FRAKTURA PENISA UDRUŽENA SA POVREDOM URETRE – PRIKAZ SLUČAJA

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CASE REPORT

PENILE FRACTURE ASSOCIATED WITH URETHRAL INJURY – CASE REPORT

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SAŽETAK

Uvod: Fraktura penisa predstavlja retko urgentno urološko stanje koje nastaje tokom povrede penisa u erekciji, najčešće tokom seksualnog odnosa. U 10%-21% slučajeva, fraktura penisa je udružena sa povredom uretre. Dijagnoza se najčešće postavlja kliničkim pregledom, ali su dopunske dijagnostičke metode korisne u proceni mesta rupture kavernoznih tela i otkrivanju povrede uretre. Ovo urgentno stanje zahteva hitno hirurško zbrinjavanje jer je odlaganje povezano sa lošijim ishodima.

Prikaz slučaja: Muškarac star 43 godine javio se u Urgentni centar Univerzitetskog kliničkog centra Srbije, zbog povrede penisa u erekciji tokom seksualnog odnosa, sa anamnestičkim podacima da je osetio bol i čuo zvuk „pucanja", nakon čega je došlo do nagle detumescencije penisa i pojave hematoma penisa, kao i pojave krvi tokom mokrenja. Kliničkim pregledom uspostavljena je sumnja na frakturu penisa. Ultrazvučnim pregledom je utvrđena ruptura tunike albuginee (lat. *tunica albuginea*) desnog kavernoznog tela, a retrogradnom uretrocistografijom utvrđena je ruptura penilne uretre. Pacijent je iste večeri operisan. Kao hirurški pristup, primenjena je središnja penoskrotalna incizija, zatim je učinjena sutura desnog kavernoznog tela i penilne uretre preko nežno plasiranog urinarnog katetera. Postoperativni tok je bio uredan. Pacijent je na kontrolnim pregledima naveo uredne erekcije, uredno mokrenje i zadovoljstvo izgledom penisa.

Zaključak: Fraktura penisa je retko urgentno urološko stanje, relativno retko udruženo sa lezijom uretre. Prikaz našeg slučaja ukazuje na značaj inicijalne ultrazvučne i radiografske dijagnostike. U slučaju kada je mesto povrede preoperativno prisutno, ventralna penoskrotalna incizija može biti pogodan hirurški pristup. Pravovremeno prepoznavanje i hirurško lečenje frakture penisa udružene sa lezijom uretre daje odlične funkcionalne rezultate.

Ključne reči: fraktura penisa, povreda uretre, urgentno urološko stanje, hitno hirurško zbrinjavanje

ABSTRACT

Introduction: Penile fracture is a rare urologic emergency that may occur when the erect penis is injured, most often during sexual intercourse. In 10%-21% of cases, it is associated with urethral injury. The diagnosis is most often made by clinical examination, but additional diagnostic methods are useful in evaluating the site of rupture of the corpora cavernosa and detecting urethral injury. This medical emergency requires urgent surgical management as delays are associated with worse outcomes.

Case report: A 43-year-old man reported to the Emergency Center of the University Clinical Center of Serbia due to an injury to the erect penis during sexual intercourse. The anamnestic data were that he had felt pain and heard a "popping" sound, upon which sudden detumescence of the penis occurred and penile hematoma appeared, as well as blood during urination. Suspicion of a penile fracture was established on clinical examination. An ultrasound examination showed a rupture of the tunica albuginea of the right cavernous body, and retrograde urethrocystography revealed a rupture of the penile urethra. The patient underwent surgery that same evening. The surgical approach was a median penoscrotal incision, followed by suturing of the right cavernous body and penile urethra through a gently placed urinary catheter. Postoperative recovery was uneventful. During follow-up examinations, the patient reported normal erections, regular urination and satisfaction with the appearance of his penis.

Conclusion: Penile fracture is a rare urologic emergency, which is relatively rarely associated with urethral injury. The presentation of our case indicates the importance of initial ultrasound and radiographic diagnostics. In the case where the site of injury is present preoperatively, a ventral penoscrotal incision may be a suitable surgical approach. Timely recognition and surgical treatment of penile fracture associated with urethral injury gives excellent functional results.

