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Craniotomy for Tumor Resection Assisted by the Navigating Retractor Robotic Device ROSA: A Series of 10 Consecutive Cases

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Introduction

The discipline of neurosurgery has seen many technological advances in the last decades. One of these advances that have revolutionized the practice of neurosurgery is the introduction of neuro -navigation. Recently, the field of robotic has made its way to the operating room. One of these systems, ROSA, is now commercially available. So far, the system has mostly been used as a biopsy targeting device, as well as an epilepsy electrode placement device. With innovation and ease of use in mind, the authors set forth to extend the functionality of the robotic operating device, and allow its purposeful use in craniotomy.

Methods

As part of a research collaboration between Medtech and the Université de Sherbrooke, the ROSA system has been modified to serve as a navigational retractor device. The retractor was designed as an adaptor to the ROSA robotic system, with embedded navigational function, thus lending continual neuro-navigational data, while serving as a precise, flexible and secure retractable device.

Results

Ten consecutive surgeries have been performed with the system and constitute the core of this report. The following clinical and radiological surrogates will be analyzed: extent of resection, extent of the FLAIR signal (pre and post op), time of surgery, neurological function (pre and post op), and incidence of complications. The advantages as well as the shortcomings of the ROSA system will be discussed and compared to traditional neuro-navigation system.

Conclusions

The ROSA retraction device is a useful and extremely secure operative assistant to the surgeon. It does present numerous advantages compared to standard retractor devices as well as commercially available neuro-navigation systems. Certain shortcomings must be overcome prior to its widespread use, but future perspectives are promising. Future implantation design in the retractor adapter device for ROSA will also be exposed.

Learning Objectives

To familiarize with the ROSA system.

To understand the function as well as the advantages of the ROSA retractor device

To foresee future development and implications of such an operative robotic assisting device.

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