

# Proximal perineal urethrostomy technique for treatment of urethral stricture in a Vietnamese pot-bellied pig



Urinary tract obstruction in pigs can be seen with anatomical abnormalities or as a complication following castration. The surgical techniques described in the pig are few and consist of prepubic urethrostomy, extrapelvic urethral or urethrophepial anastomosis. These techniques are complex and not free from complications. Aim of the study was to describe the technique used to perform a proximal perineal urethrostomy in a Vietnamese pot-bellied pig. A Vietnamese pot-bellied pig with urinary obstruction was referred for complications after prepubic cystostomy. Endoscopy showed a stricture at the junction of the membranous and penile portions of the urethra. A perineal urethrostomy was performed. Seven days later the cystostomy was closed. No complication was reported during the procedure and after surgery, with the exception of urine induced dermatitis. Perineal urethrostomy is an effective technique as an alternative to prepubic urethrostomy and extrapelvic urethral anastomosis for the treatment of urethral obstruction in Vietnamese pot-bellied pigs.

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## INTRODUCTION

Urinary tract obstruction caused by anatomical abnormalities or as a complication of castration is rarely described in the Vietnamese pot-bellied pig.<sup>1,2</sup> The surgical techniques described for the treatment of urethral obstruction in this species consist of: pre-pubic urethrostomy and extrapelvic urethral or urethrophepial anastomosis.<sup>1,2</sup> The first, also described in the goat, is of difficult execution and is associated with recurrent cystitis and stenosis.<sup>3</sup> Extrapelvic urethral or urethrophepial anastomosis is technically complex and with long surgical times. Bladder marsupialization is not

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commonly performed as it causes urinary incontinence, cystitis and pyelonephritis.<sup>2,4</sup>

The surgical technique for urethral obstructions depends on the anatomical characteristics of the species involved. In the pig, as an example, the urethra is very deep and of small diameter.

Aim of this paper is to describe a surgical technique of proximal perineal urethrostomy in a Vietnamese pot-bellied pig.

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## DESCRIPTION OF THE CLINICAL CASE

### Clinical history

An eight-month-old castrated Vietnamese pot-bellied pig was presented for urinary retention; after several attempts at urethral catheterization and an ultrasound

**Proximal perineal urethrostomy was performed to correct a urethral stricture in a Vietnamese pot-bellied pig following a cystostomy performed as a life-saving procedure.**

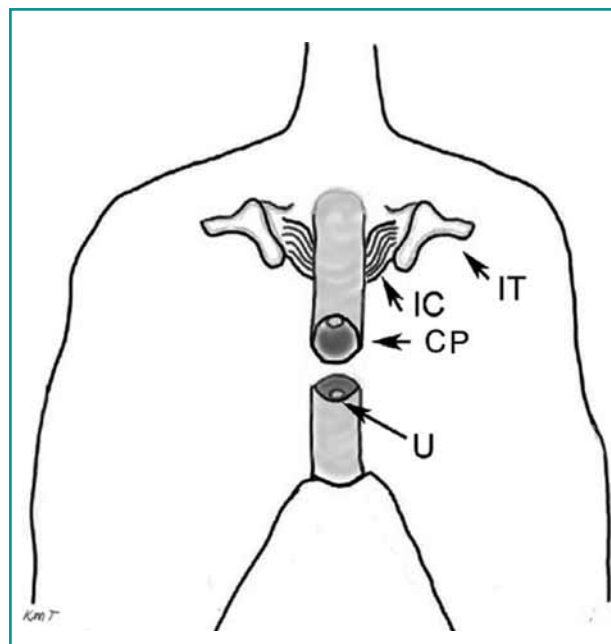
bladder scan the referring Vet performed a pre-pubic cystostomy as a salvage procedure. Five days after surgery the pig was referred to our clinic with inappetence and hyperthermia. Before carrying out any additional procedure the owner was informed about medical and surgical treatments.

### Clinical presentation

At admission, the pig was dehydrated, with pale mucous membranes, rectal temperature of 40° C and was leaking urine from the cystostomy. The patient was administered fluid therapy and an antibiotic therapy with enrofloxacin (2.5 mg/kg IM, SID). After stabilization, urinary tract endoscopy was performed.



**Figure 1** - Operating field. The penile body is retracted dorsally and its ventral ischial insertions are isolated from the surrounding tissues before its resection.



**Figure 2** - The body of the penis was severed in the caudal part of the proximal segment of the S of the penis, about 6 cm distally to the caudal portion of the ischium. IC: ischiocavernosus muscle; IT: ischiatic tuberosity; PB: penile body; U: urethra. Image taken from Tobia et al., 2013.

