The Contralateral Ear in Chronic Otitis Media

A Series of 500 Patients

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Objective: To study the contralateral ear of patients with chronic otitis media (COM).

Design: Transversal.

Setting: Tertiary referral center.

Patients: A total of 500 consecutive patients who had been diagnosed as having COM with or without cholesteatoma.

Interventions: Digital otoendoscopy was performed on both ears.

Main Outcome Measure: Pathologic alterations in the contralateral ear.

Results: In 75.2% of the patients, the contralateral ear was found to have some structural abnormalities; 60.4% of the patients presented with COM without cholesteatoma, and in this group, 69.9% had an abnormal contralateral ear. In those with cholesteatoma, the contralateral ear was found to be abnormal in 83.3%. The most frequent finding in both groups was retraction of the tympanic membrane.

Conclusions: Patients with COM in 1 ear have a high chance of presenting with some degree of disease in the contralateral side. We believe that our findings suggest that COM should be ideally approached not as a static pathological incident affecting 1 ear but rather as an ongoing process that may affect both ears.


CHRONIC OTITIS MEDIA (COM) undoubtedly represents one of the main areas of interest within modern clinical otology considering the great variety of research material recently published on this topic. Among its multiple facets, perhaps the paramount issue concerning COM is its pathogenesis. We have followed the pathogenesis model suggested by the Minneapolis group—the so-called continuum theory. According to this theory, otitis media (OM) seems to exist through a continuous series of epithelial and subepithelial events, and, after the initial triggering episode, a serous or purulent otitis becomes serous-mucoid, then mucoid, and, in the absence of therapeutic resolution, chronicity may ensue. According to the continuum theory, OM with effusion (OME) is recognized as the initial condition that, when unresolved, may progress to chronic transformation. Although only a small percentage of the ears with OME will evolve to have COM, our question is this: Considering that the presence of bilateral effusion is reported to be high, should not the prevalence of bilateral COM be similarly prevalent?

Based on such reasoning and the limited data available in the literature, the current study reports the characteristics of the contralateral ear (CLE) in a series of patients with COM with the specific objectives of (1) studying the existence of pathologic changes in the CLE of patients with COM and (2) comparing findings in patients with COM with cholesteatoma vs those without.

METHODS

Patients selected for the present study carried a diagnosis of COM and were followed at the outpatient clinic for COM. We defined COM as chronic inflammation of the middle ear and/or mastoid associated with a permanent perforation or retraction of the tympanic membrane (TM) with or without otorrhea. Chole-
tympanosclerosis was defined as a perforated or retracted TM with keratin retention, with or without granulation and recurrent inflammation. There was no age restriction. Patients with previous otologic surgery other than ventilation tubes were excluded. All patients with COM were further categorized as having or not having cholesteatoma (hereinafter, CCOM and NCCOM groups, respectively).

At the first visit, we took a detailed medical history and performed a complete otologic examination, comprising otoscopy, otoendoscopy, and otomicroscopy. Comprehensive external ear canal debridement was completed as necessary. Otoendoscopy was performed with a 0°, 4-mm endoscope adapted to a digital camera. Both ears were recorded as a video sequence, with clear identification of the patient. The recorded images were reviewed and described in detail by one of the senior authors (S.S.C.) during weekly meetings. Besides otoscopy, otomicroscopy was performed in every patient in order to examine the ears more accurately and, with the aid of binocular inspection, better judge the degree of TM retractions. All patients underwent pure tone and speech audiometry, and all data were stored in specific protocols. Imaging examinations, such as computed tomographic scans, were ordered as indicated. Similarly, the therapeutic approach and surgical technique were proposed on an individual basis.

To conduct the present study, we analyzed all patients followed in the ambulatory unit from August 2000 to July 2006 who had been diagnosed as having NCCOM or CCOM. The CLE was defined as the asymptomatic ear or, in cases with bilateral symptoms, the ear with clearly less symptoms based on hearing loss, otorrhea, and overall discomfort.

