



Mar 24, 2021

SPARC Cat acute UroMOCA implantation

Anna Rietsch¹, Brett Hanzlicek², Margot Damaser³, Dennis Bourbeau⁴

¹Department of Biomedical Engineering, Cleveland Clinic Lerner Research Institute, Cleveland, Ohio;

²Advanced Platform Technology Center, Louis Stokes VA Hospital, Cleveland, Ohio; ³Cleveland Clinic;

⁴MetroHealth Medical Center, Cleveland, Ohio

1

Works for me

dx.doi.org/10.17504/protocols.io.bf2kjqcw

SPARC

Tech. support email: info@neuinfo.org

Brett Hanzlicek

SUBMIT TO PLOS ONE

ABSTRACT

This is a procedure for an acute wired UroMOCA implant cat experiment. A cystotomy is performed and an active, wired (for power) UroMOCA is placed in the bladder. The bladder is sutured closed, and urodynamics is performed to collect wireless data from the UroMOCA. This protocol includes basic surgery, UroMOCA implantation, urodynamics and imaging.

DOI

dx.doi.org/10.17504/protocols.io.bf2kjqcw

PROTOCOL CITATION

Anna Rietsch, Brett Hanzlicek, Margot Damaser, Dennis Bourbeau 2021. SPARC Cat acute UroMOCA implantation. **protocols.io**

<https://dx.doi.org/10.17504/protocols.io.bf2kjqcw>

LICENSE

This is an open access protocol distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

CREATED

May 05, 2020

LAST MODIFIED

Mar 24, 2021

PROTOCOL INTEGER ID

36652

MATERIALS TEXT

Cat - Domestic short-haired cat. Male or female. 6-24 months; 3.5-5.0kg
Syringe Pump - Genie Touch; Kent Scientific
Pressure Transducer - Catalog # 503067
WPI Amplifier - 4 channel transbridge
WPI National Instruments multifunction I/O device - NI USB 6259
National Instruments Laptop with Labview software
Tubing - Masterflex L/S Platinum-Cured Silicone Tubing ID 3/16 "; Cole Parmer
BNC cables
Tubing to catheter - APIS
Laborie Catheter - Argyl Suction Catheter, 3.5 Fr Catalog # 8890703211
Covidien Sutures - 4-0 Vicryl Polysorb (Covidien UL212)
3-0 Prolene (Ethicon 8762)
2-0 Silk Syringe
60ml Contrast
Visipaque 320mg/ml
Receiving radio/antenna
Surgilube
Surgical instruments

BEFORE STARTING

1 week before start of experiment - Confirm absence of bladder spasm; healthy cat

12 hours before experiment, start fasting the cat

You must transport the animal chart along with the cat to surgery site. The veterinary team will record all relevant data in the chart. The chart must then go back to the housing site.

Transport Cat

- 1 Transport cat from housing site to surgery site.

Animal Prep and catheter placement

- 2 Animal is anesthetized and abdomen is shaved by the vet team. The cat is then moved into the surgery room and attached to monitors by the vet team.
- 3 Drape animal and perform betadine scrub on abdomen and genitals.
- 4 Put surgilube on 3.5Fr catheter and insert into bladder through the urethra. Advance the catheter until resistance is met, then pull back 2-3cm.
- 5 Use gentle suction with syringe to withdraw urine from bladder through the catheter. Measure the volume and save the urine for urinalysis.

 7 mL urine removed

Conductivity of urine was recorded before sending for urinalysis

40.78 mS/cm


41.54 mS/cm

41.52 mS/cm

Cystogram - DYNA CT

- 6 Use 1:10 dilution of contrast to saline to visualize bladder.

Fill the bladder with contrast and take a 3D CT image

Add  10 mL more to bladder take 3D CT image

- 7 Empty Bladder
~13.5ml

Urodynamics/Cystometry

8

Performed after cat is transferred from Isoflurane to propofol anesthetic.

Fill rate is 2ml saline/minute using syringe pump.

Data is recorded using Labview software.

Pressure is recorded using an external pressure transducer connected to syringe pump on one end and tubing that leads to the catheter on the other end.

- 9 Fill bladder with saline and record pressure using pressure transducer connected to LabView

Fill to  15 mL

- 10 Empty Bladder

Remove 17 ml of saline + urine

Urodynamics/Cystometry 2

- 11 Fill bladder with saline and record pressure using pressure transducer connected to LabView

Fill to  12 mL ; Non-voiding contraction seen

Fill to  13 mL ; Non-voiding contraction seen

Fill to  16 mL ; Non-voiding contraction seen

Surgery

- 12 See protocol titled "SPARC Cat surgery Day 0" for details on accessing and opening the bladder for device insertion.
- 13 1 cm incision made in bladder. Place device in bladder, with the wires for power remaining outside the bladder. Suture the bladder closed, check for leaks and place bladder back into body.
- 14 Test for device function.



Data is being sent wirelessly from the UroMOCA to the receiving radio
- 15 Close the abdomen, with the wires for power remaining outside of the animal

Cystogram - DYNA CT

- 16 Infuse 10mL of contrast (1:10 dilution) – Single CT image
Infuse an additional 5mL of contrast (1:10 dilution) – Single CT image
- 17 Empty Bladder


Urodynamics/cystometry 3

- 18 Fill bladder with saline at 2ml/min and record pressure using pressure transducer connected to LabView

Fill to  12 mL ; No spontaneous contractions seen
Fill to  15 mL ; Pressure response from UroMOCA is seen
- 19 Empty Bladder

Urodynamics/cystometry 4

- 20 Fill bladder with saline at 2ml/min and record pressure using pressure transducer connected to LabView

Fill to  15 mL ; Tug on catheter - large contraction
- 21 Empty bladder
15ml removed

0.9% saline Bolus infusion 1

22 Infuse 0.9% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

23 Empty bladder

1.5% saline Bolus infusion 1

24 Infuse 1.5% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

25 Empty Bladder

3.0% saline Bolus infusion 1

26 Infuse 3.0% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

27 Empty Bladder

1.5% saline Bolus infusion 2

28 Infuse 1.5% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

29 Empty bladder

1.5% saline Bolus infusion 3

30 Infuse 1.5% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

31 Empty bladder

3.0% saline Bolus infusion 2

32 Infuse 3.0% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

33 Empty Bladder

0.9% saline Bolus infusion 2

34 Infuse 0.9% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

35 Empty Bladder

3.0% saline Bolus infusion 3

36 Infuse 3.0% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

37 Empty Bladder

0.9% saline Bolus infusion 3

38 Rotate animal on right side

Infuse 0.9% saline in boluses of 3mL, 6mL, 9mL, 12mL, 15mL at a rate of 10mL / minutes.

UroMOCA transmitting data

Euthanasia

39 Cleveland Clinic animal team euthanizes the animal

Dissection/Histology

40 Bladder is removed and placed in formalin for histological analysis