Keywords: penile fracture, urethral injury, urologic emergency, urgent surgical management

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UVOD

Fraktura penisa je urgentno urološko stanje u kojem tokom povrede penisa u erekciji dolazi do prekida kontinuiteta tunike albuginee i rupture kavernoznih tela [1]. Fraktura penisa je retko stanje u urgentnoj urologiji [2]. Najčešće do frakture penisa dolazi tokom energičnog seksualnog odnosa, ali se može desiti i tokom penilne manipulacije, masturbacije i traume penisa u erekciji [3]. U 10%–21% pacijenata ruptura kavernoznih tela udružena je sa povredom uretre [4,5]. Klinički se fraktura penisa manifestuje penilnim hematomom, deformitetom penisa, bolom i momentalnom detumescencijom penisa [1]. Pacijent može prilikom nastanka frakture čuti zvuk „pucanja" [1]. U slučaju udružene povrede uretre, može biti prisutna uretroragija [1]. Sumnja na frakturu penisa postavlja se na osnovu anamneze i kliničkog nalaza, a potvrđuje se ultrazvučnim pregledom ili magnetnom rezonancom penisa [6]. Kada postoji sumnja na povredu uretre, neophodna je retrogradna uretrocistografija [3]. Fraktura penisa se leči hirurški, i po mogućstvu što ranije, jer odlaganje intervencije utiče na ishode lečenja [3].

Cilj ovog rada je prikaz slučaja pacijenta sa frakturom penisa udruženom sa rupturom penilne uretre koji je urgentno hirurški lečen sa dobrim postoperativnim funkcionalnim ishodima. Od pacijenta je dobijen pisani informisani pristanak za objavljivanje ovog prikaza slučaja.

PRIKAZ SLUČAJA

Muškarac star 43 godine javio se u večernjim časovima u urološku ambulantu Urgentnog centra Univerzitetskog kliničkog centra Srbije zbog povrede penisa tokom seksualnog odnosa. Pacijent navodi da je imao seksualni odnos sa svojom izvanbračnom partnerkom, u njenom stanu, uz penetraciju otpozadi (lat. *coitus more ferarum*; engl. *rear-entry intercourse, i.e., doggy style*), kada je osetio bol i čuo zvuk „pucanja", nakon čega je došlo do momentalnog prestanka erekcije. Primetio je hematom u predelu penisa kao i krv prilikom mokrenja.

Pacijent je naveo da nema hroničnih bolesti, te da ne koristi hroničnu terapiju. Objektivno, na prijemu su bili prisutni otok, hematom i deformacija penisa. Takođe, na meatusu uretre je bila vidljiva uretroragija (Slika 1). Učinjen je ultrazvučni pregled penisa linearnom sondom, gde je konstatovano prisustvo penilnog hematoma sa znacima prekida kontinuiteta tunike albuginee desnog kavernoznog tela sa vidljivim aktivnim krvarenjem (Slika 2). Učinjena je potom retrogradna uretrocistografija gde je uočena ekstraluminacija kontrasta iz penilne uretre (Slika 3). Indikovan je hitan prijem i hitno hirurško lečenje po prijemu, te je

INTRODUCTION

Penile fracture is a urologic emergency characterized by disruption to the continuity of the tunica albuginea and rupture of the corpora cavernosa following trauma to the erect penis [1]. Penile fracture is a rare condition in emergency urology [2]. It most commonly occurs during vigorous sexual intercourse but may also result from penile manipulation, masturbation, or trauma to the erect penis [3]. In 10%-21% of patients, rupture of the corpora cavernosa is associated with urethral injury [4,5]. Clinically, a penile fracture presents with penile hematoma, deformity, pain, and immediate detumescence [1]. Patients may report hearing a characteristic "popping" sound at the moment of injury [1]. In cases of associated urethral injury, urethrorrhagia may be present [1]. Suspicion of penile fracture is based on anamnesis and clinical findings and is confirmed by ultrasonography or magnetic resonance imaging of the penis [6]. When urethral injury is suspected, retrograde urethrocystography is necessary [3]. Penile fracture is treated surgically, preferably as early as possible, since delays in intervention adversely affect treatment outcomes [3].

The aim of this paper is to present a case of penile fracture associated with rupture of the penile urethra that was treated with emergency surgery, resulting in favorable postoperative functional outcomes. Written informed consent for publication of this case report was obtained from the patient.

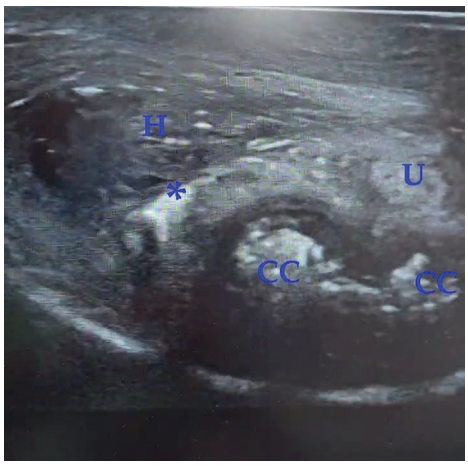
CASE REPORT

A 43-year-old man presented in the evening hours at the urology outpatient clinic of the University Clinical Center of Serbia Emergency Center, due to penile trauma sustained during sexual intercourse. The patient reported that he was having rear-entry intercourse (i.e.,"doggy style"; Latin: *coitus more ferarum*) with his extramarital partner, in her apartment, when he experienced pain and heard a "popping" sound, followed by immediate detumescence. He noticed penile hematoma as well as blood during urination.

