Urethral Rupture and Leakage Following Prolonged Surgical Removal of Urethral and Bladder Stones by Episiotomy and Urethrotomy in Female Asian Elephant (Elephas Maximus) : A Case Report

Nikorn Thongtip1,2,4,5*, Benchapol Lorsunyaluck1 Manakorn Sukmak3
Sirinart Chaichanathong4,5 Pornchai Sunyathitiseree1,2

Abstract

A 46-year-old female Asian elephant (Elephas maximus) with an abnormal ballottement mass in the perineal area was presented. The elephant was unable to urinate via the normal tract. Previously, this elephant was treated for urethral and bladder obstruction caused by stones by episiotomy and urethrotomy. Eight months later, post-operative care was completed. At this point, the incision wound completely closed and the elephant could urinate through the normal tract. However, the elephant was then mated with an adult male elephant. Three weeks later, the female showed signs of the perineal ballottement mass and was unable to urinate. Episiotomy and urethrotomy were performed following the previous incision line. After resectioning through the urethra, urine from the urinary bladder flowed through the incision wound and urine scalding was found. Then, daily wound cleaning was conducted for two months. Finally, the surgical wound completely closed and a new urinated tract behind the vulva opening was completely formed.

Keywords: elephant, surgery, urethral rupture

*Correspondence: fvetnit@ku.ac.th, nthongtip@yahoo.com

**Introduction**

In elephants, the process of secondary intention healing in the post-operative care of episiotomy wounds is well understood. Almost all elephant episiotomy cases are performed for dystocia correction, and most cases are managed by secondary intention healing (Schaffenaar, 2013; Hermes et al., 2008). However, in one dystocia case in Thailand, the suturing allowed the closing of all layers and led to successful primary intention healing (Thitaram et al., 2006). Our previous report revealed the use of episiotomy and urethrotomy for the removal of stones (Thongtip et al., 2013). In that report, suturing for the closure of all layers was attempted. However, urine obstruction was found few hours following the operation. The elephant showed signs of urine accumulation around the sutures and was restless. Following this, it was decided that all sutures should be cut to allow urine flow. Urine passed through this wound and the elephant recovered from signs of restlessness. After that, the wound was allowed to heal by secondary intention healing and this process took a total of eight months. Finally, the episiotomy wound completely closed and the elephant could urinate via the normal tract. Several factors influence the recurrence of urethral rupture and leakage, including the formation of new stones (Smeak, 2000), urethral infections (Kieves et al., 2011) and stricture of urethra structures (Hawthorne et al., 1998; Stone et al., 1997). Correction is based on the resection of episiotomy, urethrotomy and urethrostomy for urine flow out (Smeak, 2000). However, there have been no reports concerning the correction of urethral rupture and leakage in female Asian elephants (*Elephas maximus*) by using episiotomy and urethrotomy. Therefore, this report described the diagnosis, surgical procedure and post-operative care.

**Animal signalments, history taking and physical examination:** A 46-year-old female Asian elephant showed signs of an abnormal mass at the perineal area. The elephant was unable to urinate via the normal tract. Estimated weight of the elephant was 3,000 kg. The elephant’s body temperature was 99°F. Pulse rate was 35 beats per minute. Respiratory rate was 8 times per minute. The elephant was admitted to Kasetsart University, Kamphaeng Saen Veterinary Teaching Hospital on April 23, 2014. The perineal mass was separated into two parts along the perineal line. The size of each part was around 20×20 cm. From skin palpation, both masses were ballottement. The masses continued to increase in size and flowed into the lower part (Fig 1). Upon history taking it was found that, previously, in September 2012, this elephant had a urethral stone obstruction removed by episiotomy and urethrotomy. Eight months later, in March 2013, post-operative care was completed. The wound completely closed and the elephant could urinate through the normal tract. However, early in April 2013, the elephant was mated with an adult male elephant. Three weeks later, the female showed signs of perineal ballottement mass and inability to urinate.

