Why Cannot We have an Etiological Classification for the Patients with Granular Myringitis?

Mohan Bansal¹

Received: 6 April 2016 / Accepted: 6 June 2016 / Published online: 13 June 2016
© Association of Otolaryngologists of India 2016

Abstract Though granular myringitis (GM) is not a very rare disease it does not have any classification. Its exact etiology is not known. The granulations on tympanic membrane also occur in association with other lesions of external auditory canal (EAC) and middle ear. The aims of this study were to know the etiological factors of GM and classify the disease according to its etiological factors and associated disorders of EAC and middle ear. Data were retrieved from the search of four electronic databases: PubMed, EMBASE, Cochrane Library, and Google scholar. Relevant articles were also sought by a hand search review of reference books. The databases were searched using the key words otitis externa, external otitis, granular myringitis, granular otitis externa and myringitis. Data were extracted using a pre-defined data-extraction form. The following data were recorded (1) etiological and predisposing conditions; (2) pathological features; (3) associated disorders of external and middle ear. The study proposes the etiological classification of GM. It suggests two major groups: primary and secondary. The primary GM is basically idiopathic and these patients do not have evidences of any other types of otitis media and otitis externa. In the secondary GM the cause is obvious and the patients usually have associated otitis media and/or lesions of external ear canal. Author speculates that habit of self ear cleaning/scratching is a specific etiological factor in cases of primary GM but more studies are required to confirm this theory.

Keywords Otitis externa · Myringitis · Tympanic membrane · Otitis · Granular myringitis · Classification

✉ Mohan Bansal
mohanbansal@yahoo.com

¹ Gujarat Adani Institute of Medical Sciences, Bhuj, Gujarat, India

Introduction

Granular myringitis (GM) is an idiopathic inflammatory disease of tympanic membrane (TM) which is characterized by patches of granulation tissue and mucosalized epithelium on the outer surface of TM [1]. GM is described mainly in adults and is considered an uncommon infection of the TM with possible involvement of the external auditory canal (EAC) [2]. It is a poorly understood disease which causes considerable discomfort and concern to affected individuals [3]. Untreated, granular myringitis can lead to post-inflammatory medial external auditory canal fibrosis, acquired canal atresia and inflammatory infiltration of the deep canal [4]. Treatment options are diverse, and no single accepted treatment modality exists [3].

The risk factors and the mechanisms that regulate the development of granulations over TM and deep bony EAC are not well understood. There is no classification of this granulating lesion of the TM and deep bony part of EAC. The granulations on tympanic membrane (TM) also occur in association with other lesions of external auditory canal (EAC) and middle ear but they are not diagnosed as having GM. The purposes of this study were to know the etiological factors and propose an etiological classification of the GM taking into consideration the associated disorders of EAC and middle ear.

Materials and Methods

This research examined the investigations related with the etiology and pathology of granular myringitis. The databases searched were PubMed, EMBASE, Cochrane library and Google scholar. All searches were completed by April 2015. Search terms included “otitis externa, external otitis,

granular myringitis, granular otitis externa and myringitis”. These were augmented by references and option of similar articles from these studies. Author evaluated the titles and abstracts of all the studies identified in the initial search to locate any potentially relevant studies. The non-English articles which had their abstract in English were also included in the study. The full texts of English article identified as potentially relevant were then evaluated. Studies were eligible if they examined the etiology and pathology of granular myringitis. The following types of studies were also included: reviews, commentaries, case reports and letters. No limits were applied to the year of study; however author did exclude publications that did not have abstracts. Relevant articles were also sought by a hand search review of reference books.

Data were extracted using a pre-defined data-extraction form. The following data were recorded for: (1) etiological and predisposing conditions; (2) pathological and clinical examination features; (3) associated disorders of external and middle ear. After screening all titles, abstracts and full texts, the initial search strategy retrieved 102 publications for possible inclusion in the study. Among these 102 publications, 68 publications were retrieved for more in-depth evaluation.