The patient reported no chronic illnesses and was not on any regular therapy. On physical examination at admission, penile swelling, hematoma, and deformity were present. Urethrorrhagia was also observed at the urethral meatus (Figure 1). Ultrasonographic examination of the penis using a linear probe revealed a penile hematoma with disruption of the tunica albuginea of the right corpus cavernosum and evidence of active bleeding (Figure 2). Retrograde urethrocystography subsequently demonstrated contrast extravasation from the penile urethra (Figure 3). Emergency admission and immediate surgical treatment were indicated,

Slika 1. Klinička prezentacija frakture penisa kod našeg pacijenta – otečeni penis sa hematomom uz vidljive tragove krvi zbog uretroragije

Figure 1. Clinical presentation of penile fracture in our patient – swollen penis with hematoma and visible blood due to urethrorrhagia

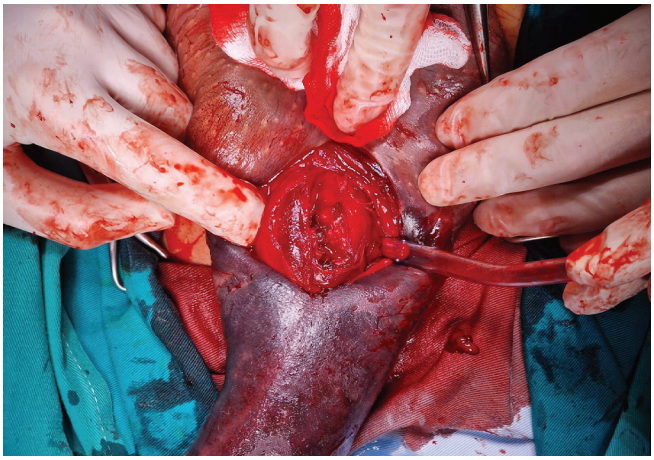


Slika 2. Ultrazvučni pregled penisa pokazuje penilni hematom i krvarenje iz desnog kavernoznog tela (H – hematom, U – uretra, CC – kavernozna tela, * krvarenje)

Figure 2. Ultrasound examination of the penis showing penile hematoma and bleeding from the right corpus cavernosum (H – hematoma, U – urethra, CC – corpora cavernosa, * bleeding)

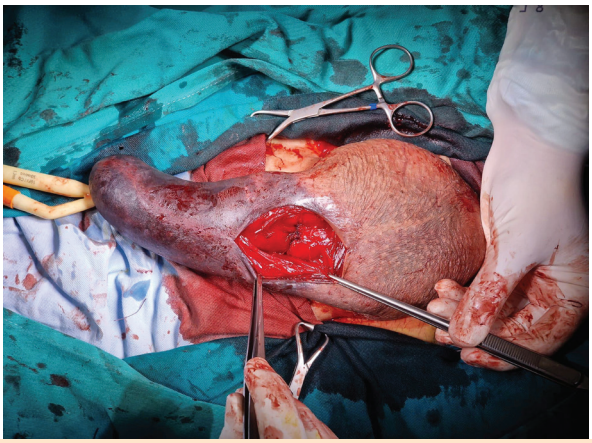
Slika 3. Retrogradna uretrocistografija pokazuje ekstraluminaciju kontrasta iz penilne uretre

Figure 3. Retrograde urethrocystography showing contrast extravasation from the penile urethra



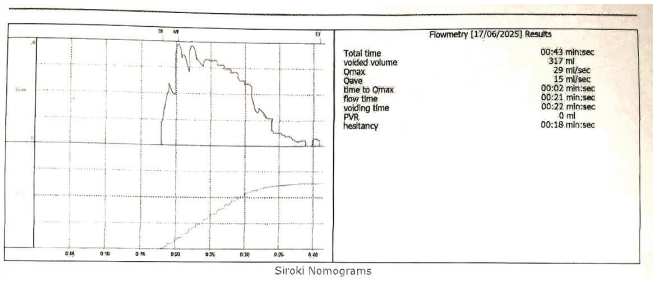
Slika 4. Intraoperativni nalaz ukazuje na rupturu desnog kavernoznog tela i penilne uretre

Figure 4. Intraoperative finding demonstrating rupture of the right corpus cavernosum and penile urethra



Slika 5. Prikaz nakon izvršene sutura desnog kavernoznog tela i penilne uretre pojedinačnim šavovima

Figure 5. Appearance after repair of the right corpus cavernosum and penile urethra using interrupted sutures



Slika 6. Normalna, zvonasta kriva na urofloumetriji, na kontrolnom pregledu

Figure 6. Normal bell-shaped uroflowmetry curve at follow-up examination

pacijent nakon četiri sata od inicijalnog pregleda uveden u operacionu salu.

