

Short- and long-term outcome after perineal urethrostomy in 86 cats with feline lower urinary tract disease

L Ruda ¹, R Heiene

Affiliations + expand

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Introduction

- Studies from Hostutler and others 2005 , Forrester and Roudebush 2007, Kruger and others 2009, Williams 2009, Westropp and Buffington 2010 have reported that surgical treatment doesn't eliminate recurrence of FLUTD or UTI's
- Complications reported after PU include
 - Urethral strictures
 - Cystitis
 - Wound dehiscence
 - Urinary or faecal incontinence
 - UTI
- Several studies have shown that PU predisposes cats to develop UTI – Gregory and Vasseur 1983, Griffin and Gregory 1992, Osborne and others 1996, Bass and others 2005

Aim

- Evaluate long term prognosis recurrent episodes quality of life and survival times in cats with FLUTD who underwent perineal urethrostomy

Inclusion/exclusion criteria

- 10 years 1 hospital
- Indications for surgery were obstructive cats that could not be medically unblocked, recurrence of urethral obstruction despite conservative therapy or urethral trauma secondary to obstruction
- Inclusion criteria were obstructive FLUTD and PU performed more than 1 year prior to the study

Procedure

- Procedure as modified by Wilson and Harrison 1971
- 19 different surgeons
- 14 cats also had cystostomies to remove obstructive material from the urinary bladder
- Post op IVF, buprenorphine or methadone, abs if needed, NSAIDs for most cats
- Advice on drinking and diet
- Abundant struvite/oxalate – diet prescribed ,
- Use of canned food/ taste additives to water and fountains

Medical Records

- Min follow up 1 year
- Analysis of medical records and telephone interviews
- Mean follow up time 4.2 years
- Questions – housing, diet,
- Medical records – case history, clinical examinations, urinalysis, urine culture, blood samples, radiographs, US
- Time of death or euthanasia
- Cats divided into 3 groups
 - Cats surviving less than 2 weeks – time of death was likely related to the severity of FLUTD
 - Less than 6 months - stoma was healing
 - More than 6 months – further scar retraction of the stoma would not be expected
- Cats euthanized during the first 2 weeks were evaluated from the medical records – pain after surgery, overall quality of life, frequency, and severity of recurrent signs of FLUTD were graded on a scale from 1 to 3. Any lower urinary tract signs such as dysuria, pollakiuria, stranguria, periuria or incontinence was recorded as a recurrent episode
- The owner's satisfaction with surgery was classified by yes or no

Results

- 86 cats – 20 purebred , 66 DSH ; all neutered
- Median age 5 years at time of sx (range 1-11yr)
- Weight 2.5-9.3kg with a median weight of 5.1kg
- 75 cats (87%) survived more than 6 months after sx , 11 (13%) cats died within 6 months
- 47/75 (61.8%)cats surviving more than 6 months were still alive at the time of the study while 26/75 cats had died (34.2%)
- 10 of those had died from disease related to LUTD
- Most cats 16/26 had died of other diseases
- 2 cats were lost to follow up at 3 and 6.3 years after surgery
- The median survival time for these 75 cats with 3.5 years
- 5 cats survived less than 2 weeks after surgery, an additional six cats did not survive 6 months . Four of these six cats had undergone cystotomy in addition to PU
- Recurrent episodes of FLUTD considered any lower urinary tract signs such as dysuria , haematuria, pollakiuria, stranguria, periuria or incontinence
- Among 75 cats surviving more than 6 months 45 (60%) were stated by owners to be asymptomatic after discharge from hospital
- The median survival time for cats that never had recurrent FLUTD was 4.5 years
- 22 cats (29.3%) experienced few or mild recurrent episodes
 - Variable clinical course of disease varying from 1-2 episodes with moderate signs of FLUTD over several years to 4-5 episodes of minor clinical signs of short duration
 - Most cats had mild episodes over several years or some episodes during the first few months only
 - 8 cats (10.7%) had experienced severe signs – 7/8 these cats were euthanised because of the severity of the recurrent FLUTD – median survival time for these 8 cats were 1.5 years
- There was no statistical significant effect on type of housing or diet on survival time
- Most owners were very satisfied with the outcome of surgery

- 67 owners (89.3%) considered PU an acceptable procedure that they would recommend to others
- 2 owners would not recommend sx due to cost
- 5 owners were dissatisfied - they had cat euth due to FLUTD
- 66 of the owners (88%) evaluated their cat to have very good to moderate QOL

