Standards of care for feline urethral catheters in the United Kingdom

Kate Holroyd BVetMed MRCVS

Karen Humm

The Lodge, Benington Lordship, Benington, Nr. Stevenage, Hertfordshire, SG2 7BS

Kholroyd@rvc.ac.uk

Khumm@rvc.ac.uk

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Abstract

Objectives

This study aimed to determine the standards of care of urethral catheters (UCs) in male cats with UCs placed due to urethral obstruction. It also assessed whether these standards were affected by year of graduation of the veterinary surgeon (VS).

Methods

One hundred veterinary practices were randomly selected and a telephone survey was conducted with a VS in the practice. Regarding the last urethral catheterisation performed for a male cat with urethral obstruction the VS was asked about use of antibiotics whilst the catheter was in situ, whether a closed urinary collection system was used, whether aseptic skin preparation of the patient was performed and whether aseptic hand preparation was performed. An ANOVA with a post hoc Tukey HSD was used to determine whether there were significant differences in these percentages when considering year of graduation.

Results

Twenty seven percent of VSs did not use antibiotics whilst the urethral catheter was in place, 44% used closed urinary collection systems, 41% performed aseptic skin preparation of the patient and 60% aseptically prepared their hands and wore sterile gloves. VSs who graduated between 1975-1984 were significantly less likely to wear sterile gloves and use closed urinary collection systems compared to VSs

who graduated between 2004-2013 ($p<0.05$). They were also significantly more likely to use antibiotics with the urinary catheter in situ ($p<0.01$).

Conclusions and relevance

Non-sterile urethral catheter placement with open urinary drainage and antibiotic prophylaxis is still a widespread practice amongst VSs; however, more recent graduates are more likely to perform the procedure aseptically with a closed urinary collection system and withholding antibiotics.

There is a need for further education in postgraduate vets in the prevention of catheter associated urinary tract infections in cats and further research to provide evidence-based guidelines for feline urethral catheter care.

Introduction

Feline lower urinary tract disease (FLUTD) is a broad term including any disorder affecting the urinary bladder or urethra of cats (e.g. uroliths, urethral plugs, bacterial infection).[1] Clinical signs include haematuria, stranguria, dysuria, pollakiuria and periuria.[1] FLUTD is a common presentation, reported to account for 3% of feline consultations in a 1995 survey of primary care veterinary hospitals in the United States.[2] The percentage of cats with FLUTD that present with urethral obstruction (UO) has been found to range from 18% to 58%.[3, 4,5] Treatment for feline

UO involves placement of a urethral catheter which is recommended to be left in situ for a variable time period depending on individual factors but generally 24-48 hours.[6]

Guidelines exist for urethral catheterisation in humans,[7] and general principles from these have been adapted for feline urethral catheter management. It is suggested that feline urethral catheters are placed in an aseptic manner, that antibiotics are not used prophylactically and that a closed urinary collection system is used to reduce the incidence of catheter-associated urinary tract infection (CAUTI). [6-8]

To the authors' knowledge there is no research into the prevalence of the use of aseptic technique, closed collection systems and antibiotics in cats undergoing urethral catheterisation. The aim of this study was to determine the prevalence of compliance with the advice on feline catheter management and a further aim was to assess whether prevalence was affected by the year of graduation of the veterinary surgeon performing the procedure.

Materials and Methods

A random number generator[i] was used to select veterinary practices from all those listed on the Royal College of Veterinary Surgeons' 'Find a Vet' database. Each

practice was contacted by telephone and the first available veterinary surgeon was surveyed. If no veterinary surgeon was available or if the veterinary surgeon available had not placed a urethral catheter in a male cat with UO in the preceding 12 months no further data was collected. One hundred surveys were completed.

The gender and year of graduation of the veterinary surgeons were determined. They were then asked, when considering the last male cat that they had placed a urethral catheter in for UO:

1. Did you aseptically prepare the perineum and prepuce of the cat?
2. Did you aseptically prepare your hands and use sterile gloves?
3. Did you use a closed urinary collection system?
4. Did you give antibiotics whilst the urethral catheter was in-situ?

