Multi-Slice Computed Tomography Imaging of Oral and Oropharyngeal Cancer

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Abstract

In most cases, the volume of formations localized on the mucous membranes of the head and neck is squamous cell carcinoma. The purpose of medical imaging is not only to determine the histological structure of the formation but also to assess its spread into the surrounding tissues in order to determine the disease stage and pathology for treatment.

Study Aim: To study the multi-slice computed tomography (MSCT) semiotics of oral and oropharyngeal cancer.

Materials and Methods: MSCT was performed in spiral mode using a Somatom Emotion 6 (Siemens, Germany). In the process of postprocessing, mandatory evaluations of multiplanar reformed (MPR) images in the sagittal and frontal as well as oblique projections were performed. To determine the boundary of the volume formation, the degree of adhesion to the surrounding structure, and the expansion of the neoplasm, MSCT with intravenous contrast was performed in 13 patients. The scanning area included the area from the base of the skull to the jugular notch. Thirty patients (25 men, 5 women) from 41 to 73 years old were examined. MSCT results in all cases were compared with histological data.

Results: Of the 30 total patients, 12 (40%) had a tumor localized in the area of the tongue, 6 (20%) in the area of the bottom of the oral cavity, 7 (23.3%) at the tonsils, 3 (10%) at the soft palate, 1 (3.4%) at the alveolar process. Regarding the tumor advancement, 12 patients had stage T3 (40%), 7 had stage T4 (23.3%), 9 had stage T2 (30%), and 2 had stage T1 (6.4%). Regarding the degree of lymph node lesion, 14 had stage N1 (46.7%), 10 had stage N2 (33.3%), and 2 had stage N3 (6.7%). In 2 cases (6.7%), a lesion of the lower jaw was detected.

It was found that the MSCT semiotics of oral and oropharyngeal cancer corresponded to the magnetic resonance imaging (MRI) semiotics and included direct and indirect signs. Direct signs of the formation of malignant were volumetric proliferation of pathological tissue, thinning of the fat layer or complete obliteration of fat spaces, infiltration of muscle tissue and bone destruction. Indirect signs were structural heterogeneity of the tissue (in the presence of necrosis) and changes in density indicators after the introduction of a contrast agent during MSCT.

Figure 1: Patient K., 68 years old. Oropharynx MSCT in axial projection: A. Native study, B. With intravenous bolus contrast. A small infiltrative tumor of the oropharynx (left palatine tonsil stage T1). The boundaries of the tumor are not differentiated, the accumulation of contrast is weak (density indicators in the native phase of the study are 45 units.N; after intravenous bolus amplification: 56 units.H). The displacement of the left wall of the oropharynx, the smoothness of the contour (arrows) is determined.
Contrast accumulates moderately. The accumulation of contrast by lymphoid tissue can complicate the diagnosis. The key to the correct diagnosis and determination of the extent of tumor spread is understanding the anatomy of the cellular spaces and layers of the neck.

Using MSCT, it was difficult to detect small tumors (stage N1) and their borders due to the low contrast as well as presence of neoplasms with superficial spread. At the same time, 72.0% of the examined patients had stage T3 or T4 tumor advancement, and after additional administration of a contrast agent, the tumor contrast increased. With the increase in the size of the tumor, heterogeneity of amplification was observed due to the presence of necrosis.

The fat spaces of the hyoid region in the normal state are a symmetrical zone of low density between the maxillofacial and chin-hyoid muscles. Obliteration of the fatty spaces of the sublingual area serves as the main indicator of a tumor lesion when small formations of the bottom of the oral cavity are detected.
In some cases, visualization was facilitated by the presence of an ulcerative defect in the structure of the tumor. In all tumors of stages T3 or T4, an increase in density was determined after the introduction of a contrast agent, with the edges clearly visualized relative to the surrounding tissues. In all tumors of stages T3 or T4, it was possible to determine the size of the tumor and assess its infiltration and spread to neighboring zones as well as beyond the median line.

**Conclusion**

MSCT is highly effective for detecting tumors of the oral cavity and oropharynx as well as for assessing the extent of the spread of tumor advancement. However, the algorithm concerning radiation diagnostics for patients with malignant formations of the oral cavity and oropharynx should include an MSCT study with intravenous bolus contrast.

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**References**


