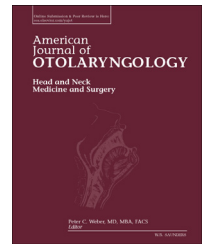


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# Use of positron emission tomography scanning in metastatic head and neck cutaneous squamous cell cancer: Does it add to patient management? ☆☆☆★

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## ABSTRACT

**Purpose:** To evaluate the impact of whole-body positron emission tomography in comparison to staging by conventional methods alone in management of patients with head and neck cutaneous squamous cell cancer (cSCC) with confirmed regional nodal metastasis.

**Materials and methods:** This is a retrospective case cohort study carried out at a tertiary referral cancer centre. The participants were thirty-one adults with head and neck cSCC and regional nodal metastasis. The original treatment plan based on conventional cross-sectional imaging and clinical examination was compared to the final treatment plan after additional PET staging to evaluate the impact of 18F-FDG PET-CT on patient management.

**Results:** Addition of 18F-FDG PET-CT did not change the management in 24/31 (77%) of patients. In four cases the 18F-FDG PET-CT failed to pick up biopsy proven metastatic disease. Two patients who had reduced extent of surgery have shown no features of regional failure after one year of follow-up.

**Conclusion:** Overall the management in majority of head and neck cSCC patients with regional metastasis does not change by addition of 18F-FDG PET-CT over conventional imaging.

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## 1. Introduction

Management of non-melanoma skin cancer (NMSC) consumes the greatest cost of any single cancer care in Australia [1]. The incidence of cutaneous basal cell cancer (CBCC) and squamous

cell cancer (cSCC) in Australia is more than five times the incidence of all other cancers combined [1]. When the body surface area is taken into account the face is the site most commonly affected by SCC in any population, [2–4] particularly the regions of the lip, ear, nose, cheek and eyelid [5].

\* Presentation: This was presented at the annual 2011 Australian Society of Otolaryngology-Head and neck Surgery meeting held in Melbourne.

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\* Ethical Consideration: The medical ethical committee of Peter MacCallum Cancer Centre approved the study.

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While NMSCs overall have a low metastatic potential, head and neck skin cSCCs have been shown to have a higher rate of regional metastasis than cSCC elsewhere. [6-8] Peri-neural invasion is more common in the head and neck region [9,10] and has been shown to be a strong predictor of loco-regional recurrence [1]. The presence of nodal metastasis is associated with poor patient outcome and about 30% of patients who develop regional metastases will die of SCC [11-13]. Distant metastasis occurs exclusively in patients with regional nodal metastasis and they rarely survive beyond two years despite aggressive treatment [1]. This underlines the importance of optimum staging in this group of patients as timely intervention may lead to improved rates of disease control.

In the context of head and neck skin cancers, the utility of fluorine-18 fluorodeoxyglucose positron emission tomography scanning (18F-FDG PET-CT) has been extensively studied for melanoma. Only a few studies have reported its use in non-melanoma skin cancers and none have looked at cSCC in the head and neck specifically. The aim of our study was to evaluate the impact of staging by whole-body 18F-FDG PET-CT in comparison to staging by conventional methods alone in management of patients with cSCC of the head and neck with confirmed regional nodal metastasis.

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## 2. Materials and methods

This is a retrospective study that included eligible patients managed at Peter MacCallum Cancer Centre (PMCC), from 1st January 2009 to 31st December 2010. Management of patients with advanced, regional head and neck cancers is decided upon by discussion at the head and neck multi disciplinary meeting. Surgery for these patients is performed by the senior author who has a special interest in management of advanced cutaneous cancer of the head and neck region. In general our philosophy is to offer selective neck dissection and/or superficial parotidectomy in patients with limited metastatic disease.

For our study we included adult patients with confirmed cSCC with regional nodal metastasis in the head and neck region. For inclusion subjects had to fulfill the following criteria: cSCC of the head and neck with regional nodal metastasis, staging Computed Tomogram (CT) and/or Magnetic Resonance Imaging (MRI) in addition to 18F-FDG PET-CT within four weeks of each other. We excluded any patient with regional nodal recurrence.

Data were collected on a custom made Microsoft Access database and analyzed by the institute's department of statistics. Eligible patients were identified from the data from the department of radiology, theatre logbook and from outpatient attendance from dermatology and the head and neck clinic. Two of the authors retrospectively reviewed data to assess eligibility.

For each patient we recorded demographics, location of primary lesion, clinical findings, mode of tissue diagnosis, CT/MRI findings, cervical level of nodal disease and staging, 18F-FDG PET-CT finding and staging, change of management based on PET findings and post operative pathology findings.

The original treatment plan was based on available information in the clinical records and was recorded after presentation and discussion of conventional cross-sectional imaging. The original treatment plan was then compared to the final treatment plan after additional 18F-FDG PET-CT staging was performed to evaluate the impact of 18F-FDG PET-CT on patient management. The change in patient management was categorized according to the criteria adopted by the department of radiology and is as follows; **none** if the scan was ignored, **low** if there was no change in intent or modality of management, **medium** if there was a change in extent of surgery or radiotherapy and **high** if there was change in intent or modality of treatment offered to the patient.

The final pathology report of patients undergoing surgery was assessed and compared to 18F-FDG PET-CT staging to determine its sensitivity and specificity.

### 2.1. Imaging

All patients had preoperative imaging that included CT and/or MRI and 18F-FDG PET-CT. Patients were fasted for 6 h prior to intravenous administration of FDG. The scanning protocol included base of brain to mid-thigh with arms raised. Imaging was performed on PET/CT scanners with attenuation correction achieved using CT data. A low dose (~80 mA) protocol was used to produce CT scans of sufficient quality for anatomical co-registration with the PET data. The scanners were calibrated and maintained to permit accurate SUV analysis. A single radiologist with special interest in 18F-FDG PET-CT scanning evaluated and reported the 18F-FDG PET-CT results.

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## 3. Results

Thirty-one cases were identified over the study period that fulfilled our inclusion criteria. This included 28 males and 3 females with a mean age of 73 (range 58 years to 87 years) years. The presence of parotid and/or cervical nodal metastasis was confirmed by fine needle aspiration biopsy (FNAC) in 22 patients, core biopsy in 3 and open biopsy/resection in 6 patients, usually prior to their referral to our center.

The primary lesion for all of these cases was in the head and neck area. This was on the scalp in 15 patients, on the face in 12 patients, on the pinna or external auditory canal in 3 patients and on the lip in 1 patient.

20 patients had had their primary cSCC excised elsewhere prior to their referral to our center, while 11 had their primary excised simultaneously with metastatic disease by our unit.

Table 1 summarizes nodal staging based on CT/MRI findings compared to staging based on 18F-FDG PET-CT.

Two patients were found to have a synchronous cancer on 18F-FDG PET-CT scan. The first patient had metastatic cSCC in his anterior neck with synchronous advanced stage cancer in the pancreas. The other patient had a parotidectomy elsewhere for metastatic cSCC and was referred for neck dissection based on a CT scan indicating metastasis in the neck. However 18F-FDG PET-CT was indicative of high uptake in a thyroid nodule (confirmed malignant on subsequent FNAC), but no disease in the neck.

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