Discussion

- Most cats asymptomatic after surgery or experienced few relapses which could be managed medically
- 52.3% cats did not require subsequent vet tx for FLUTD
- 25.6% cats had mild recurrent FLUTD that was tx medically
- 22.1% of cats including non survivors during the first 6 months had sx complications or more freq severe recurrent episodes of FLUTD
- Mortality immediate post period was 5.8% which is lower than previous studies
- Many surgeons with variable skills – thus unlikely to be surgical skill as reason why improved complication rates
- If cats survived the first 6 months recurrent FLUTD is less likely to be the major cause of death
- Griffin and Gregory - Bacterial infection most important complication post PU sx – incidence of 22-53% - infection may be asymptomatic or self-limiting but study had limitations : low number of cats , non standardized sampling and failure to report negative cultures

Original Article



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Clinical outcomes of 28 cats 12–24 months after urethrostomy

Reginaldo P Sousa-Filho¹ , Diana CS Nunes-Pinheiro¹ ,
Keytianne O Sampaio² , Ellen CB da Silva² ,
Grazielle ASA Cavalcanti²  and
Marina Gabriela MC Mori da Cunha³ 

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 SAGE

- Perineal urethrostomy (PU) is a technique associated with penectomy in which a new ostium for the urethra is created in the perineal region
- Some proximal urethral obstructions may be suitable for PU and a more cranial urinary diversion such as prepubic urethrostomy (PPU) or trans pubic urethrostomy is indicated
- These salvage urinary diversion procedures frequently have reported complications such as urinary incontinence, UTIs, peristomal dermatitis, subcutaneous urine leakage and stenosis.

Aim

- Evaluate and compare the long term clinical outcomes and QOL for cats following PU or PPU

Materials and Methods

- ___ Retrospective , urethrostomy between July 2014- July 2017

- Inclusion
 - Minimum of 1 year post operative follow up
- Exclusion
 - CKD prior to date of urethrostomy
 - CKD diagnosis was based on increased SDMA , proteinuria and poor corticomedullary distinction on US
- Pet owners were contacted and offered a follow up consult and at the time of follow up they were asked to fill out a questionnaire
- Patient blood and urine samples were collected for analysis
- Pet owner server
 - Age at castration
 - Number of prior obstructions
 - Immediate and later post op alterations including sings of FLUTD (haematuria, stranguria or periuria) and dermatitis at the surgical area
 - Level of satisfaction with the surgical outcome
 - QOL of the cat based on preservation of urine continence, social behaviour with owners and signs of pain (explanation to owners on how to define these)
- Medical record review
 - Age, BCS, CSx , history of CKD, surgical technique, reason for surgical indication and perioperative interventions
 - Data was related to time of sx
 - Records of UTI frequency confirmed by urine culture
- CKD staging
 - Iris stage 1 – IV
 - Guidelines using crea and SDMA
 - If increased reassess in 2-3 weeks and IRIS staging based on persistent increases

Results

- 28 cats; PU n=22; PPU n=6
- All performed by same surgeon – technique by Wilson and Harrison for PU and Baines et al for PPU
- Dietary management of FLUTD was performed based on urine sediment assessment
- Most common indication for PU was
 - Recurrent FLUTD 54.5%
 - Stricture
 - Penis /urethra trauma
- Most common indication for PPU was
 - PU stricture (83.3%)
 - Female cat only 1 due to adherence and fistulation of the urterus in the urethra subsequent to OH
- Median age was PU 3.38 PPU 2.5years
- 68.1% of cats underwent PU already castrated and 100% of PPU were already castrated
- Most PU cats were fed a dry diet (72.7%) while 50% of PPU cats were fed a mixed diet
- BCS preop 59.1% PU and 66.7% PPU cats had high BCS (4-5 on scale 1-5)
- Multiple catheterization was reported in 90.9% and 83.4% of PU and PPU cases respectively
- 72.7% of PU cases preop Ab therapy was administrated after catheterization and 50% of PPU cases

- CaOX in 2 cats 9.1% and 18 and 20 months after PU, none of the PPU cats had this
- Pet owner survey
 - The main transient post op complication with PU and PPU was haematuria (72.7% vs 83.3%)
 - Overall complication rate was 31.8% for PU and 83.3% for PPU
 - Recurrent FLUTD signs were less frequent in PU than in PPU patients (22.7-66.7%)
 - A significantly less common complication of PU was peristomal dermatitis around the urethral ostium, which was present in only 4.5% of cats. However, this was present in 83.3% of cats that had undergone PPU
 - Urinary incontinence was observed in one case of PPU (16.7%) in the immediate post op period with no subsequent recovery of function
 - Recurrent lower UTIs (>1 episode) were less frequent in PU than PPU cats (22.7 vs 66.6%)
 - Continued use of commercial acidifying diet in post op period for 30 days was followed in most cases (77.3% of PU and 50.0% of PPU patients)
 - Owner satisfaction after urethrostomy was considered excellent in 81.8% of PU cases and 33.3% of PPU cases
- Lab analysis
 - No significant difference between the 2 cohorts
 - *Staphylococcus sp* most common, then *E.coli* and *Streptococcus sp*
 - No difference with CKD levels and staging between the 2 cohorts

