



Retrosigmoid Transtentorial Transcollateral Sulcus Approach to Lateral Ventricle: A Cadaveric Study

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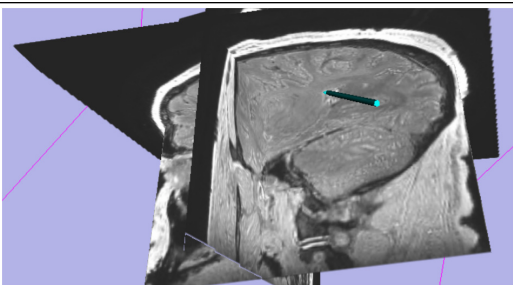
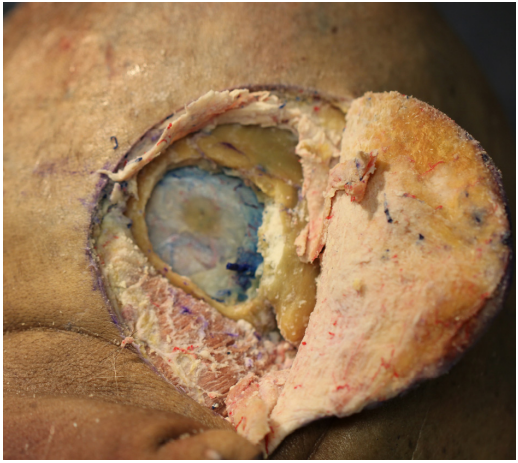
Introduction

Conventional approaches to the atrium of the lateral ventricle can be associated with complications related to direct cortical injury or brain retraction. We describe a novel approach to the atrium through a retrosigmoid, transtentorial transcollateral sulcus corridor.

Methods

Eight retrosigmoid craniotomies were performed on four latex injected cadaver heads. Visualization was provided by microsurgical dissection (3x - 24x microscope), 2.3 mm diameter, 0° Minop endoscope lens & 0° and 45° rigid Hopkins endoscope lenses. Measurements of the angle of entry to the ventricle, transcortical distance traversed and the total depth of exposure were recorded using a 3D spatial coordinate tracking system with MR-based registration and anatomical reference points.

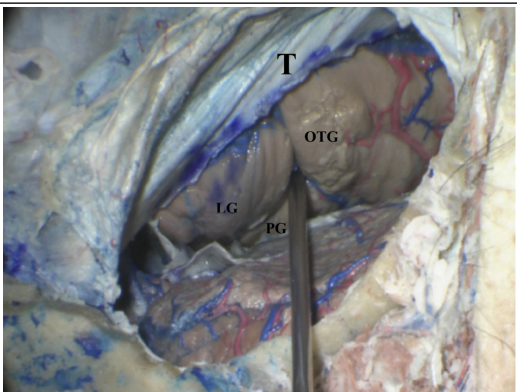
Right-sided retrosigmoid craniotomy



Planning endoscope trajectory with probe-based 3D navigation

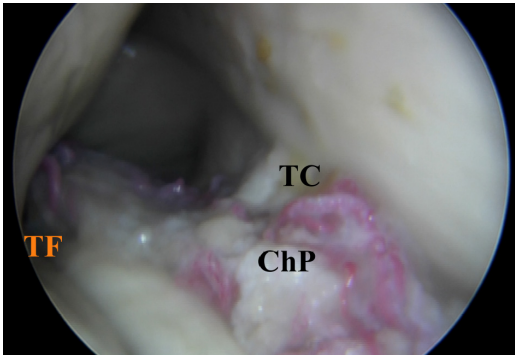
Results

The retrosigmoid endoscopic approach allowed for clear visualization of the surgical field. Identification of the collateral sulcus permitted adequate endoscopic access to the atrium. The optimal angle of entry to the atrium was found to be approximately 80° to the tentorial surface. The mean cortical thickness traversed was 14 mm. The mean distance from the skull to the ventricle was 59 mm. The intraventricular anatomy was well-visualized.

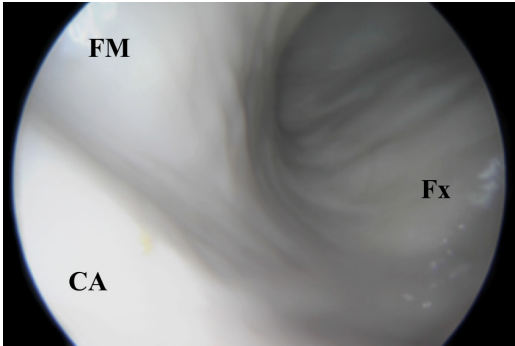


Probe placed on collateral sulcus for planning of trajectory to atrium (T=tentorium; LG=lingual gyrus;OTG=occipitotemporal gyrus;PG=parahippocampal gyrus)

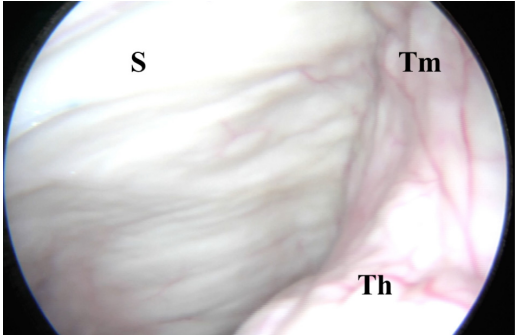
Trigone



Medial wall

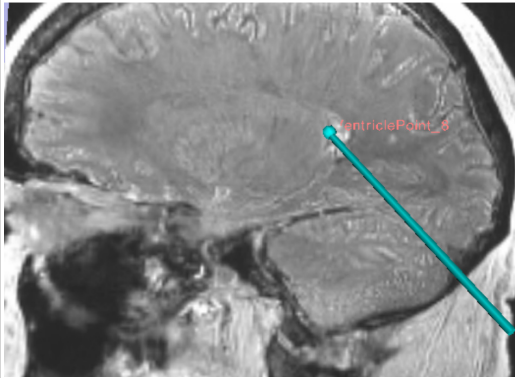


Roof



Right atrium, transcollateral sulcus endoscopic view (TF=taenia fornicea; ChP=choroid plexus; TC=taenia choroidea; FM=forceps major; CA=calcar avis;Fx=fornix;S=splenium of corpus callosum; Tm=tapetum; Th=thalamus)

Endoscope trajectory



Conclusions

We have shown that the retrosigmoid transtentorial transcollateral sulcus approach is technically feasible. While this medial approach is unconventional, it provides a minimally invasive trajectory to the atrium that may prove useful in selected cases where conventional approaches may carry a higher than normal risk.

References

1. Izci, Y.,et al. Supracerebellar transtentorial transcollateral sulcus approach to the atrium of the lateral ventricle: Surg Neurol, 72(5), 509-514;
2. Marcus, H. J.et al (2013). Keyhole supracerebellar transtentorial transcollateral sulcus approach to the lateral ventricle. Neurosurgery, 73(2 Suppl Operative), E295-301;

Learning Objectives

- By the conclusion of this session, participants should be able to:
- 1) Describe the conventional approaches to the atrium of the lateral ventricle.
 - 2) Discuss the transcollateral sulcus approach as a minimally-invasive option to access the atrium.