

Interactive Virtual Reality Assisted Pyeloplasty in a Horseshoe Kidney

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Introduction

Three-dimensional (3D) virtual reality (VR) models have been shown to be of some potential benefit in cases of partial nephrectomy. In this video we present the use of 3D VR modeling in complex upper urinary tract reconstruction. This is the case of a 38 year-old, otherwise-healthy male who was diagnosed with a horseshoe kidney and ureteropelvic obstruction after presenting to an outside emergency room with flank pain.

Methods

Routine preoperative assessment was performed with laboratory workup to assess overall renal function, contrast computed tomography (CT) to delineate anatomy and assess for a crossing vessel, retrograde pyelography, and nuclear medicine (NM) diuretic renal scan to determine differential renal function and confirm obstruction. A 3D VR model was created and an Oculus Rift platform with Leap motion controllers was used to interact with the model. Thereafter a robot-assisted laparoscopic dismembered left pyeloplasty was performed. The Foley was removed on post-operative day 1 and the stent was removed 4 weeks after surgery. A NM diuretic renal scan was performed 8 weeks after surgery to assess for obstruction.

Results

There were no complications during surgery and the patient was discharged home on post-operative day 1. He remained asymptomatic after stent removal and a NM renal scan performed 8 weeks after surgery revealed improvement in the diuretic T1/2 from no excretion preoperatively to 17 minutes postoperatively.

Conclusion

Interactive VR modeling may be useful in planning complex reconstructive cases.