Otoendoscopy of CLE was reviewed, and the ears were classified as normal or abnormal. All ears were classified by their dominant pathologic findings if more than 1 finding was present, and these were defined as effusion, retraction, perforation, cholesteatoma, or presence of otitis-derived sequelae (tympanosclerosis). The TM retraction was classified according to a modified Sade´ and Berco classification14 as shown in Table 1.

Data were entered, stored, and analyzed using SPSS statistical software (version 10 for Windows; SPSS Inc, Chicago, Illinois) using the Fisher exact test. \( P \leq .05 \) was considered significant. All patients authorized storage of data and recording of otoendoscopy.

### RESULTS

A total of 500 patients were included in the study. The mean (SD) age was 26.3 (17.0) (range, 2–82 years). The sex distribution was 51% male. Overall, only 24.8% of the patients presented with a completely normal CLE (Table 2). In the 75.2% with abnormalities, the most frequent alterations were TM retraction (38.2%), TM perforations (26.2%), cholesteatoma (5.2%), tympanosclerosis (3.6%), and fluid in the middle ear (2.0%). A total of 302 patients (60.4%) presented with NCCOM in the most affected ear, and of this group, 30.1% presented with a normal CLE. In the 69.9% with abnormalities, the most frequent alterations were TM perforations (30.8%), TM retraction (30.1%), tympanosclerosis (6.0%), and fluid in the middle ear (3.0%). Among patients with CCOM, 16.7% presented with a normal CLE at otoendoscopy. The most frequent abnormalities in this group were TM retraction (50.1%), TM perforation (19.3%), cholesteatoma (13.3%), and fluid in the middle ear (0.6%). Table 2 describes the abnormalities found for NCCOM and CCOM separately and together.

Although all listed abnormalities were undisputable, some of them were mild and possibly not as clinically relevant. Therefore, an effort was made to focus on the more notable levels of disease (Table 3). For this analysis, we excluded those CLEs with solely the presence of mild retractions, serous effusion, and otitis-derived sequelae (tympanosclerosis), and we still found a total of 55.8% of CLEs with abnormalities; 43.0% in the NCCOM group and 68.6% of CLE in the CCOM group. The difference between the 2 groups was statistically significant \((P < .001)\).

When we looked only for the presence of retractions on the CLE, we found in the NCCOM group mild retractions in 17.9% of the CLE, moderate retractions in 8.6%, and severe retractions in 3.6%. Interestingly, in the CCOM group, those with cholesteatoma in the most affected ear displayed severe retractions in 24.7% of the CLE, mild retractions in 14.1%, and moderate retractions in 11.2% (Figure).
Concomitance of middle ear pathologic processes have been addressed by some studies. However, few of them have been published describing the details of the otoscopic findings of the CLE in patients with COM. Chalton and Stearns in 1984 assessed the CLEs of 73 otoscopic findings of the CLE in patients with COM. In the present study, we sought to better define and classify the abnormalities observed in the CLE and to standardize the clinical descriptions. Our series showed a high prevalence of CLE alterations in patients with COM (75.2%). Even after the exclusion of mild retractions, effusions, and tympanosclerosis membrane, and focusing only on patients with notable findings in the CLE, we still came to a surprising prevalence of 55.8% focusing only on patients with notable findings in the CLE. Fisher exact test, P<.001.

In the present study, we sought to better define and classify the abnormalities observed in the CLE and to standardize the clinical descriptions. Our series showed a high prevalence of CLE alterations in patients with COM (75.2%). Even after the exclusion of mild retractions, effusions, and tympanosclerosis membrane, and focusing only on patients with notable findings in the CLE, we still came to a surprising prevalence of 55.8% abnormality, or just over half of the cases. These findings clearly confirmed the tendency of COM to present itself as a bilateral and, sometimes, quite symmetrical condition.

