

External Auditory Canal Granulations of Varying Aetiology Other than Cholesteatoma: A Series of Seven Cases

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ABSTRACT

External Auditory Canal (EAC) granulations can occur due to various causes, each with different presenting features, treatment options, and prognoses. They can arise from trivial situations, such as a neglected Foreign Body (FB), or indicate serious pathology like squamous cell carcinoma. The most common causes of EAC granulations are otitis media, including squamous and mucosal types. However, clinical practice encounters numerous other rare and common causes. The present case series describes seven patients with EAC granulations resulting from different aetiologies apart from Chronic Suppurative Otitis Media (CSOM). The study was conducted over a six-month period at a Government Medical College (GMC) in North Odisha. It aims to assist clinicians in considering these situations when managing patients with EAC granulation. Proper diagnosis and treatment of these patients resulted in successful outcomes. Therefore, the author recommends considering these underlying causes whenever EAC granulations do not respond to appropriate medical treatment with antibiotics. Radiological imaging, fine needle aspiration cytology, and histopathological studies can help exclude many of these causes from the list of differential diagnoses.

Keywords: Diagnoses, Granulation, Malignant otitis externa

INTRODUCTION

Granulation tissue is a new connective tissue with angiogenesis that develops over the surface of a healing wound. It has a red, beefy appearance due to abundant newly formed capillaries. Granulation tissue in the EAC is a diagnostic finding in certain pathologies. For example, granulation tissue in the junction of the bony and cartilaginous portions of the EAC is almost always seen in malignant otitis externa [1]. Aural granulation masses can occur due to various causes such as inflammation, neoplastic growths (both benign and malignant), infection (e.g., furuncle with granulation tissue), trauma, Langerhans cell histiocytosis, malignant otitis externa, skin adnexal tumours of the EAC, rhabdomyosarcoma, osteoma, complications of CSOM, and relapsing polychondritis [2]. These aural masses can present as granulation tissue, aural polyps, or growths with persistent ear discharge, ear fullness, ear pain, and hearing impairment [3].

EAC granulations are frequently observed in Ear, Nose, Throat (ENT) Outpatient Departments (OPDs). However, many of them are due to the unsafe variety of CSOM, which can lead to cholesteatoma formation and subsequent bone erosion, with granulation tissue present at the site of bone healing. In the present case, the author described a series of cases where the aetiology of EAC granulations was caused by factors other than CSOM. These other causes include tubercular otitis media, malignant otitis externa, and benign

tumours such as osteomas, exostosis, pleomorphic adenoma, tumours from the ceruminous and sebaceous glands, and malignant tumours like squamous cell carcinoma and rhabdomyosarcoma. The treatment modalities for these cases differ, as does their prognosis. A thoughtful insight into the differential diagnoses of these cases will lead to early diagnosis and prompt treatment.

CASE SERIES

This hospital-based case series included all the patients who came to the GMC hospital for the treatment of EAC granulations over a six-month period. Patients with CSOM as the cause of EAC granulation were excluded from the study. Patients of all age groups were included, but only those with a definite diagnosis as the cause of EAC granulations were included in the study. The author had seven cases in this six-month period where the cause of EAC granulation differed from CSOM.

The age of patients ranged from 12 years to 71 years, and the male-to-female ratio was 5:2. Granulation was found in the left ear in four patients, while in three patients, it was seen in the right ear [Table/ Fig-1]. All patients had a history of ear discharge, out of which three had blood-tinged discharge. Facial palsy was observed in one patient with malignant otitis externa. Hearing loss was reported by four patients. Otalgia, associated with infective aetiology, was observed in only two patients. During clinical examination, the tympanic membrane was not visible in four patients.