Clarification and explanation of the questions was provided if requested or if confusion was apparent. The answers to the survey were analysed using statistical software.[ii] Percentages of veterinary surgeons answering yes and no to each question were calculated. A chi squared test was used to determine whether there were significant differences in these percentages when considering year of graduation with $p<0.05$ being considered significant.

Results

Two hundred and forty-two veterinary practices were contacted to reach 100 veterinary surgeons eligible to be surveyed. Of these 57% (n=57) were female and 43% (n=43) were male. The year of graduation ranged from 1974 to 2013. Veterinary surgeons were categorised into year groups. The results of the questionnaire are summarised in Table 1. There was a significant difference in antibiotic administration ($p<0.01$), use of closed urinary collection systems ($p<0.01$) and aseptic hand preparation and gloving ($p<0.01$) between year groups. There was no significant difference in aseptic preparation of the patients skin between year groups ($p=0.051$).

Table 1: responses to questions regarding the most recent urethral catheter placement in a male cat with urethral obstruction

	Graduation Year Group					
	1975-1984 N= 16	1985-1994 N= 20	1995-2004 N= 24	2005-2013 N =40	P value	Total population N= 100
Antibiotics given (%)	100.0 (n=16)	80.0 (n=16)	79.0 (n=19)	55.0 (n=22)	0.004	73 (n=73)
Open urine drainage (%)	100.0 (n=16)	85.0 (n=17)	58.0 (n=14)	47.5 (n=19)	0.000	56 (n=66)
No aseptic skin preparation (%)	75.0 (n=12)	70.0 (n=14)	67.0 (n=16)	42.5 (n=17)	0.051	59 (n=59)
No aseptic hand preparation and gloving (%)	75.0 (n=12)	45.0 (n=9)	46.0 (n=11)	20.0 (n=8)	0.002	40 (n=40)

The percentage of veterinary surgeons that both aseptically prepared their hands and the cat's skin was 6.3% for vets graduating in the 1975-1984 group and increased to 50% for vets graduating in the 2005-2013 group. The percentage of veterinary surgeons that neither aseptically prepared their hands nor the cat's skin was 56.3% for vets graduating in the 1975-1984 group, which reduced to 12.5% for, vets graduating in the 2005-2013 group.

Discussion

This paper reports a survey of the standard of care provided by veterinary surgeons in the United Kingdom performing urethral catheterisation in male cats with UO. The study aimed to establish the prevalence of aseptic placement technique, antibiotic usage and closed urinary collection system usage.

This study found that the 1975-1984 graduates reported using antibiotics 100% of the time when placing urethral catheters in obstructed cats, compared to 55% of 2005-2013 graduates. Antibiotic usage whilst urethral catheters are in situ is associated with multi-drug resistant bacterial urinary tract infections in dogs and cats,[8] and in feline guidelines published in 2011 it was recommended that symptomatic CAUTI, (>1000 colony forming units (CFU)/ml of bacteria grown from a quantitative culture of urine collected by cystocentesis)[9] should be treated with antibiotics but preferably after removal of the catheter, although it was recognised that this may not be possible in all patients.[9] A recent study of healthy female dogs with asymptomatic bacteriuria found that no dogs with subclinical bacteriuria developed clinical signs requiring antimicrobial treatment during the 3-month observation period. It is therefore suggested that asymptomatic bacteriuria should not be considered as an indication for antibiotics[10]. Although, human, canine and feline evidence suggests that antibiotics should not be routinely used in patients

