

I. Specific educational aims:

We aim to validate a global assessment tool for use in Endourology – surgery performed endoscopically within the urinary tract, usually to treat urologic stone disease.

Beyond validation of the assessment tool we will be exploring a new method of capturing and archiving endoscopic skills that addresses control of the ureteroscope, treatment of stones, use of fluoroscopy and motor skills required to place wires and sheaths up to the kidney to enable treatment of kidney stones.

II. Project rationale:

The majority of surgical techniques have validated global assessment tools used to quickly evaluate and effectively score surgical skills in the simulation setting as well as in the operating room. Such tools have been developed for open surgery (OSATS), laparoscopic surgery (GOALS), robotic surgery (GEARS) and many more. We aim to validate a global assessment tool for originally developed in 2001 for a ureteroscopy simulator and since modified for application to skills in the operating room (Matsumoto, Hamstra, Radomski, & Cusimano, 2001).

Crowd sourced evaluation of surgical skills has become commonplace in hospitals for quality improvement and this has been extended to resident education in urology (Holst et al., 2015). Crowd sourced evaluation is cost effective and rapidly becoming a cheaper alternative to expert evaluation. As this becomes increasingly common the field of urology will need to find a way to distil endourologic procedures into a package that can be presented to surgery-naïve crowd sourced evaluators and provide enough data to detect proficiency.

Our work would not only validate an intra-operative assessment tool, but it would pave the way for crowd sourced assessment of endourologic surgery for quality improvement in hospitals around the world as well as resident education.

III. Approach:

We propose to use C-SATS, an online service that specializes in surgical skills review using crowd sourced and expert review of surgical videos. We have been in contact with the company and will use their resources to help adapt our current global assessment form and develop a way to capture performance in a video that can be shortened recording of a procedure, while still capturing the important skills.

We will be providing approximately 25 compiled video clips to the service for evaluation. The practitioners being evaluated will be anywhere from PGY-2 through PGY-6 as well as local experts in the field.

Ureteroscopy initially requires significant work with wires and sheaths in order to place the ureteroscope in the kidney for treatment of stones. This requires organization, use of an assistant as well as fine motor coordination while manipulating the wires. We propose to capture this aspect of the surgery with a video camera positioned so that the movements of the surgeon, and use of the assistant and back table be evaluated. Next we will move on to video of the endoscopic procedure, recorded through the video tower onto a hard drive. We will select representative segments of video that include navigation of the

renal collecting system, navigation of the ureter, lasering of the stone, and basketting of the stone. Our final video will be approximately 10 minutes long. This has been found to be the best length for videos used for crowd sourced evaluation as it contains enough data to evaluate and not too long as to lose focus.

After packaging of the videos for review we will obtain the crowd-sourced review data. We will look at inter-rater reliability and ability of the technology to discriminate novices and experts. We will also have attending urologists rate each video as an additional external validation. We will obtain videos at Stanford Hospital and the Veterans Administration hospital and will obtain IRB approval prior to proceeding.

IV. Timeline and plan for implementation:

Beginning in September 2016 we will begin recording video for residents and attendings performing the procedures. In order to obtain 25 videos, given the limited number of urology residents and limited number of cases per week we project this will take 6 months to capture enough performances and generate the 10 minute representative video clips.

V. Anticipated work product:

Our work will produce a validated assessment tool for use in endourology as well as an accompanying way to capture performance for education and quality improvement purposes.

VI. Evaluation plan:

We will consider this successful if crowd sourced evaluation is able to differentiate novices from experts and provide helpful feedback using a global assessment tool for urologic stone surgery.

VII. Dissemination of results:

We will initially present our work at Stanford teaching research symposiums as well as the yearly American Urological Association meeting. A manuscript would be submitted to the Journal of Urology. Alternatively we would submit our work to a surgical education journal.

Sources:

Holst, D., Kowalewski, T. M., White, L. W., Brand, T. C., Harper, J. D., Sorenson, M. D., ...

Lendvay, T. S. (2015). Crowd-sourced assessment of technical skills: an adjunct to urology resident surgical simulation training. *Journal of Endourology / Endourological Society*, 29(5), 604–609. <http://doi.org/10.1089/end.2014.0616>

Matsumoto, E. D., Hamstra, S. J., Radomski, S. B., & Cusimano, M. D. (2001). A novel approach to endourological training: training at the Surgical Skills Center. *The Journal of Urology*, 166(4), 1261–1266.