

Use of Neuro-Robotic Exoscope for Neurosurgery in Pakistan: A Case Series

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ABSTRACT

Neuro-robotic exoscope' is a recent advance. Reports on the use of this operative visualization system are few. In this study we have described our initial experience with the use of Bright Matter™ system for various neurosurgical procedures.

Methods: All patients who underwent neurosurgery using Bright Matter™ (Synaptive Medical) at the Aga Khan University Hospital (AKUH) from April 2016 to October 2016 were included in this retrospective study. Data was collected from medical charts. Descriptive analysis was performed using SPSS v 21.

Results: Bright Matter™ systems were used for a total of 71 cases. The exoscope was used with neuro-navigation and Diffusion Tractography Imaging (DTI) in 28 cases while in 7 cases it was used without navigation. During the same study period, neuro-navigation alone was performed for 36 additional cases but the exoscope was not used. The exoscope was used for a total of 53 hours while the Operating Microscope (OM) was used for 33.5 hours. A total of 12 cases were completed using the exoscope alone, without the need the OM. Twenty-four lesions were found to be involving different white matter tracts of the brain. Gross Total Resection was done in 17 (of 30) patients. Perioperative mortality was 0%. Five patients had a new neurologic deficit postoperatively Progress in neurosurgery has been linked with an improved illumination and visualization. Operative Microscope, (OM) with excellent magnification and illumination, has become indispensable for most neurosurgical procedures. The quest for better intraoperative visual

aids has not stopped. The OM is bulky, causes surgeon discomfort, has narrow depth of field and is costly. Minimally invasive endoscopic surgery has its own limitations due to its short focal length, long learning curve and issues of handling. A recent advent in operative imaging is the 'neuro-robotic exoscope', a rigid rod lens system that is positioned outside the surgical cavity. Improved visualization, especially in and around corners, good illumination, magnification and high maneuverability with the use of a neuro-robotic arm adds further to the strengths of the exoscope. This recent addition to the neurosurgeon's armamentarium has gained approval among many peers but its use so far had only been limited to few centers. In April 2016, Aga Khan University Hospital (AKUH), Karachi started using neuro-robotic Exoscope (Synaptive Medical, Bright Matter™). Since its acquisition, it has been in use in all the different types of neurosurgical procedures, at AKUH. We planned to report our early experience with the use of the exoscope and study the learning curve with its use.. Synaptive Bright Matter™ systems were used for a total of 71 cases. The exoscope was used with neuro-navigation and Diffusion Tractography Imaging (DTI) in 28 cases while in 7 cases it was used alone. During the same study period, neuronavigation alone was performed for 36 additional cases but the exoscope was not used. denotes data on use of these systems.

Keywords: Exoscope; Neuro-robotics; Pakistan