JS-3 : JUA/UAU/AUA/EAU Joint Session3

Future Perspectives of Minimally Invasive Therapy in the Field of Urology

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Minimally invasive therapy (MIT) has captured the worldwide attention of the patients as well as the surgeons in this decade. Due to the rapidly evolutionary nature of this field, some once considered innovative surgical procedures will soon become the standard procedure, and become out-of-date later. As one of the best example, laparoscopic surgery has successfully replaced open surgery in Urology recently. In the future, the evolution of MIT will still be a formidable challenge to both novice and experienced laparoscopic surgeons. Laparoscopic surgery of single site (LESS) has been used successfully for many urological procedures since 2004. Experimental natural orifice transluminal endoscopic surgery (NOTES) first described in 2003 has expanded significantly since the application of the technique within the human arena after 2008. Although the technology of LESS or NOTES may not be mature at the present, its application will expand rapidly as other MIT procedures. The robotic system initially conceived for use in cardiac surgery, has been adopted widely by urologists. The surgical outcomes of robotic procedure have been proved to be at least the same, if not better than, as traditional laparoscopic or open prostatectomy. With miniaturization and refinement in fiberoptic and endoscopic technology, imaging of myriad bodily viscera through a multitude of natural orifices will soon become routine, and almost every body cavity, including the brain, will be accessible to endoscopic inspection and manipulation. A computer-controlled robotic platform will allow precise, controllable, complex, and reproducible maneuvers of flexible endoscopes inside hollow organs and threedimensional anatomic spaces to further enhance the capabilities of endoscopy. The economic challenges have created a dilemma for many hospitals and physicians; it is hopeful that the price will decrease as competition evolves and the technology become more mature in the future. Since the first transatlantic telerobotic cholecystectomy, further development for this technology will expand to the delivery of healthcare. As telecommunications and robotic technology continues to advance, telesurgery is likely to take on a more prominent role in surgical practice. Further development on teleradiology and telepathology will also occur for future patient care. National Aeronautics and Space Administration (U.S.A.) is investigating extraterrestrial application of robotic surgery as continued space exploration provides the potential for astronauts in space needing emergent operation. The future development of MIT is really unpredictable. However, no matter how surgical technology advances, no technology can replace you as a caring physician with love in the heart of your patients.