Title

MP60-04 PILOT EXPERIMENTAL ANALYSIS OF MEATUS CONFORMATION AND DEVELOPMENT OF NOVEL MEASUREMENTS FOR ABERRANT URINARY STREAM IN 3D PRINTED URETHRAS DERIVED FROM CADAVERIC MODEL

Journal

Investigative Urology, 203(Supplement 4)

ISSN

0021-0005

Authors

Cohen*, Andrew
Patino, German
Mirramezani, Seyed
et al.

Publication Date

2020-04-01

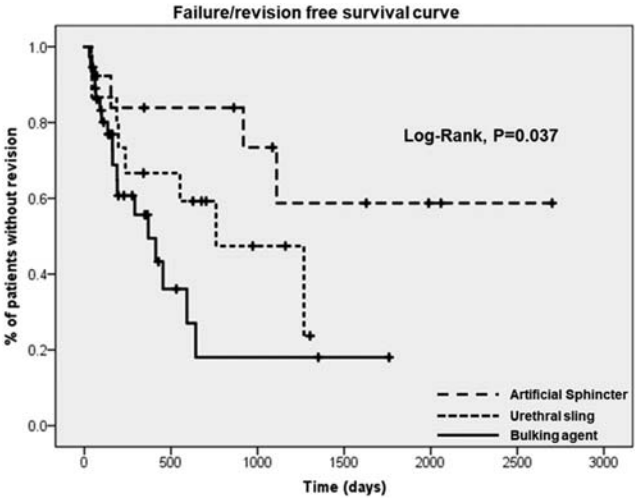
DOI

10.1097/ju.0000000000000929.04

Peer reviewed

follow-up was 256 days (IQ: 108-717). AUS had the longest failure free interval, followed by sling, and UBI (Figure 1). AUS had 46% failure rate at 2700 days post implantation and sling and UBI had 50% failure rates at 760 and 369 days, respectively (log-rank, p = 0.037). Age< 19 years was a significant factor for failure of any procedure in multivariable analysis (OR 0.088, p=0.020). Failure was particularly prevalent in patients < age 19 treated with UBI (90% failure). Sex and cause of neurogenic bladder were not associated with failure. No Clavien IV-V complications were noted in any procedure and there were no differences in overall complication rates.

CONCLUSIONS: Neurogenic stress incontinence can be safely treated with artificial urinary sphincter, sling or bulking agent. Artificial sphincter had the longest failure free interval and urethral bulking agents demonstrated the most rapid time to failure. Since the durability is different between each procedure, shared decision making between patient and physician is necessary to match expectations and outcomes.



Source of Funding: none

MP60-04

PILOT EXPERIMENTAL ANALYSIS OF MEATUS CONFORMATION AND DEVELOPMENT OF NOVEL MEASUREMENTS FOR ABERRANT URINARY STREAM IN 3D PRINTED URETHRAS DERIVED FROM CADAVERIC MODEL

Andrew Cohen, Baltimore, MD; German Patino, Bogota, Colombia; Seyed Mirramezani, Berkeley, CA; Sudarshan Srirangapatanam, Anas Tresh, Bhagat Cheema, Jenny Tai, Dylan Romero, Anthony Enriquez, San Francisco, CA; Shawn Shadden, Berkeley, CA; Benjamin Breyer, San Francisco, CA*

INTRODUCTION AND OBJECTIVE: An estimated 10% of male adults have split or dribbled stream which can lead to poor hygiene, embarrassment, inconvenience and social distress. There is no metric that measures the degree of stream deviation from normal, nor is there a definition of normal in this context. Our objective is to develop an innovative method to measure spray. We also evaluate the effect of common pathologies in the distal urethra and corrective surgeries on the urine stream.

METHODS: We use cadaveric tissues and 3D Printed models to define distal meatus conformations and their impacts on stream characteristics (Figure). We developed a novel platform to reliably measure spray of urinary flow. Silicone was used to cast the lumen of cadaveric urethra, this was subsequently converted to 3D printable model. Cadaveric penile tissue and 3D printed models were affixed to fluid pump and used to simulate micturition events. Dyed fluid captured on fabric allowed for spray detection. Spray pattern area, deviation from normal location, and flowrates were recorded as obstructions were surgically created in cadaveric tissue or modelled using 3D printing.

