Case Report

Nab-paclitaxel as induction chemotherapy in external auditory canal carcinoma: Case report and review of literature

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ABSTRACT

Squamous cell carcinoma of the external auditory canal, middle ear, and temporal bone is a rare and unusual malignancy. The rare occurrence of the disease makes the formulation of uniform treatment guidelines and appropriate management challenging. The role of chemotherapy in this disease is not clearly defined in literature. We describe a clinical case of a patient with this rare malignancy and an excellent response achieved with nanoparticle - albumin-bound paclitaxel and present a comprehensive review of literature.

Key words: External auditory canal, nab-paclitaxel, squamous cell carcinoma

INTRODUCTION

The ear canal, middle ear, and temporal bone are rare sites of malignancies among which squamous cell carcinoma (SCC) is the most commonly occurring cancer type.[1] The age-adjusted incidence has been reported to be 1/1000,000/year in women and 0.8/1000,000 in men.[2] The aggressive nature of the disease along with the complex anatomical location and invasive nature leads to considerable difficulties in its management, particularly in advanced stages.[3] Despite the description of several treatment modalities (primarily surgical), there is a lack of consensus as to the best treatment modality owing to the absence of prospective randomized studies.[4] Surgical management is frequently employed with or without adjuvant radiotherapy whereas the role of systemic chemotherapy (CT) has also been described in literature but remains to be fully determined.[5]

Nab-paclitaxel (NP) is a soluble form of paclitaxel that is linked to albumin nanoparticles. The development of nanotechnology as a delivery system for paclitaxel has provided better pharmacokinetic and pharmacodynamic characteristics.[6] In view of its favorable safety and tolerance profile, NP is being tested for its potential application in various tumor sites.[7] The following case report describes a patient with a diagnosis of SCC of external auditory canal (EAC), who was treated with NP and showed a near complete response.

CASE REPORT

Patient characteristics and chief complaints

A male patient in his seventh decade presented with a biopsy proven diagnosis of SCC of the left EAC. He had

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Access this article online

Quick Response Code:

Website: www.ccij-online.org

DOI: 10.4103/2278-0513.172077

Cite this article as: Shrivastava A, Mandloi V, Tiwari V, Ghori HU, Singh OP, Yogi V. Nab-paclitaxel as induction chemotherapy in external auditory canal carcinoma: Case report and review of literature. Clin Cancer Investig J 2016;5:76-8.

previously received conservative treatment, but to no relief. At presentation, he was in a fair general condition with a Karnofsky performance score of 70%.

History of presenting illness

The patient had 5 months history of pain, decreased hearing, discharge from the left ear and tinnitus. The pain was moderate to severe in nature with no definite aggravating or relieving factors. He had facial nerve paresis on the left side, but no other neurological signs. A contrast-enhanced computerized tomography (CECT) scan of the head [Figure 1a and b] had revealed an ill-defined, heterogeneous, minimally enhancing soft tissue (ST) growth in the left EAC involving mastoid, petrous temporal bone, occipital bone and skull base. The growth caused the destruction of petrous bone medially and mastoid bone inferiorly. Superiorly, the growth was eroding the sinus, tegmen with intracranial extension and involving the sigmoid and jugular vein. Left middle ear showed ST opacity with maintained appearance of middle air ossicles. Inner ear showed maintained cochlea. Extensive fat stranding was noted in the infratemporal region, paraphyrangeal mucosal space, masticator space, carotid, and parotid spaces. He had been subjected to a left ear mass biopsy that revealed a well-differentiated SCC [Figure 2].

Course

At presentation, the patient had complaints of discharge from the left ear, tenderness on the left mastoid process and a postauricular swelling that measured 4 cm × 2 cm. He had two palpable lymph nodes in the left submandibular region (levels II and V). The routine laboratory work up (complete blood picture, renal function tests and liver function tests) revealed parameters within the normal range. The chest-X ray of the patient showed inhomogeneous patchy radio opacity in the right parahilar region, right upper, and middle lung field that was suggestive of consolidation. The disease was staged as a T4 N1 lesion using the Pittsburgh classification system for EAC carcinomas [Table 1]. The disease was unresectable due to extensive local invasion and in accordance with the departmental protocol; he was advised induction CT consisting of NP (230 mg/m^2) and carboplatin (area under curve 5) for 2 cycles (q21 days) before being planned for radiation. After the first cycle, he showed >50% clinical and subjective response. The symptoms of pain and ear discharge relieved significantly while the postauricular swelling and neck nodes subsided completely. After the second cycle, he was advised a follow-up CECT [Figure 1c and d] that showed a partial response in comparison with the pretreatment CECT as per the response evaluation criteria in solid tumors criteria. An in-house single photon emission computerized tomography-CT also confirmed the findings [Figure 3].

