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Video 2

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V02-01

DESIGN AND DEVELOPMENT OF A HIGH-FIDELITY HYDROGEL SIMULATION MODEL FOR ARTIFICIAL URINARY SPHINCTER PLACEMENT UTILIZING EXPERT CONSENSUS

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INTRODUCTION AND OBJECTIVE: Artificial urinary sphincter (AUS) implantation is a safe and effective treatment for severe stress urinary incontinence. However, high rates of reoperation due to device erosion, infection, and mechanical failure, combined with limited amount of training outside of live surgery, creates the need to train the next generation of surgeons without patient risk. Utilizing the consensus-building Delphi process, we sought to create a high-fidelity, non-biohazardous, simulation model for AUS implantation.

METHODS: 20 high volume AUS implanters were recruited to complete a Delphi process to reach expert consensus on the necessary parameters and design specifications for the simulation model. Consensus>80% was reached in 46% of 187 questions pertaining to procedural realism, anatomical realism, and educational effectiveness. Using previously validated 3D printing and hydrogel molding techniques, researchers fabricated a hydrogel model that incorporated all the expert determined aspects. Prototypes were sent to 9 of the experts who performed a skin-to-skin AUS implantation and a questionnaire evaluating the model and determining if the consensus defined steps were met. The questionnaire utilized a 5-point Likert scale where agreement=4/5, neutral=3, and disagreement=1/2.

RESULTS: 100%, 89%, and 100% agreed the model procedurally replicates; all steps of the procedure, tissue texture/behavior, and anatomical relationships including perineal and urethral incision/exposure (100%), circumferential urethral dissection (89%), AUS device prep (89%), reservoir counter incision (67%), cuff measurement/placement (100%), tubing passage (89%), development of subdartos pouch (78%), pump placement (89%), fashioning of tubing (78%), skin closure (89%), and device cycling (79%). 89%, 89%, 78%, 89%, 78%, 89%, and 56% agreed it anatomically replicates the; perineum, urethra, fascia over urethra, corpora cavernosa/spongiosum, bulbospongiosus and pubic bone. 78%, 100%, 100%, 100%, and 89% agreed it offers; useful error feedback, a safe/non-biohazardous training platform, and is useful for teaching/practicing, improving technical skills and assessing trainees.

CONCLUSIONS: We successfully created a high-fidelity, non-biohazardous, simulation model for AUS implantation utilizing expert consensus. The model replicated the entire implantation and was rated highly for procedural realism, anatomical realism, and educational effectiveness. Ultimately, this model can be used to improve current AUS training.

Source of Funding: n/a

V02-02

NOVEL TECHNIQUES TO REMOVE FRACTURED AND INTACT SACRAL LEADS

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INTRODUCTION AND OBJECTIVE: SNM is currently indicated by the FDA for urinary frequency and urgency, urge incontinence, non-obstructive urinary retention, and fecal incontinence. Off-label, SNM may improve pelvic pain, interstitial cystitis, dyspareunia, pelvic floor dysfunction, sexual dysfunction, and persistent genital arousal. Neuromodulation is achieved by implanted electrical leads which stimulate sacral nerve roots. The first iterations of stimulator implants were not compatible with MRI and many patients still retain MRI-incompatible titanium leads which can heat up during magnetic imaging. For this reason, as well as lead migration, loss of efficacy, or adverse events, implanted leads may need to be removed. Current medical literature offers few techniques to successfully remove outdated or ineffective leads. We present novel, effective methods of intact and broken lead removal in MRI and non-MRI compatible interstim devices.

METHODS: Lead removal is demonstrated in two patients. First, a 53- year-old-female who needs Interstim removal and replacement to the MRI compatible version. The second patient is a 54-year-old woman with an MRI compatible device that fractured below the bone plate during initial removal.

RESULTS: In the first patient, a hemostat was used to grasp and pull the inner wire. This process results in a wireless “ghost lead”, which is MRI-compatible. However, by pulling the inner wire, the distal lead contracts, creating an accordion effect on its tines. The tines are freed from the surrounding tissue, completely removing the intact lead. Our second patient is a 54-year-old female with a MRI-compatible device. Newer leads differ from older models in that they have firmer adherence to the wire. Even in this case, our same technique can be applied. Occasionally during lead removal, the lead can break. Often times the breakage occurs above the bone plate at which point the incision is extended and dissection is performed down to the level of the broken lead. The lead is then removed. Rarely, the lead breaks below the sacral bone plate, resulting in a more challenging removal. To remove the lead, an incision is made over the sacrum. The lead introducer is advanced into the foramen alongside the fractured lead and the inner trocar is removed. Next, a flexible grasper is advanced through the lead introducer down to the foramen. Under fluoroscopic guidance the lead introducer and grasper are manipulated down to the fractured lead which is grasped and removed intact.

CONCLUSIONS: In conclusion,we present minimally invasive methods for easier lead removal and fractured lead removal, both above and below the sacral bone plate.

Source of Funding: None

V02-03

ROBOTIC-ASSISTED INTRAVESICAL MESH EXCISION FOLLOWING MIDURETHRAL SLING

Elizabeth J. Olive, Brian J. Linder, Rochester, MN*

INTRODUCTION AND OBJECTIVE: Intravesical mesh is an uncommon complication following synthetic midurethral sling placement. Management options have included endoscopic techniques such as laser ablation, which is less invasive, or surgical excision, which is more invasive but also likely more definitive. We present our technique for robotic-assisted excision of intravesical mesh following a retropubic midurethral sling.

METHODS: Our patient is a 66-year-old female with prior history of laser ablation of intraurethral mesh after midurethral sling, and persistent symptomatic intravesical mesh with associated stone at the bladder neck and right bladder wall. After docking the robot, the space of Retzius is entered and mobilized to the pubic