U uslovima opšte anestezije učinjena je središnja penoskrotalna incizija po *raphe* penisa i skrotuma. Izvršena je incizija ovojnica inbibiranih hematomom. Ispreparisana su oba kavernozna tela. Evakuisan je hematom pored desnog kavernoznog tela, a u nivou korena penisa smo uočili ventralnu rupturu desnog kavernoznog tela u dužini od oko 2 cm. U istom nivou smo uočili i rupturu penilne uretre u dužini od oko 1cm (Slika 4). Plasirali smo Folijev urinarni kateter (*Foley CH 16*) pod vizuelnom i manuelnom kontrolom u mokraćnu bešiku, i dobili bistar urin. Učinjena je suturu desnog kavernoznog tela pojedinačnim šavovima korišćenjem 3-0 resorptivnog polifilamentnog šava. Učinili smo suturu penilne uretre pojedinačnim šavovima korišćenjem 5-0 resorptivnog monofilamentnog šava (Slika 5). Zatim je učinjena sutura ivica incizije i previjanje.

Pacijentu je ordinirana antibiotska profilaksa i tromboprofilaksa. Postoperativni tok je bio uredan. Pacijent je otpušten kući dobrog opšteg stanja četvrtog postoperativnog dana sa urinarnim kateterom. Na kontrolnim pregledima su skinuti konci sa rane. Potom je petnaestog postoperativnog dana učinjena retrogradna uretrocistografija pored katetera na kojoj nije uočena ekstraluminacija kontrastnog sredstva. Na sledećoj kontroli, devetnaestog postoperativnog dana, izvađen je urinarni kateter. Pacijentu je savetovano uzdržavanje od seksualnih aktivnosti narednih mesec dana. Tokom daljih kontrola pacijent je naveo da su erekcije uredne, da je zadovoljan izgledom penisa, kao i da uredno mokri. Nakon osam meseci, urađena je urofloumetrija koja je pokazala normalnu, zvonastu krivu sa maksimalnim protokom (*Qmax*) 29 ml/s (Slika 6).

DISKUSIJA

Fraktura penisa predstavlja retko urgentno urološko stanje. U Sjedinjenim Američkim Državama, fraktura penisa ima procenjenu incidenciju od 1,0–1,8 na 100.000 hospitalizacija [2]. Ovo stanje predstavlja rupturu tunike albuginee kavernoznih tela prilikom povrede penisa u erekciji [1]. Studije pokazuju da se fraktura penisa javlja kod mlađih i sredovečnih muškaraca, prosečne starosti nešto ispod 40 godina [2,4]. U našem slučaju, u pitanju je sredovečni muškarac starosti 43 godine. S obzirom na anatomiju tunike albuginee, najčešće mesto njene rupture je lokalizovano gde je ona najtanja – ventralno ili lateralno, i najčešće distalno od suspenzornog ligamenta [1,7,8]. U našem slučaju, postojala je unilateralna ventralna ruptura desnog kavernoznog tela. Ruptura kavernoznih tela je najčešće jednostrana i bez udružene povrede uretre, u oko 80% slučajeva [3], dok se ruptura uretre događa u oko 10%-

and the patient was transferred to the operating room four hours after the initial examination.

Under general anesthesia, a midline penoscrotal incision was performed along the penile and scrotal raphe. The hematoma-infiltrated tissue layers were incised. Both corpora cavernosa were dissected. A hematoma adjacent to the right corpus cavernosum was evacuated, and at the level of the penile root, a ventral rupture of the right corpus cavernosum measuring approximately two cm was identified. At the same level, a rupture of the penile urethra measuring approximately one cm was also identified (Figure 4). A Foley urinary catheter (Foley CH 16) was inserted into the bladder under visual and manual control, yielding clear urine. The right corpus cavernosum was repaired using interrupted sutures with 3-0 absorbable multifilament material. The penile urethra was repaired using interrupted sutures with 5-0 absorbable monofilament material (Figure 5). The incision was then closed, and a dressing was applied.

