

Two cases of dysuria as a complication of single-session bilateral triple pelvic osteotomy

Dysuria is a rare, but nevertheless severe postoperative complication associated with single-session bilateral triple pelvic osteotomy. Two cases are described in which contrast radiography of the lower urinary tract was used to diagnose urethral compression due to pelvic canal narrowing. Relief of the pressure on the urethra was achieved with an external fixation device, which distracted the acetabular fragments of the pelvis. In both cases the dysuria was resolved. The significance of this complication and its possible causes, especially regarding surgical technique, are discussed.

G. PAPADOPOULOS AND
M. TOMMASINI DEGNA*

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INTRODUCTION

Triple pelvic osteotomy (TPO) has been described as a successful method for increasing hip joint congruity and decreasing joint laxity in young, dysplastic dogs (Dejardin and others 1998, Hara and others 2002, Tomlinson and Cook 2002). It has been shown to improve limb function and to reduce the progression of osteoarthritis, especially in dogs with little or no signs of degenerative joint disease at the time of surgery (McLaughlin and others 1991, Slocum and Slocum 1992).

The most commonly performed methods of TPO are variations of the technique described by Slocum and Devine (1986), using specialised pre-angled plates. Differences in technique involve the placement of the ilial osteotomy site, sacral screw purchase, plate angle and the additional use of wire to stabilise the ischial osteotomy (Black 2000).

The most commonly documented complication of TPO is premature screw loosening and implant failure. A decreased range of joint motion due to dorsal acetabular rim impingement on the femoral neck, constipation and dysuria due to pelvic inlet narrowing, infection, iatrogenic sciatic nerve injury and progression of degenerative joint disease have also been identified as complications (Schrader 1986, Slocum and Devine 1986, Remedios and Fries 1993, Simmons and others 2001, Schulz and Dejardin 2003). Most of

these complications have been shown to be avoidable by using the most appropriate surgical technique and the right choice of implants (Slocum and Devine 1987, Sukhiani and others 1994, Tomlinson and Cook 2002, Whelan and others 2004). Lateral segmental osteotomy of the pubic ramus rather than a pubic osteotomy has been advocated to help avoid urethral entrapment (Slocum and Devine 1987).

In the two dogs described in this paper urethral obstruction was diagnosed as a postoperative complication of single-session bilateral TPO using the technique of Slocum and Slocum (1992) with segmental pubic osteotomy. Both were successfully treated using an external fixator.

CASE HISTORIES

Case 1

Bilateral TPO had been performed on an 18-month-old, male Cane Corso dog with hindlimb lameness due to hip dysplasia. Immediate postoperative radiographs showed mild narrowing of the pelvic inlet (Fig 1). Five days after the surgery the dog was presented with signs of acute dysuria. A urethral catheter could be passed into the bladder with some difficulty and was easier while the dog was standing. Contrast radiographs revealed leakage of the contrast agent from the pelvic urethra and showed a narrowed pelvic canal (Fig 2). The craniomedially pointed bony spike of the sectioned right ischial wing had displaced medially and was suspected to have caused a perforation of the urethra.

The treatment consisted of applying a type Ia external fixation device with one threaded pin into each ischial tuberosity. A connecting bar was attached to the pins and fixed under a distraction force, thus spreading both acetabular segments apart (Fig 3). An indwelling urethral catheter was used for urinary diversion and the bladder was emptied three to five times daily.

After one week of supportive therapy in hospital, the urinary catheter was removed

Ospedale Veterinario, Gregorio VII, Piazza di Villa Carpegna 52, 00165 Rome, Italy

*Piazza di Villa Carpegna 52, 00165 Rome, Italy



FIG 1. Immediate postoperative radiograph showing good width of pelvic canal



FIG 2. Contrast agent leaking from pelvic urethra, pelvic canal narrowing



FIG 3. External fixation used to open up pelvic canal

and the dog was discharged. There was no recurrence of the dysuria and the fixator was removed five weeks postoperatively.

Case 2

A bilateral TPO had been performed on an eight-month-old, male Newfoundland dog with bilateral hip pain and radiographic evidence of hip dysplasia. Dysuria developed immediately after surgery and was thought to have most probably been caused by postoperative pain. Since the dog was able to pass urine and faeces it was sent home on medication for pain management.

Five days after surgery, the owner reported that the dog had been unable to pass urine over the past 24 hours. The bladder was found to be hard and distended and could not be emptied manually. A urethral catheter was inserted but could not be passed into the bladder due to resistance in the area of the pelvic or prostatic urethra. The dog was anaesthetised and it was possible to pass the catheter while manually distracting the ischial tuberosities. Subsequent contrast radiography of the lower urinary tract revealed an obstruction of the pelvic urethra in the area of the pubic remnants due to severe pelvic canal narrowing (Fig 4).

An external fixator was again used to distract the pelvic inlet until the urinary catheter could be passed easily into the bladder. The dysuria resolved immediately after surgery. The external fixator was removed after three weeks and no further complications occurred.

DISCUSSION

Pelvic canal narrowing is an undesired effect of TPO surgery. Its degree is mainly influenced by the angle of rotation and the length of the pubic remnants and is obviously a greater risk in bilateral surgery (Sukhiani and others 1994). Slocum and Devine (1987) describe postoperative dysuria in three cases caused by the inward rotation of the pubic ramus leading to urethral impingement. One of these required ostectomy of the pubis to relieve the dysuria and in two other cases the dysuria resolved spontaneously seven days after surgery. Consequently, Slocum modified the technique by performing a pubic osteotomy instead of pubic osteotomy to avoid urethral impingement by the pubic remnants. There is little other published information about this complication and most



FIG 4. Urethra compressed by pubic remnants

authors do not mention postoperative dysuria as a significant problem.

