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Virtual Reality Applications In Pediatric Urology: Enhancing Surical Planning And Patient Education

Shanmuga Priya[1], Heera[2], Ramesh Babu[3]

[1]1st year MD Pediatrics , Sri Ramachandra Institute of Higher Education and Research
[2]Department of Pediatric Urology , Sri Ramachandra Institute of Higher Education and Research
[3]Professor , Department of Pediatric Urology , Sri Ramachandra Institute of Higher Education and Research

Background & Aims: Virtual reality (VR) reconstruction allows immersive experience of spatial orientation of vascular/ complex anatomy. In this case record study we have analyzed usefulness of VR in pediatric urology treatment.

Methods: All patients who underwent VR reconstruction in our department over the last one year (2023-24) were included. Contrast enhanced CT scan/ MRI images were obtained at 1mm thickness. A VR model and a 3D environment were created (Immersive view 5.0; Immersive Touch Inc. 910). The usefulness of VR among the cases managed in the pediatric urology department was assessed objectively by three independent physicians. The usefulness was assessed on a Likert scale (1-5) on the following headings: VR usefulness in anatomical delineation, VR tools, surgical planning, student teaching and patient counseling. Inter observer variation was assessed by statistical analysis using Cohen's Kappa test.

Results: During the study period 15 cases underwent VR reconstruction. The various diagnoses were bilateral Wilms Tumor 1; pelvic kidney 1;Recurrent PUJO-1, horse shoe kidney 1; duplication anomalies 6, recto urethral fistula 1;PUJ Calculus with perinephric abscess-1;Bladder diverticulum-1; renal cortical cyst 1 and renal trauma with urinoma 1. Among the study population 13/15 underwent surgical treatment; two were managed conservatively. The mean usefulness score was anatomical delineation -3.9, VR tools -3, surgical planning-3.2, student training and patient counseling-3.9. There was a very good inter observer rating between assessors (kappa 0.8).

Conclusions: VR application is useful in patient/ student education and in anatomical delineation of complex pediatric urological malformations. Selection of ideal cases for VR will make this novel tool cost-effective .

Keywords: Virtual reality, Surgery, Patient education

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