



MEDICINE 2040

Rewriting the future of healthcare

VIRTUAL REALITY TECHNOLOGY FOR PREOPERATIVE PLANNING IN TRAUMA SURGERY

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Background: Virtual reality environment (VRE) is an emerging and appealing technology to analyse surgical and clinical data from a different perspective. VRE could also allow the visualization of 3D anatomical patient-specific models created starting from standard CT scan. Aims: By using open source software and Head-Mounted Display (HMD) with tracker, we visualized a case of a patient with massive liver injury in an interactive and portable VRE developed by our team. Methods: We retrospectively processed a CT scan of a 48-years-old female with a severe liver injury caused by mechanical cardiopulmonary device “Lund University Cardiac Assist System” (LUCAS). The virtual model was created with 3D slicer, then adjusted in Blender and loaded through Unity 3D into our VRE on smartphone-based HMD. The entire process took about 1.5 hour to be performed. A team of expert surgeons and radiologists evaluated the 3D virtual liver (VL). Results: According to the opinions of the expert team, our VL allowed a higher level of clinical and anatomical information when compared to CT scan alone. In particular, it allowed a better understanding of the extent of the intrahepatic hematoma and a precise visualization of the relationship of the lesion with liver segments and vascular structures. Conclusions: The integration of radiologic imaging and VRE technology applied to clinical practice in liver trauma could help surgeons in planning a safer surgical strategy. Moreover, it can also allow a specific training in surgery for young trainees allowing surgical simulation in a safe environment for the best surgical strategy.