The patient received antibiotic prophylaxis and thromboprophylaxis. The postoperative course was uneventful. The patient was discharged from hospital in good general condition on the fourth postoperative day with a urinary catheter in place. At follow-up visits, skin sutures were removed. On postoperative day 15, retrograde urethrocystography performed with the catheter in situ showed no contrast extravasation. At the next follow-up, on postoperative day 19, the urinary catheter was removed. The patient was advised to abstain from sexual activity for one month. During subsequent follow-up, the patient reported normal erections, satisfaction with penile appearance, and normal urination. Eight months later, uroflowmetry demonstrated a normal bell-shaped curve with a maximum flow rate (Qmax) of 29 ml/s (Figure 6).

DISCUSSION

Penile fracture is a rare urologic emergency. In the United States, its estimated incidence ranges from 1.0 to 1.8 cases per 100,000 hospitalizations [2]. This condition is, in fact, the rupture of the tunica albuginea of the corpora cavernosa following trauma to the erect penis [1]. Studies indicate that penile fracture typically occurs in younger and middle-aged men, with a mean age slightly below 40 years [2,4]. In our case, the patient was a middle-aged, 43-year-old man. Based on the anatomical characteristics of the tunica albuginea, rupture most commonly occurs at its thinnest point – ventrally or laterally, most often distally to the suspensory ligament [1,7,8]. In our case, a unilateral ventral rupture of the right corpus cavernosum was identified. Rupture of the corpora cavernosa is usually unilateral

21% slučajeva [4,5] i često je udružena sa bilateralnom rupturom kavernoznih tela [3].

Do frakture penisa u zapadnim zemljama najčešće dolazi tokom energičnog seksualnog odnosa (preko 80% slučajeva), mnogo ređe tokom masturbacije ili traume penisa u erekciji [3]. U zemljama Srednjeg istoka dominantan uzrok nastanka frakture penisa je „*taghaandan*", odnosno nasilno postizanje detumescencije penisa u erekciji [9]. Najčešće seksualne poze u kojima dolazi do frakture penisa su tzv. „*doggy style*" i „ misionarska poza" [10,11], kada rigidni penis sklizne iz vagine i udari u perineum ili pubičnu kost [1]. I kod muškaraca koji upražnjavaju seks sa drugim muškarcima, najčešća seksualna poza pri kojoj nastaje fraktura penisa je tzv. „*doggy style*" poza [12]. Najčešće do frakture penisa dolazi prilikom seksualnog odnosa u „stresnim situacijama", poput vanbračnog seksualnog odnosa, na radnom mestu ili na neuobičajenim mestima [13]. U našem slučaju, pacijent je imao seksualni odnos sa vanbračnom partnerkom, u njenom stanu. Studija iz Sjedinjenih Američkih Država iz 2021. godine pokazala je češću upotrebu psihoaktivnih supstanci kod pacijenata hospitalizovanih zbog frakture penisa [2].

Anamnestički, pacijent može navesti da je čuo zvuk „pucanja" i da je osetio bol, nakon čega je došlo do nagle detumescencije penisa. Fraktura penisa se klinički manifestuje penilnim hematomom, otokom i deformacijom penisa, pri čemu hematom izaziva devijaciju penisa na suprotnu stranu. Opisani izgled penisa naziva se „patlidžan deformacija". U slučaju rupture Bakove fascije, hematom može da se proširi na skrotum, perineum i suprapubičnu regiju [1,3,8]. Ukoliko postoji lezija uretre, može biti prisutna uretroragija iz meatusa uretre [1]. Pacijent u našem slučaju je prijavio sve navedene anamnestičke podatke, a objektivnim pregledom su konstatovani svi gorenavedeni klinički znaci frakture penisa.

Dijagnoza frakture penisa se postavlja uglavnom na osnovu anamnestičkih podataka i kliničkog nalaza, dok je u nejasnim situacijama potrebno uraditi ultrazvučni pregled penisa ili pregled magnetnom rezonancom [1,14,15]. Iako se u velikom broju studija navodi da je klinička dijagnoza dovoljna u većini slučajeva, primena „imidžing" metoda može doprineti boljem planiranju hirurške intervencije, manjoj inciziji, kao i manjem hirurškom morbiditetu [1,6,14,15]. Praksa u našoj ustanovi je da se kod svake sumnje na frakturu penisa obavi ultrazvučni pregled penisa. Pregled magnetnom rezonancom se u našoj ustanovi indikuje kada ni klinički ni ultrazvučno nije jasno postojanje frakture penisa, ili kada se pacijent odloženo javi na pregled urologa. Kod datog pacijenta, ultrazvučni pregled je pokazao postojanje prekida kontinuiteta tunike albuginee desnog kavernoznog tela, ventralno sa vidljivom ek-

and not associated with urethral injury in approximately 80% of cases [3], whereas urethral rupture occurs in approximately 10%–21% of cases [4,5] and is often associated with bilateral cavernous rupture [3].

