed mostly by the quacks, barbers, technicians and also by the general practitioners, paediatricians, gynaecologist, urologist, general surgeons and by the paediatric surgeons[31]. Circumcision by quacks is performed at all ages by various methods mostly bone cutters using unsterilised techniques and dressings with animal dung. The reported incidence of complications varies from 0.1% to 35% the most common being infection, bleeding, glans amputation and failure to remove the appropriate amount of foreskin[15]. In our series, 24% of patients developed complications following ritual circumcision. Our six patients (17%) sustained glans amputations during circumcision performed by bone cutter (fig.6). This is of great significance as the use of bone cutter for circumcision is on the rise in our country and measures should be taken to stop this practice.

Laceration and animal bites are other rare but fatal causes of penoscrotal trauma[7]. We got three cases of penoscrotal lacerations due to fall on sharp objects and fire arm injury. There was one young little boy who sustained amputation of distal penile shaft due to donkey bite. This is very strange and unusual cause not reported elsewhere in the literature. Bite injuries to the penis require extra care, as they have the potential for infection with unique organisms[3]. The most common animal bites are dogs followed by humans and horses[7]. They consist of multiple pathogens such as Staphylococcus and Streptococcus species, Escherichia coli, and Pasteurella multocida[3]. Management involves irrigation, débridement, antibiotic prophylaxis, and tetanus and rabies immunization as appropriate as well as primary wound closure or surgical reconstruction[7]. Good functional and cosmetic results are possible in the majority of cases.

Conclusion:

Penoscrotal degloving and amputations injuries are frightening for the patient and formidable to the surgeon. Urgent referral to the unit specialized in these injuries is necessary to achieve good results. Careful selection of which tissue to debride, along with proper selection of primary closure and grafts for reconstruction, allows satisfactory results to be obtained and minimizes further morbidity. Surgeons must take a rational approach to provide the patient with safe and timely care and produce a favorable outcome.

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