International Congress of the Italian Association of Companion Animal Veterinarians

28 - 30 May, 2010
Rimini, Italy

Next Congress:

SCIVAC International Congress
May 27-29, 2011 - Rimini, Italy

Reprinted in IVIS with the permission of the Congress Organizers
Complications of urinary tract surgery

Robert N. White

BSc (Hons), BVetMed, MRCVS, CertVA, DSAS (soft tissue) Dipl ECVS, RCVS, Nottingham (UK)

GENERAL COMPLICATIONS

It will come as no surprise that the dehiscence of a surgical incision into the lumen of an organ making, transporting or storing urine will result in the leakage of urine into the surrounding adjacent tissues. Therefore, any such dehiscence of an incision into the renal pelvis, ureter, urinary bladder or proximal urethra will result in uraemia and/or uroretroperitoneum (Kyles and others 1996).

Clinical signs of uraemia include abdominal discomfort, progressive lethargy, anorexia and depression, abdominal distension and ascites, and vomiting. Dehydration will become evident leading and the inability to excrete urine will result in the development of potential life-threatening hyperkalaemia. The animal may still be able to pass small volumes of urine and the passage of some urine does not preclude the diagnosis of uroretoneum.

The following is a summary of the complications associated with the more common surgical procedures of the urinary tract (Kyles and others 1996).

SPECIFIC COMPLICATIONS

Nephroureterectomy

The potential complications of nephroureterectomy include haemorrhage, haemoperitoneum, the inability to excrete viscera, infection, and renal failure if the contra-lateral kidney is incapable of maintaining renal function. In addition, there may be more specific complications associated with the pathological process that necessitated the removal of the kidney. For example, the excision of the renal abscess might have an increased risk of post-operative infection, whereas, the removal of a renal carcinoma might be associated with the likely complication of local and metastatic tumour spread.

Nephrotomy

The potential complications of nephrotomy include renal failure and haematuria.

Nephrotomy has been reported to reduce renal function in the operated canine kidney by 30-50% (Gahring and others 1977, Fitzpatrick and others 1980). Signs of significant renal impairment include reduced urine output or anuria, associated with progressive azotaemia. Normal urine output is 0.5-1.0 ml/kg/hr. Urine output can be measured with the placement of an indwelling urethral catheter connected to a closed drainage system. In addition, plasma urea and creatinine concentrations should be measured for evidence of azotaemia.

Post-operative gross or microscopic haematuria should be expected in the post-operative period following nephrotomy. A further complication of persistent renal haemorrhage may be the development of blood clots and an associated urinary tract and structure.

Pyelolithotomy

Pyelolithotomy is indicated for the removal of relatively large calculi from its dilated renal pelvis. Pyelolithotomy results in less renal damage and haemorrhage when compared to nephrotomy; only the relatively avascular renal pelvis and not the vascular renal parenchyma is incised.

Complications of pyelolithotomy include urine leakage, urolith recurrence, and ureteral stricture.

Nephrostomy catheterisation

Nephrostomy catheterisation provides the temporary diversion of urine in patients with ureteral obstruction. The catheter is passed percutaneously through the renal parenchyma so that it is positioned within the renal pelvis. Complications of this procedure in humans are common; major complications are found in 5% of patients and minor problems in up to 70% of patients (Munch 1991). Common complications associated with nephrostomy catheterisation in dogs and cats include urine leakage (intra-abdominal, retro-peritoneal, subcutaneous and/or cutaneous) and ascending infection resulted in pyelonephritis, renal abscessation and/or peritonitis.

Renal biopsy

Kidney biopsies are performed in an attempt to determine the precise cause of a patient’s renal compromise or failure. Kidney biopsies can be obtained percutaneously, laparoscopically or at open surgery. Complications of the procedure include haemorrhage and hypodrenism. Haemorrhage is always associated with the procedure and its extent and severity depend on the technique employed to obtain the biopsy, the renal pathology that is present, the presence of concurrent issues with blood clotting and the experience/competence of the person taking the biopsy.

ureterotomy/ ureteral resection and anastomosis

Ureterotomy is indicated for the surgical removal of ureteral calculi in the dog and cat. Ureteral resection and anastomosis is indicated for ureteral trauma, stricture and neoplasia. Complications of both procedures include the intra-abdominal leakage of urine and the formation of ureteral stricture/stenosis leading to hydrenephrosis and subsequent ipsilateral renal shutdown.
Ureteroneostomy/ureterocystostomy

Ureteroneostomy involves ligation and division of the ureter with the re-implantation of its proximal segment into the bladder. This procedure is most commonly indicated for the treatment of extramural ureteral ectopia. Ureterocystostomy is the treatment most commonly indicated for the management of intramural ureteral ectopia where a new opening to the ureter is formed at the trigone and the submucosal ridge of intramural ureter either requires removal, ligation or to be ‘laid open’. The complications of ureteroneostomy and ureterocystostomy are similar and include hydronephrosis/hydrdrureter and urinary incontinence.