In Western countries, penile fracture most commonly occurs during vigorous sexual intercourse (over 80% of cases), and much less frequently during masturbation or trauma to the erect penis [3]. In Middle Eastern countries, the predominant cause is "taghaandan," or forced detumescence of the erect penis [9]. The sexual positions most commonly associated with penile fracture are the so-called "doggy style" and "missionary" positions [10,11], when the rigid penis slips out of the vagina and strikes the perineum or pubic bone [1]. Among men who have sex with other men, the most common position associated with penile fracture is also "doggy style" [12]. Penile fracture most often occurs during intercourse in "stressful situations," such as extramarital intercourse, intercourse at the workplace, or in unusual locations [13]. In our case, the patient reported intercourse with an extramarital partner in her apartment. A study from the United States (2021) reported increased use of psychoactive substances among patients hospitalized for penile fracture [2].

As to anamnesis, patients often report hearing a "cracking" sound accompanied by pain, followed by sudden detumescence. Clinically, a penile fracture presents with hematoma, swelling, and deformity, with the hematoma causing deviation of the penis to the contralateral side. This characteristic appearance is referred to as the "eggplant deformity" or "aubergine sign". In cases of Buck's fascia rupture, the hematoma may extend to the scrotum, perineum, and suprapubic region [1,3,8]. When urethral injury is present, urethrorrhagia from the urethral meatus may occur [1]. In our case, the patient reported all the characteristic symptoms, and all the above-described clinical signs were confirmed on examination.

The diagnosis of penile fracture is primarily based on history and clinical findings, while imaging – ultrasound or magnetic resonance imaging – is usually employed in equivocal cases [1,14,15]. Although many studies suggest that clinical diagnosis is sufficient in most cases, imaging modalities may facilitate better surgical planning, smaller incisions, and reduced surgical morbidity [1,6,14,15]. In our hospital, ultrasound examinations are routinely performed in all suspected cases of penile rupture. Magnetic resonance imaging is reserved for cases where diagnosis remains unclear or when patients present late. In our patient, ultrasound imaging revealed disruption of the tunica albuginea of the right corpus cavernosum ventrally, with visible blood extravasation ("blush") and penile hematoma. When urethral injury is

stravazacijom (engl. *extravasation, i.e., blush*) krvi i prisutnim penilnim hematomom. U slučaju kada postoji sumnja na povredu uretre, u vidu prisutne uretroragije, hematurije ili nemogućnosti mokrenja, potrebno je preoperativno uraditi retrogradnu uretrocistografiju [1,3,16] ili fleksibilnu uretroskopiju [1,16]. Retrogradna uretrocistografija je u našem slučaju pokazala isticanje kontrasta iz penilne uretre što je potvrdilo rupturu penilne uretre.

Fraktura penisa se leči hirurški. Rezultati istraživanja koje su sproveli Gamal i saradnici, pokazali su da, u slučaju konzervativnog lečenja, erektilna funkcija bude zadovoljavajuća kod svega 50%, za razliku od hirurškog lečenja, gde erektilna funkcija bude zadovoljavajuća kod 96% pacijenata [17]. Ovi podaci idu u prilog činjenici da je hirurško lečenje metod izbora kod pacijenata sa frakturom penisa [3]. Podaci iz literature ukazuju da se hirurško lečenje može odložiti i do sedam dana uz zadovoljavajuće postoperativne rezultate u pogledu erektilne funkcije [1,18]. S druge strane, retrospektivna multicentrična studija, koja je obuhvatila 137 pacijenata sa frakturom penisa, pokazala je da odlaganje hirurške reparacije duže od osam sati dovodi do lošije erektilne funkcije [3]. Mišljenje autora je da hirurškom lečenju treba pristupiti što je ranije moguće da bi se postigli bolji rezultati, ali bez bespotrebne žurbe. U našem slučaju, pacijent je uveden u operacionu salu četiri sata nakon inicijalnog pregleda od strane urologa.

