International Journal of Livestock Research, Vol. 10 (8) Aug' 2020
http://www.ijlr.org
eISSN: 2277-1964
NAAS Rating 2020 – 5.36

Original Research

Modified Proximal Perineal Urethrostomy (MPPU) using Novel Direct Guided Urethral Catheterisation Technique for Early Management of Obstructive Urolithiasis in Male Goats

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How to cite this paper: Nair, S., Ramankutty, S., Hansoge, A., Narayanan, M., & Devanand, C. (2020). Modified Proximal Perineal Urethrostomy (MPPU) using Novel Direct Guided Urethral Catheterisation Technique for Early Management of Obstructive Urolithiasis in Male Goats. *International Journal of Livestock Research*, 10(8), 69-74. doi: http://dx.doi.org/10.5455/ijlr.20200607052239

Received : Jun 07, 2020
Accepted : Jul 07, 2020
Published : Aug 31, 2020

Abstract

A novel direct guided urethral catheterisation technique was developed aiding the existing modified proximal perineal urethrostomy (MPPU) procedure for the management of obstructive urolithiasis in male goats. This novel technique is performed using a modified stent catheter to directly access the perineal urethra through a unique site at about two to three cm below the anus and between the pin bones by gentle urethral puncture. Six cases of obstructive urolithiasis by struvite stones in goats were successfully managed by this technique and full functional regaining of urethra was achieved by third post-operative week without any complication. This article puts on record, the first-time documentation of a unique direct guided catheterisation technique which is a modification of existing MPPU procedure for early management of obstructive urolithiasis in goats.

Keywords: Guided Urethral Catheterisation, Goat, K-Wire, Modified Proximal Perineal Urethrostomy (MPPU), Obstructive Urolithiasis, Struvite Crystals, Stent Catheter

Introduction

Obstructive urolithiasis is a common emergency in small ruminant practice characterised by presentation of animals with turgid urinary bladder and stranguria. The condition can lead to bladder rupture if immediate intervention is not performed (Elisa and Mary, 2011). Modified proximal perineal urethrostomy (MPPU) performed by resecting penile body at about 4–8 cm distal to the caudal edge of the pubis was first documented by Tobias *et al.* (2012). Even though this technique offers unique advantage of reduction of long-term risk of stricture, the post-operative complications and permanent uretherostomy opening, the technique was reserved for goats that were not meant for breeding purpose. There existed a need for modifying this urinary diversion technique by developing a simplified and more precise access to the perineal urethra which can be practiced at field level with minimal complications. It was with this objective, the current technique of direct guided urethral catheterisation technique for MPPU was developed with an added advantage of saving the normal urethral patency and probable retention of breeding efficiency.

Materials and Methods

Six cases of chronic obstructive urolithiasis in male goats were presented to the University Veterinary Hospital, Mannuthy, KVASU Thrissur over a period of six months from March to August, 2018 with a history of stranguria, anuria and anorexia.

History and Clinical Examination

On clinical examination, all the animals had acute abdomen with turgid urinary bladder and severe discomfort as evident by stranguria. All the cases were presented after initial attempts of medical management with antispasmodics and urinary acidifiers. Abdominal ultrasonography revealed hyperechoic bladder wall and typical hyperechoic sludge in the bladder which was confirmatory for urolithiasis in all cases (Fig. 1).

Figure 1: Sludge inside urinary bladder with cystitis

Surgical Procedure

The animals were prepared for aseptic surgery after chlorhexidine 2% solution scrub. An enema with 0.1% dilute chlorhexidine solution in saline was also performed as this technique deployed per rectal passing of index finger of the surgeon to identify the neck of the bladder and proximal urethra. Regional analgesia was achieved by caudal epidural nerve block using 1.5 to 2.5 ml of lignocaine hydrochloride injection as described by Hodgkinson *et al.* (2007). The animals were restrained on lateral recumbence. A novel site for effectively accessing perineal urethra was identified as 2-3 cm below the anus and between the pin bones. An imaginary line when drawn from the rectum downwards will intersect the line connecting two pin bones (Fig. 2). It was at this site that perineal urethra was found more cutaneous giving noticeable perineal pulsations. The animal was positioned with elevated hind quarters and after detecting the urethral pulsation on the perineal region, the gloved left index finger of the surgeon was gently inserted to about 1 inch per rectally to feel the proximal part of the pulsating urethra at the pelvic brim. This is possible due to close proximity of rectal wall and anatomic location of the proximal part of urethra which is almost parallel with rectum in its course. A 1 cm nick incision was performed at this site described above in Fig. 2 and after separating the subcutaneous fascia with a mosquito forceps, the turgid urethra was identified (Fig. 3). A modified

stented catheter was used for this technique by passing a K-wire bent at 40-degree angle passed through a suction catheter or infant feeding tube of suitable size depending on the size of the urethra to be accessed (Fig. 2).