Results

GM is defined as a chronic external ear disorder that is characterized by lateral surface de-epithelialisation and granulation of the TM [1, 2, 4]. It was found to be reported in the literature under the following names: granular myringitis [1–11], chronic myringitis [12, 13], myringitis granulosa [14], granulomatous myringitis [15], granulating myringitis [16] and granular external otitis [17].

GM was found to be described mainly in adults and was considered an uncommon infection of the TM [16] with possible involvement of the external ear canal [2]. GM was reported to occur even after tympanoplasty [5, 18]. The higher incidence was seen with the use of tympanic homografts [19].

Bacterial and or fungal infections were implicated in all the studies. Bacterial cultures of ear discharges have revealed *Staphylococcus*, *Corynebacterium*, *Providencia stuartii*, and no growth of bacteria [8]. One study reported *Pseudomonas aeruginosa* as infecting organism [5]. The most important predisposing factor was presumed to be disturbed epithelial migration, which might be exaggerated by eustachian tube dysfunction [5]. Grewal and Hathiram [20] were of the opinion that GM might occur when there was a recurrent eustachian tube blockage due to infection especially if the patient had received frequent and

inadequate courses of antibiotics. A nonspecific injury involving the lamina propria of the TM was presumed to suppress epithelialization that could lead to the development of granulations. The following predisposing factors were also suggested: high-ambient temperature, swimming, lack of hygiene, local irritants and foreign bodies [21].

The pathologic process can affect all TM layers and cause even perforation of TM [5]. Histopathology revealed non specific acute and chronic inflammatory reaction and majority of the granulation tissue had no covering epithelium [2, 10]. The granular areas might be patchy, diffuse, or segmental. The segmental type was found to be the most frequent. The most commonly affected segment was posterosuperior quadrant [5]. The children with GM had involvement of only a circumscribed area of the pars tensa with either by a tiny shallow lesion or by raised polypoidal masses (2). The active stage of GM must be distinguished from chronic otitis media and cholesteatoma. Although distinct from chronic otitis media, GM could cause a perforation. The quiescent stage does not have any symptom and may go unnoticed [5].

In the prospective study of Wolf and colleagues perforation of the tympanic membrane (TM) was noted and they classified otoscopic findings into three grades: focal de-epithelization, focal polypoid granulations and diffuse polypoid formation over the entire TM [2]. The untreated, granular myringitis can lead to post-inflammatory medial external auditory canal fibrosis, acquired canal atresia and inflammatory infiltration of the deep canal [4]. The diseases of EAC and middle ear infections [22] can have granulations on the lateral surface of TM but were not included under the GM [5].

Etiological Classification Suggested by this Study

Author suggests following etiological classification of GM:

1. Primary granular myringitis (idiopathic)
2. Secondary granular myringitis
 - a. Traumatic
 - i. Trauma to deep bony EAC
 - ii. Foreign bodies in the bony EAC
 - iii. Postoperative
 1. Grommet
 2. Tympanoplasty
 3. Stapedectomy
 4. Tympanomastoidectomy
 - b. Infective
 - i. Otomycosis
 - ii. Chronic suppurative otitis media (CSOM)

1. Tubotympanic disease
 2. Atticoantral/posterosuperior lesions/cholesteatoma
- c. Granulomatous lesions such as Wegner's and tuberculosis
 - d. Neoplastic: carcinoma of EAC
 - e. Miscellaneous
 - i. Keratosis obturans
 - ii. Malignant otitis externa

The primary GM is basically idiopathic and these patients do not have evidences of any otitis media and otitis externa. In the secondary GM the cause is obvious and the patients usually have associated otitis media and/or lesions of external ear canal.

Discussion

Earlier reports found the GM uncommon [16] but some of the later studies do not consider it that rare [10]. It seems that GM was under diagnosed and under-reported. Now the routine ear-microscopy facilitates the diagnoses of GM which in past were perhaps considered as chronic suppurative otitis media (CSOM) and otitis externa.

