

AN AUTOMATED EXOSCOPE AS A SUBSTITUTE FOR AN OPERATING MICROSCOPE IN NEUROSURGERY

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Introduction

Neurosurgeons have relied on operating microscopes to improve visualization of the surgical field. New technology provides “robotic” microscopes and exoscopes to improve surgeons’ vision and ergonomics. We describe the first series of clinical cases to use the BrightMatter Servo system (Synaptive Medical) in cranial or spinal surgery. This system integrates imaging, surgical planning, and robotic visualization in real-time.

Methods

We used at least 1 component of the BrightMatter Servo system (robotic exoscope) for 17 cranial and 4 spinal procedures. Then we retrospectively analyzed the following data: need for subsequent use of the operating microscope, procedure duration, estimated blood loss, procedure success, and intraoperative complications. We calculated the frequencies of categorical variables and the mean, standard deviation, and range for numerical variables.

Results

This series included 10 women and 11 men with a mean age of 61.1 ± 16.1 years (range 29-84 years). The BrightMatter Servo system was utilized in 4 spinal and 17 cranial surgeries. Among the 18 exoscope procedures, a standard operating microscope was required in 4 (22.2%) cases. All of those cases were successful except 1 case of intraparenchymal hematoma. There were no intraoperative complications using the exoscope. Although the exoscope provided superior ergonomics to the surgeons, a learning curve and absent 3-dimensional view limited its use. A major drawback was the lack of depth perception that can provide a clear benefit in surgeries like encephaloduroarteriosynangiosis. Additionally, the maneuverability and positioning of the exoscope was one of the features that had to be learned, making it cumbersome at times.

Conclusions

The BrightMatter Servo system may be an alternative to the operating microscope in certain cases; however, a lack of depth perception limits its use in its current form.

Learning Objectives

- 1) The first series of clinical cases in which the BrightMatter Servo system (Synaptive Medical, Toronto, Ontario, Canada) was used in cranial or spinal surgeries.
- 2) The utility of BrightMatter Servo system (Synaptive Medical, Toronto, Ontario, Canada) as a possible substitute for operating microscope.
- 3) The drawbacks using of BrightMatter Servo system (Synaptive Medical, Toronto, Ontario, Canada) as observed in our experience.

References

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