Minimally invasive technique (Nummular craniotomy) for Mesial Temporal Lobe Epilepsy: a Comparison of Two Approaches

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The authors have no disclosures to report. 

This work has been accepted and published in World Neurosurgery (https://doi.org/10.1016/j.wneu.2019.10.160)

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The purpose of this work is to describe a minimally invasive technique using a small scalp incision and keyhole craniotomy for the removal of mesial temporal lobe structures through a transcortical approach in patients with medically intractable mesial temporal lobe epilepsy (MTLE).
Methods

The study enrolled 73 consecutive patients with refractory MTLE and unilateral hippocampal sclerosis; 30 patients were operated with standard frontotemporal craniotomy between 2010 and 2013 and 43 were operated with a minimally invasive craniotomy (numular craniotomy) between 2014 and 2016. The preoperative evaluation included clinical history, physical examination, video-electroencephalography, neuropsychological assessment and magnetic resonance imaging including thin-section coronal sequences. Operative time, length of hospitalization, postoperative complications and seizure control were analyzed.
Results

There were no deaths in either group. Postoperative complications in the standard frontotemporal craniotomy group included temporal muscle atrophy (4 patients- 13.3%), cerebrospinal fluid leakage (1 patient- 3.3%) and wound infection (1 patient- 3.3%). No complications were observed in the keyhole craniotomy group.

Figure 1. Projection of the incision and the nummular craniotomy site onto a skull.
Results

There was no between-group difference in postoperative seizure control. The mean Engel Class I seizure-free outcome was 90.4% in the standard frontotemporal craniotomy group and 90.7% in the keyhole craniotomy group ($p > 0.05$). Lengths of hospitalization (2.81 days vs. 4.37 days, $p < 0.001$) and operative times (85.79 min vs. 142.73 min, $p < 0.001$) were lower in the keyhole craniotomy than in the standard frontotemporal craniotomy group.
Results

Figure 3. Closure of the dura (A) and replacement and fixation of the bone flap (B). (C) Final aspect of the closure and size of the scalp incision. (D) Postoperative coronal magnetic resonance images acquired after right amygdalohippocampectomy.
Conclusions and Summary Points

- The keyhole craniotomy technique was associated with faster recovery, early hospital discharge and fewer complications compared to the standard technique.
- Keyhole craniotomy is a safe, easy, and effective treatment option for medically intractable MTLE.