Prognostic Factors and Management of Squamous Cell Carcinoma of External Auditory Canal and Middle Ear – A Single Institutional Experience.

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Abstract

Aim: External auditory canal cancers are rare, aggressive cancer that spread along the vascular and neural pathways invading adjacent structures. This study aims to analyze the prognostic variables, treatment and outcomes of patients with squamous cell carcinoma of external auditory canal and middle ear treated in our institution.

Materials and Methods: Retrospective analysis of 10 patients treated in our institution between 2010 and 2019. The data collected includes patient characteristics, treatment modality and outcomes.

Results: The mean overall survival including all stages was 10.9 months (range 4-28 months) at 2 years of follow up. The mean OS was 21 months in patients with stage I while it was 6.8 months in stage III and IV. The mean overall survival in patients presented with facial nerve palsy was 7 months.

Conclusion: Early stage squamous cell carcinoma of EAC who had upfront surgery with negative margins had good prognosis. Advanced stage III and IV, positive margin, facial nerve and nodal involvement were associated with poor prognosis.

Abbreviation - EAC’s-External auditory canal cancers, CCRT- concurrent chemoradiation, OS - Overall Survival

Keywords: squamous cell carcinoma; external auditory canal cancers; radiotherapy; surgery; treatment

Introduction

External auditory canal cancers (EAC’s) are rare accounting for only one in one million annual incidence [1,2]. The most common pathology is squamous cell carcinoma which accounts for 90%. These tumors are aggressive in nature and spread along the vascular and neural pathways invading adjacent structures [3]. There is lack of a universally accepted staging system for EAC’s. Currently university of Pittsburgh classification is being widely practiced with respect to tumor extent and survival prognosis. Combination of surgery and radiotherapy is considered as a preferable treatment approach. This study aims to analyze the prognostic variables, treatment and outcomes of patients with squamous cell carcinoma of external auditory canal and middle ear treated in our institution.

Materials and Method

This is a retrospective analysis of 10 patients diagnosed with squamous cell carcinoma of EAC’s in our institution between 2010 to 2019. Data regarding age, gender, Eastern Cooperative Oncology Group (ECOG), performance status, symptoms, Imaging, TNM staging according to the Pittsburgh classification, histology, management, toxicities and survival were collected from hospital based cancer registry. The duration of overall survival (OS), disease free survival (DFS), progression free survival (PFS) were calculated as follows. DFS is defined as time from date of completion of treatment to date of detection of recurrence. Progression free survival is defined as time from date of completion of treatment to date of detection of disease progression or metastasis. Overall survival is defined as the time from date of diagnosis of disease to date of death of patient.

Results

Ten patients with squamous cell carcinoma of EAC’s and middle ear ranged in age from 40 - 79 years with median age of 56 years and sex ratio of 1:1. About 90% of the patients had an ECOG performance status of 1. The presenting complaints was ear discharge in 80% of the patients and facial nerve palsy in 20% associated with earache, ulcer, hearing loss, ear block and bleeding. 60% of patients presented with laterality towards right side.

Common imaging modality used was Computed tomography (CT scan) complimented with magnetic resonance imaging (MRI). The TNM stage determined on the basis of Pittsburgh classification revealed 2 (20%) patients with T1 stage, 2 (20%) with T3 stage and remaining 6 (60%) with T4 stage. Only one of them had nodal disease at presentation.

Treatment

5 patients (50%) patients were treated with surgery. 2 patients (20%) with early stage T1 No disease had undergone sleeve resection and split skin graft (SSG). One had complete resection with negative margins and the other patient had proximal and circumferential margins positive and was treated with adjuvant radiotherapy of 60 Gy in 30 fractions.
30% patients with stage T3 and T4 disease were treated with modified radical mastoidectomy and one patient with sub-temporal bone resection. Two patients were treated with adjuvant radiotherapy and chemotherapy with dose of 60 Gy to 66 Gy in 30 / 33# along with weekly cisplatin. 5 (50%) patients with stage T3, T4 and nodal disease were deemed inoperable due to extensive disease and received concurrent chemo radiation (CCRT).

