



VIDEO FIRST PRIZE

ADVANCING PEDIATRIC SOLID TUMOR SURGERY THROUGH THE CLINICAL INTEGRATION OF VIRTUAL REALITY (VR) AND INDOCYANINE GREEN (ICG) FLUORESCENCE-GUIDED IMAGING

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Abstracts Book



Advancing Pediatric Solid Tumor Surgery Through the Clinical Integration of Virtual Reality (VR) and Indocyanine Green (ICG) Fluorescence-Guided Imaging

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PURPOSE

Pediatric solid tumors often require meticulous surgical interventions due to their complex anatomical locations and proximity to vital structures. Emerging technologies, such as Virtual Reality (VR) and Indocyanine Green (ICG) fluorescence-guided imaging, offer promising solutions to enhance surgical precision and outcomes. However, their application in pediatric urology oncology remains underexplored. This case report illustrates the integration of VR and ICG fluorescence imaging in the surgical treatment of neuroblastoma, emphasizing their benefits, limitations, and areas for future advancements.

MATERIAL AND METHODS

A 12-month-old female with a prenatal diagnosis of cloacal malformation, Müllerian anomalies, and a horseshoe kidney presented with a solid retroperitoneal mass discovered during preoperative imaging for her reconstructive surgery. The mass was confirmed as a right adrenal neuroblastoma. After six cycles of chemotherapy, persistent mIBG uptake suggested potential residual tumor viability. Definitive surgical resection was scheduled, incorporating VR and ICG fluorescence to facilitate precise dissection and preservation of critical structures.

RESULTS

The integration of VR allowed for detailed preoperative planning and intraoperative navigation, enhancing anatomical orientation. ICG fluorescence provided real-time visualization of vascular structures, aiding in safe tumor resection. The procedure was completed without complications, and the patient had an uneventful postoperative recovery. Follow-up imaging confirmed no evidence of residual disease.

CONCLUSIONS

VR and ICG fluorescence imaging hold great promise for enhancing surgical precision and safety in pediatric urology oncology. Addressing current limitations, such as the inability to superimpose VR images onto the surgical field and the lack of neuroblastoma-specific fluorescent probes, should be a priority for future advancements to improve outcomes further.