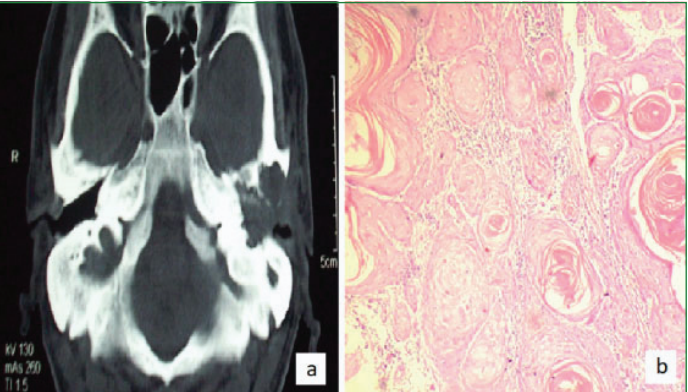
S. No.	Age/Sex	Side	Symptoms	Clinical findings	Radiological findings	Final diagnosis
1	71/M	Left	Bleeding, tinnitus	Granulation tissue filling the EAC.	HRCT showed bone erosion	Squamous cell carcinoma
2	62/M	Right	Discharge, hearing loss, tinnitus	Granulation in posterior part of EAC, FB (rice grain) seen during probing of the granulation.	HRCT showed normal mastoid	FB with granulation
3	58/M	Left	Aural fullness, tinnitus, hearing loss, discharge, painless	Pale granulation in floor of EAC, Attic normal.	HRCT showed granulation in EAC and middle ear	Tuberculosis of EAC
4	67/M	Right	Discharge, facial palsy, tinnitus	Uncontrolled diabetic, CKD, Lt. LMN facial palsy.	HRCT showed bone erosion.	Malignant otitis externa
5	13/F	Left	Bleeding, mass, hearing loss	Granulation tissue in EAC, CHL.	HRCT normal	Post-traumatic granulation tissue

6	17/F	Right	Pain, blood-tinged discharge, hearing loss	Granulation tissue with purulent discharge from posterior wall of EAC.	HRCT normal	Organised furuncle with granulation tissue
7	12/M	Left	Discharge, intermittent pain, swelling	Granulation arising from posterior wall.	HRCT showed normal middle ear and mastoid	Infected EAC epidermoid cyst

[Table/Fig-1]: Summary of all clinical findings of the cases with final diagnosis.
EAC: External auditory canal; HRCT: High resolution computed tomography; FB: Foreign body; CKD: Chronic kidney disease; LMN: Lower motor neuron; CHL: Conductive hearing loss

Case 1

Squamous cell carcinoma: A 71-year-old male came to the ENT-OPD with a history of bleeding from the left ear for two months, accompanied by tinnitus. On examination, granulation tissue was found filling the left EAC. High-Resolution Computed Tomography (HRCT) of the temporal bone revealed bone erosion in the left EAC. A biopsy was performed, and the sample was sent for histopathological study, which revealed a well-differentiated squamous cell carcinoma [Table/Fig-2]. The epithelium exhibited marked keratinisation and the formation of keratin pearls. The patient was treated with chemoradiation as he was not fit and not willing to undergo subtotal temporal bone resection.



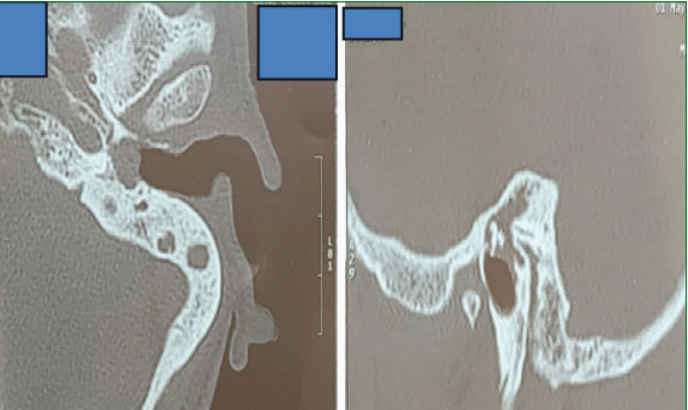
[Table/Fig-2]: Squamous cell carcinoma of left ear: a) CT scan image showing bone erosion of the left EAC; b) Photomicrograph showing islands of malignant squamous cells with keratin pearl formation (H&E stain, 100X).