RESULTS: Characteristic voiding scenarios were validated with high precision. Spray patterns of each void were recorded (Figure d). Obstructions at the penile tip worsen spray dynamics and reduce urinary flow. Ventral meatotomy improves flow rate and reduces spray compared to tips obstructed ventrally, dorsally or in the fossa naviculars. 3D printed models to do not fully reproduce parameters of their parent cadaver material. All other variables constant, the flow rate from 3D model is 3 ml/sec less than that of the penis from which it was derived (p=0.03). Nonetheless, increasing obstruction in 3D models leads to the same pattern of reduced flow rate and worse spray. Via dynamic modelling, distal obstruction was experimentally shown to worsen fluid vorticity.

CONCLUSIONS: We developed a robust method to measure urine spray in a research setting. Dynamic 3D printed models hold promise as a methodology to study common pathologies in the distal urethra and corrective surgeries on the urine stream. We recapitulate clinical observations that increased meatal obstruction worsen flow and spray whereas meatotomy leads to improvements. These novel methods require further validation, but offer promise as a powerful research and clinical tool.

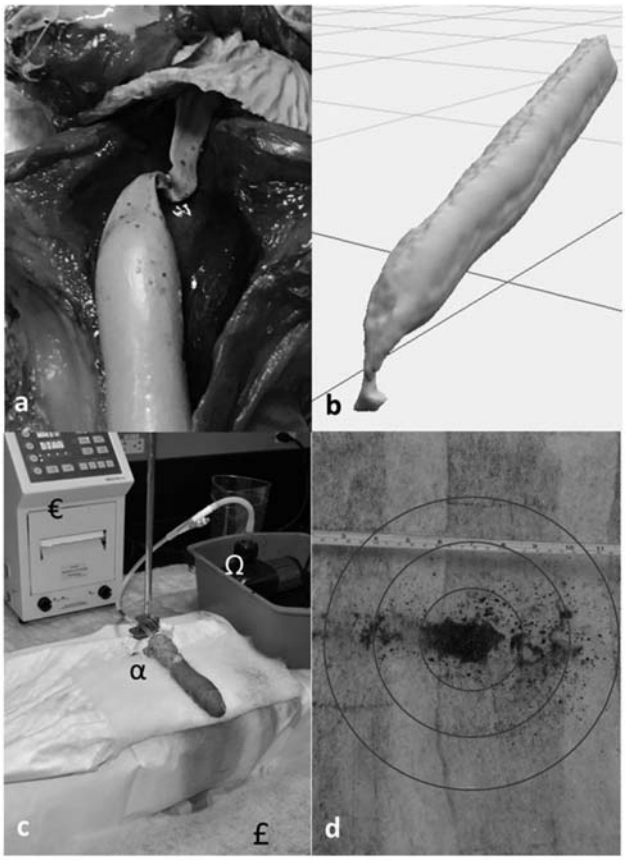


Figure 1a: silicone model of cadaveric urethra *in-situ* b: Scanned urethral lumen for computational modelling c: experimental set up for flow experiments; α: modified silicone catheter with extension tubing affixed to cadaveric penis, €: MedAmicus 4114UF Lumax Cystometry System, Ω Uniclife DEP-4000 Controllable DC Water Pump £: spray detection area d: Example urinary spray pattern result of cadaveric model

Source of Funding: Alafi Fund

MP60-05

TWO-YEAR OUTCOMES OF A PACLITAXEL-COATED BALLOON FOR TREATMENT OF MALE BULBAR URETHRAL STRICTURE

Sean Elliott, Minneapolis, MN; Ramon Virasoro, Jessica DeLong, Norfolk, VA; Rafael Estrella, Miami, FL; Merycarla Pichardo, Santa Domingo, Dominican Republic; Ramon Rodriguez-Ley, Panama City, Panama; Gustavo Espino, San Fernando, Spain; George Suarez, Miami, FL; George Webster, Durham, NC; Gerald Jordan, Norfolk, VA*

INTRODUCTION AND OBJECTIVE: We report 2-year outcomes of ROBUST I, a multi-center, single-arm, open-label study