42.8% had complete response, 42.8% had partial response and 14.4% had progressive disease at 2 month after completion of treatment. Survival data included seven patients with at least 2 yrs of follow up. The mean overall survival was 10.9 months (4-28 months) including all stage. The mean OS was 21 months in patients with stage I while it was 6.8 months in stage III and IV. The mean overall survival in patients presented with facial nerve palsy was 7 months compared to 12.4 months without facial nerve palsy.

Table 1

<table>
<thead>
<tr>
<th>AGE</th>
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| TREATMENT | Surgery alone | 1 |
|           | Surgery --> Adjuvant radiotherapy | 1 |
|           | Surgery followed by adjuvant radiochemotherpy | 3 |
|           | Concurrent chemo -radiation | 5 |

Table 1: Summary of Patient Characteristics,Stage and Treatment.

Discussion

External auditory canal cancers are rare malignant tumors .There are only few case reports and case series in literature and there are no randomized studies published until date which hampers the universal treatment decision and complete understanding of this rare entity.

EAC’s usually occurs in middle aged and elderly people during the 5th – 7th decades of life. The median age noted in this series was 56 years (Range 40-79 years) approximating to literature. Although in larger revisions a clear predominance of sex has not been observed but there is slight male predominance noted in some series [4,5,6,8], but in this series we had a sex ratio of 1:1.

The most common presenting complaint is otalgia and other clinical features include mass, hearing loss, headache, facial numbness, hoarseness, dysphagia, blood stained otorrhea, facial palsy [7]. Because some of these symptoms are similar to those of otitis externa and chronic suppurative otitis media EAC’s can be misdiagnosed with them. Facial nerve palsy is indicator of extensive disease and should be considered in clinical examination and it is associated with poor outcome. In our study ear discharge was seen in 80% of patients associated with otalgia and 20% of the patients had facial nerve palsy at diagnosis comparable to 13-20% noted in literature [4,6,9,10]. Squamous cell carcinoma is the most common histopathology noted in tumors of external auditory canal and middle ear accounting for 80-90% [11].

CT scan of the temporal bone was the most common imaging used for diagnosis and staging in this study complemented with MRI .(figure 1)

![Figure 1: Axial image of CT Scan showing soft tissue density lesion in external auditory canal and middle ear with destruction of left temporal bone and base of skull](image)

There are number of limitations to the use of CT such as evaluating the soft tissue involvement (parotid and infratemporal fossa).MRI is beneficial in evaluating the parotid ,soft tissue, infratemporal fossa and temporal dura matter involvement Therefore MRI should be systematically performed for staging .The role of PET-CT has yet to be defined [5,12,13,14].

There are various staging system proposed for EAC’s such as Pittsburgh staging system and other by Stell and Mc Cormick staging system.In this study we followed the widely accepted Pittsburgh staging system [1,12,15]. In this study 20% of patients presented with T1 stage, 20% with T3 stage and 60% with T4 stage. Nodal involvement was seen only in 10% of the patients There was no distant metastasis noted and this was in par with literature evidence .Yin et al. in a analysis of 95 cases of SCC of external and middle ear found only 13.7% of patients with regional nodal metastasis [5] Moody et al. reported a regional nodal metastasis of 2.5% and none with distant metastasis [1].
The most common modality of treatment of EAC cancers is surgery. In this series 3(50%) patients underwent surgery. 2 patients (20%) with early stage T1N0 disease had undergone sleeve resection and split skin graft (SSG). one had complete resection with negative margins and the other patient had proximal and circumferential margins positive and was treated with adjuvant radiotherapy of 60 Gy in 30 fractions. In remaining 3(30%) patients with T3 and T4 disease safe resection margin could not be obtained and they were planned for post-operative radiotherapy either alone or with chemotherapy. Yin et al. in an analysis of 95 cases with SCC of external and middle ear found involved margins in 27% of patients mainly in stage III and IV. Ouaz et al. in a series of 10 patients found incomplete resection in more than one third of the patients [5,6]. Early stage and complete surgical excision with negative margins is a good prognostic indicator [18].

