A Case on Fracture of Os Penis and Partial Penectomy in a Raccoon

Azlan Che-Amat^{1*}, Nur Asyikin Haron¹, Azim Salahuddin Muhammad¹, Hoe Kai Thong¹, Fitri Wan Nor¹, Faez Firdaus Abdullah Jesse¹, Syahirah Ahmad Affandi¹, Eric Lim Teik Chung², Asinamai Athliamai Bitrus³, Innocent Damudu Peter⁴ and Bura Thlama Paul¹

¹Faculty of Veterinary Medicine, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

²Faculty of Agriculture, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

³Faculty of Veterinary Medicine, University of Jos, Nigeria

⁴Faculty of Veterinary Medicine, University of Maiduguri, Nigeria

*Corresponding author: c_azlan@upm.edu.my

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ABSTRACT

The os penis is a unique structure existing in some placental mammals, however it predisposes the organ to fracture. Partial penectomy is an incomplete penile amputation which is carried out when the transection site needed. In this report, a clinical case of partial penectomy in a raccoon was described. A 20-month-old, male albino raccoon (*Procyon lotor*) was referred to University Veterinary Hospital in Universiti Putra Malaysia with the penile prolapse. Preliminary therapeutic plan included prescription of broad-spectrum antibiotic and anti-inflammatory. Partial penectomy was arranged in this case. Postoperative treatment prescribed were fluoroquinolone antibiotic and analgesics. The prognosis was good due to minimal complication. The clinical symptoms on fracture of os penis, complications of partial penectomy, and options for treatment on fracture of os penis were discussed in this report. Castration can be an alternative preventive method to prevent trauma related to the fracture of masturbation os penis.

Key words: Os penis, Fracture, *Procyon lotor*, Trauma, Partial penectomy.

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INTRODUCTION

The raccoon, *Procyon lotor*, is a medium-sized carnivore native to Central and North America (García et al. 2012). In raccoons, the trabeculae of corpora cavernosa is replaced by the fibrous structure, known as os penis, or commonly baculum (de la Puerta and Baines 2012). The os penis is morphologically diverse between species and it is s-shaped in raccoon (Čanádý 2017). However, the unique structure of the os penis in raccoons causes this organ to be susceptible to fracture.

Fracture and penectomy of the os penis is an uncommon condition and the procedure should be performed in veterinary surgery. However, the surgical procedure is often indicated as an emergency in cases of traumatic abnormalities in order to restore the urinary and/or reproductive function (Papazoglou and Kazakos 2016). Fracture of the os penis has previously not been reported in raccoons. However, fracture of os penis has a high incidence as commonly seen in dogs (Kouki et al. 2015). The main cause for fracture of os penis is trauma

which usually arises from fighting wounds, penile torsion during mating and motor vehicle accident (Kustritz 2006; Kouki et al. 2015). Another cause for that has been postulated as intra-specific aggression during mating season (Bartosiewicz 2000).

Treatment modalities for fracture of os penis are surgical intervention. The common surgical approaches described were fixated with mini plate, wire suture, penile amputation and scrotal urethrostomy (Gregory 2015). The outcome treatment for fracture of os penis due to traumatic causes is excellent (Burrow et al. 2010). Herein a case on fracture of os penis in a raccoon was described.

Case presentation and treatment

A 20-month-old, 7.0kg intact male albino raccoon was referred to the University Veterinary Hospital (UVH), Universiti Putra Malaysia with a complaint of prolapsed penis. The raccoon was kept in a cage and fed with commercial raccoon diet. There was no other clinical sign or evidence suggesting penile trauma to the raccoon from the client. Initial treatment given was placement of suture

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on the prepuce and the penis in order to support and stabilize to the penis. However, the raccoon was presented again to the UVH due to failure of resolution after 9 days of post initial penile repair.

During a closer examination of the penis, swelling was observed at the prepuce and the anterior part of the penis and there was an open wound, with fresh blood and pus on the ventral part of the penis by palpation (Fig. 1). The hypothesis for fracture of os penis is self-inflicted injury in this situation. The diagnostic work-up planned in this case was radiography evaluated to assess the integrity of the os penis. The radiological findings showed a presence of a discontinued morphology of the os penis at the distal third segment (Fig. 2) with the radiological diagnosis of a displaced oblique fracture at the distal third of the os penis.

Surgical intervention was the clinical management opted for this case where partial penectomy procedure was adopted. Preliminary therapeutic plans for this case were prescribed of broad-spectrum antibiotic, amoxicillin and clavulanic acid (62.5mg/kg, PO, BID) for 5d and anti-inflammatory, papain (1 tab, PO, BID) for 7d. The animal was fasted overnight before the surgery and premedicated with xylazine (1mg/kg, IM). Anesthesia was induced with ketamine (10mg/kg, IM) and maintained with isoflurane at 2% to 4% concentration. A cat version of v-gel supraglottic airway device (size 5) was used for the intubation as described (van Oostrom et al. 2013). The caudal abdomen was clipped and prepared for surgery. The penis and prepuce were rinsed and cleaned with diluted 0.5% chlorhexidine solution concentration (Neihaus et al. 2011).

