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Temporal bone malignancy: an overview

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ABSTRACT

Background: Carcinoma of the temporal bone is rare, accounting for fewer than 0.2% of all the tumours of the head and neck. Despite the recent advances made in oncology, delayed diagnosis is common with temporal bone tumors which lead to significant morbidity and poor surgical outcomes. All cases of persistent otitis media or otitis externa which fails to improve with adequate treatment, temporal bone malignancy should be suspected. The aim of the study was to assess the incidence of temporal bone malignancy in patients with CSOM or external auditory mass.
Methods: It is a prospective study conducted in Department of ENT and Head and Neck surgery and Department of, Karnataka institute of medical sciences, Hubballi from July 2015- December 2016. All patients with CSOM presenting with otorrhoea and mass in the external auditory canal in our outpatient department were included in the study.
Results: Out of 6496 patients included in our study, 3 patients were found to have temporal bone malignancy. Histopathological examination showed squamous cell carcinoma in all 3 patients. All three patients underwent lateral temporal bone resection with post-operative radiotherapy.
Conclusions: High level of suspicion is necessary for early diagnosis of temporal bone malignancy especially in patients with CSOM unresponsive to conventional treatment.

Keywords: Temporal bone malignancy, Squamous cell carcinoma, Surgical resection

INTRODUCTION

Malignancy of temporal bone is a rare entity with a annual incidence of 0.8-1.0 per 1000000, majority of which are squamous cell carcinoma.[1] Despite the recent advances made in the field of oncology over the last few years the prognosis remains unfavourable for extensive lesions as delayed diagnosis is common with this malignancy and has been correlated with a poor outcome. As the clinical presentation of these tumors significantly overlaps that of an infective etiology, keeping a vigilant eye in patients presenting with otorrhoea and mass in the external auditory canal can lead to early diagnosis and a conservative surgical approach hence having a favorable outcome. This study is undertaken to detect the cases of temporal bone malignancy at an earlier stage by screening all patients of CSOM.

The study was done with the objective to study the incidence of temporal bone malignancy in patients presenting with otorrheoa, mass in the external auditory canal and chronic suppurative otitis media.

METHODS

A prospective study was conducted in the Department of ENT and Head and Neck surgery, Department of Surgical Oncology, Karnataka Institute of Medical Sciences, Hubballi from July 2015- December 2016. All patients presenting with ear discharge or mass in the ear and

diagnosed with chronic suppurative otitis media in our outpatient department were screened for temporal bone malignancy by clinical examination including thorough otoscopic examination, radiological imaging and examination under microscope. All patients with any mass in the external auditory canal including aural polyps or granulation tissue underwent biopsy and histopathological analysis. In the study period of 18 months, a total of 6496 patients were screened. Out of these 186 patients were found to have mass in the external auditory canal. These patients were subjected to CT scan imaging and biopsy of the tissue for histopathological examination. Out of these 186 patients, 3 patients had squamous cell carcinoma and are presented below.

Inclusion criteria

All patients presenting with ear discharge and prescence of mass in external auditory canal were included

Exclusion criteria

Patients with acute suppurative otitis media, secretory otitis media, cholesteatoma with complications.

RESULTS

Sex distribution

Out of 186 patients screened, 106 were males and 80 were females.

Table 1: Sex distribution.

Sex	Male	Female
Number of patients	106	80

Age distribution

In our study, the most common age of presentation of mass in the external auditory canal is between 41-50.

Table 2: Age distribution of patients presenting with mass in the external auditory canal.

Age group	Number of patients
<20	12
21 – 30	31
31 – 40	33
41 – 50	43
51 – 60	38
>60	29

Histopathological reporting of biopsy from external auditory canal

In our study, 1.61% of patients with mass in the external auditory canal screened had squamous cell carcinoma.

Table 3: Histopathological reporting of biopsy specimen.

Granulation tissue	Inflammatory polyp	Squamous cell carcinoma
107	76	3

In our study we had three interesting cases, the details of which are given below. First case was a 52 year old female who was a farmer by occupation and presented with complaints of ulceroproliferative growth over the right pinna since 2 months which was insidious in onset and gradually progressive, associated with pain which was throbbing in nature and severe in intensity. Examination revealed an ulceroproliferative growth in the right pinna superiorly from the root of the helix extending up to the ear lobule. On palpation the growth was found to be hard, tender and fixed. The external auditory canal was filled with foul smelling purulent discharge. The tympanic membrane couldn't be visualized. The right facial nerve showed grade 4 function as per House Brackman grading.