Najčešći hirurški pristup kod lečenja frakture penisa je cirkumcizijska subkoronalna incizija [1,5,6,8]. Nakon ove incizije, načini se *degloving* penisa i pristupi se svim trima komponentama penisa. Ukoliko pacijent nije cirkumciziran, po završetku reparacije kavernoznih tela, potrebno je načiniti cirkumciziju, čime se izbegava postoperativni edem i eventualna ishemija prepucijuma [1,8]. Ovaj pristup je pogodan kada preoperativno nije poznato mesto laceracije kavernoznog tela, jer se njime postiže bolji pristup kavernoznim telima i spongioznom telu [1,19]. Takođe, *degloving* tehnika ima prednosti kada je prisutno veliko oticanje penisa i ekstenzivan hematom [20]. Međutim, kada je preoperativnim snimanjem utvrđeno mesto laceracije kavernoznog tela, pristup može biti vertikalna penoskrotalna incizija, ili manja lokalna longitudinalna incizija, čime se takođe postižu dobri rezultati [19,21]. U našem slučaju, s obzirom da je na ultrazvučnom pregledu uočena ventralna ruptura kavernoznog tela proksimalno, kao i ruptura uretre na istom nivou na uretrocistografiji, odlučili smo se za središnju vertikalnu penoskrotalnu inciziju. Središnja ventralna i longitudinalne lateralne incizije, za razliku od *degloving* procedura, manje traumatizuju tkivo i manje dodatno povređuju krvne sudove i nerve [19,21]. Takođe, later-

suspected – based on urethrorrhagia, hematuria, or urinary retention – preoperative retrograde urethrocystography [1,3,16] or flexible urethroscopy [1,16] is indicated. In our case, retrograde urethrocystography confirmed urethral rupture, revealing contrast extravasation.

Penile fracture is treated surgically. A study by Gamal et al. demonstrated that erectile function was preserved in only 50% of patients treated conservatively, compared to 96% of those treated surgically [17]. These findings support surgical repair as the treatment of choice [3]. Some studies suggest that surgery may be delayed for up to seven days with acceptable outcomes [1,18]. However, a retrospective multicenter study of 137 patients showed that delays longer than eight hours were associated with worse erectile function [3]. The authors advocate that surgical intervention should be performed as early as possible, but without unnecessary haste. In our case, surgery was performed four hours after initial evaluation.

The most common surgical approach is a circumferential subcoronal incision [1,5,6,8]. Upon incision, penile degloving is performed and all three components of the penis are made accessible. If the patient is uncircumcised, circumcision is recommended at the end of the procedure, i.e., after cavernous body reparation, to prevent postoperative edema and potential preputial ischemia [1,8]. This approach is particularly useful when the location of the cavernous body laceration is unknown preoperatively, as it enables better access to the cavernous bodies and the corpus spongiosum [1,19]. Also, the degloving technique has its advantages when the penis is excessively swollen with extensive hematoma [20]. However, when the site of cavernous body laceration is identified with preoperative imaging, a targeted approach such as a penoscrotal or localized longitudinal incision may be applied, which also yields good outcomes [19,21]. In our case, since preoperative ultrasound imaging revealed a ventral rupture of the cavernous body, proximally, and preoperative urethrocystography showed a urethral rupture at the same level, the midline vertical penoscrotal incision was chosen. Compared to degloving techniques, the midline ventral and longitudinal lateral incisions are less traumatic for the tissue and reduce the risk of additional neurovascular injury [19,21]. Additionally, lateral incisions are applicable in circumcised men in whom there is not enough skin for adequate healing [19]. Penoscrotal access also provides better exposure of the urethra [21].

Intraoperative injection of saline solution can contribute to identifying the site of laceration of the corpus cavernosum and the urethra, as well as enable verification of the success of the suture [1,8]. When the site of laceration of the corpus cavernosum is identified, sutur-

alne incizije pogodne su i kod cirkumciziranih muškaraca kod kojih nema dovoljno kože za adekvatno zarastanje [19]. Penoskrotalna incizija, takođe, pruža i bolji pristup penilnoj uretri [21].

Intraoperativno ubrizgavanje fiziološkog rastvora može da doprinese identifikaciji mesta laceracije kavernoznog tela i uretre, kao i da omogući proveru uspešnosti suture [1,8]. Kada se identifikuje mesto laceracije kavernoznog tela, preporučuje se sutura 2-0 ili 3-0 resorptivnim šavovima [1,5,8]. U slučaju povrede uretre, preporučuje se sutura uretre preko pažljivo plasiranog urinarnog katetera finim resorptivnim 4-0 ili 5-0 šavovima [1,3,22]. Aćimović i saradnici su opisali slučaj reparacije uretre udružene sa frakturom penisa pomoću grafta bukalne mukoze [23]. U našem slučaju, reparacija kavernoznog tela učinjena je pomoću 3-0 polifilamentnog resorptivnog šava, a reparacija uretre pomoću 5-0 resorptivnog monofilamentnog šava preko pažljivo plasiranog Folijevog katetera.

