Abstract

Objective: To examine the relationship of body mass index (BMI) and the results of transmastoid repair of adult patients with spontaneous cerebrospinal fluid (CSF) otorrhea.

Study Design: Retrospective Case Review.

Setting: Tertiary Referral Private Practice.

Patients: Patients presenting with spontaneous CSF otorrhea.

Intervention: Transmastoid repair of temporal bone defect.

Main Outcome Measures: Patients presenting with spontaneous CSF otorrhea over a consecutive 12-year period were examined. Clinic and operative records were reviewed to obtain the clinical presentation, examination findings, BMI, results of repair, location and size of skull base defect(s), and methods of repair. Preoperative MRIs were studied for evidence of empty sella and encephalcele.

Results: Seventeen patients were included in the study. The mean age was 61 years and 9 patients were female. Average length of follow up was 21 months. Average body mass index (BMI) was 34.7 kg/m². Evidence of partial or empty sella was present in 82% of MRIs reviewed. Sixty-five percent had more than one bony defect along the tegmen tympani or mastoideum. All 17 patients were repaired initially using a transmastoid approach. The patient with the highest BMI (50.2 kg/m²) required revision surgery via a middle fossa approach 27 months after initial repair due to a recurrent leak.

Contact

Jonathan McJunkin MD, Joyce Kim BS, Richard J Wiet MD, FACS, Robert Battista MD, FACS
Ear Institute of Chicago, Hinsdale, IL

Introduction

Patients with spontaneous cerebrospinal fluid (CSF) otorrhea often present with conductive hearing loss due to a unilateral middle ear effusion. Placement of a tympanostomy tube can result in persistent clear otorrhea. Initial workup includes CT imaging to identify the temporal bone defect. If an adequate sample can be obtained, testing for beta 2 transferrin will confirm the diagnosis. MRI is often obtained to determine if an encephalcele is present. Treatment of CSF otorrhea requires surgical repair of the temporal bone defect. Repair can be carried out via a transmastoid or middle fossa approach.

Recent studies have suggested a correlation between spontaneous CSF otorrhea and idiopathic intracranial hypertension. Idiopathic intracranial hypertension (IIH) is a syndrome characterized by elevated intracranial pressure without hydrocephalus or an underlying mass. The majority of patients with IIH are obese, middle-aged females. Patients with IIH have been shown to frequently demonstrate an empty or partially empty sella. MRI imaging is often obtained to determine if an encephalcele is present. The purpose of this study is to identify a relationship between body mass index (BMI) and success of transmastoid repair of skull base defects causing spontaneous CSF otorrhea.

Methods and Materials

A retrospective review was performed on the Ear Institute of Chicago database of all patients presenting with spontaneous CSF otorrhea between November 1998 and May 2010. Only those patients that underwent surgical repair were included in the review. Patients with a history of prior otologic surgery or cholesteatoma were excluded. Seventeen patients were included in the study. The study was approved by the Hinsdale Hospital Institutional Review Board, Hinsdale, IL.

Clinic notes and operative/anesthesia records were reviewed for data including demographics (age, gender, height, weight, BMI), preoperative symptoms, operative techniques, complications and length of follow-up.

Preoperative CT imaging was evaluated for the presence and number of bony defects identifiable in the temporal bone. MRI imaging was evaluated for the presence of encephalcele and partial or empty sella. Operative reports were reviewed for type of surgical approach, repair materials used, size and location of bony defects and presence of encephalcele.

Results

Demographics - see Table 1

Age at surgery: 34-78, Average: 61.4
Height (inch): 60-74, Average: 67.2
Weight (lbs): 97-360, Average: 224.2
BMI (kg/m²): 15.7-50.2, Average: 34.7
Gender: 53% Male / 47% Female

Figure 1. Preoperative CT. Arrow shows tegmen defect

Figure 2. Postoperative CT. Arrow shows defect repair.

Discussion

Spontaneous CSF otorrhea is often initially misdiagnosed. Unilateral effusion or persistent otorrhea after tympanostomy tube placement should raise suspicion of CSF leak. The majority (53%) of the patients in this series underwent tube placement prior to diagnosis.

Burrer arachnoid granulations along the tegmen mastoideum or posterior fossa plate are presumed to be the etiology of spontaneous CSF otorrhea in adults. Recent research suggests a link between idiopathic intracranial hypertension (IIH) and spontaneous CSF leaks. Patients with IIH are characteristically obese females. 9 of 17 patients in our study were female with an average BMI of 33.9 kg/m² (obese >30), which is similar to previous studies. Patients with IIH have a much higher incidence of partial or empty sella. 82% of patients and all females in our population demonstrated partial or empty sella. The proposed mechanism of spontaneous CSF leak is that central obesity affects central venous return with resulting increased intracranial pressure causing thinning and defects of the skull base.

All patients in this study were initially managed with a transmastoid approach using bone cement and fascia with a high rate of success. The one patient with a recurrent leak in our series also had the highest BMI of 50.2 kg/m².

Limitations of this study include relatively small sample size, retrospective nature and length of follow-up.

Conclusions

Patients with spontaneous cerebrospinal otorrhea often have characteristics of idiopathic intracranial hypertension.

Spontaneous cerebrospinal otorrhea can be safely managed utilizing a transmastoid approach.

Patients with extreme obesity (BMI>50 kg/m²) may be at risk for recurrent leak and should be considered for middle fossa repair of the tegmen defect.

References