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# Beware of the Dog: Traumatic Extrusion of an Artificial Urinary Sphincter Following Blunt Trauma to the Scrotum by a Domestic Animal

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## Abstract

Artificial urinary sphincters are commonly used in males with intrinsic sphincter deficiency to improve continence and quality of life. Complications include erosion, mechanical failure and infection. Frequently, a staged approach involving removal of the device, followed by a period of healing and subsequent reinsertion of a new sphincter is required to restore continence. We describe the first case ever reported of traumatic sphincter extrusion following blunt scrotal trauma by a dog and review its clinical features and management.

**Keywords:** Sphincter, Erosion, Trauma, Artificial, Urinary

## 1. Case Report

A 59 year old man presented to out patients with a three month history of a discharging wound in his perineum adjacent to the bulbar urethra. He also complained of urinary loss through this sinus when voiding. There was a recent history of trauma having sustained a headbutt to the scrotum by a dog. His past history was remarkable for an industrial accident in 1981 in which he sustained a pelvic fracture and vesicourethral distraction defect. This had been initially managed with a urethroplasty to restore his urethral integrity and the subsequent insertion of an Artificial Urinary Sphincter (AUS) for continence purposes. This was removed soon after insertion as it had become infected. Eight years later a second successful attempt was carried out to insert a second artificial urinary sphincter and this lasted a further ten years until mechanical failure occurred. This was again revised but on activation of this third sphincter continence was not successfully achieved. Finally, a fourth urinary sphincter was successfully implanted with restoration of continence in 1999. This had successfully worked up until the recent trauma which occurred when a dog head butted the patient in the scrotum and perineum. Immediately following the event he developed pain and swelling which subsided. Several months after the event he developed a sinus on the left side of his perineum through which urine dripped following deflation of the sphincter cuff to allow satisfactory urethral voiding.

Initial surgical management involved examination under anaesthesia, cystoscopic evaluation and removal of the eroded, infected sphincter. Physical examination revealed a cutaneous fistula at the left side of his perineum near the scrotal junction. (**Figure 1**) Rigid cystoscopy revealed a urethral erosion at the junction of the mid and distal bulbar urethra with the sphincter cuff visible on the left side of the urethral defect. A 14 french silicone catheter was inserted with the assistance of a guidewire to allow urethral healing. Using a perineal incision the

**Figure 1.Cutaneous fistula at the junction of the left hemiscrotum and perineum with visible sphincter erosion.**

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bulbar urethra was exposed allowing visualisation of the urethral erosion and the cuff was explanted from around the urethra. (**Figure 2**) Monofilament absorbable sutures were used to restore urethral integrity. A separate incision over the right inguinal area allowed for successful extraction of the pump and its tubing. Finally, a right iliac fossa scar permitted delivery of the reservoir and its tubing as well as allowing the old scar to be excised. (**Figure 3**) The catheter was left *in situ* for three months to allow wound healing. A Magnetic Resonance image (MRI) of pelvis was carried out at six weeks which revealed no pelvic collections or abscess formation. The second stage of his management involved the reinsertion of a fifth artificial sphincter six months after removal followed by sphincter activation six weeks later.

**Figure 2. A perineal incision was used to remove the sphincteric cuff and visualize the urethral erosion.**

**Figure 3. A right iliac fossa scar was used to remove the sphincter reservoir. The scrotum is deflected toward the right showing the perineal incision and the old inguinal scar that was excised.**

## 2. Discussion

Surgical management of urinary incontinence was revolutionised following the invention of the artificial urinary sphincter by Foley in 1947 and the subsequent implantation by Scott in 1972 [1,2]. Less invasive treatments have been developed over time such as collagen injections and the male urethral sling but the artificial urinary sphincter remains the gold standard for male incontinence. [3] In male patients, the bladder neck is the usual insertion site unless precluded by a history of disease or trauma. In specific cases of post prostatectomy incontinence the bulbar urethra can be used but with higher complication rates. [4] In females the bladder neck is the only insertion site. The artificial sphincter mechanism consists of three basic components which work hydraulically [4]: 1) an inflatable cuff placed around the bladder neck, 2) a pressure regulating balloon or reservoir fitted extraperitoneally and 3) a pump which is placed immediately beneath the scrotal skin in a dartos pouch in males or labia majora in females. [5] The pump mechanism further incorporates a valve, a refill delay resistor and a deactivation button. The three main components are connected by fluid filled tubes and are activated by squeezing on the pump allowing fluid transfer from the reservoir to the inflatable cuff. [3] Pressure within this closed system and by inference, the occlusive pressure of the cuff (available in different sizes) is dependent on the pressure regulating balloon and is decided intraoperatively by the surgeon [4].

There is limited long term data on artificial urinary sphincter outcome [6]. Initial reports revealed high complication and revision rates but with acceptable outcomes. *Duncan et al.* [7] have reported a series of late complications with the longest interval recorded between implantation and erosion being seven years. *Venn et al.* [8] in 2000 reported that 37% of devices implanted were removed during a ten year period due to either infection or erosion and highlighted that the risk of cuff revision is higher if placed around the bulbar urethra as opposed to the bladder neck. *Kim et al.* [9] reported an overall complication rate of 37% with mechanical failure, erosion and infection being the three most common complications [6]. No specific differences were found between complications and artificial sphincter characteristics. Over two years prior sphincter revision surgery itself is a

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risk factor for sphincteric erosions and continence rates are lower in patients presenting for revision surgery for erosions compared to other causes such as previous radiation therapy. *Lai et al.* [10] followed four specific patient groups who underwent artificial sphincter insertion and found the rate of cuff erosion to be 6% occurring at a mean of 19.8 months [3]. However, the four groups (radiated, non radiated, neurogenic and secondary) displayed no difference in the rate of complications or the need for device explant. However, the risk of atrophy, mechanical failure and the need for revision (compared to the risks of infection and erosion) did increase as the study progressed with sphincter cuff atrophy being the commonest complication.

Two complication types require a surgical approach. Complications such as infections and urethrocutaneous erosions require device removal. Separately, complications such as disconnection or leakage causing fluid extravasation with a resultant pressure fluctuation within the artificial sphincter frequently require repair, but not necessary removal [11].

There are reports of unusual presentations of urethral erosions in patients on steroid therapy who have undergone repeated urethral catheterisations without cuff deflation in the intensive care setting and who have subsequently presented with delayed erosions and worsening incontinence [12]. Previous authors have alluded to the role of trauma as a potential aetiological factor in artificial sphincter erosion but do not mention the mechanism. [8] Similar to this case all patients were initially managed by removing the infected device.

In this case we report a case of erosion of a urinary sphincter following blunt trauma to the scrotum by a dog necessitating removal of the device and reinsertion of a fifth sphincter six months later. We believe this to be the only recorded case of sphincter extrusion caused by blunt trauma from a domestic animal. Similar to other cases of delayed erosion due to infection our patient was managed with a staged approach, involving explant of the damaged sphincter and reinsertion of a new sphincter after a period of wound healing. Given the previous history of AUS insertion in our patient and visible cutaneous erosion, repair of the affected components was not a viable surgical option.

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