

Fat Graft Repair of Skull Base Defects: An MRI Evaluation of Interval Changes in Size and Quality

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Introduction

Following skull base surgery for resection of neoplastic lesions, defect due to approach can make definitive tissue approximation challenging. CSF leaks occur at a rate of 11.5%. 93.4% of anterior skull base CSF leaks are repaired on first attempt. Fat graft has been extensively used to repair skull base defects. We sought to evaluate interval changes in fat graft using MR technology.

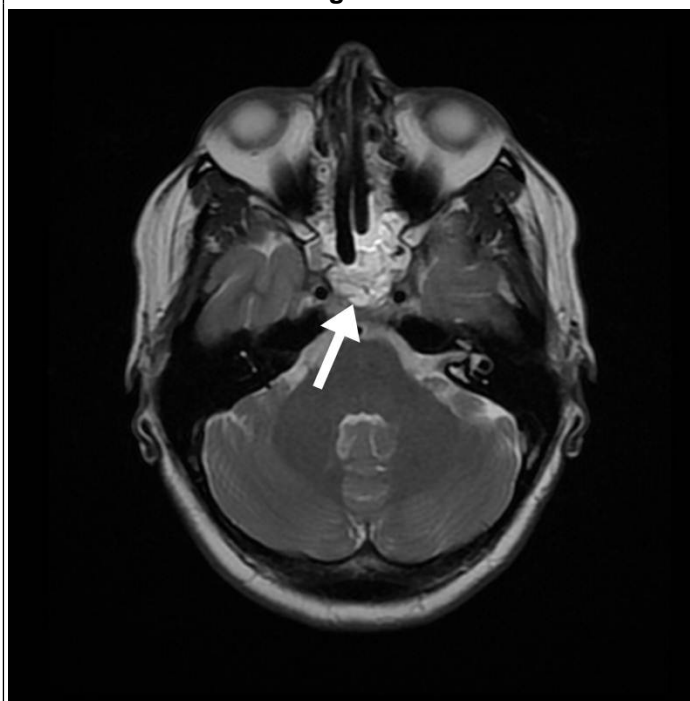
Methods

This was a retrospective case series analysis. 124 patients underwent skull base surgery at single institution during the period from 2009 to 2012. Of these patients, twenty-nine who received autologous fat graft for repair of skull base or dural defect were selected for this study. 24.1% (n=7) of patients had CSF leak secondary to previous skull base surgery, 20.7% (n=6) had an acoustic schwannoma, 13.8% (n=4) had meningioma, 13.8% (n=4) had pituitary adenoma, 6.9% (n=2) had traumatic CSF leak, and 20.7% (n=6) had other etiologies. 69% of the cases were done via endoscopic endonasal approach with the remaining cases performed intracranially. MR signal intensity of fat graft was measured and normalized to buccal subcutaneous fat tissue. Imaging assessment was performed immediately post-op and at three month follow-up.

Results

The mean days of total clinical follow up were 225 days, ranging from 22 to 629 days. Of note, 6.9% (n=2) of patients experienced post-op CSF leak, which was successfully repaired with single reoperation. There were no reported graft associated complications. At three month follow up, graft size was 50% of pre-operative size. MR signal intensity showed lower signal intensity compared to subcutaneous fat at three month follow up than that immediately post-op. (Fig 1, 2)

Figure 1



Immediate postoperative axial T2 MRI demonstrates fat graft in the sellar region.

Conclusions

Fat graft size decreases in size and demonstrates a change in MR signal intensity representing a qualitative transformation in composition at three month follow up. This data suggests depressed viability of grafted fat.

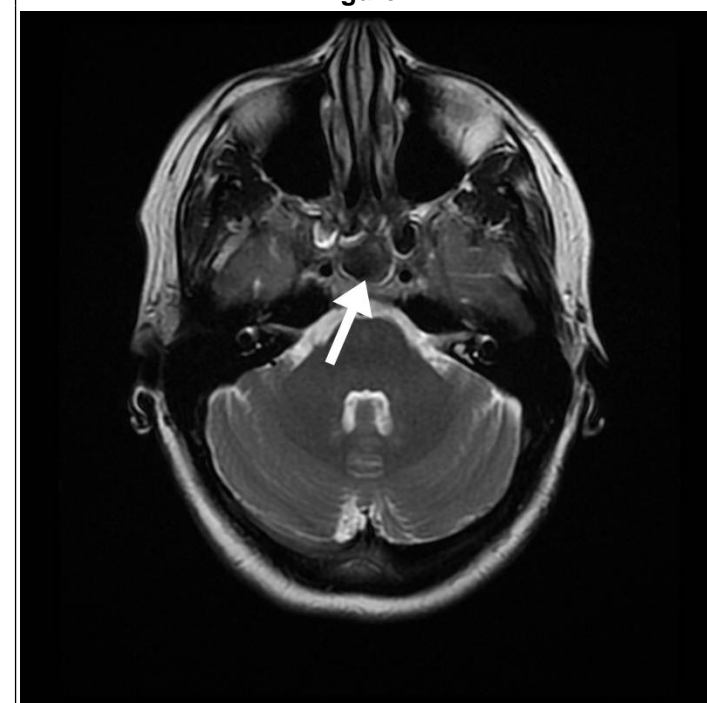
Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of CSF leak after skull base surgery 2) Discuss, in small groups, dynamic changes of fat graft after reconstruction 3) Identify an effective treatment CSF leak after skull base surgery.

References

1. Esposito F, Dusick JR, Fatemi N, Kelly DF. Graded repair of cranial base defects and cerebrospinal fluid leaks in transsphenoidal surgery. *Neurosurgery*. 2007 Apr;60(4 Suppl 2):295-303; discussion 303-4.
2. Gilat H, Rappaport Z, Yaniv E. Endoscopic transnasal cerebrospinal fluid leak repair: a 10 year experience. *Isr Med Assoc J*. 2011 Oct;13(10):597-600.

Figure 2



Axial T2 MRI performed 5 months after surgery. Fat graft size decreases in size and demonstrates a change in MR signal intensity representing a qualitative transformation in composition.