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Accurate Placement of the Initial Retrosigmoid Burr Hole Using Preoperative 3D Reconstruction: A Teaching Technique

Chuan Zhou; Andrea Boschi; Tao Xu; Juxiang Chen; Philip E. Stieg MD, PhD; Antonio Bernardo MD; Alexander I Evins MD
Department of Neurosurgery, Beijing United Family Hospital, Beijing, China
Department of Neurological Surgery, Weill Cornell Medicine, New York, NY, USA

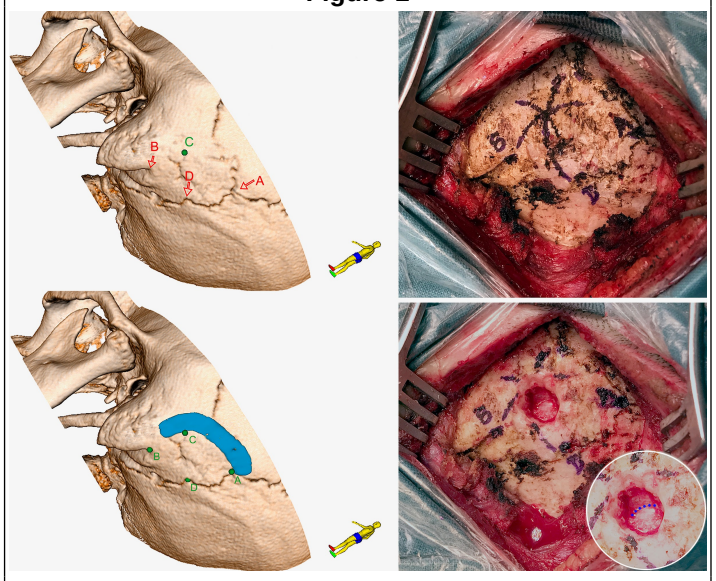
Introduction

The retrosigmoid approach is one the most common approaches in neurosurgery. In some cases, young neurosurgery residents may have difficulty in accurately placing the initial burr hole at the inferior aspect of the transverse sigmoid sinus junction. Placement of the burr hole too far from the sinus can lead to unnecessary bone removal and placement on top of the sinus can increase the risk of sinusal injury. Precise preoperative planning and 3D reconstruction can serve as a valuable teaching aid for demonstrating correct placement of the initial burr hole and can help facilitate a safe and accurate approach.

Methods

Seven cadaveric specimens (14 sides) underwent computed tomography and subsequent 3D reconstruction. The surface location of the transverse sigmoid sinus junction and the proximal segment of the sigmoid sinus were identified using the reconstruction and the distances from this ideal entry point to the asterion, mastoid process, and root of the zygoma. The retrosigmoid craniotomy was then fashioned on each side, the burr hole was placed at the identified point based on the measured distances, the anterior edge of the craniotomy was fashioned based on the 3D reconstruction as close as possible to the sigmoid sinus, and target accuracy was assessed.

Figure 1



3D Reconstructions and Burr Hole Placement

Results

All burr holes and craniotomies were successfully placed at the location of the transverse sigmoid junction, as confirmed by microscopic inspection. The average time for reconstruction was 12 minutes.

Conclusion

Preoperative 3D CT reconstruction and measurement is useful technique for teaching young residents how to accurately identify the location of the initial retrosigmoid burr hole.