Case 2

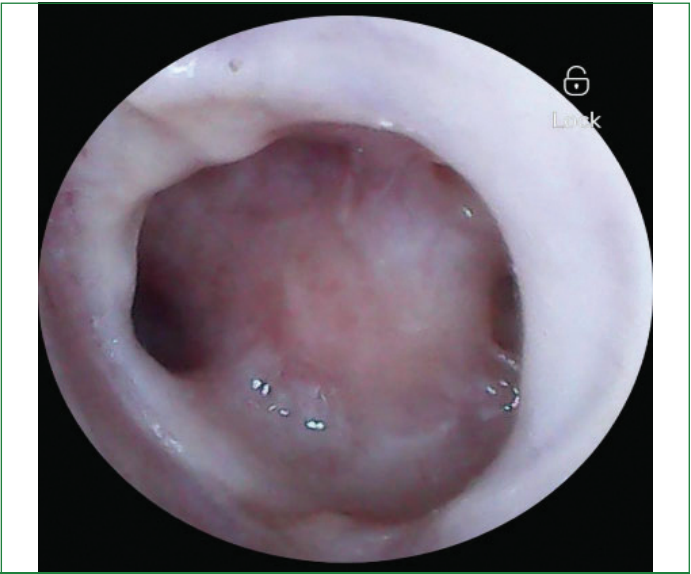
Foreign body with granulation: A 62-year-old male presented with complaints of discharge, hearing loss, and tinnitus in the right ear. On examination, granulation tissue was observed in both the EAC and middle ear. High-Resolution Computed Tomography (HRCT) of the temporal bone showed granulation in the external and middle ear [Table/Fig-3]. During an examination of the ear under a microscope, a FB was seen impacted in the granulation, which was subsequently removed. The patient was managed with conservative treatment, and the granulations completely disappeared within one month following the removal of the foreign body [Table/Fig-4].

Case 3

Tuberculosis of EAC: A 58-year-old male presented with symptoms of aural fullness, tinnitus, hearing loss, and painless discharge from the left ear for five months. The symptoms did not subside with

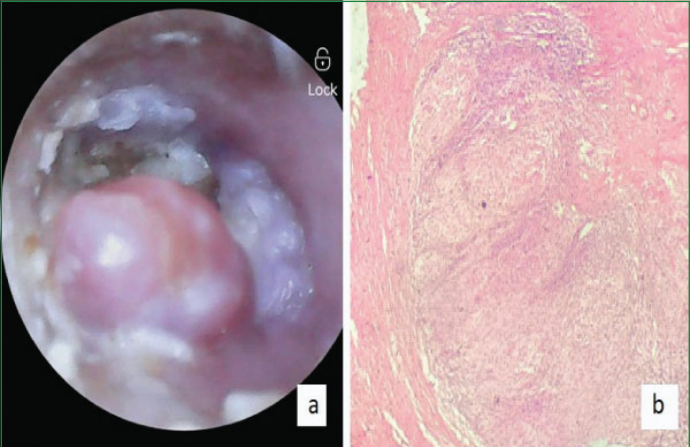


[Table/Fig-3]: CT scan of temporal bone showing granulations present in external and middle ear secondary to retained foreign body in axial and sagittal section.



[Table/Fig-4]: Otoloscopic appearance of resolution of granulation after removal of the foreign body.

conservative treatment. On otoscopic examination, pale-looking granulation tissue was observed on the floor of the EAC. A biopsy of the granulation was performed under local anaesthesia. The tissue was sent for histopathological study, which revealed the presence of caseating granulomas along with Langhans giant cells. Based on the patient's contact history, clinical and histopathological findings, the diagnosis of tuberculosis involving the EAC was made [Table/Fig-5]. The patient was treated with antitubercular therapy.