Discussion

- Main findings
 - Urethrostomy does not always resolve the clinical signs of FLUTD
 - PU is associated with less frequent complications such as dermatitis, FLUTD and UTI CSx than PPU
 - Pet owners are more satisfied after PU than after PPU
- 1 female cat sx indicated post OH, another case of urethral stenosis in a female cat has been reported in the literature which was associated with an inflammatory response due to trauma 11
- Obesity BCS >4 was observed 59.1% of PU and 66.7% of PPU cases
- Multiple urethral de-obstructions increase the risks of urethral and penile stenosis or traumas – major reason for urethrostomy
- Another common surgical indications for performing PU and PPU is postoperative urethral ostium stenosis, a serious complication of urethrostomy
- It has been reported that the risk of stoma stricture is higher after PU than after PPU 10
- This may be due to the diameter of perineal urethra, which is 4 x narrower than in the pubic region
- Transient surgical complications such as haematuria, oedema and hematoma are also common post sx
- The procedures have the advantage of decreasing the likelihood of re-obstruction
- Subcutaneous extravasation of urine is usually observed in cases of malposition of urethral mucosa or by dehiscence of sutures 10
- The PPU tech may have a greater risk of incurring this complication owing to the tension the urethra is subjected to when sutured at the ventral region

- Long term complications – chronic peristomal dermatitis – more common in PPU than the PU cohort
- Urinary incontinence was observed in one case of PPU – due to higher chance of vascular and neurological damage
- Recurrent UTIs were also reported significantly more often post op in PPU cats than PU cats
- However bacteriuria was observed in 77.3% of PU and in 100% of PPU cats but PU cats were more commonly asymptomatic
- This may be consequence of the loss of the natural barrier that follows a penectomy which may facilitate the ascent of infection
- Overall of QOL for PU was excellent
- QOL for PPU good level of satisfaction even with the presence of complications related to peristomal dermatitis
- These results differ from those reported by Baines et al which stated the 6/16 cats were euth because of post op complications

Conclusions

- Main indications for urethrostomy are multiple catheterizations and urethral trauma
- Cats that underwent urethrostomy showed bacteriuria, recurrent UTI and increased levels of SDMA
- This highlights the importance of follow-up for the prevention and/or early treatment of urinary disorders
- PPU is important salvage procedure, it should be limited to cases in which standard techniques for PU cannot be performed

Original Article



Comparison of surgical indications and short- and long-term complications in 56 cats undergoing perineal, transpelvic or prepubic urethrostomy

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Maheeka Seneviratne^{ID}, Polina Stamenova^{ID} and Karla Lee

- PU (perineal urethrostomy)
 - Reported complication rates are 13-25% and 20-42% in the short and long term respectively and mortality rates of up to 24% 2
 - salvage that makes the narrow distal penile urethra redundant by creating a permanent urethral opening between the wider more proximal pelvic urethra and perineal skin
- PPU (prepubic urethrostomy)
 - deal with failed PU or irreparable injury of the intrapelvic urethra or congenital narrowing of the intrapelvic urethra.
 - Pelvic urethra is transect as far caudally as possible but proximal to the site of injury and sutured to the skin of the ventral midline just cranial to the pubis.

- Complication rate of up to 83.3% and mortality rates of up to 38%
- TPU (transpelvic urethrostomy)
 - Alternative technique for cats with failed PU
 - Cdl intrapelvic urethra is accessed by making a window in the pubis . The urethrostomy is then created between the exposed intrapelvic urethra and overlying skin
 - A single study of 11 cats reported a complication rate of 36% with no mortality
- Based on reported complication and mortality rates for each technique, preservation of the longest length of urethra possible according to the underlying disease process is recommended
- Thus PU preferred over TPU over PPU

Aim

- Retrospective review of the feline urethrostomy procedures at a single referral centre in order to directly compare the indications, complications and mortality rates of PU , PPU , and TPU
- Null hypothesis is that when used for the appropriate indication the outcome for each of these techniques would be the same, when the outcome was assessed according to complication rates, mortality and owner satisfaction