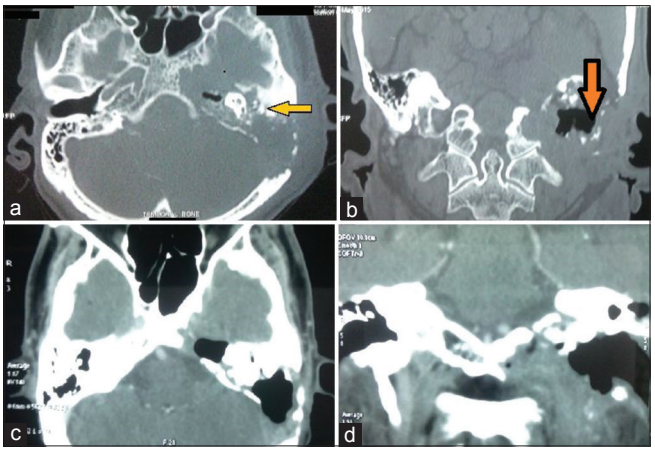

Figure 1: (a) Axial contrast-enhanced computerized tomography scan with yellow arrow showing the bone destruction. (b) Coronal section showing the extensive soft tissue growth (red arrow). (c and d) Post 2 cycle chemotherapy axial and coronal scan showing partial response at the primary site

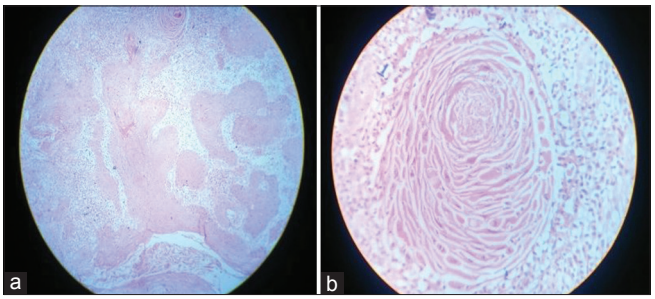

Figure 2: (a) Squamous proliferative lesion with mild dysplasia and nonspecific inflammation (H and E, ×10). (b) Presence of well-defined keratin pearl (H and E, ×40)

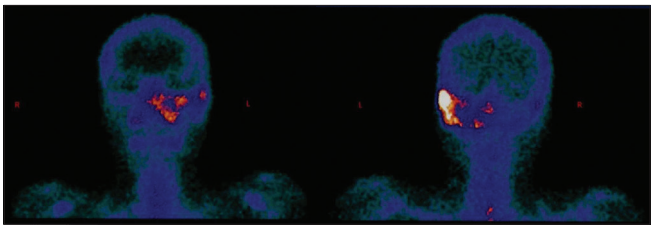

Figure 3: Post 2 cycles single-photon emission computerized tomography showing partial response

He was thereafter planned to receive palliative local radiotherapy, is currently under treatment and tolerating it well.

DISCUSSION

SCC of the EAC, middle ear and temporal bone is an unusual and rare malignancy. There is no American Joint Committee on Cancer or Union for International Cancer Control staging system for this type of neoplasm[5] and the EAC carcinomas are classified using the Pittsburgh classification[5] [Table 1].

The presentation of EAC neoplasm is often associated with chronic otitis media and exposure to radiation.[2] Because

Table 1: The pittsburgh classification system for external auditory meatus carcinoma

Stage	Status
T1	Tumor limited to EAM without bony erosion or evidence of soft tissue extension.
T2	Limited EAM erosion (not full thickness), or radiographic findings consistent with limited (<5 mm) soft tissue involvement.
T3	Erosion into the EAM (full thickness) with limited (<5 mm) soft tissue involvement, or tumor involving the middle ear and/or mastoid, or presence of facial paralysis.
T4	Tumor eroding the cochlea, petrous apex, medial wall of middle ear, carotid canal, jugular foramen or dura, or with extensive (>5 mm) soft tissue involvement.
N	As described by the American Joint Committee for classifying lymph node involvement in head and neck neoplasms. However, any node involvement is considered to be advanced disease: stage III, T1, N1; stage IV, T2, T3, T4, N1.
M	Any metastasis is considered to be advanced disease: stage IV, M1

of the anatomic complexity, surgical resection is relatively hard to carry out, especially for advanced cases that invade the temporal bone and the surrounding extratemporal bone tissues.[8] Furthermore, since radical surgery involves resection of the temporal bone to some extent, it often results in an unfavorable quality of life and sequelae such as facial nerve palsy and hearing impairment.[8] Efficacy of induction CT regimens using docetaxel, cisplatin, and 5 fluorouracil have been well documented in head and neck SCC.[9,10] In addition, the novel induction regimen including NP has been found to be feasible and has resulted in a high complete response rate at the primary tumor site even in large (T3, 4) primary tumors.[11] Compared with conventional preparations of paclitaxel, NP has a number of advantages: (i) no premedication to prevent hypersensitivity is required; (ii) any type of intravenous infusion set may be used (with no requirement for inline filters); (iii) NP may be used even in patients who are sensitive to alcohol; and (iv) NP may be administered at a higher dose over the course of a shorter period than paclitaxel.[12] Secreted protein acidic and rich in cysteine plays a role in albumin receptor-mediated endothelial transport and correlates with tumor response to NP in head and neck SCC (HNSCC).[13] In addition, macropinocytosis, the process by which macromolecules like albumin are taken up into cells, is upregulated in the setting of activated rat sarcoma or P13K pathways that are frequently activated in HNSCC[14] are a few postulates explaining the high anti-tumor effect of NP in SCC of head and neck region.

CONCLUSION

NP along with carboplatin appears to be a safe induction CT regimen in the setting of SCC of the EAC especially in advanced stages where surgery is not feasible. The patient tolerated the treatment well and did not have any major side effect causing any delay in treatment or hospitalization. We found a good subjective response of the regimen in our patient and advocate further studies in this regard.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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