When we analyzed TM retractions, a flagrant difference was noted in the CLE in the CCOM group in the subject ear compared with the CLE in the NCCOM group. In the CCOM group we found a higher prevalence of severe retractions in the CLE (24.8%), followed by moderate (11.2%) and mild retractions (14.1%). In the NCCOM group, the relative prevalence of TM retractions was reversed (3.6% severe, 8.6% moderate, and 17.9% mild). In short, our results suggest that COM is frequently bilateral and that the ears tend to follow a more or less standard course. This finding is more evident in the cases associated with cholesteatoma.

We believe the importance of considering the CLE in conjunction with the most affected side in COM cannot be overemphasized. Regardless of the presence of cholesteatoma, the astute analysis of both ears may shed some light on 3 key aspects of the disease process: Where did it come from (etiology)? What is the current condition (established pathology)? And, more important, how fast and in which direction is the disease developing (natural history)? The answer to these questions will illuminate and improve the true understanding of the pathogenesis of COM to help in the treatment and the counseling of patients and their relatives.

Precise and critical analysis of both ears plays a key role in the prognostic assessment of each patient, because the ear established as having COM may predict the likely evolution of the CLE. An aggressive cholesteatoma on 1 side with massive bony destruction and unfavorable evolution should lead us to more vigilant follow-up care of the CLE. We refer to this as the "crystal ball effect." In other words, the ears should be analyzed as an intrinsically related pair and not as an isolated unit.

In conclusion, patients with COM diagnosed in 1 ear are very likely to present with associated disease in the CLE. The CCOM group had a greater prevalence of CLE alterations than those in the NCCOM group. Consequently, the CLE should always be comprehensively studied in patients with unilateral COM to efficiently diagnose the alterations and, if necessary, provide timely therapeutic intervention.

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Table 3. Description of the Major Videotoscopic Findings in the CLE (Horizontal Axis) of Patients With COM

<table>
<thead>
<tr>
<th>Finding</th>
<th>Perforation</th>
<th>Cholesteatoma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perforation</td>
<td>26 (20.0)</td>
<td>93 (71.5)</td>
<td>130 (100)</td>
</tr>
<tr>
<td>Cholesteatoma</td>
<td>23 (16.9)</td>
<td>38 (27.9)</td>
<td>136 (100)</td>
</tr>
<tr>
<td>Total</td>
<td>49 (18.4)</td>
<td>131 (49.7)</td>
<td>266 (100)</td>
</tr>
</tbody>
</table>

Abbreviations: CLE, contralateral ear; COM, chronic otitis media.

aChronic otitis media without cholesteatoma and COM with cholesteatoma, vertical axis, after excluding normal, mild tympanic membrane retractions, tympanosclerosis, and effusion in the CLE. Fisher exact test, P<.001.

Figure. Prevalence of tympanic membrane (TM) retractions (mild, moderate, and severe) stratified by the presence of cholesteatoma in the subject's contralateral (CLE) ear. CCOM indicates chronic otitis media (COM) with cholesteatoma; NCCOM, COM without cholesteatoma.
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Author Contributions: Drs Selaimen da Costa, Rosito, and Sperling and Ms Dornelles had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Selaimen da Costa, Rosito, Dornelles, and Sperling. Acquisition of data: Selaimen da Costa, Rosito, and Dornelles. Analysis and interpretation of data: Selaimen da Costa, Rosito, Dornelles, and Sperling. Drafting of the manuscript: Selaimen da Costa, Rosito, Dornelles, and Sperling. Critical revision of the manuscript for important intellectual content: Selaimen da Costa, Rosito, Dornelles, and Sperling. Statistical analysis: Selaimen da Costa, Rosito, Sperling, and Dornelles. Administrative, technical, and material support: Selaimen da Costa, Rosito, and Dornelles. Study supervision: Selaimen da Costa, Rosito, and Dornelles.

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REFERENCES


