Squamous cell carcinoma (SCC) of the oral cavity represents about 2% of all malignant neoplasms and 47% of those developing in the head and neck area. The tongue is the most common site involved, and this incidence is increasing particularly in young people, possibly related to human papillomavirus infections. Prognosis depends on the stage: the 5-year survival rate of tongue squamous cell carcinoma, whatever the T stage, is 73% in pN0 cases, 40% in patients with positive nodes without extracapsular spread (pN1 ECS-), and 29% when nodes are metastatic with extracapsular spread (pN1 ECS+: p \( \geq 0.0001 \)). Nodal micrometastases (cN0 pN1) are found in up to 50% of cN0 tongue squamous cell carcinoma patients operated on the neck. At present, no clinical, imaging staging modalities or biological markers are available to diagnose nodal micrometastases. The sentinel node biopsy has been tested since 1996 in order to find a solution to this problem. The sentinel node is the first node reached by the lymphatic stream, assuming an orderly and sequential drainage from the tumour site, and should be predictive of the nodal stage. According to the literature, sentinel node biopsy is a reliable technique in selected cN0 cases, but the procedure is still experimental and should not be performed outside validation trials. Successful application of sentinel node biopsy in the head and neck region requires surgical experience and specific technical devices, including pre-operative lymphoscintigraphy and intra-operative gamma-probe. Moreover, dynamic lymphoscintigraphy seems to be able to show the lymphatic stream from the primary tumour and could allow a selective neck dissection to be tailored thus reducing the related morbidity.

Introduction

Squamous cell carcinoma (SCC) of the oral cavity represents about 2% of all malignant neoplasms and 47% of those developing in the head and neck area. The main risk factors are alcohol and tobacco, and their effects are multiplicative. The tongue is the most common site involved, and this incidence is increasing particularly in young people, possibly related to human papillomavirus infections. Prognosis depends on the stage: mortality ranges from 10% in stage I to 70% in stage IV, and the neck is a critical point. The 5-year survival rate of tongue SCC, whatever the T stage, is 73% in pN0 cases.
40% in patients with positive nodes without extracapsular spread (pN1 ECS-), and 29% when nodes are metastatic with extracapsular spread (pN1 ECS+: p > 0.00001). The risk of neck metastasis depends on the site, size, grading, and depth of infiltration of the tumours. Metastatic neck nodes (cN1) can be diagnosed pre-operatively in up to 95% of cases by both clinical and imaging evaluation such as ultrasonography (US), computed tomography (CT), magnetic resonance (MR), positron emission tomography (PET) and fine-needle aspiration cytology (FNAC). These patients undergo neck dissection. Clinical diagnosis of negative nodes is difficult: nodal micrometastases (cN0 pN1) are found in up to 50% of cN0 tongue SCC patients operated on the neck. Neck dissection is debated in these cases because it could be an over-treatment in about half the patients, with a possible associated morbidity such as haemorrhage, nerve injury, pain, or lymphoedema; on the contrary, the wait-and-see option should be considered an under-treatment in about half the cN0 patients, whose prognosis could be worsened by this non-aggressive approach. Several non-randomised studies showed an improved survival in cN0 patients who underwent elective neck dissection. The majority of series showed that the SNB technique usually removes 2-3 sentinel nodes. All required detailed pathological investigation. The accuracy of SNB in patients with head and neck SCC is currently under investigation in a multicentre study sponsored by the American College of Surgeons Oncology Group, that compares the results of SNB with standard elective neck dissection.
Recently published preliminary results of a multicentre trial, based on the Canniesburn SNB protocol. Six centres took part in the study and enrolled 134 T1/T2 cN0 oral and oro-pharyngeal SCC. Overall, 79 cases underwent SNB to stage the neck: a subsequent neck dissection was performed only in positive sentinel nodes, while 55 patients underwent elective neck dissection synchronous to the SNB. The overall identification rate was 93% and 42 cases (34%) were upstaged from cN0 to pN1. Identification of a sentinel node and sensitivity in SCC of the floor of the mouth were 86% and 80%, respectively, compared to 97% and 100% of the other sites. This difference could be related to the close proximity of the floor of the mouth to the draining nodal basin. This leads to difficulties in identifying and harvesting the sentinel node, even when using software masking techniques and lead shields. In conclusion, in our opinion, SNB is a reliable mini-invasive technique for detecting micro-metastatic nodes. Long-term oncological results of SNB followed by clinical follow-up in patients with negative histology are not yet available.

From SNB to Radio-guided Selective Neck Dissection

Neck dissection should be performed, also in cN0 and SNB-negative patients, when removal of the tumour or reconstructive surgical procedures for oral SCC include access through the neck. In these cases, extension of surgery on the neck remains controversial; in particular, there is no agreement concerning which levels should be removed. To answer these issues, we evaluated whether lympho-scintigraphy can supply complete mapping of the lymphatic drainage before surgery, in order to plan reliable selective neck dissection tailored to each patient. A low-weight tracer (colloidal sulphide particle size < 50 nm) was used to obtain this dynamic evaluation. Each cN0 patient received a maximum total activity of 40 MBq in 3 injections around the primary lesion, with an injected volume of 0.1 ml for each aliquot. After injection, patients were instructed to rinse their mouths thoroughly with tap water, to remove any residual radiocolloid. A dynamic acquisition was started after administration of colloids for 15 minutes in anterior view (30 seconds/frame). Static images of the head and neck in anterior and lateral views were acquired 30 minutes and again 2 hours after injection. A single photon emission tomography-computed tomography (SPECT-CT) was performed after delayed static images, in order to carefully localise the anatomical position of the lymph node(s) draining the injection area. This system allows simultaneous acquisition of anatomical and functional information. Post-operative images were compared with the pre-operative lympho-scintigraphy and the pathological findings. Preliminary results on 11 patients suggest that dynamic lympho-scintigraphy is able to supply complete mapping of the lymphatic drainage before surgery, thus making it possible to tailor a selective neck dissection for each patient, sparing healthy lymphatic tissue and reducing surgery-related morbidity.

Conclusion

Prognosis of oral SCC becomes worse as nodal involvement increases; in cN1 pN1 cases, neck dissection is potentially curative with a low morbidity. Management of cN0 patients remains controversial since up to 50% are cN0 pN1. SNB is a reliable technique in selected cN0 cases, but the procedure is still experimental and should not be performed outside validation trials. Successful application of SNB in the head and neck region requires surgical experience and specific technical devices, including pre-operative lympho-scintigraphy and intra-operative gamma-probe. Moreover, dynamic lympho-scintigraphy would appear to show the lymphatic stream from the primary tumour and could thus allow selective neck dissection to be tailored reducing the related morbidity.

References