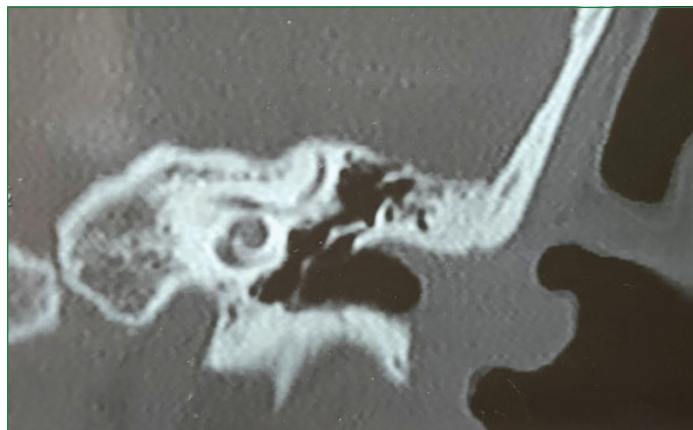
[Table/Fig-5]: Tubercular lesion: a) Otoloscopic picture of granulation in the EAC; b) Photomicrograph showing granulomas consisting of clusters of epithelioid cells (H&E stain, 100X).

Case 4

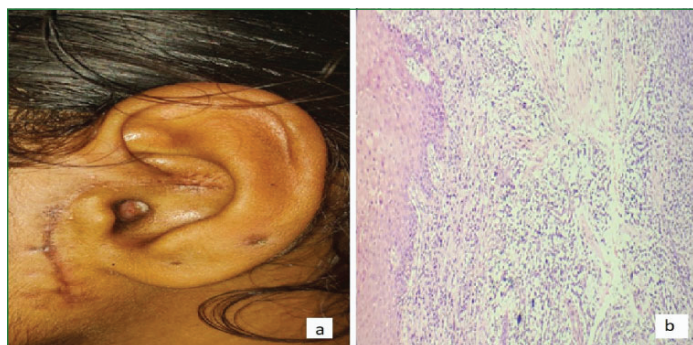
Malignant otitis externa: A 67-year-old male with diabetes and Chronic Kidney Disease (CKD) presented with a discharge from his right ear accompanied by tinnitus for a duration of two months. Recently, the patient developed facial palsy on the right side of his face. Upon examination, granulation tissue was found in the right EAC, along with purulent discharge. A pus culture was conducted, revealing the growth of Pseudomonas. HRCT of the temporal bone showed bone erosion in the EAC and facial canal. A biopsy of the granulation tissue was performed to rule out malignancy. The patient was treated with intravenous piperacillin with tazobactam for a period of 10 days, followed by oral levofloxacin once daily for one month.

Case 5

Post-traumatic EAC granulation: A 13-year-old female child presented to the OPD with complaints of bleeding from the left ear and hearing loss. Upon examination, granulation tissue was found filling the left EAC. During a detailed history-taking, the mother revealed that the child had experienced trauma to the left ear in a road traffic accident one month prior, which was treated at a nearby local hospital. A CT scan of the temporal bone revealed granulation tissue in the cartilaginous EAC, with a normal bony canal, middle ear, and mastoid [Table/Fig-6]. The histopathological examination confirmed a diagnosis of post-traumatic granulation, and the patient underwent surgical treatment [Table/Fig-7]. The granulation tissue was removed, and meatoplasty was performed to prevent future canal stenosis.



[Table/Fig-6]: CT scan of the patient with post-traumatic granulation showing granulation tissue filling the cartilaginous EAC with normal middle ear and mastoid.



[Table/Fig-7]: Post-traumatic granulation tissue: a) Granulation tissue in the EAC with scar mark of the injury around the left ear; b) Photomicrograph showing capillaries lined by reactive endothelial cells, plump fibroblasts, and a mixed inflammatory infiltrate (H&E stain, 100X).

