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Robotic Assisted Flexible Ureteroscopy (RAFURS) with Avicenna Roboflex
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Introduction: As recently reported in European Urology, the new robot for flexible ureteroscopy “Avicenna Roboflex” produced by Elmed-Turkey is used now in three Urologic Departments (Ankara, Paris, Heilbronn). In this paper we were able to demonstrate the safety and effectivity of the new robotic device for flexible ureteroscopy. Thus, treatment of kidney stones by using Avicenna Roboflex, is no more experimental. Now, we are searching the additional advantages of the Roboflex.

Methods: Avicenna Roboflex consists of a console and manipulator. The position of the ergonomic chair, arm rest and control panel can be individually adjusted and stored in the system for six users. The flexible ureteroscope is introduced into the access sheath manually, the hand piece of the scope is locked to the robotic arm. The surgeon at the console, controls two joy-sticks to manipulate the rotation, deflection and in and out movement of the endoscope. It is possible to observe the deflection degree, and when necessary switch the European type to the United States type. A miracle wheel on the right holder enables, fine tuning of deflection inside the collection system. The left joy stick allows for rotation of the flexible device 440 degrees, which is impossible by hand. This minimizes the torsion risk of the endoscope. Once the tip comes on the stone, the speed of in and out movement is usually decreased to 2mm per second to provide an excellent precision for dusting. Laser fiber can be remotely moved in and out which is very helpful to provide suitable distance between stone and the tip of the laser fiber. Software prevents firing of the laser shot, when the laser tip is very close to the endoscope to prevent the laser damages. The integrated water pump can be also adjusted remotely. By this way, it is possible to treat the stone with a minimal flow rate and to provide low pressure lithotripsy.

Results: Robotic flexible ureteroscopy, provides better ergonomics and by this way prevents the doctors fatigue. Because of remote control of the functions prevents the user from radiation exposure. It prevents damages of the device. Based on a validated ergonomic questionnaire there was a significant difference when comparing the ergonomics of classical versus robotic flexible ureteroscopy. In the meantime more than 150 renal stones have been treated with the Avicenna Roboflex at all three centers including a series of larger stones.

Conclusions: Avicenna Roboflex is a new suitable, safe and effective platform for the flexible ureteroscopy, with free rotatable manipulator, fine movement steerable at console, adjustable to American and European endoscopes, versatile for endoscopes and lasers, the Avicenna Roboflex improves ergonomy by sitting at console with armrest and free control of all functions.