Method

- 2008-2018, single referral hospital
- Signalment, hx, pex , clinical path and diagnostic imaging, surgical reports, anaesthesia records and hospitalization records were reviewed to confirm details of urethrostomy tech, peri-op tx and post op progress
- Techniques PU:Wilson and Harrison , TPU: Bernard and Viguier and PPU: Bradley
- Outcome of urethrostomy was assessed according to complications, mortality and owner satisfaction.
- Short term complications were divided into minor and major complications
 - Minor complications
 - non intervention or pharmacological treatments
 - Major complications
 - Required surgical or other procedural intervention or resulted in death or euthanasia
- Long term outcome was defined as outcomes arising after the first 4 weeks post -op
 - Owner questionnaire at time review was carried out or review of case records

Results

- Signalment
 - 56 cats – 37 cats (66.1%)had PU; 8 cats (14.3%) had TPU; 11 cats (19.6%) that had PPU
 - 54/56 MN; 2/56 ME
 - 51/56 DSH/DLH; 5/56 purebreds
 - Median age was 5.9 years (8mth – 18 years)
 - Median weight 4.9kg (2.5-8.2kg)
- Presenting problem

- Recurring UO due to FIC n=26 (46.4%), urolithiasis n=15(26.8%), major trauma n=13 (23.2%); inflammatory penile mass n=11 (1.8%) and a penile adenocarcinoma n=1 (1.8%)
- 34/56 cats 60.7% had urine bacterial culture and sensitivity test performed – 12 (21.4%) had a positive culture before or at the time of surgery
- 23/56 (41.1%) were prescribed antibiotics empirically or based on culture and sensitivity
- Cats with FIC
 - 26 cats
 - Median duration of clinical signs prior to urethrostomy of 221.5 days (range 8-1245 days)
 - 96% cats had U cath a median of 3 times (range 1-7) prior to referral
 - 80.8% were prescribed medical management for FIC prior to referral
- Cats with urolithiasis
 - 15 cats – median duration of csx prior to sx 19 days (0-1095 days)
 - All had prior u cath median of 2 times (range 1-4 days) and 12 (80%) cats were prescribed medical management for FIC
- Trauma
 - 13 cats with major trauma, urethrostomy was performed a median of 20 days (range 1-44 days) after trauma
- Association between primary presenting problem and urethrostomy technique
 - Significant association
 - 37 PU cats – FIC 57%, urolithiasis 32.4%, trauma 5.4% and penile mass 5.4%
 - 11 PPU cats – trauma 81.8% , 2 FIC cats
 - TPU cats – FIC 37.5% , trauma 37.5% and urolithiasis 25%
- Association between diagnostic imaging findings and urethrostomy technique
 - Significant association was found between urethrostomy technique and both the nature and site of the lesion as determined by plain radiographs, positive contrast retrograde urethrocytography and/or normograde cystourethrography
 - 15 PU cats had no lesion , 27% had calculi or clots, 8 had stricture and 4 had rupture
 - 100% of PPU cats had rupture with 4 also having a stricture
 - TPU cats had a range of lesions: stricture, rupture, stricture + rupture and calculi
 - All expect 1 cat with PPU had a pelvic lesion
 - PU cats 1 with pelvic lesion and 21 with penile lesion
 - TPu cats 75% had a penile lesion and 25% with a pelvic lesion
- Short term outcomes
 - 33/55 cats 60% - 23/37 PU cats (62.2%); 4/7 (57.1%) TPU cats and 8/11 (72.7%) PPU cats
 - The only complication significantly associated with a particular urethrostomy technique was peristomal dermatitis – 2 cats with PPU (18%)
 - UO was reported in 2 cats with PU and 1 cat with PPU prior to hospital discharge (1 cat euth and other 2 UC managed fine)
 - Stoma stricture was seen 2 weeks after sx in 1 PU and 3 weeks after sx in 1 cat with TPU and 1 cat PPU
 - The cats with PU and PPU underwent successful lrevisio sx ; the PU was revised TPU and the PPU was revised more crnl , cat with TPU euth

- Urine leakage into the peristoma subcut space was successfully managed in 1 cat with PPU with revision sx and 1 cat with PU by ucath
- 3 cats died in short term 5.4% - not associated with urethrostomy technique
- Minor complications
 - Overall 32/55 58.2%;
 - PU 20/37 (54%);
 - 4/7 (57.1%) TPU;
 - 8/11 (72.7%) PPU cats
- Major complications
 - 9/55 16.4% overall
 - 5/37 PU cats 13.5%
 - 1/7 cats 14.3% TPU
 - 3/11 cats 27.3% PPU