The patient was positioned in dorsal recumbency. An elliptical incision was made around the penis on the prepuce at the fracture site. Then the penis was retracted caudally and a tourniquet was applied on the body of the penis to prevent excessive bleeding during the amputation procedure. Another elliptical incision was then made across the tunica albuginea and cavernous tissues at the fracture site. The distal part of the penis was then removed (the size approximately 3×4cm size). The urethra was dissected at the level of the intact penis and was not spatulated. The urethral mucosa was sutured to the prepuce using round simple continuous 3-0 synthetic monofilament absorbable suture. The tunica albuginea and cavernous tissues were incorporated in each bite. Shortening of the prepuce was then performed by full thickness skin removal of approximately 3cm-× 4cm size at the base of the penis, and then sutured using simple interrupted pattern with 3-0 non-absorbable nylon suture (Fig. 3).

Postoperative treatment given were enrofloxacin (10mg/kg, IV) to prevent secondary bacterial infection, (BID, PO) for 5d. Meloxicam (0.2mg/kg, PO, SID) was given for 3d as analgesic and anti-inflammatory agent. Tramadol (3mg/kg, PO, SID) was also given for 2d for an additional analgesic. The urine output and surgical site were monitored 4 times a day to detect any complication such as dysuria, oliguria, bleeding or suture breakdown. Day-1 post-surgery, there was presence of blood in the urine suggesting postoperative haemorrhage, however the condition improved within 3 days before the raccoon was discharged. The raccoon was bright, alert and responsive, showed no abnormal sign or behaviour as compared before the surgery. Postoperative consultation feedback received from the owner was satisfied with the functional and cosmetic outcome of the procedure.

Fig. 1: Open wound at the tip of the os penis with fresh blood and pus on the ventral part

Fig. 2: Plain radiograph on right lateral view showing a displaced oblique fracture at the distal third of the os penis.

Fig. 3: Cosmetic suture of the urethral mucosa and prepuce with shortening of the prepuce by full thickness skin removal of approximately 3×4 cm size at the base of penis.

DISCUSSION

Fracture of the os penis repair and partial penectomy are rare surgical procedures performed in domestic animals. Fracture of the os penis varies in onset and clinical symptoms. The main reason for clinical manifestation is the excessive fibrous tissue formation due to malunion fracture healing, occurring typically 2 weeks post-fracture. The fibrous tissue causes urethral compression and obstruction

leading to dysuria and hematuria (Papazoglou and Kazakos 2016). Pain and crepitus can be appreciated for a cases fracture during manipulation of the penis but in this case, there was no crepitus felt upon physical examination and this case can be categorized as early intervention of the fracture of the os penis.

Depending on the severity of the case, not all fracture of the os penis requisite surgical intervention (Neihaus et al. 2011). In cases of mild fracture, immobilization via urinary catheterization would be sufficient to reduce mobilization of os penis fragment and prevent urethral obstruction caused by fibrous tissue compression (Kouki et al. 2015). Stabilization could be established by placing the cerclage wire or bone plate on the fracture site, however in fracture which involves middle or proximal part of penis, complete penectomy is indicated and should be accompanied by scrotal urethrostomy (Gavioli et al. 2014; Katayama et al. 2018). Partial penectomy is appropriate for injuries involving distal part of the penis, which was opted in this case and provide less complications (Pavletic 2007; Kouki et al. 2015). Many complications could be experienced with penectomy. In this study, only hemorrhage was observed and had resolved within 3 days. Hemorrhage and urethral obstruction are common and expected to be resolved between 3 to 21 days post-operatively (de la Puerta and Baines 2012). Besides that, partial penectomy shorten the length of the penis, increasing the risk of urine dribbling and scalding due to increase in contact time of skin with the urine (Pavletic 2007).

Sexual maturity was related to aggressive behavior and fracture of the os penis was commonly associated with the aggressive behavior during mating in raccoons (Bartosiewicz 2000). In animal, self-inflicting injuries to the penis from masturbation and antagonistic behavior may happen including in this case. Castration can be an alternative preventive method to prevent trauma related to the fracture of masturbation os penis which will improve the welfare of the animal (Houlihan 2017; Bravo et al. 2019). In this case, the sequelae to fracture of the os penis which eventually leads to partial penectomy is hypothesized to compromise the function of the organ for mating. This veterinary case report highlights the success of wildlife veterinary surgical management in a raccoon with fracture of the os penis and surgically repaired via partial penectomy. Clinical symptoms in this case were the abnormalities observed on the penis perceived as prolapsed penis. A variety of surgical and non-surgical intervention are available, however consideration to the bone and as well as restoration of function of penis, partial penectomy was opted in this case.

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