

T400-Series Surgical Protocol

Rat & Guinea Pig Urethra: Urine Flow Measurement

APPLICATION BASICS

Site: Urethra
 Species: Rat; Guinea Pig
 Body Weight: Rat: 450 grams
 Guinea Pig: 950 grams
 Duration: Acute

PROBE

Size: 3 mm
 Reflector: LS
 Connector: CRA10: 10-pin
 Cable Length: 100 cm
 Catalog #: MA-3PSB

FLOWMETER TS420 Perivascular Module

Application

Using the Transonic® Flowmeter and Probe provides the possibility to describe urinary flow patterns in terms of flow rate, flow time and voided volume. In this study, these parameters were used to compare rat and guinea pig voiding. The results show the striking difference between the intermittent and continuous flow patterns. The ability to measure flow rate will increase the insight into the intricate relationship between the urinary bladder and the urethra. It will add to a better understanding of the functioning of the lower urinary tract.

Surgical Approach

Male Wistar rats (450 g) and Dunkin Hartley guinea pigs (950 g) were anesthetized with urethane (1.2 g/kg body weight, i.p.). The animals were placed on a heated undercover. The urinary bladder and the distal part of the urethra were exposed through an abdominal incision.

A 24G needle was inserted into the bladder dome and via tubing and a T-connector was attached to an infusion pump and a pressure transducer. A 3mm Transonic® Probe was placed around the dissected distal part of the urethra and was connected to a Flowmeter. The bladder was filled with room-temperature saline at an infusion rate of 0.1 ml/min (rat) or 0.5 ml/min (guinea pig). The bladder was filled until the bladder pressure rose steeply and the animal started to void. Both flow and pressure signals were recorded by computer at a sampling rate of 100 Hz (rat) and 10 Hz (guinea pig).

Flow Ranges Observed

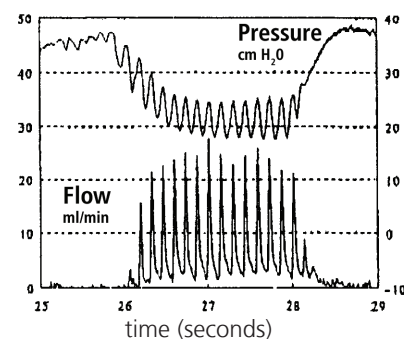


Fig. 1: Rat: A decrease in intravesical pressure on which is superimposed a series of high frequency oscillation accompanies flow.

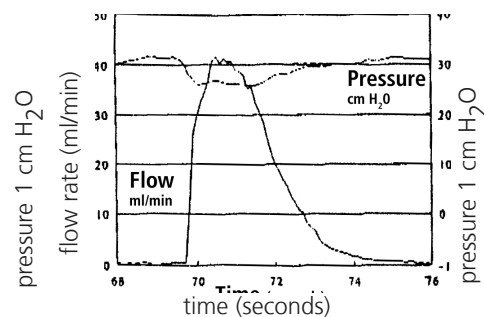


Fig. 2: Guinea pig: A small decrease in intravesical pressure is accompanied by flow. Note the absence of high frequency oscillations.

Rat & Guinea Pig Urethra: Urine Flow Measurement Cont.

Flow Ranges Observed cont.

Figures 1 and 2 show representative recordings of the bladder pressures and flow through the urethra. In both species, the voiding contraction consists of a steep rise in pressure, which then decreases, re-rises and finally falls down to base-line values. In the rat, the decrease is accompanied by so-called high frequency oscillations. These oscillations also occur in the flow rate of the rat which results in an intermittent flow pattern in contradiction to the continuous flow pattern in the guinea pig.

ACKNOWLEDGEMENTS

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REFERENCES

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van Asselt E, Groen J, van Mastrigt R, "A Comparative Study of Voiding in the Rat and the Guinea Pig; Simultaneous Measurement of Flow Rate and Pressure," *Am J Physiol* 1995; 269(1 Pt 2): R98-103.

For additional references, visit www.transonic.com

For Anesthesia: check what is currently available and allowed with your Institutional Animal Care & Animal Use Committee and know what affects the drugs will have on the parameters you are interested in studying. See Anesthetic Guidelines RL-67-tn for more information.



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