There was no association between incidence of minor and major complications and urethrostomy technique

- Long term outcome
 - 30 cats 14 PU, 6 TPU and 10 PPU cats
 - Median duration of follow up was 29.5 mths (range 2-125mths)
 - Long term complications were reported in 2 14.3% PU cats , 2 33.3% TPU cats and 7 (70%) PPU cats
 - PPU cats had most complications
 - The only complication significantly associated with particular urethrostomy technique was urinary incont which was seen in 4 cats with PPU (13.3%)
 - Long term mortality was reported in 4/30 (13.3%) of cats
 - 1 cat with PPU was euth for reasons related to urethrostomy – this cat had recurrent episodes of cystitis, urinary incont, peristomal dermatitis and was euth 9 months post op , all 3 other cats euth non related reasons
 - 30 cats had long term follow up questionnaire filled out with 28 (96.6%) owners stating they would recommend urethrostomy
 - QOL rated good in 27 cats (93.3%), moderate 3.4% and poor in 1 cat 3.4%
 - All owners of the cats in the PU grps stated that they would recommended the procedure and reported a good quality of life and the 2 cats rated as having a moderate and poor quality of life underwent TPU and PPU respectively

Discussion

- ___no evidence to suggest that earlier surgical intervention in these cases results in fewer post operative complications
- ___PU or TPU – more likely FIC or urolithiasis , penile lesion
- ___PPU – more likely trauma , pelvic urethral lesion
- ___Supports literature that technique should be based on location of lesion and preserve as much urethra as possible
- ___PPU more likely to have urethral rupture or stricture than PU or TPU

- Short term complications – 60% irrespective of technique (higher than previous reports PU 13-25% TPU 36% and lower than PPU up to 83% . Minor 58.2% and major 16.4% . cats hosp longer could be reason reported more
- Overall long term complication rate of 36.7%. Significantly higher in PPU grp of 70% , other report had 83% PPU and Pu 25-31.8%
- Good long term quality of life post urethrostomy in 93.3 % of cats irrespective of technique used with 96.6% owner satisfaction. other reports owner QOL PU 75-88% , another report had satisfaction rate of only 33% of cats undergoing PPU which was significantly lower than the 81.8% of PU cats
- 16.7% of cats had one or more UTI during the long term follow up period
- No difference in the incidence of bacterial UTI at long term follow up was seen in surgical grps . Contrast to recent study of 28 cats which reported a higher incidence of UTIs in cats undergoing PPU vs PU (66.7% vs 22.7%)
- Urethrostomy stricture has been reported in up to 11% of cats in early reports of PU but not in all case series but may be due to surgical tech used earlier of not releasing penile urethra from pelvis
- In current study stricture was seen in one cat 2.9% PU , 1 stricture in PPU and 1 TPU cat in 4 weeks and 1 PPU cat at 9 months – major complication that resulted in euth of 2 cats and revision sx for 1 cat
- Peristomal dermatitis – uncommon post PU and in previous PU study only one cat had a sign of dermatitis . More common following PPU owing to the location of the stoma and was reported 43.7% and 83.3% of PPU cats in 2 separate studies
- In current study 2 cats both in the PPU grp were reported to have peristomal dermatitis in the long term
- Urinary incontinence – may result from pudendal nerve, sacral spinal cord or pelvic plexus damage; excessive urethral distension secondary to obstruction , or reduction in urethral length
- Incontinence reported in 12-58% of the cats following PPU
- In current study early incont was seen in nine cats 17% with no diff btw sx grps
- Long term follow up significantly more common in the PPU grp
- Limitations – retrospective, low number is TPU and PPU , low numbers in long term follow up which ranged 2-125months , no even distribution of cats lost to follow up with higher % Pu cat s lost , multiple surgeons , variations in case management , bias with questionnaire

Original Article



Welfare of cats 5–29 months after perineal urethrostomy: 74 cases (2015–2017)

Margaret R Slater, Sharon Pailler¹, J'mai M Gayle, Illoneete Cohen*, Erin L Galloway[†], Kristen A Frank[‡] and Camille DeClementi

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Aim – evaluate long term qual of life post PU sx 3 aims determine impact of PU sx on retention in the home vs (surrender to a shelter or euth owing to disease ; describe owner -reported cat health and welfare and document owner perception of the cats QOL

Retrospective – sx 2015 – July 2017 122 cats with PU sx 9 excluded

Sx – indications