### Diagnostic procedures

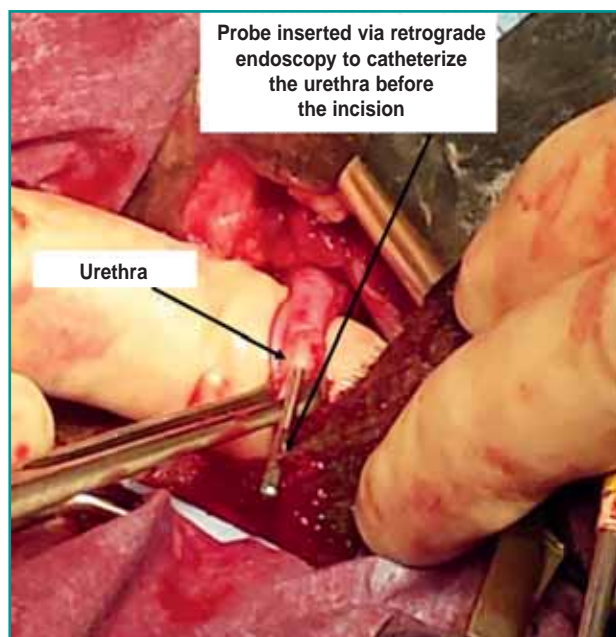
The pig was premedicated with tiletamine/zolazepam (3.5 mg/kg, IM) and methadone (0.1 mg/kg, IM). General anaesthesia was induced with propofol (3 mg/kg, IV) and after intubation the anaesthesia was maintained with isoflurane in oxygen. An epidural coccygeal anaesthesia was also performed as described in the cat,<sup>5</sup> with lidocaine 2% (0.3 mg/kg) and ropivacaine 0.2% (0.03 mg/kg).

Endoscopy identified a major stricture at the junction between the penile and membranous portions of the urethra as well as cystitis caused by the entrance of straw into the bladder through the cystostomy wound. A proximal perineal urethrostomy was thus performed on the patient.

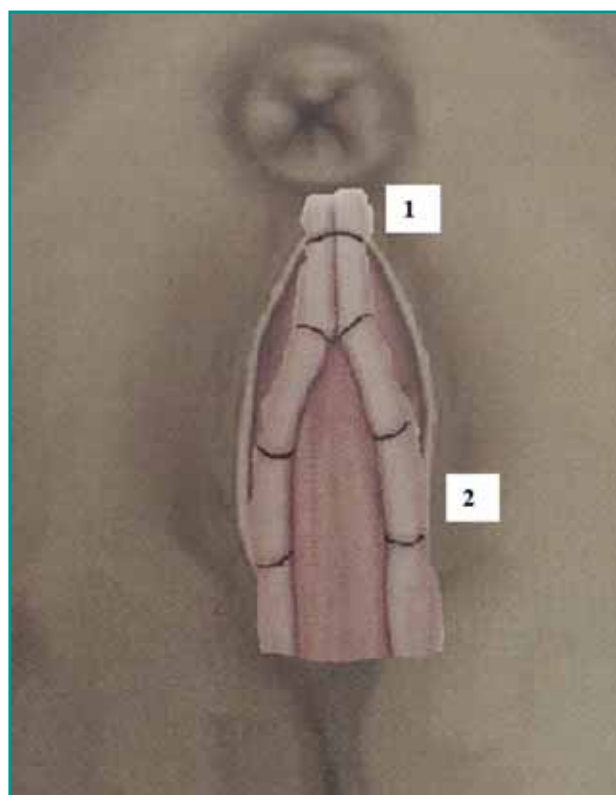
### Surgical procedure

The pig was placed in sternal decubitus with the hind limbs outside the operating table. A purse-string suture was placed around the anus, the perineal area was shaved and the operating field was prepared for surgery. A 7-8 cm skin incision was made starting from 2 cm ventrally from the anus.

The subcutaneous tissue was released and, by blunt dissection using Mayo scissors, the body of the penis was exposed, at a depth of about 7 cm (Figure 1); this was then released from the surrounding tissues and the retractor muscles resected. The body of the penis was dissected in the caudal part of the proximal seg-



**Figure 3** - Operating field. The urethra was exposed at the caudo-dorsal portion of the proximal stump of the penile body and grasped using Allis forceps. Subsequently, by retrograde endoscopy, the distal part of the urethra was exposed and incised longitudinally to create a spatula of about 2 cm which was then sutured to the perineum.



**Figure 4** - Graphic representation of the urethroscopy. (1) After being incised, the urethra was sutured to the perineum starting from the dorsal margin with interrupted stitches using USP 2-0 monofilament polyglycolic acid suture. (2) The urethra was then sutured laterally on both sides with a continuous suture. Image taken from Bleedorn and Bjorling<sup>10</sup>.

ment of the penile S, about 6 cm distally from the caudal end of the ischium (Figure 2). The distal segment of the penis was closed with a mass ligature with USP 0 monofilament polyglycolic acid suture. The urethra was exposed at the caudo-dorsal portion of the proximal stump of the penile body and grasped with Allis forceps (Figure 3).

