

# MASTOID OBLITERATION WITH HYDROXYAPATITE VERSUS BONE PÂTÉ IN TYMPANOMASTOIDECTOMY SURGERY PERFORMED ON PATIENTS WITH CHOLESTEATOMA AND CHRONIC SUPPURATIVE OTITIS MEDIA: A RETROSPECTIVE ANALYSIS

Jantine J. Lindeboom, MSc (1,2); P.M.W. van Kempen, MD, PhD (2); Joeri Buwalda, MD, PhD (2), Steven J.H. Bom, MD, PhD (2); Boris O. Westerlaken, MD, PhD (1); Diederick A. van Zuijlen, MD (1); Feddo B. van der Beek, MD, PhD (1)

(1) Department of Ear, Nose and Throat Surgery, Medisch Spectrum Twente, Enschede, The Netherlands

(2) Department of Ear, Nose and Throat Surgery, Deventer Hospital, Deventer, The Netherlands

Deventer  
ziekenhuis



## INTRODUCTION

The introduction of obliteration of the epitympanic and mastoid space may end the long-lasting discussion about the best surgical treatment for patients with cholesteatoma and chronic suppurative otitis media (CSOM). However, the most suitable obliteration material is still a matter of debate.

Autologous obliteration material such as bone pâté is often used. However, disadvantages such as resorption, atrophy, too little available, and donor site morbidity are described. (1,2)

Biocompatible materials like hydroxyapatite (HA) are theoretically endlessly available and cannot be contaminated with cholesteatoma cells. In addition, due to their unique properties, these biomaterials are very similar to human bone structures, which results in osteoconductive and osteopromotive properties. However, the use of HA can be associated with complications, such as wound infections, severe osteitis, delayed osseointegration, and risk for a foreign body reaction. (2,3)

Although HA is considered a relatively safe and effective obliteration material, the literature describing its otologic use is limited.

## OBJECTIVE

To compare the efficacy and safety of HA versus autologous bone pâté as a filler material in tympanomastoidectomy surgery with obliteration performed on patients with chronic suppurative otitis media and acquired cholesteatoma.

## METHODS

This is a retrospective multi-center cohort study between January 2017 and January 2020. Eighty-one patients (83 ears) with chronic suppurative otitis media or acquired cholesteatoma underwent tympanomastoidectomy surgery and mastoid obliteration by use of HA (n=45) or bone pâté (n=38). All patients underwent preoperative CT scanning and were followed up with micro-otoscopy, audiometry, and MRI with diffusion-weighted imaging if indicated.

Outcome parameters:

- Procedure safety (wound infections; complications)
- Cholesteatoma recidivism (residual; recurrent)
- Control of infection (Merchant's scale)
- Audiometric performance (1000; 2000; 4000 Hz)

## REFERENCES

1. Leatherman BD, Domhoffer JL. The use of demineralized bone matrix for mastoid cavity obliteration. *Otol Neurotol* 2004; 25: 22-6.
2. Skoulakis, C., Koltsidopoulos, P., Iyer, A., & Kontorinis, G. (2019). Mastoid obliteration with synthetic materials: a review of the literature. *The journal of international advanced otology*, 15(3), 400.
3. Mahendran, S., & Yung, M. W. (2004). Mastoid obliteration with hydroxyapatite cement: the Ipswich experience. *Otology & Neurotology*, 25(1), 19-21.

## PATIENT CHARACTERISTICS

	Hydroxyapatite	Bone pâté	p
<b>Total patients</b>	45 (100%)	38 (100%)	
<b>Gender (% male)</b>	35 (77.8%)	25 (65.8%)	.224
<b>Median age at surgery, years (IQR)</b>	40 (17–54)	45 (18–58)	.696
<b>Mean follow-up period, months (± SD, range)</b>	25.33 (±8.64, 12–43)	24.24 (±6.28, 11–43)	.517
<b>Mean number of previous surgeries per patient (± SD, range)</b>	1.93 (±1.86, 0–8)	3.6 (±2.61, 2–12)	.009*
<b>Number of CWD surgeries (% of total)</b>	11 (24.4%)	6 (15.8%)	.330

## RESULTS

### Procedure safety

Wound infections were only detected in patients obliterated with bone pâté (4.8%) (OR 1.12 (p=.026), and these were successfully treated with antibiotics. No other major surgical complications were observed.

### Cholesteatoma recidivism rates

Cholesteatoma recidivism was observed in 10.5% (recurrence 5.3%; residual 5.3%) using bone pâté and 6.7% (recurrence 0%; residual 6.7%) using HA (p=.471).

### Control of infection

Complete control of infection (Merchant 0) was achieved in 86.8% using bone pâté and in 68.9% using HA at 3 months postoperatively (OR 2.4 (p=.052). The remaining cases scored a Merchant 1 or 2, and none showed complete failure to manage infection (Merchant 3).

### Audiometric performance

Pre- and postoperative audiometry showed significant improvement for both the HA and bone pâté group in the air conduction threshold (9.0 dB, 9.0 dB), mean air-bone gap (8.0 dB, 6.0 dB), and high Fletcher Index (7.0 dB, 12.0 dB) in both obliteration groups. Audiometric performance did not differ significantly.

## CONCLUSION

**Mastoid obliteration with HA and bone pâté are both safe and effective materials in tympanomastoidectomy surgery.**

- Remarkably, in the bone pâté group, wound infections were observed; wherein the HA group none were established in any of the follow-ups.
- There is no difference in cholesteatoma recidivism rates between HA and bone pâté.
- Obliteration with both HA and bone pâté resulted in good hygienic status afterwards.
- Significant hearing improvement after mastoid obliteration with both HA and bone pâté is observed.