5(50%) patients deemed inoperable were planned for concurrent chemoradiation(CCRT). Only 3(30%) patients completed treatment with external beam radiotherapy with radiation dose of 66Gy in 33 fractions along with concurrent chemotherapy with cisplatin. A retrospective review of 87 patients of SCC of EAC and middle ear was reported by Ogawa et al. where CCRT was the primary treatment modality in 39% of patients with varying chemotherapy schedules and regimens [16]. Hyun-choel Kang et al. evaluated the role of radiotherapy for SCC of external auditory canal and middle ear among 51 patients and reported radiotherapy as one of treatment modality in 89% of the patients [17].

Acute skin reactions were the most common complication noted in patients undergoing treatment with either adjuvant or concurrent chemoradiation. Among the patients treated with concurrent chemo radiation 83.3% of patients had Grade II or less dermatitis and 16.6% had Grade III dermatitis. No treatment related deaths were found due to complications noted. Ogawa et al. in a retrospective review of 87 patients with EAC and middle ear cancers found that acute Grade II or less dermatitis was found in 88.5% of patients and Grade III dermatitis in 11.5% of patients treated with concurrent chemoradiation or adjuvant RT [16].

In this study 42.8% of patients had complete response, 42.8% had partial response and 14.4% patient had progressive disease at 2 month after completion of treatment.

Survival data included seven patients with at least 2 yrs of follow up. The mean disease free survival was 14.7 months (6-24 months) about 19 months in stage I disease and 6months in stage III and IV disease. The mean overall survival including all stages was 10.9 months (4-28 months). The mean OS was 21 months in patients with stage I while it was 6.8 months in stage III and IV. The mean overall survival in patients presented with facial nerve palsy was 7 months compared to 12.4 months without facial nerve palsy. In a comparative survival analysis of 348 subjects by Higgins et al. found that the overall and disease specific survival for patients with facial palsy was significantly worse than those without facial palsy [9]. The mean overall survival in node negative patients was 11.3 months and in node positive patients it was 8 months. The mean progression free survival was 9.4 months (2.5 – 28 months) and was 21 months in stage I disease and 5.3 months for stage III and IV disease.

A tertiary cancer centre experience of 43 patients in treatment of SCC of EAC by Gandhi AK et al. found that at 2 years PFS for all patients was 30.4%. Median PFS of patients with facial nerve palsy was 6.8 months and without facial nerve palsy it was 17.6 months. He found tumour stage and facial nerve palsy as factors leading to poor outcome.(19)Yin et al. in analysis of 95 cases of SCC of external and middle ear found that overall 5 year survival was 66.8% and reached 100% in stages I and II while only 29.5% survived in stage IV [5].

Death due to advanced disease progression and recurrence was found in 42.8% of patients taken for survival analysis in this series even after combined modality of treatment implying the poor survival rates found in EAC cancer patients and also higher stage of disease presentation found in this series. The reported 5 year survival in literature is between 33% and 55% [16,20,21,22]

Conclusion

Early stage squamous cell carcinoma of EAC who had upfront surgery with negative margins had good prognosis as compared to locally advanced disease who had received multimodality treatment like surgery, chemo radiation. The poor prognostic factors noted in this study were stage III & IV, positive margin, facial nerve involvement and nodal involvement.

Author Contribution

1. Literature search and Review, Design, Manuscript Editing: Ramesh Basu, DMRT, DNB, RT.
2. Data Acquisition, Literature search, Manuscript Preparation: Vijayan Sindhuja, DMRT.
3. Concept, Definition of Intellectual contents Manuscript Review: Murugaiyan Nagarajan, MD, RT.
4. Radiotherapy planning: Thangavel Sundaram, PhD

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References