Secondary Cerebrospinal Fluid Leaks and Encephaloceles: Presentation and Strategies for Management

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Background

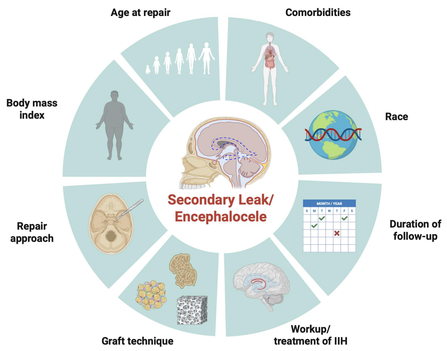
Secondary cerebrospinal fluid leaks and encephaloceles occur as a consequence of chronic otitis media, cholesteatoma, or other temporal bone pathology, and they are less well-characterized than primary spontaneous leaks. This study aims to characterize the patients experiencing secondary cerebrospinal fluid leaks, describe the surgical approaches and repair methods, and evaluate the outcomes of repair.

Study Design

Retrospective cohort study, 2004-2024

Methodology

- Patients identified using ICD-10 codes for cerebrospinal fluid leak
- 154 patients identified
- 130 excluded from analysis
  - Primary/spontaneous leaks
  - Traumatic leaks
  - Iatrogenic leaks
  - Improper coding
- 24 leaks **secondary to other ear pathology** analyzed



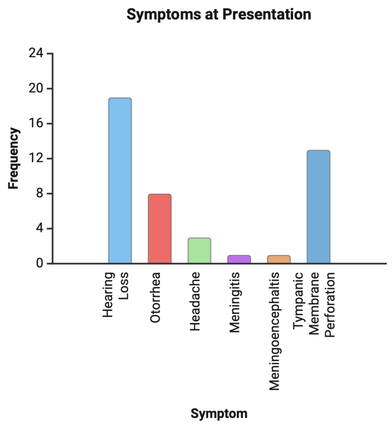
- ANOVA for statistical analyses with α=0.05

Results

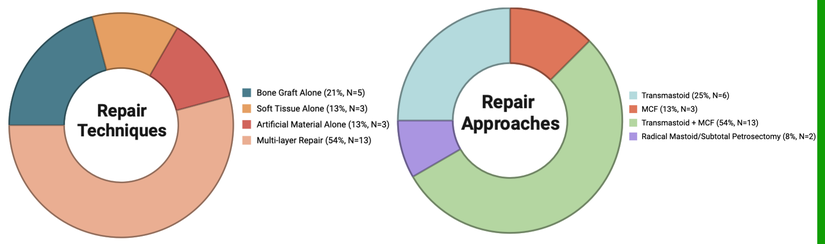
Race	
White	83.33%
Hispanic/Latino	4.17%
Other	12.50%
Ethnicity	
Hispanic/Latino	79.17%
Non-Hispanic/Latino	4.17%
Unknown	12.50%
Other	4.17%

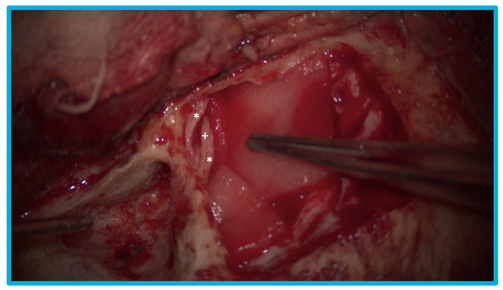
Demographic Data	
Mean Age at Presentation	49.31 ± 14.65 years
Median Duration of Follow-Up	6.03 years
Mean Body Mass Index	32.39 ± 5.91

There was *no significant difference* in average BMI between primary and secondary leak patients (p=0.2787).



Most patients presented with symptoms indistinguishable from chronic otitis media or cholesteatoma, such as hearing loss, otorrhea, and headache.





Combined transmastoid and middle cranial fossa approach and encephalocele repair *(left)* in a chronic ear. The middle fossa floor is reconstructed with a multi-layer temporalis fascia (*) and split calvarial bone graft (+) repair.

There was *no difference In outcomes* between the different repair approaches used.

Audiometric Data Mean	Before Repair (n=18)	After Repair (n=17)
Pure Tone Average (PTA)	38.57	41.07
Word Recognition Score (WRS)	86.44%	77.88%
Bone Conduction Average (BCA)	23.04	24.59
Air Bone Gap (ABG)	15.53	16.72

There was *no significant change* in hearing after repair between PTA (p= 0.7318), WRS (p=.4732), BCA (p= .7986), and ABG (p= .7499).

- **Almost all patients with secondary leak had a history of cholesteatoma**
- **3 patients underwent intracranial idiopathic hypertension (IIH) workup; 2 received a ventriculoperitoneal shunt**
- **1 patient experienced recurrent leak within 1 year**
- **1 patient had bilateral leaks**
- **1 patient had a complication- temporal lobe abscess on POD #10, managed with surgical evacuation and vancomycin**

Conclusions

- High index of suspicion is required for secondary leaks, as presenting symptoms are similar to chronic ear disease
- Mean BMI of patients experiencing leaks was in the obese category, and there was no difference in BMI in patients with idiopathic/primary leaks and secondary leaks
- Repairs are highly successful with no significant differences in outcomes between repair approaches or techniques
- Patients experienced a very low rate of recurrence and post-operative complications after repair
- Repair associated with stable hearing outcomes
- Consider implementing IIH workup in patients with secondary leaks
- The pathophysiology of secondary cerebrospinal fluid leaks and encephaloceles may include factors beyond advanced chronic ear disease

Acknowledgements and Citations

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