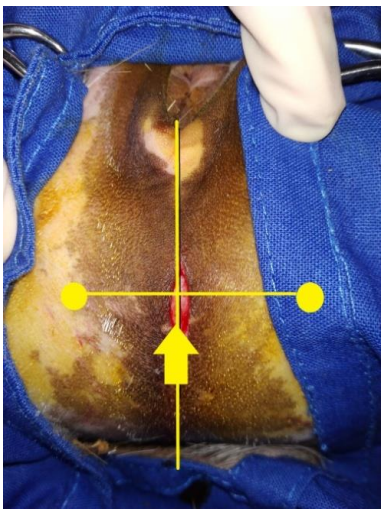

Figure 2: Site for MPPU under guided urethral catheterization technique –2-3 cm below the anus between pin bones

Figure 3: Accessing the turgid urethra

Figure 4: Modified cathter made of suction catheter tube with K wire passed as stent

The mosquito forceps was gently withdrawn and modified stent catheter was used to carefully puncture the urethra. Once the catheter was in place, urine started flowing through the catheter with ease and catheter was gently advanced with simultaneous withdrawal of k-wire. The catheter was left in-situ by fixing it to the skin for one to two post-operative weeks. The urinary diversion done by this novel technique on six animals under study are depicted in figures 5 to10 below. The urine pH was found to be alkaline in all the cases ranging from 7.5 to 8.0. The stones were sieved from collected urine showed consistency of white powder and were later sent for spectrophotometric analysis. Post operatively 0.5 ml tetanus toxoid was administered intramuscularly. Concurrent antibiotic therapy was carried out with Inj. Enrofloxacin @ 4mg / kg body weight intramuscularly along with anti-inflammatory agent Inj. Meloxicam @ 0.2 mg/ kg body weight for one week. Ammonium chloride powder @ 200 mg BID per orally was given for three weeks as urinary acidifiers in all the cases.

Figure 5: Animal No 1

Figure 6: Animal No 2

Figure 7: Animal No 3

Figure 8: Animal No 4

Figure 9: Animal No 5

Figure 10: Animal No.6

Results and Discussion

The catheter was well tolerated by all the animals resulting in free drainage of urine. By 10th to 14th post-operative day, all animals started voiding urine through the normal opening and then the catheter was withdrawn from the bladder. There was urine scalding noticed from the surgical site after catheter removal for few days, but complete healing with normal urethral patency was established in all the cases by one week of catheter removal. The details of animals under study are depicted in the table below.

Table 1: Details of animals that had undergone MPPU surgery

Animal No	Age (Months)	Body weight (Kg)	Breed	MPPU Catheter Size (FG)	Catheter removal / conformation of uretheral patency (days)	Urine scalding through MPPU site after catheter removal (days)
1	24	26	Malabari	7	13	10 days
2	18	22	Malabari	6	14	7 days
3	20	20.5	Malabari	8	14	11 days
4	20	35	Jamnapaari	10	15	5 days
5	16	22.5	Beetel	7	17	11 days
6	22	20	Malabari	10	10	7 days