Cystotomy

Cystotomy in indicated for any surgery that requires access to the bladder lumen and/or mucosal surface of the bladder (for example, removal of cystic and urethral calculi, ureteral ectopia, persistent urachal remnant, excision of bladder wall tumours, etc.). Complications include the dehiscence of the cystotomy incision with resultant intra-abdominal leakage of urine, bladder/detrussor instability associated with the cystotomy incision, haematuria, and cystitis.

Partial cystectomy

Partial cystectomy is indicated for the excision of bladder neoplasia, polyps, ulcers, patent urachus, urachal diverticuli and infected urachal remnants. A return to normal function is anticipated following the excision of up to 75% of the cranial pole of the bladder; the trigone should ideally be kept intact. Complications of partial cystectomy include intra-abdominal leakage of urine, bladder/detrussor instability, haematuria, cystitis, tumour recurrence, small bladder volume.

Urethrotomy in male dogs

Urethrotomy is indicated in male dogs for the removal of urethral calculi that partially or completely obstruct the urethra. Complications are less likely following urethrotomy and, therefore, it is preferable to retrograde flush urethral calculi into the bladder rather than perform a urethrotomy. Complications include haemorrhage, subcutaneous leakage of urine, urethrotomy stricture formation.

Urethrostomy (prescrotal, scrotal and perineal) in male dogs

Urethrostomy is indicated for irreparable urethral obstruction from conditions such as urethral stricture, trauma, neoplasia, and priapism. Complications are similar to urethrotomy and include haemorrhage, subcutaneous leakage of urine, urethrostomy stoma stricture formation, urine scalding and ascending lower urine tract infection.

Perineal urethrostomy in male cats

Perineal urethrostomy may be indicated as part of the management of dysuria/stranguria associated with feline lower urinary tract disease (feline urological syndrome). Reported complications include haemorrhage, wound dehiscence, subcutaneous urine leakage, anuria, urinary/faecal incontinence, cystitis/urethritis, and urethral stricture.

Prepubic urethrostomy in male cats

Prepubic urethrostomy is indicated for the treatment of urethral trauma, urethral neoplasia, and for the management of complications of perineal urethrostomy in male cats. The complications of prepubic urethrostomy are similar to those discussed for other urethrostomy procedures; they include urethral obstruction, peristomal skin irritation or necrosis, urinary incontinence and unresolved lower urinary tract disease (Baines and others 2001).

Urethral anastomosis

Urethral resection and anastomosis is indicated for the treatment of urethral trauma or neoplasia. Access to the intrapelvic urethra is achieved by pubic symphyseotomy or by pubic osteotomy. Complications of urethral anastomosis include urethral stricture formation, the leakage of urine from the site of the anastomosis, urinary incontinence, recurrence of the underlying condition (neoplasia, etc.), orthopaedic issues related to the symphyseotomy/osteotomy.

Urethropexy

Urethropexy is indicated for the surgical management of urethral sphincter mechanism incompetence (uSMI) in the bitch and more rarely in the male dog. Complications of the surgery include failure to resolve the incontinence, postoperative urethritis/cystitis, and on rare occasions the development of dysuria and stranguria (White 2001).

Colposuspension

Colposuspension is indicated for the surgical management of uSMI in the bitch. Complications of the surgery include failure to resolve the incontinence, postoperative urethritis/cystitis, and on rare occasions the development of dysuria and stranguria (Holt 1985).

Urethral submucosal injection of collagen

Urethral submucosal injection of collagen is indicated for the management of uSMI in the bitch and more rarely in the male dog (Barth 2005). Complications of the procedure include failure to resolve the incontinence, postoperative urethritis/cystitis, and the development of dysuria and stranguria. In the male dog, the procedure is sometimes performed via a urinary cystotomy and in such cases, additional complications associated with the cystotomy may be seen.

References