In the authors experience postoperative dysuria is a rare complication of bilateral TPO, which can be severe in its consequences. In one case, that has not been included in this report due to insufficient data, complete urethral obstruction and bladder rupture after bilateral TPO

surgery was discovered on postmortem examination, although in this particular case owner negligence had to be partially blamed for the fatal outcome.

It is likely that milder signs of dysuria following TPO that resolve within a few days after surgery are probably caused by urethral irritation rather than postoperative pain.

Personal experience with the complications of TPO surgery has shown that postoperative dysuria is as relevant as premature screw loosening, which very rarely leads to clinically significant problems.

The two main sites for urethral impingement to occur seem to be either between the pubic remnants or between the ischial wings. In case 1 the oblique cut of the ischial wing created a bony spike which, together with the narrowing of the pelvic canal, caused urethral perforation. It is essential therefore to ensure a precise cut of the ischium parallel to the long axis of the pelvis as described by Slocum and Slocum (1992). It is open to speculation as to what role the narrowing of the pelvic canal played in causing urethral entrapment in this case.

The use of a cerclage wire to stabilise the ischial osteotomy site is discussed controversially in the literature especially concerning its effect on screw loosening (Hunt and Litsky 1988, Simmons and

others 2001, Whelan and others 2004). In case 2, where the pubic remnants were left sufficiently small, use of a cerclage wire might have helped to minimise the effects of pelvic canal narrowing and it ought to be considered in bilateral TPO surgery. To achieve less pelvic narrowing the authors believe it is also of assistance to pull the caudal part of the acetabular segment laterally while applying the screws into the caudal plate holes.

In conclusion it appears that postoperative dysuria has a significantly greater incidence in single-session bilateral TPO compared with unilateral or staged surgery, making an argument for avoiding bilateral TPO in a single surgery whenever possible.

The treatment of this complication using an external fixator has been shown to be successful.

References

- BLACK, A. P. (2000) Triple pelvic osteotomy for juvenile canine hip dysplasia. *Australian Veterinary Journal* **78**, 820-821
- DEJARDIN, L. M., PERRY, R. L. & ARNOCKY, S. P. (1998) The effect of triple pelvic osteotomy on the articular contact area of the hip joint in dysplastic dogs: an in vitro experimental study. *Veterinary Surgery* **27**, 194-202
- HARA, Y., HARADA, Y., FUJITA, Y., TAODA, T., NEZU, Y., YAMAGUCHI, S., ORIMA, H. & TAGAWA, M. (2002) Changes of hip joint congruity after triple pelvic osteotomy in the dog with hip dysplasia. *Journal of Veterinary Medical Science* **64**, 933-936
- HUNT, G. A. & LITSKY, A. S. (1988) Stabilization of canine pelvic osteotomies with AO/ASIF plates and screws. *Veterinary Comparative Orthopaedics and Traumatology* **1**, 52-57
- MCLAUGHLIN, R. M., JR, MILLER, C. W., TAVES, C. L., HEARN, T. C., PALMER, N. C. & ANDERSON, G. I. (1991) Force plate analysis of triple pelvic osteotomy for the treatment of canine hip dysplasia. *Veterinary Surgery* **20**, 291-297
- REMEDIOS, A. M. & FRIES, C. L. (1993) Implant complications in 20 triple pelvic osteotomies. *Veterinary Comparative Orthopaedics and Traumatology* **6**, 202
- SCHRADER, S. C. (1986) Triple osteotomy of the pelvis and trochanteric osteotomy as a treatment for hip dysplasia in the immature dog: the surgical technique and results of 77 consecutive operations. *Journal of the American Veterinary Medical Association* **189**, 659-665
- SCHULZ, K. S. & DEJARDIN, L. M. (2003) Surgical treatment of canine hip dysplasia. In: *Textbook of Small Animal Surgery*. 3rd edn. Ed D. SLATTER. W. B. Saunders, Philadelphia, PA, USA. p 2029-2056
- SIMMONS, S., JOHNSON, A. L. & SCHAEFFER, D. J. (2001) Risk factors for screw migration after triple pelvic osteotomy. *Journal of American Animal Hospital Association* **37**, 269-273
- SLOCUM, B. & DEVINE, T. (1986) Pelvic osteotomy technique for axial rotation of the acetabular segment in dogs. *Journal of the American Animal Hospital Association* **22**, 331
- SLOCUM, B. & DEVINE, T. (1987) Pelvic osteotomy in the dog as treatment for hip dysplasia. *Seminars in Veterinary Medicine and Surgery (Small Animal)* **2**, 107-116
- SLOCUM, B. & SLOCUM, T. D. (1992) Pelvic osteotomy for axial rotation of the acetabular segment in dogs with hip dysplasia. *Veterinary Clinics of North America: Small Animal Practice* **22**, 645-682
- SUKHIANI, H. R., HOLMBERG, D. L. & HURTIG, M. B. (1994) Pelvic canal narrowing caused by TPO in the dog. *Veterinary Comparative Orthopaedics and Traumatology* **7**, 110-118
- TOMLINSON, J. L. & COOK, J. L. (2002) Effects of degree of acetabular rotation after triple pelvic osteotomy on the position of the femoral head in relationship to the acetabulum. *Veterinary Surgery* **31**, 398-403
- WHELAN, M. F., MCCARTHY, R. J., BOUDRIEAU, R. J. & KRAUS, K. H. (2004) Increased sacral screw purchase minimizes screw loosening in canine triple pelvic osteotomy. *Veterinary Surgery* **33**, 609-614