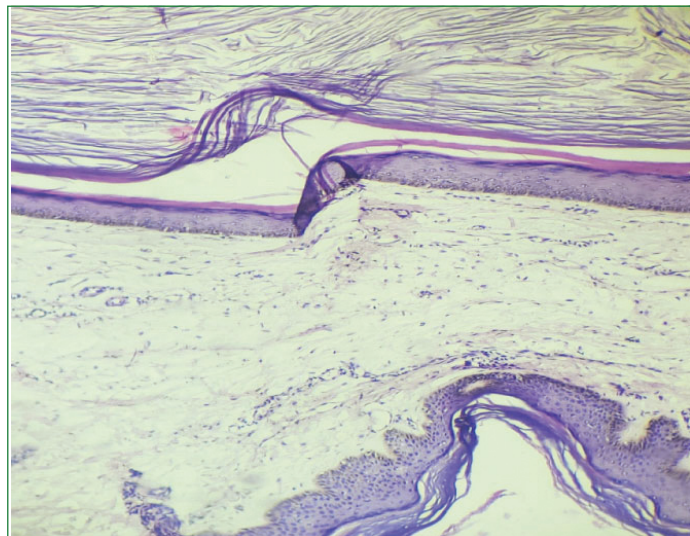
Case 6

Organised furuncle with granulation tissue: A 17-year-old female complained of pain, blood-tinged discharge, and hearing loss in her right ear. Upon examination, granulation tissue with purulent discharge was observed on the posterior wall of the right ear canal. The discharge was cleaned from the ear canal, and upon probing, a furuncle was discovered in the deep posterior wall. Following a course of oral antibiotics, the furuncle was scooped out under local anaesthesia. The ear canal was regularly dressed for two weeks, and the ear was inspected periodically to check for the recurrence of granulation tissue. There was no reappearance, and the patient was completely cured within one month.

Case 7

Infected epidermoid cyst with granulation: A 12-year-old male child presented with complaints of discharge, intermittent pain, and swelling in the left EAC. On palpation with a probe, granulation tissue was observed to originate from the posterior wall of the EAC. Initially, cholesteatoma was suspected, but a HRCT of the temporal bone revealed a normal middle ear and mastoid. During exploration in the operation theatre, a cystic swelling was observed. The cystic mass

was completely excised and sent for histopathological examination, which revealed a cyst lining composed of stratified squamous epithelium containing keratin flakes within the cyst [Table/Fig-8]. This finding led to the diagnosis of an epidermoid cyst of the EAC.



[Table/Fig-8]: Photomicrograph of epidermoid cyst lined by stratified squamous epithelium with cyst contents composed of keratin flakes (H&E stain, 100X).

DISCUSSION

Aural granulation tissues are often thought to be the result of CSOM only. However, the present case series illustrates that other causes should be considered, and it is prudent to actively rule out other causes by taking a detailed history. When the CT scan shows a normal middle ear and mastoid without any involvement by the disease process, other pathologies of the EAC need to be considered [4]. Aural granulation tissues are typically of inflammatory origin and can provide clues to the underlying pathology when examined under a microscope, indicating whether they are a result of CSOM or an indicator of some rare pathological process [4].

The proper diagnosis of EAC granulations relies on a detailed history, meticulous clinical evaluation, and adequate investigations. HRCT of the temporal bone is a useful addition to the battery of investigations, serving several purposes. Firstly, it provides a three-dimensional view of the anatomy of the middle ear, mastoid, and EAC. Secondly, it helps in determining the extent and spread of the disease process into the surrounding areas. Thirdly, it aids in predicting impending complications. When the otoscopy is unable to visualise the tympanic membrane due to overlying granulation tissue, HRCT is the best method to assess the condition of the middle ear [5]. In the present study, HRCT was performed in all cases, assisting the authors in establishing a final diagnosis. Similarly, cytology and histopathology also aided in establishing a pathological diagnosis [5,6].

