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The blue eardrum—idiopathic hemotympanum

John F. Gschwendtner, M.D.*
Nathan A. Geurkink, M.D.
Department of Otolaryngology

In 1929, Shambaugh[1] reported three cases in a paper entitled *The Blue Drum Membrane,* and he therefore is credited with being the first physician to recognize this clinical entity.[2] In 1941, O'Donnell[3] introduced the term "idiopathic hemotympanum" as being a more specific term than "blue drum." Idiopathic hemotympanum was considered an uncommon entity, but in the last 10 years its occurrence has been frequently reported, possibly the result of an increased interest in the disease. Others[4] have attributed its increased recognition to the parallel increased frequency of serous otitis media.

Clinical picture

The presenting symptoms of a patient with idiopathic hemotympanum may be otalgia, aural discharge, or loss of hearing. Occasionally, fullness in the affected ear will be the presenting complaint.[5] When the patient has pain, it is usually intermittent and is suggestive of closure of the eustachian tube.[6]

The physical examination may reveal only hearing loss on the affected side and the striking feature of a bluish-black tympanic membrane. The membrane may or may not bulge, or it may even appear retracted. Decreased mobility of the tympanic membrane will be noted with the pneumatic otoscope. Occasionally, dry blood may be present in the external canal, and when this is a recent occurrence a perforation may be noted in the tympanic membrane. The hearing loss will be of a conductive type unless sensorineural impairment coexists, which would then result in a mixed type of hearing impairment.[5]

The eustachian tube usually can be inflated easily, which does not change the color of the tympanic membrane or improve the hearing generally. With myringotomy, a chocolate-colored fluid that may be either thin or viscous can be aspirated from the middle ear. The analysis of the chocolate-colored aspirate shows the presence of debris, leukocytes, epithelial cells, and occasionally a few erythrocytes. The culture is sterile, and the test for bilirubin is positive. The debris consists of granulation tissue and cholesterol crystal spaces surrounded by giant cells of the foreign body type sometimes called cholesterin granuloma.[5] When the eustachian tube is inflated after myringotomy, a temporary improvement in hearing can be expected.[5]

Under magnification, the blue-black tympanic membrane has a soiled ap-

* *Fellow, Department of Otolaryngology.*

pearance because of the reflection from cholesterol crystals in the middle ear fluid, or the presence of cholesterol granuloma masses in the middle ear.[7] Occasionally, in serous otitis media, the tympanic membrane will appear blue, but it is a gray-blue or gunmetal blue and not the bluish-black of idiopathic hemotympanum.[6]

The roentgenographic picture is not specific. The mastoid may or may not be well pneumatized. When the air cells are developed, they may be cloudy with blurring of the intracellular septa, and there may even be destruction of the bone.[5] Systemic hematologic studies for bleeding disorders are negative.[5]

Differential diagnosis

Idiopathic hemotympanum. The four criteria for the diagnosis of idiopathic hemotympanum are (1) dark-blue or bluish-black tympanic membrane, (2) conductive hearing loss, (3) sterile, chocolate-colored fluid in the middle ear, and (4) absence of an obvious cause.[5, 8] According to McKibben,[5] the most important diagnostic feature is the chocolate-colored fluid in the middle ear, since its gross appearance is so typical that laboratory determination of its hemic origin is not necessary.

Sanguineous secretory otitis media. The middle ear fluid is chocolate colored but usually contains more erythrocytes than does middle ear fluid in idiopathic hemotympanum. Routine therapeutic measures that are used in secretory otitis media usually are successful, and the disorder may even resolve spontaneously.

Postinflammatory hemotympanum. A history of acute otitis media usually precedes symptoms similar to idiopathic hemotympanum.

Trauma. The history of injury is the distinguishing feature.

Blood dyscrasia. The clinical history together with the physical findings and the appropriate laboratory tests make possible the diagnosis.

Protrusion of the jugular bulb into the middle ear. The discoloration of the tympanic membrane may be limited to the inferior portion. Pulsation may be present. When pressure is applied to the jugular vein of the same side, a definite bulge may become obvious. When a question still exists, the problem should be resolved by exploratory tympanotomy.

Glomus jugular tumors. In cases of these tumors, the color of the tympanic membrane is the distinguishing feature; it will not be bluish-black.

Treatment

Initial treatment of idiopathic hemotympanum should include myringotomy, inflation, aspiration of the middle ear fluid, and perhaps insertion of a drainage tube.[4, 5] When symptoms persist, mastoidectomy should be performed. There is some difference of opinion as to the type of operation required. Paparella and Lim[4] stated that when there is hypocellularity of the mastoid, as seen on roentgenograms, a modified radical mastoidectomy with

insertion of a polyethylene tube into the eardrum is the preferred procedure. When there is evidence of sufficient development of the mastoid air cells, these authors[4] advised that cortical mastoidectomy may be performed. Other surgeons[5, 7] advise only a simple mastoidectomy when the drainage tube does not relieve the symptoms. When there is doubt as to the diagnosis, an exploratory tympanotomy should be the first step in the treatment schedule, to confirm or to exclude the possible presence of other unsuspected middle ear pathologic lesions, before any attempt is made to ventilate the middle ear space.[2]

Armstrong and Nash[8] reviewed 500 cases of chronic secretory otitis media and found that in 30 patients the tympanic membrane was described by the examining physician as being blue to blue-black. They also found that the treatment of serous otitis media was essentially the same—myringotomy, inflation, aspiration, and insertion of plastic tubes—in the blue eardrums as in the cases without bluish discoloration, and the results were essentially the same. It was their belief[8] that idiopathic hemotympanum is the sanguineous phase of chronic secretory otitis media, differing only in the erythrocyte content of the fluid. However, tubal occlusion was a consistent finding in their patients, whereas a patent eustachian tube is more frequently found in cases of idiopathic hemotympanum.[2, 5]

The basic histopathologic changes in the chronic forms of suppurative otitis media, idiopathic hemotympanum, serous otitis media, and secretory mastoiditis are quite similar. Because of this similarity, many clinicians believe that each condition has a common pathogenesis, and consequently that only syndromes are being described and not specific diseases. The syndromes may all be stages of chronic serous otitis media. In fact, the only significant differentiation between chronic serous otitis media and idiopathic hemotympanum is based on the responses to conservative therapy.[4, 7, 8] Rarely will chronic serous otitis media become intractable and necessitate mastoid surgery, whereas, resistance to treatment is considered a characteristic feature of idiopathic hemotympanum.[4]

Chronic serous mastoiditis is closely related to idiopathic hemotympanum. Both conditions are nonsuppurative mastoid diseases with cholesterol granuloma present to a greater or lesser extent. Secretory epithelium may be found in each disorder.[7] Cholesterol granuloma also may be found in suppurative otitis media, and sometimes even coexisting with cholesteatoma.[4, 9]

Cholesterol granulomas have been produced experimentally in monkeys by obstructing the eustachian tube with Silastic sponges. These granulomas developed only in the mastoid cells and were not produced in the animals in which the eustachian tubes remained patent. This relationship is offered as a possible common etiologic link for all the diseases in which cholesterol granulomas are found.[9]

Because of the similarity of clinical findings, responses to treatment, and histopathologic features, the unusual syndrome of idiopathic hemotympa-

num is probably not a separate entity, but a stage of a more common disease, namely secretory otitis media.

Conclusion

The clinical features of idiopathic hemotympanum have been presented, along with the differential diagnosis and suggested therapy. The close similarities between idiopathic hemotympanum and chronic secretory otitis media have been listed. The chronic mastoid diseases may represent different phases of a common disease, secretory otitis media.

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