HRCT of the temporal bone showed a large irregular lobulated heterogenously enhancing mass arising from the right pinna and extending into the pre-auricular and post auricular soft tissue. Medially the lesion was found to be extending into the external auditory canal within the right temporal bone. The right parotid gland was enlarged in size and shows prominent intra-parotid lymph nodes. No evidence of bony destruction was seen on CT scan.

The patient was subjected to right lateral temporal bone resection (parotidectomy + radical mastoidectomy) with right modified radical neck dissection and reconstruction was done using a pectoralis major myocutaneous flap. Histopathological examination revealed moderately differntiated squamous cell carcinoma. Patient recieved postoperative radiotherapy after 3 weeks.

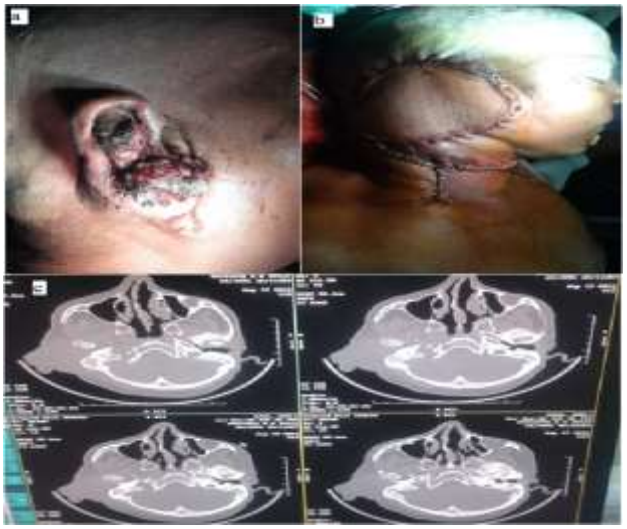

Figure 1: Case 1 a) Pre-operative image, b) Postoperative image, c) CT scan image.

Second case was a 60 year old male who presented with complains of discharge from the left ear since 4 months, insidious in onset, progressive, yellowish, foul smelling copious, no relation to cold, no relieving factors. Patient had a swelling in front of the left ear, initially small, progressive in size, associated with throbbing pain, non-radiating and complained of bilateral decreased hearing since 5 months. Patient also had decreased appetite and weight loss since 4 months. On examination the Left pre auricular area shows a diffuse swelling of about 3×3 cm above the level of the zygomatic arch, which was hard in consistency, immobile, tender on pressure, smooth surfaced. Left EAC shows a pale polypoidal mass which can be probed all around and is insensitive to touch, doesn't bleed on touch and covered with discharge. Left tympanic membrane is not visualized. Right TM shows a small perforation in the posterior-superior quadrant. MRI revealed an aggressive neoplasm in left temporal and auricular –pre-auricular regions of size 4.5×4.1 cm causing destruction of squamous temporal bone and extending extradurally into middle cranial fossa. Patient was subjected to surgery and a left lateral temporal bone resection along with craniotomy and extradural debulking of the tumour was done. Histopathological examination of the excised specimen was reported to be moderately differentiated squamous cell carcinoma. Patient was subjected to adjuvant radiotherapy after 3 weeks of surgery.