Though defined differently by others author feels that granular myringitis (GM) is a clinical diagnosis and should be defined as condition that is characterized by granulation tissue and/or de-epithelization on the outer surface of the tympanic membrane (TM) with or without the involvement of deep bony external auditory canal (EAC). So the GM includes even the granulating disease of deep bony EAC.

By definition, the terms granular myringitis should apply to all of the numerous inflammatory conditions of external ear and middle ear that can have granulations in the deep bony EAC and over TM. However, the use of the term 'granular myringitis' is usually restricted to the granulating lesions of TM, which are not associated with other middle ear and EAC lesions such as suppurative otitis media (SOM) and other types of otitis externa (OE) [22].

Author proposes that if the patient has granulations on the lateral surface of TM without any other TM and deep bony EAC it should be called primary GM and if patient has associated other lesions of TM and deep bony EAC than it should be called secondary GM. The patients who develop GM after middle ear surgeries such as tympanoplasty and myringoplasty are difficult to categorize. Author feels that if GM develops during the post-operative healing it should be called secondary GM and if it occurs after the complete healing it should be called primary GM.

The patients of GM with TM central perforation are again difficult to categorize because GM can cause TM

perforation and patients with CSOM can also develop TM granulations. In cases of unsafe CSOM with cholesteatoma there is no confusion as these patients with TM granulations would fall in secondary category of GM. The patients with small central perforation that is not visible due to TM granulations are definitely the examples of primary GM while the patients with big central perforations with granulations away from the margins of perforations are the cases of safe CSOM and should come in the group of secondary GM. Author is of the opinion that to begin with, pathology in primary GM is limited to cuticle layer of TM but later on disease can involve deeper layers as well and can eventually lead to TM perforation.

The secondary GM is secondary to the lesions and operations of the EAC and middle ear but the cause of primary GM is an enigma. In suspected cases biopsy will exclude the granulomatous lesions and carcinoma. The search for underlying causes such as diabetes, particularly in elderly patients with malignant otitis externa is important.

No reports mentioned any specific risk factors of primary GM. The bacterial and or fungal infection was implicated in all reports. The commonly cultured microorganisms are *Pseudomonas aeruginosa*, *Proteus* species *Staphylococcus aureus* and *Candida albicans* [8]. It is very difficult to say whether these microorganisms are the cause of GM or are secondary invaders. As suggested by some [5, 20] how can the Eustachian disorders can disrupt directly the lateral surface of TM without causing any middle ear pathology.

Author speculates that habit of self ear cleaning/scratching is a specific risk factor in the development of GM. It seems that frequent injury to the lamina propria of the TM suppresses epithelialization and superadded secondary infection leads to the development of granulations. These patients also enjoy the self-cleaning of ear canal. The normal persons and patients with acute otitis externa find this self-cleaning unpleasant or painful. The habit of self ear cleaning with ear buds is considered normal and safe by the general public and is usually not told to the physician during history taking until unless asked specifically. The author has observed in his practice that GM patients initially feel as if some thing is there in their EAC and start self ear cleaning and consequently develop purulent ear discharge. GM patients do not give initial history of frank ear discharge. Some of the author's patients with GM had itching and irresistible desire to scratch which lead to exaggeration of symptoms (acute on chronic disease). The author has observed that once the patients give up the habit of self cleaning of ear and resist the desire of scratching EAC the number and frequency of their visits reduce significantly and they recover fully with conservative medical treatment (meticulous microscopic

aural toilet and topical antibiotic and steroid ear drops). Only few patients needed application of topical caustic agents (such as chromic acid, formalin, or silver nitrate) or surgical excision of granulation tissue and reconstructive ear-microsurgery [23].

Conclusion

Granular myringitis (GM) is characterized by granulation tissue on the outer surface of the tympanic membrane (TM) with or without the involvement of deep bony external auditory canal (EAC). The study proposes an etiological classification of GM. This etiological classification divides the GM patients into two major groups: (1) Primary GM and (2) Secondary GM. The primary GM is basically an idiopathic condition and labeled when no obvious cause of the disease is noticed during the history taking and examination of the patient. These patients do not have evidences of any other types of otitis media and otitis externa. In the secondary GM the cause is obvious and the patients usually have associated otitis media and/or lesions of external ear canal. The cure is difficult in the primary GM while secondary GM will need treatment of the associated diseases of EAC and middle ear and recurrence is very uncommon. The author speculates that habit of self ear cleaning/scratching is a specific etiological factor in cases of primary GM but more studies are required to confirm this speculation.

