

# Urethral Obstruction in Male Cats: Transmission Studies

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## ABSTRACT

Urethral obstruction was produced by injecting centrifuged urine from cats with urethral obstruction into the urinary bladders of unaffected cats. Filtration of urine from affected cats did not remove the causative factor.

## INTRODUCTION

The etiologic factors involved in urolithiasis were recently reviewed (3). Various factors were discussed and evaluated, however no mention was made of attempts to transmit this disease. Urolithiasis, as it occurs in male cats, often results in urethral obstruction (4). The incidence of urethral obstruction in the male cat population has been reported to be as high as 10% (1, 2). In the last three years the incidence of urethral obstruction, occurring in our cat facilities, was 3%. This report describes investigations which demonstrate the transmissibility of urethral obstruction in male cats.

## MATERIALS AND METHODS

Urine was collected from normal cats and from cats with urethral obstruction by vesical paracentesis. The urine was streaked on the surface of 5% bovine blood agar plates and the plates were incubated at 37°C for 48 hours. Urine samples checked for sterility in this manner were used throughout these transmission studies. The urine samples were centrifuged at 700 g for 30 minutes and frozen until used.

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In the preliminary experiment, 2.0 ml of the centrifuged urine from an obstructed cat was injected into the urinary bladders of two adult, male cats. The injections were given by urethral catheter daily for a total of four injections. One control cat was injected with urine from a normal cat and another control cat was injected with sterile physiological saline on each occasion.

Methods used in the second experiment were the same as in the preliminary experiment except that urine from a different obstructed cat was injected into the urinary bladders of four adult, male cats. When obstruction occurred the urine was pooled and divided into two fractions. Fraction 1 was centrifuged at 700 g for 30 minutes (same procedure as with the other urine samples). Fraction 2 was centrifuged at 10,000 g for 30 minutes and then filtered<sup>1</sup>. Each fraction was injected into five adult, male cats. A separate control experiment was conducted by injecting normal urine into the urinary bladders of five male cats. The injections were given by urethral catheter daily for a total of four injections.

## RESULTS

In the preliminary experiment, one out of the two cats injected with obstructed urine developed urethral obstruction within two days after injection. The two control cats were unaffected for 60 days after injection.

Three out of four cats developed urethral obstruction within 23 days in the second experiment. One cat out of five became obstructed with fraction 1 and two out of five with fraction 2. The incubation periods ranged from three to 58 days (Fig. 1). All five of the control cats, used in the second

<sup>1</sup>Millipore Filter Corp. (HA-.45u), Bedford, Mass.

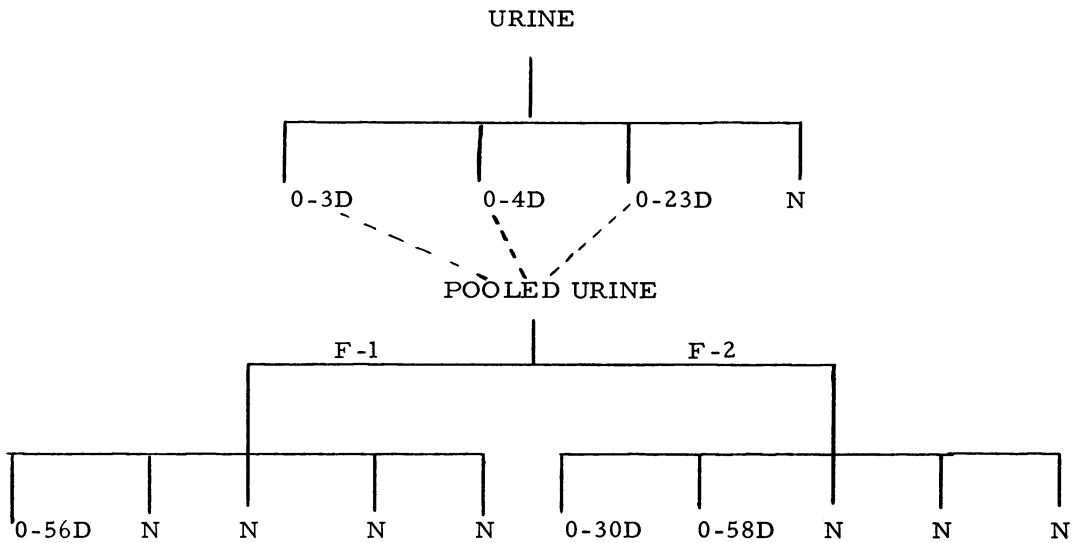


Fig. 1. Figure showing that urethral obstruction in male cats can be transmitted by injecting centrifuged urine from affected cats into the urinary bladders of unaffected cats. The incubation periods ranged from three to 53 days. Urine = urine from a cat with urethral obstruction; O = developed urethral obstruction; O = 3D = developed urethral obstruction three days postinjection; N = unaffected for 60 days postinjection; F-1 = urine that was centrifuged at 700 g for 30 minutes; F-2 = urine that was centrifuged at 10,000 g for 30 minutes and passed through Millipore® filters (HA).

experiment, were unaffected for 60 days after injection.

While bacteria were occasionally cultured from the urine of the experimental cases, they were not consistently found and were considered to be contaminants.

### DISCUSSION

The data show that urethral obstruction in the male cat can be produced by injecting centrifuged urine from obstructed cats into the urinary bladders of normal cats. Filtration of urine from affected cats did not remove the causative factor. The experimental disease resembled natural urethral obstruction in all clinical aspects.

Using these experimental procedures the incidence of urethral obstruction, in the research facilities, increased from 3% to 44%. These experiments raise the possibility that the trauma associated with urethral catheterization might be a factor in producing the experimental disease; but this is unlikely because seven control cats remained unaffected.

### REFERENCES

1. BLOOM, F. Pathology of the dog and cat. 2nd ed. Santa Barbara, Calif American Veterinary Publications, Inc. 1954.
2. FOSTER, S. J. The "urolithiasis" syndrome in male cats: A statistical analysis of the problems, with clinical observations. *J. small Anim. Prac.* 8: 207-214. 1967.
3. KING, J. S. Etiologic factors involved in urolithiasis: A review of recent research. *J. Urol.* 97: 583-591. 1967.
4. KRABBE, A. Urolithiasis in dogs and cats. *Vet. Rec.* 61: 751-755. 1949.

### ADDENDUM

Two picornaviruses have been isolated from cats with natural occurring urethral obstruction. Both isolates produced cytopathic changes in primary monolayer cell cultures of feline kidneys. One was isolated from urine, the other from muscle. The urine isolate was injected into the urinary bladders of four mature, male cats; three of the four cats developed urethral obstruction within 30 days.

Additional studies are now in progress to determine the significance of these picornavirus isolates.