The EAC is an uncommon site for malignant neoplasms. When it does occur, squamous cell carcinoma is the most frequent, followed by basal cell carcinoma in terms of occurrence rate [7]. Squamous cell carcinomas of the temporal bone most commonly affect individuals in their fifth or sixth decade of life [8]. A study conducted by Kishore P et al., revealed that a neglected retained foreign body in the ear can lead to common ear symptoms such as hearing loss, pain, ear discharge, and a sensation of fullness in the ear. They can also cause EAC granulations and aural polyps. These conditions do not respond to conservative management and require early diagnosis and surgical intervention for foreign body removal [9]. Tuberculosis of the EAC is a rare condition but can be observed in developing countries like India where tuberculosis still poses a significant burden. Therefore, when a patient with long-standing ear discharge is resistant to routine antibiotics and is found to have granulations in the EAC, suspicion of tuberculosis should be considered [10].

Malignant otitis externa occurs in immunocompromised or diabetic and renal failure patients. It carries a bad prognosis due to the compromised health status of these patients. Cranial nerve palsies are frequently associated with this condition, which in turn leads to high morbidity and mortality. Therefore, early diagnosis and management of malignant otitis externa are crucial to reduce complications and mortality rates [11].

According to Kumar A et al., trauma to the EAC can injure the skin, expose the cartilage, and result in the formation of granulation tissue. Infection and retained foreign bodies in such cases can further complicate the disease process in this blind-ended pouch. Infections and granulation can be managed with appropriate medical therapy, but surgical intervention is necessary to prevent and treat post-traumatic canal stenosis, which is common in these cases [12]. Furunculosis is the localised form of external otitis characterised by infection in a single hair follicle of the cartilaginous EAC. If left untreated or undertreated, it can progress and become an organised furuncle of the EAC. Chronic infection leads to the formation of granulation tissue at the site where the perichondrium of the cartilaginous EAC is exposed.

Epidermoid cysts of the EAC primarily occur in its cartilaginous portion. This is because the bony EAC lacks skin appendages such as hair follicles and sebaceous glands. Epidermoid cysts are not very common in the EAC and are mainly observed in paediatric patients, being rare in adults [13]. They can cause obstruction, resulting in decreased hearing, pain, and infection, leading to discharge and granulations [14].

In the study of EAC lesions conducted by Chatra PS, it was observed that various types of lesions, including inflammatory, neoplastic, congenital, and traumatic lesions, can affect the EAC [15].

Similarly, in the present study, we also found different causes of EAC granulations, including inflammatory, infective, neoplastic, and traumatic causes.

The treatment of these patients was guided by the final diagnosis. Squamous cell carcinoma was treated with chemoradiation. Patients with foreign bodies and granulation underwent microscopic examination and removal of the foreign body. They were followed up until the granulation tissue disappeared through conservative treatment. Tubercular otitis externa was treated with antitubercular therapy. Malignant otitis externa was initially treated with intravenous antibiotics, followed by oral Levofloxacin. Post-traumatic granulation was managed with debridement and regular dressing. The CT scan of the patient with granulations in the cartilaginous portion of the EAC but normal bony canal and middle ear showed no abnormalities. Granulation tissue associated with furuncle was excised under local anaesthesia, followed by antibiotic dressing. The patient with granulation associated with an infected epidermoid cyst initially

underwent conservative treatment with debridement and antibiotics, followed by complete excision of the cyst after one month.

CONCLUSION(S)

The authors suggested considering all possible differential diagnoses whenever a case of EAC granulation does not respond to medical management. In such situations, patients should undergo a comprehensive evaluation that includes a detailed medical history, a thorough clinical examination, and assessments through radiological, microbiological, and pathological investigations. In these cases, conducting a histopathological study is imperative to reach a definitive diagnosis.

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