Compliance with Ethical Standards

Conflict of interest Author declares that he has no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

References

1. Bansal M (2016) Essentials of ear, nose and throat. Jaypee Brothers Medical Publishers, New Delhi, p 93
2. Wolf M, Primov-Fever A, Barshack I, Kronenberg J (2001) Granular myringitis in children. *Int J Pediatr Otorhinolaryngol* 57:17–20
3. Atef AM, Hamouda MM, Mohamed AH, Fattah AF (2010) Topical 5-fluorouracil for granular myringitis: a double-blinded study. *J Laryngol Otol* 124:279–284
4. Neilson LJ, Hussain SS (2008) Management of granular myringitis: a systematic review. *J Laryngol Otol* 122:3–10
5. El-Seifi A, Fouad B (2000) Granular myringitis: is it a surgical problem? *Am J Otol* 21:462–467
6. Jang CH, Kim YH, Cho YB, Wang PC (2006) Endoscopy-aided laser therapy for intractable granular myringitis. *J Laryngol Otol* 120:553–555
7. Jung HH, Cho SD, Yoo CK, Lim HH, Chae SW (2002) Vinegar treatment in the management of granular myringitis. *J Laryngol Otol* 116:176–180
8. Kim YH (2011) Clinical characteristics of granular myringitis treated with castellani solution. *Eur Arch Otorhinolaryngol* 268:1139–1146
9. Stoney P, Kwok P, Hawke M (1992) Granular myringitis: a review. *J Otolaryngol* 21:129–135
10. Wolf M, Primov-Fever A, Barshack I et al (2006) Granular myringitis: incidence and clinical characteristics. *Otol Neurotol* 27:1094–1097
11. Zhang Z, Liu X, Chen S, Zheng Y (2010) Combined tympanic epithelial layer avulsion and overlay myringoplasty for diffuse granular myringitis. *J Laryngol Otol* 124:842–845
12. Blevins NH, Karmody CS (2001) Chronic myringitis: prevalence, presentation, and natural history. *Otol Neurotol* 22:3–10
13. Cheng YF, Shiao AS (2008) Intractable chronic myringitis treated with carbon dioxide laser microsurgery. *Arch Otolaryngol Head Neck Surg* 134:152–156
14. Boedts D (1995) Myringitis granulosa. *Acta Otorhinolaryngol Belg* 49:187–189
15. Hoshino T, Ueda Y, Mukohdaka H, Mizuta K (1998) Acute granulomatous myringitis. *J Laryngol Otol* 112:150–153
16. Moffett J (1943) Granulating myringitis: an unusual affection of the eardrum. *J Laryngol Otol* 58:453–456
17. Sade J (1962) Granular external otitis. *Ann Otol Rhinol Laryngol* 71:391–396
18. Black B (1998) The use of vascular flaps in middle ear surgery. *Am J Otol* 19:420–427
19. Puls T (1996) Myringoplasty: is molded collagen xenograft a valid alternative for fresh temporalis fascia? *Acta Otorhinolaryngol Belg* 50:111–114
20. Grewal DS, Hathiram BT (1997) Retraction pockets in the tympanic membrane: aetiology and management—our view point. *Indian J Otolaryngol Head Neck Surg* 49:125–129
21. Kunachak S (1992) Intractable granular myringitis: possible etiology and management. *J Otolaryngol* 21:297–298
22. Bansal M (2013) Diseases of ear, nose and throat. Jaypee Brothers Medical Publishers, New Delhi, pp 183–215
23. Bansal M (2015) Granular myringitis: current status of management. *Int J Otorhinolaryngol Head Neck Surg* 1:55–57