with indwelling urethral catheters, the present study did not question the reason for antibiotic administration in these cases. A small percentage of cases where antibiotics were used may have been appropriate, due to pre-existing urinary tract infection, pyrexia or systemic infection, for example. However, the use of antimicrobial drugs in 55-100% of cats (dependent on year of graduation) in the present study is likely to be unwarranted in the majority of cases as the incidence of bacterial urinary tract infection (UTI) in cats presenting for symptoms of FLUTD has been found to be low. In one study 37% of cats with FLUTD presented with urethral obstruction and of these 10% had significant bacteriuria (>10^4 CFU/ml) in combination with crystals and/or uroliths, and only 2% had bacteriuria alone.[3] Another study had similar results in which 55% of cats with FLUTD were obstructed and none of these cats had a significant bacteriuria.[4] In a recent Cochrane review in human medicine, bacteriuria was found to be reduced with antibiotic usage during urethral catheterisation, however, it selected for antibiotic resistant bacteria.[11] An alternative approach suggested in human medicine to limit prophylactic antibiotic usage, is to only use antibiotics in patients who are at high risk from complications of a UTI, for example, those with implants, immunosuppression or diabetes.[11] Previous use of antibiotics in cats with UTI's has also been found to be associated with multi-drug resistant *Escherichia coli*[12].

One hundred percent of graduates from the group 1975-1984 reported using open urine drainage compared to 47.5% of vets from the 2005-2013 group. Closed urinary collection systems are used in human medicine due to evidence suggesting that they result in reduced bacteriuria[13] Although small animal studies directly comparing the use of open urine drainage with closed urinary collection systems are lacking, a 1981 study found the incidence of bacteriuria in cats with indwelling urethral catheters was 56% in cats maintained with an open indwelling catheter[14] and a more recent study using closed collection systems found that the probability of CAUTI after 24 hours of catheterisation was 16.7% and this increased to 33.3% after 48 hours.[15] Closed urinary collection systems have the additional benefit that urine is diverted away from the body and contained, thereby preventing discomfort, urine scald and potential distress.

In humans, most microorganisms causing CAUTI derive from the patient's own colonic and perineal flora or from the hands of health-care personnel during catheter insertion or manipulation of the collection system.[16] Expert opinion in human medicine, clinical guidance and principles of best practice indicate that aseptic technique is important in preventing CAUTI and consequently reducing antibiotic usage.[16] Currently veterinary surgeons were found to be poor at utilising the aseptic technique recommended. Of the 100 vets sampled only 31 reported

175 performing both aseptic hand and patient skin preparation. The remaining 69% of
176 vets were either only performing one of these techniques or neither.
177
178 This study details the techniques reported by veterinary surgeons when placing
179 urethral catheters in feline patients with urethral obstruction. It relied on self-
180 report of an event happening up to 12 months prior to the questionnaire, potentially
181 leading to either intentional or unintentional misinformation being provided due to
182 poor recall or desire to provide the perceived 'correct' response respectively;
183 although it is felt that the latter is unlikely given the anonymised nature of the study.
184 The number of veterinary surgeons recruited was fair and allowed identification of
185 significant differences between graduating year groups. The data gathered was
186 limited to encourage full survey response, meaning that the reasons for the
187 decisions made were not analysed, which was probably particularly relevant
188 regarding antibiotic use. For example, if symptomatic bacteriuria was identified on
189 initial urinalysis when the urethral catheter was placed this could lead to
190 appropriate antibiotic use.
191

Conclusions

The study shows significant differences in techniques regarding performance and management of feline urethral catherisation reported by vets who graduated prior to 1985. These differences likely reflect changes in teaching and the move towards evidence based medicine over this time period. This study suggests that recent graduates are more aware of the evidence-based techniques now recommended and are maintaining a more responsible approach to antibiotic usage. By following the aseptic guidelines and by using closed drainage systems the likelihood of a CAUTI reduces and consequently so does the potential need for antibiotics. However, further research is still required into the advantages of closed urinary collection systems in cats.

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Conflict of interest

The authors do not have any potential conflicts of interest to declare.

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Footnotes

[i] Microsoft Excel 2010 v14.0.
[ii] IBM SPSS Statistics 21