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REVIEW

Site-specific lymphatic mapping relative to lingual septum in localizing the regional lymph nodes of tongue - an animal study

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Tongue carcinoma;
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Abstract
Background and Objectives: With technical adaptations, recent studies showed SLNB could predict cervical nodes status of head and neck carcinoma with high accuracy. However, as for tongue carcinoma, such technical adaptations seem to be not enough because the tongue has peculiar characteristic which may demand a specific procedure for accurate lymphatic mapping. This investigation explored the effect of lingual septum on lymphatic mapping of tongue to provide data for achieving an accurate lymphatic mapping for managing early tongue carcinoma.
Methods: Four doses of Methylene Blue were injected into various parts of 64 rabbits' tongue, then diffusion range of Methylene Blue in tongue and sites of cervical nodes stained blue were noted. Finally, the tongues were resected for further histological examination and morphometric assessments.
Results: There was lingual septum in the tongue and the diffusing of Methylene Blue could be terminated by lingual septum. Blue-stained nodes were identified in 84 lateral necks of 60 rabbits.
Conclusions: A site-specific way of lymphatic mapping relative to lingual septum should be developed for staging early tongue carcinoma.

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Contents

Introduction

Squamous cell carcinoma of the tongue (SCT) with clinically negative neck (cN0) may have an up to 50% incidence rate of occult cervical node metastases [1]. However, treatment of their necks is still debated: most surgeons perform elective neck dissection or neck irradiation in all N0 cases to offer the best chance of cure [2,3], while others prefer a wait-and-see policy treating the neck only when a metastatic node is detected clinically: in this way, the associated morbidity is avoided in cases (at least 50%) with disease-free neck [4]. Yet, in compliance with an important medical discipline called evidence-based practice, treatment of the cervical nodes in cN0 SCT patients should be done based on accurate nodal status of the neck [5].

Then how can we predict the accurate nodal status of neck before management of it? In theory, techniques such as sentinel lymph node biopsy (SLNB) or lymphadenectomy based on lymphatic mapping bear the promise; many recently published studies applying these techniques as a staging tool to head and neck cancer also reported high reliability and accuracy [6—10], even some consensus has been achieved on methodological requirements [11,12]. However, such a consensus seems not a finished one, and there is still a long way to cover before they can be widely used in clinically managing head and neck cancers [13]. Why? The reason for it seems that while these techniques in general have a role in all solid tumors, specific technical details are needed when certain site's squamous cell carcinoma is concerned [13—15]. It would be no wonder considering that they all have their own site-specific topographical anatomy [15—17]. This pilot study has explored the effects of lingual septum on tongue lymph mapping by animal experiment and suggested that site-specific methodological requirements be needed if lymph mapping was to be applied as an accurate staging tool in managing the neck of patients with cN0 SCT.

Materials and methods

Animals and group design

Sixty-four healthy adult Japanese rabbits were used and all experimental procedures were approved by the Animal Research Committee of Shanghai Jiao Tong University. The rabbits were grouped as following: first, they were randomly divided into four equal site-groups, each with 16 rabbits, named respectively as group tongue-tip, group tongue-lateral, group tongue-centre and group tongue-root according to the site where Methylene Blue (MB) would be injected while experimenting; then each site-group was subdivided equally into four dose-groups named 0.1 ml group, 0.2 ml group, 0.3 ml group and 0.4 ml group, the 4 rabbits in each dose-group would be injected corresponding dose of MB during experiment.

Animal experiment

After being administered 3% of Amobarbital (Sheng Q plant, Shanghai Pharma-centical Inc. of China General Group, Shanghai, China; 30 mg/kg) through ear-marginal vein as anesthesia, the rabbit was fixed face-up and the size of tongue was measured (width & length); then with a fine needle punctured vertically into the tissue through middle point of median sulcus on the dorsum linguae in tongue-centre group or horizontally into respective lingual margin