Kod našeg pacijenta, postoperativni tok je protekao uredno. Devetnaestog postoperativnog dana je izvađen urinarni kateter. Savetovana je apstinencija od seksualnih odnosa narednih mesec dana, što je u skladu sa preporukama da kateter ostane dve do tri nedelje od operacije [1] i da pacijent apstinira od seksualnih odnosa najmanje dve nedelje [24], pri čemu većina urologa savetuje seksualnu apstinenciju šest do osam nedelja od operacije [25]. Tokom osam meseci praćenja, pacijent je navodio da je zadovoljan izgledom penisa, da ima potpune erekcije, kao i da uredno mokri. Na uroflometriji, nakon osam meseci od operacije, opisana je normalna, zvonasta kriva sa Q_{max} 29 ml/s.

Udaljene postoperativne komplikacije frakture penisa najčešće su erektilna disfunkcija i nastanak kurvature penisa. Većina studija ukazuje na očuvanje erektilne funkcije u preko 90% slučajeva nakon hirurškog lečenja [8,24,26]. S obzirom da je fraktura penisa traumatičan događaj, erektilna disfunkcija može nastati i kao posledica psihogenog faktora [25]. Prisustvo kurvature penisa procenjuje se na oko 5% slučajeva nakon hirurškog lečenja frakture penisa, pri čemu su kurvature obično blage i u većini slučajeva ne zahtevaju hirurški tretman [3,25]. Aktuelne studije pokazuju da je procenat dugoročnih komplikacija veći u slučaju odlaganja hirurškog lečenja [3,27], bilo da je u pitanju kasno javljanje u referentni centar [27], bilo da je u pitanju produženo vreme od prijema do hirurškog lečenja [3].

ZAKLJUČAK

Fraktura penisa je retko urgentno urološko stanje, pri čemu je relativno retko udružena sa lezijom uretre. Prikaz našeg slučaja ukazuje na značaj inicijalne ultrazvučne i radiografske dijagnostike u detekciji rupture kavering with 2-0 or 3-0 absorbable sutures is recommended [1,5,8]. In the case of urethral injury, urethral suturing over a carefully placed urinary catheter using fine 4-0 or 5-0 absorbable sutures is recommended [1,3,22]. Aćimović et al. described a case of urethral repair associated with penile fracture using a buccal mucosa graft [23]. In our case, repair of the corpus cavernosum was performed using a 3-0 polyfilament absorbable suture, while urethral repair was performed using a 5-0 absorbable monofilament suture over a carefully placed Foley catheter.

In our patient, the postoperative course was uneventful. The urinary catheter was removed on the nineteenth postoperative day. Abstinence from sexual intercourse for the following month was advised, which is in accordance with recommendations that the catheter remain in place for two to three weeks after surgery [1] and that the patient abstain from sexual intercourse for at least two weeks [24], while most urologists advise sexual abstinence for six to eight weeks after surgery [25]. During eight months of follow-up, the patient reported satisfaction with the appearance of the penis, full erections, as well as normal urination. On uroflowmetry, eight months after surgery, a normal, bell-shaped curve with Q_{max} 29 ml/s was described.

Late postoperative complications of penile fracture are most commonly erectile dysfunction and the development of penile curvature. Most studies indicate preservation of erectile function in over 90% of cases after surgical treatment [8,24,26]. Given that penile fracture is a traumatic event, erectile dysfunction may also occur as a result of psychogenic factors [25]. The presence of penile curvature is estimated at around 5% of cases after surgical treatment of penile fracture, with curvatures usually being mild and in most cases not requiring surgical treatment [3,25]. Current studies show that the rate of long-term complications is higher in cases of delayed surgical treatment [3,27], whether due to late presentation to a referral center [27] or prolonged time from admission to surgical treatment [3].

CONCLUSION

Penile fracture is a rare urologic emergency and is relatively infrequently associated with urethral injury. This case highlights the importance of initial ultrasonographic and radiographic evaluation in detecting both cavernosal and urethral rupture. When the site of injury is identified preoperatively, a ventral penoscrotal approach may be an appropriate surgical option. Early recognition and prompt surgical management result in excellent functional outcomes in terms of erectile function, urination, and penile appearance.

Conflict of interest: None declared.

noznog tela i uretre. U slučaju kada je preoperativno prisutno mesto lezije, ventralna penoskrotalna incizija može biti pogodan hirurški pristup. Pravovremeno prepoznavanje i hirurško lečenje frakture penisa udružene sa lezijom uretre daje odlične funkcionalne rezultate u pogledu erektilne funkcije, mokrenja i izgleda penisa.

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