Mean age of animals and body weight under study were 20 months and 24.3 kg respectively. Size of catheters used ranged from 6 to 10 FG. Average days of removal of catheter was 14 days. Urine scalding through the MPPU site after catheter removal was found to be on an average for 9 days. The uroliths collected from all the urine samples were identified as magnesium ammonium phosphate (Struvite) by Fourier transform spectrophotometry at the central instrumentation lab, College of Veterinary and Animal Sciences Mannuthy. Considering the findings,

preventive management measures of ad-libitum watering, reduction in bran feeding and open grazing was advised. Breeding ability of three animals was established as they mated successfully and produced offsprings as reported by the owner. Obstructive urolithiasis causes great economic losses to farmers due to the cost of treatment, anticipated complications, prolonged recovery time and reduced breeding efficiency. (Ewoldt *et al*, 2014). Struvite crystals were generally formed by improper feeding practices and fine crystals get lodged in urethral process and subsequently obliterates at the level of ischial arch and sigmoid flexure. (Gazi *et al*, 2014). By employing a urine diversion technique, the normal urethral patency can be regained as the stone impaction at urethral process, ischial arch and sigmoid flexure gets dried and desiccates clearing the urethra returning its functional patency. (Fazili *et al*, 2010).

MPPU technique documented by Tobias *et al*. (2012) recommends digital palpation of penile body and sharp dissection at the perineal region to the level of the ischium with concurrent transection of retractor penis muscle respecting the dorsal artery of penis to expose perineal urethra. This procedure needs ample expertise and thorough knowledge of regional anatomy of goats. The newly developed direct guided urethral catheterisation technique using a stent catheter, is a recommended modification for conventional MPPU and aids in direct access of perineal urethra at its origin by a per rectal guided approach. The unique site of 2-3 cm below rectum located at the intersection point of an imaginary line drawn between pin bones and a line drawn from rectum downwards was identified as the easiest site for detecting perineal pulsation. A firm guided stent catheter with K- wire can directly enter the urethra with moderate pressure resulting in quick evacuation of a turgid bladder. An intact bladder aids in detecting turgid urethra whereas this technique may not be useful in case of bladder rupture cases. As this novel technique is done with minimal incision, complications like hemorrhage, misdirected urine stream, suture dehiscence and delayed wound healing which were the most reported complications in conventional MPPU technique (Tobias *et al*., 2013) can be avoided. In all the cases, normal patency of urethra and subsequent catheter removal gave encouraging results. Long term follow ups and further investigations are needed to justify the above-mentioned results and comparative evaluation of this new technique with existing urinary diversion techniques are highly recommended.

Conclusion

Owing to the precise approach to the turgid perineal urethra using a modified stented catheter, the novel direct guided urethral catheterization technique for MPPU described in this study has excellent results with minimum complications. This novel technique has the potential to be a developed as a successful surgical option for male goats with urolithiasis in field conditions presented with intact urinary bladder.

Conflict of Interests

There is no conflict of interest.

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References

1. Cypher, E. E., van Amstel, S. R., Videla, R., Force Clark, K., and Anderson, D. E. (2017). Vesicopreputial anastomosis for the treatment of obstructive urolithiasis in goats. *Veterinary Surgery*, *46*(2), 281-288.
2. Ermilio, E. M., and Smith, M. C. (2011). Treatment of emergency conditions in sheep and goats. *Veterinary Clinics: Food Animal Practice*, *27*(1), 33-45.
3. Ewoldt, J. M., Jones, M. L., and Miesner, M. D. (2008). Surgery of obstructive urolithiasis in ruminants. *Veterinary Clinics of North America: Food Animal Practice*, *24*(3), 455-465.
4. Fazili, M. R., Malik, H. U., Bhattacharyya, H. K., Buchoo, B. A., Moulvi, B. A., and Makhdoomi, D. M. (2010). Minimally invasive surgical tube cystotomy for treating obstructive urolithiasis in small ruminants with an intact urinary bladder. *Veterinary Record*, *166*(17), 528-532.
5. Gazi, M. A., Makhdoomi, D. M., Parrah, J. D., Ganai, A. M., Shiekh, G. N., & Mir, A. S. (2014). Recent advances in surgical management of urolithiasis in sheep and goat. *African Journal of Agricultural Research*, *9*(26), 2055-2061.

6. Hodgkinson, O., & Dawson, L. (2007). Practical anaesthesia and analgesia in sheep, goats and calves. *In Practice*, *29*(10), 596-603.
7. Tobias, K. M., & van Amstel, S. R. (2013). Modified proximal perineal urethrostomy technique for treatment of urethral stricture in goats. *Veterinary Surgery*, *42*(4), 455-462.
8. Van Metre, D. C., & Divers, T. J. (2002). Urinary tract infection. *Large Animal Internal Medicine, third ed. Mosby, St. Louis*, 863-866.

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