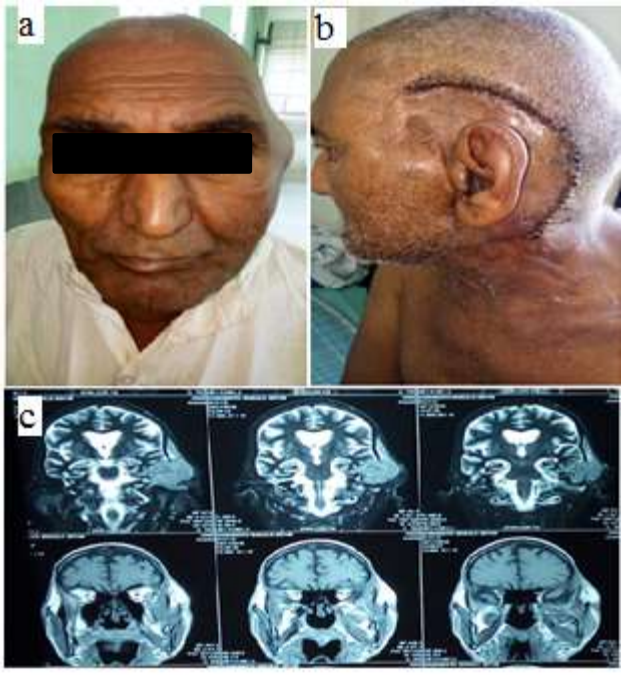

Figure 2: Case 2 a) Pre-operative image, b) Postoperative image, c) CT scan image.

Third case was a 56 year old male patient who presented with complains of right ear discharge since the last 4 months which was insidious in onset, scanty, foul smelling, with no specific aggravating factors and did not decrease with medication. Ear discharge is occasionally blood stained since the last 2 months. Patient had pain in the right ear since the last 2 months, dull aching, continuous, radiating to the occipital region, decreased with analgesics. Patient also gave history of decreased hearing and ringing sensation in the right ear. Patient had deviation of angle of mouth and inability to close the right eye since the last 1 week which was sudden in onset and gradually progressive. Patient is known case of diabetes mellitus and hypertensive since past 6 years- on oral medication. Patient is regular betal nut chewer and occasional alcoholic. Examination revealed an ulcerative lesion of about 1×1 cm in size in the mastoid tip area of right post auricular area, skin is indurated 1cm around the lesion. External auditory canal revealed a pinkish proliferative growth obscuring view of deeper structures and bleeds on touch. Rinne's test was negative for 256, 512 and 1024 hz on right side and positive for all frequencies on the left. Weber's test lateralized to the right ear. CT scan revealed a homogenously enhancing soft tissue dense lesion in the right middle ear cavity occupying the EAC and the middle ear with erosion of the petrous, squamous, tympanic and mastoid parts right temporal bone. MRI shows T1/T2 isointense heterogeneously enhancing mass in the right EAC extending inwards into the middle ear. Mass causing destruction of petrous and mastoid bones. Sigmoid sinus plate is destroyed on the right side. Patient was subjected to surgery and a right lateral temporal bone resection was done. Postoperative radiotherapy was given after 3 weeks.

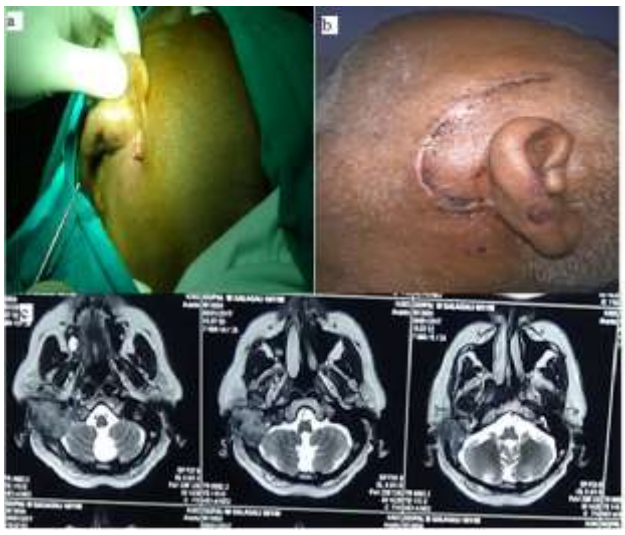

Figure 3: Case 3 a) Pre-operative image, b) Postoperative image, c) CT scan image.