**Laboratory tests:** Pre-operative blood examination via auricular vein puncture was conducted. Hematological profiles, liver enzyme and kidney function were within normal limits.

**Ultrasoundography**: Trans-skin ultrasonography (ALOKA; SSD 500 with convex transducer probe; 3.5 MHz) at the abnormal mass was performed. The ultrasound image revealed subcutaneous fluid-like accumulation.

**Clinical diagnosis:** Clinical diagnosis was based on history background, physical examination and ultrasonography. The urethrotomy wound under the skin rupture was assumed to be a clinical case.

**Treatment plans:** Due to the lack of information about recurrence of Urethrotomy wound rupture and leakage, an episiotomy for exploration was performed. Then, complete urethrotomy for urine flow was done. Finally, secondary intention wound healing was performed.

**Sedation and surgical procedure:** An intravenous catheter No. 18, 1.5 inch (NIPRO IV Catheter, Phra Nakhon Si Ayutthaya, Thailand) was inserted into the auricular vein and NSS (Normal Saline 0.9%, General Hospital Products Public Co., Ltd., Patumthani, Thailand) was given through it. The flow rate was around 2 liters per hour. Sedation was done by administering xylazine hydrochloride 0.04 mg/kg intravenously (Ilum Xylazil-1000; Troy Lab PTY Ltd, Smithfield NSW, Australia). Local anesthetic, sixty ml of 2% lidocaine hydrochloride (Lidocaine 2%, Union Drug Laboratories Ltd., Bangkok, Thailand), was administered by infiltration at the previous incision area, 1 ml per 1 cm². The surgical procedure was started with a 15-cm episiotomy incision. The fusion of
skin-vestibulo-urethral muscles was resected. Urethrotomy towards the releasing of urine was performed. Some released urine was absorbed into subcutaneous tissue and combined with the previous mass. After the operation, the elephant was given yohimbine hydrochloride (Reverzine®, Parnell Lab Pty Ltd, NSW, Australia) 0.125 mg/kg intravenously. Secondary intention wound healing without suturing was applied.

**Post-operative care:** Daily wound cleaning was done using chlorhexidine scrub (O.R. Scrub, Sinopharm Co. Ltd., Bangkok, Thailand) on the skin and subcutaneous tissue. The urethra was lavaged with clean tap water and 10 liters of NSS using equine stomach tube. Topical nitrofurazone ointment (Bactacin®, Osoth Inter Lab, Bangkok, Thailand) and insect repellent (Negazun®, Bayer CropScience Ltd.) were applied. Systemic control of bacterial infection was also performed by using long acting amoxycillin (Longamox®, Vetocinol, Lure, France) at a total dose of 7,500 mg/day for 30 days intramuscularly. The total course of antibiotic injections was one month. Phenylbutazone (Butasyl®, Novartis Animal Health, Australia) at a total dose of 9000 mg daily was injected intramuscularly for 5 days. An injectable supplement containing butaphosphan and cyanocobalamin (Catosal®, Bayer Health Care, Kansas, USA) at a total of 50 ml was intramuscularly administered every 2 days over a 30-day period. The accumulation of urine under the subcutaneous tissue and the urine scalding led to purulent exudates and necrotic tissues around the surgical wound. The necrosis covered the base of the incision line through umbilicus (Fig 2). The wound was then cleaned and the necrotic tissues were removed daily. Then, both necrosis points were pierced through skin in the same way behind the vulva opening and all urine flowed out this way. After the operation, the elephant had good appetite and was able to defeate normally. Two months of wound cleaning and trimming were performed. During the early phases of healing, the elephant urinated through the episiotomy wound. However, the wound healing increased daily. New urine subcutaneous tract under the surgical wound was formed behind the vestibule and vulva. Finally, the surgical wound completely closed and the new tract was completely formed (Fig 3). At present, like other female elephants, the elephant could urinate via the new tract with large amount of urine (Fig 4). However, sometimes, urinary incontinence still occurred and stained the hind limbs of the elephant. Fortunately, her overall health was not affected.