The remaining tissues around the body of the penis were dissected; the ventrolateral anchoring of the penis, consisting primarily of the ischiocavernosus muscle and associated connective tissue - very short and thick in the pig - was then separated by blunt dissection using Mayo scissors. The anchoring that firmly joined the ventral margin of the body of the penis to the pubis was severed with a scalpel. After finger dissection of the remaining pelvic anchorings to the pelvis, the body of the penis was elevated. At this point using a retrograde technique, by inserting the endoscope through the cystostomy opening, the distal part of the urethra was exposed and then incised longitudinally in order to create a spatula of about 2 cm (Figure 3) which was sutured to the perineum, starting from the dorsal margin, with interrupted stitches using USP 2-0 monofilament polyglycolic acid suture. The urethra was then sutured laterally on both sides with a continuous suture. The skin was sutured with horizontal U-shaped stitches using USP 2-0 nylon thread (Figure 4).

The bladder was washed with abundant saline and 1% polyvinylpyrrolidone iodine. The cystostomic catheter was repositioned. The animal was then housed in a pen with no straw in order to avoid further contamination.

In the post-operative period, buprenorphine (20 mcg/kg, IM) was administered every 8 hours for three days for analgesia and enrofloxacin (2.5 mg/kg, IM) for 10 days. A urinary catheter was left *in situ* for seven days, after which the pig was anaesthetized as before to close the cystostomy.

The bladder was washed with 1% polyvinylpyrrolidone iodine solution, the bladder wall was separated from the surrounding tissues and closed with a Lambert suture using 2-0 polyfilament polyglycolic acid thread; the subcutaneous layer and the skin were sutured, respectively, with 2-0 polyfilament polyglycolic acid and with USP 0 polyfilament nylon thread.

### Evolution

Eight months after surgery the pig was in good health and with no urinary incontinence or signs of cystitis. The only complication was the periodic occurrence of urine-induced dermatitis just below the urethroscopy site which, at six months from surgery, was of scarce relevance.



## DISCUSSION

In the pig, in the literature, perineal urethrostomy had already been described as a life-saving procedure by Mann et al.,<sup>2</sup> however, the execution of the surgical technique had not been described. The technique used

**The difficulty of perineal urethrostomy in the Vietnamese pot-bellied pig and possible complications lie in the fact that the urethra is deep and the penis course is tortuous.**

in our case is a variant of the proximal perineal urethrostomy technique described in ruminants<sup>6</sup>, which involves a “book-like” opening of the urethra to prevent stenosis. In fact, among the complications associated with perineal urethrostomy in the pig, Mann and colleagues had reported a case of urethral stenosis which was then corrected by means of urethro-preputial anastomosis by amputating the penis and creating an anastomosis between the pelvic portion of the urethra and the prepuce.<sup>2</sup> In the case here described the only complication reported was recurrent urine-induced dermatitis.

Among other proposed surgical treatments, pre-pubic urethrostomy can only be performed if the functional urethra is long enough to be stomatized to the abdominal wall, without exerting excessive tension on the tissues.<sup>1</sup>

Two extra-pelvic urethral anastomosis techniques have been described in the Vietnamese pig; the technique is performed in particular when the non-pathological urethra is of sufficient length.<sup>2</sup> The surgery appears complex and in the presence of a narrow penile urethral lumen the surgery becomes impossible. In ad-

dition, following this surgery the onset of serious recurrent cystitis is reported in the literature as the urethro-preputial conduit does not have the same antibacterial properties of the urethra.<sup>7</sup>

Perineal urethrostomy is extensively described also in the cat, with the approach appearing to be acceptable but not without complications.<sup>8</sup> In the pig, the difficulty of the surgical technique lies in the fact that the urethra is very deep and the penis course is tortuous; this implies the risk of an accidental dissection of structures such as the abductor muscles. The procedure has however been made easier by the possibility of executing a retrograde endoscopy.

Once the urethra was externalized and isolated it gave the impression, during its anchoring to the cutis, of being very tense, however the tissue appeared to be much thicker and more resistant compared to that of the dog and cat.

When executing a perineal urethrostomy the urethral mucosa is usually fixed to the perineal skin using interrupted stitches.<sup>8</sup> In the cat, when the urethra is anchored and attached to the skin no difference in outcome has been reported between interrupted stitches or a continuous suture.<sup>9</sup> In the pig, in the absence of data, we used interrupted stitches in the dorsal segment, to be used as a landmark, and a continuous suture on the two sides, for speed of execution and because the knots of interrupted stitches could cause delayed tissue healing.

In conclusion, proximal perineal urethrostomy performed as described above is a valid surgical option for the resolution of urethral obstructions in the Vietnamese pot-bellied pig; in the case reported, the approach proved safe and free of the complications described using other techniques in the same species.

## PUNTI CHIAVE

- In the pig, urinary tract obstructions are usually caused by anatomical malformations or post-castration complications.
- The surgical technique for urethral obstructions depends on the anatomical characteristics of the species involved.
- Retrograde endoscopy helps to detect the urethra during the execution of proximal perineal urethrostomy in the pig.
- Proximal perineal urethrostomy resulted effective in treating urethral obstructions in the Vietnamese pot-bellied pig.

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