DISCUSSION

Tumours of the temporal bone is extremely rare and it includes cancers arising from skin of the pinna that spread to the temporal bone, primary tumours of external

auditory canal, middle ear, mastoid or petrous apex, and metastatic lesions to the temporal bone. Primary malignant tumours of the temporal bone have an estimated incidence of 0.8 -1.0 per 1,000,000 inhabitants per year and 60- 80 % of them are Squamous Cell Carcinoma[1]. Although they can occur at all ages, temporal bone tumours are more common in the 6th to 7th decade of life and in the male gender.[2]

Since temporal bone cancer is so rare, measuring specific etiological factors for cancers in this area is very difficult. Ionising radiation is a significant risk factor for the tumours originating from skin of pinna and external auditory canal especially in fair skinned individuals. A genetic predisposition to cancer may also exist, manifested as the development of skin cancers in sites not exposed to sunlight as well as sun exposed areas. Although chronic suppurative otitis media has been associated with the presence of the temporal bone carcinoma, there is no scientific evidence that this entity is involved in its aetiology.[3] Chronic suppurative otitis media and the resulting chronic inflammation may lead to squamous metaplasia.

Agents such as chlorinated disinfectants or human papilloma virus also has been implicated in squamous cell carcinoma of middle ear in certain studies.[4-6] Lim et al (2000) reported a series of temporal bone carcinoma in 7 patients who had undergone radiotherapy for nasopharyngeal carcinoma.[7] These patients had a particularly poor outcome.

Metastatic lesion in temporal bone is rare and usually originates from primary breast, lung or kidney.[8] Common presenting symptoms include ear pain, ear discharge, bleeding and hearing loss. Physical findings include otorrhoea, a mass lesion, facial swelling, facial paresis and other cranial nerve deficit. 10-20 % of the patients have lymph node metastasis. The facial nerve courses in its fallopian canal which may have dehiscence's. In such patients, presentation with facial nerve paresis occurs early in the disease process.

After thorough clinical examination and histopathological analysis, radiological imaging is an essential tool for accurate tumour diagnosis and staging. Computerised tomography (CT) with contrast allows assessing the bone erosion and the presence of regional adenopathy, whereas magnetic resonance imaging (MRI) with contrast allows a better assessment of its extension to the parotid gland, temperomandibular joint, petrous apex and intracranial invasion.[9] Positron emission tomography(PET) can be useful in assessing distant metastasis in centres where this facility is available.

In general, all patients who are medically able should undergo surgical treatment. The resection procedures that can be performed for the temporal bone include a lateral temporal bone resection, mediolateral temporal bone resection, subtotal resection, total temporal bone resection, adjunctive surgical procedures including neck dissection, parotidectomy and craniotomy should be

performed when indicated. Currently, curative surgical treatment is contraindicated if there is involvement of the cavernous sinus, massive intracranial extension, unresectable cervical disease, distant metastasis or poor general status.[10]

Postoperative adjuvant radiotherapy is considered for all patients as a protocol in our institute as achieving tumour free margins without any residue is a rarity. We subject all our patients for adjuvant radiotherapy after 3 weeks.

In our study, of the 3 patients who underwent lateral temporal bone resection, all patients underwent a thorough clinical examination and radiological imaging. Staging was done based on the University of Pittsburgh staging system for temporal bone malignancy. After clinical staging, all the 3 patients were subjected to biopsy under local anesthesia under microscopic vision. After the tissue diagnosis of squamous cell carcinoma was established, patients were planned for surgery after thorough pre-operative work up.

In our first case, as the entire skin over pinna and pre-auricular region was involved, we had to consider closure with a pectoralis major myocutaneous flap after excision of the tumour and resection of the temporal bone. Patient had a total parotidectomy included as a part of the treatment plan. Patient was planned for postoperative radiotherapy after 3 weeks.

In our second case, our patient had an intracranial extradural extension. Hence the treatment plan was constituted in consultation with neurosurgeon. After radical masoidectomy and lateral temporal resection, craniotomy was performed and tumour was debulked. Intra operatively, the dura was found to be intact. The reconstruction was achieved with primary closure. Patient was subjected to postoperative radiotherapy.

In our third case, the main challenge lied in trying to achieve primary closure after excision of the skin infiltration with adequate margin. This could be successfully achieved and patient was subjected to radiotherapy after 3 weeks.

The main complications we encountered in our study was complete deafness following surgery and facial nerve paralysis.

CONCLUSION

Malignant tumours of the temporal bone are quite rare and these patients present with symptoms which are similar to chronic suppurative otitis media. It is important for the otologist to keep a vigilant eye to detect these malignancies at early stages. Early diagnosis is considered highly important in performing a good

surgical resection and providing a good quality of life postoperatively.

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