In this report, the rupture and leakage of urethral wound occurred and was corrected. The cause might result from inflammation after natural copulation. However, the inside anatomy and mechanism remain unclear. The attack during breeding might have ruptured the urethral wall. Then, the leaked urine could have accumulated through subcutaneous tissues. The incision through the previous wound line was a benefit to this operation as the urethrotomy leakage area was easily found. In the previous study, urethral canula modified from reused elephant endotracheal tube was inserted to the urethra canal. Although the elephant could urinate via the canula, the fitting of the canula on the perineum was not entirely secured and was later removed unintentionally on the first day when the elephant wagged its tail on the canula. Then, secondary intention healing without the canula was chosen. Daily wound cleaning and trimming of the necrotic tissues were the key to success of this treatment. Due to the fact that the elephant could not urinate via the normal tract, the formation of new urine tract was initiated. Surprisingly, the control of urination improved and the urinary incontinence was not frequently found. Therefore, the bladder sphincter might not have been affected. However, the monitoring of her condition still continues.

In conclusion, this study has improved our knowledge of the performance and care in the processes of elephant episiotomy and urethrotomy surgery. It is important to protect elephants during the early stage of urinary system wound healing. Moreover, mating could negatively impact this wound healing.
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References


บทคัดย่อ

การฉีกขาดของท่อปัสสาวะและการรั่วไหลภายหลังการผ่าตัดแก้ไขภาวะนิ่วอุดตันทางเดินปัสสาวะในช้างเอเชียเพศเมีย (Elephas maximus): รายงานสัตว์ป่วย

นิกร ทองทิพย์1,2,4,5* เบญจพล หล่อสัญลักษณ์1 นานกร สุขมาก3 สิรินารถ ชัยชนะทอง4,5 พรชัย สัญฐิติเสรี1,2

ช้างเอเชียเพศเมียอายุ 46 ปี ได้เข้ารับการรักษาด้วยอาการมีถุงน้ำผิดปกติที่บริเวณฝีเย็บ และไม่สามารถอ้าปัสสาวะในช่องทางปกติ ก่อนหน้านี้ในเดือนกันยายน ปี 2555 ช้างมีการฉีกขาดทางเดินปัสสาวะและกระเพาะปัสสาวะ และได้รับการรักษาด้วยการผ่าตัด episiotomy และ urethrotomy เพื่อจัดการอาการนี้ ช้างได้รับการดูแลและฝีเย็บเป็นเวลาแปดเดือนจนแผลปิดสนิท และช้างสามารถปัสสาวะออกจากช่องทางปกติ อย่างไรก็ตามนั้นช้างได้เจาะช่องน้ำผิดปกติและมีการรั่วไหลของปัสสาวะอยู่ในช่วงที่รักษาการรักษาด้วยการยาซึมและผ่าตัดฝีเย็บ ได้ไปที่ศูนย์เทคโนโลยีชีวภาพเกษตร มหาวิทยาลัยเกษตรศาสตร์ ที่กทม. ผ่านการอักเสบและเนื้อตายที่เกิดขึ้นในช่วงที่รักษาทางออกของปัสสาวะเป็นด้านหลังของ vestibule และ vulva ในช่วงที่รักษาอาการนี้ ช้างได้รับการผ่าตัดพิสัยที่เกิดการรั่วไหลของปัสสาวะอยู่ในช่วงที่รักษา

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3 ศูนย์เทคโนโลยีชีวภาพเกษตร สานักพัฒนาบัณฑิตศึกษาและวิจัยด้านวิทยาศาสตร์และเทคโนโลยี สำนักงานคณะกรรมการอุดมศึกษา กรุงเทพฯ 10900
4 ผู้รับผิดชอบบทความ E-mail: fvetnit@ku.ac.th, nthongtip@yahoo.com