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Value of intraoperative ultrasonography in tonsil cancer☆

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ABSTRACT

Background: The exact assessment of a tonsil carcinoma's size is often difficult because of the tumour's submucosal extension and deep infiltration.
Aim: The aim of the study is to assess the usefulness of intraoperative ultrasonography in tonsil cancer.
Material: Twenty patients with carcinoma of the tonsil were included in the study (squamous cell carcinoma keratosis – 12, squamous cell carcinoma akeratosis – 6, diffuse large B cell lymphoma – 1, neoplasma malignum microcellulare – 1).
Method: Transcutaneous, endoscopic, and intraoperative ultrasonography were performed using a linear 7.5 MHz probe.
Results: The difference in the results was statistically significant between palpation examination and intraoperative ultrasonographic examination, between transcutaneous ultrasonographic examination and intraoperative ultrasonographic examination, and between endoscopic ultrasonographic examination and intraoperative ultrasonographic examination in tonsil tumours. Generally, tumour size assessed by intraoperative ultrasonography was more advanced than those assessed by other methods.
Conclusions: Intraoperative ultrasonography is a safe, non-invasive method, which can be repeated at every stage of surgery. There were no contraindications or side effects. In all cases histological margins corresponded to sonographic margins. Intraoperative ultrasonography provides a quick and reliable orientation during resection of tonsil carcinoma.

1. Background

In Poland, the most frequent location of the cancerous process is the respiratory system. In the material of the Otolaryngological Clinic in Poznań covering 1980–1999 tonsil cancer accounted for 34.8% of all oral cavity cancers and oropharynx cancers.[1] The peak incidence of oral cavity cancers and oropharynx cancers falls in the fifth, sixth and seventh decades of life in men (the sixth being most common) and a little later in women. At the same time men suffer from these cancers – according to various authors – from 2 to 4 times more often than women.[2] Oral cavity cancers and oropharynx cancers belong to the group of tobacco-related cancers.[1]

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The second fundamental and independent aetiological factor is alcohol abuse, with exposure to both factors causing a multiplicative increase in the risk of cancer development.[1] Human papilloma viruses (HPV) – most often HPV 16 and HPV 18 – and also Ebstein-Barr (EBV) virus are among the most important carcinogenic factors.

Oral cavity cancer and oropharynx cancer are characterized by rapid growth and clinical malignancy. The lesions remain painless for a long time, and in consequence patients go to see doctors late with very advanced cancers. The "silent" nature of the carcinoma means that its first noticed symptom may be enlarged neck lymph nodes.[1] In tonsil cancer early symptoms are a sensation of itching and burning throat, and obstructed airway. With progression of the lesions the symptoms become similar to those of tongue cancer, dominated by pain while swallowing, otalgia and increasing trismus.[1] Asymmetry of the tonsils is notable. Frequently observed are exophytic hard masses or ulcers extending deep into the tonsil and its capsule.[1]

Spread of cancer by metastases involves mainly the lymphatic system of the neck. The metastases usually affect neck lymph nodes of levels I, II, and III. Depending on the stage of progression, in 30–60% of patients lymph node metastases are observed at the moment of diagnosis/visiting a doctor.[1]

The scheme of treatment of oral cavity cancer and oropharynx cancer comprises surgical treatment and radiotherapy. In the case of early-stage cancers (T1, T2) radiotherapy[3] or surgery[4] is recommended. In patients with more advanced cancer, the use of the classical method of surgical treatment supplemented with post-operative radiotherapy[4,5] seems to be advisable.

Tonsil tumours are still a diagnostic challenge. Submucosal extension of a tumour and palmate projections infiltrating healthy tissues frequently prevent a correct assessment of the extent of the process in the palpation examination. Helbig et al. state that agreement of the assessment of tumour extent in palpation and histopathological examination is only 40%.[9] On one hand, as they state, the size of the tumour in the palpation examination was usually larger than its real size in the histopathological examination, which led to an increase of the resection area and as a result may have caused complications such as major articulation or swallowing disorders. On the other hand, it was difficult to assess the extent of infiltration in the case of small tumours through the palpation examination, which could have led in extreme cases to non-radical removal of the lesion. Therefore, in order to correctly assess the tumour extent various imaging methods are used. Because of the great accessibility and low costs of the examination, the most common method of imaging head and neck tumours is currently ultrasonography.[10] A method enabling placement of the probe directly on the organ we want to image is intraoperative ultrasonography.

2. Aim

The aim of the study is to assess the usefulness of intraoperative ultrasonography in tonsil cancer.

3. Material

Twenty patients diagnosed on the basis of clinical imaging and histopathological examination with tonsil cancer were included in the study (Table 1). These patients were surgically treated in the Department of Head and Neck Surgery and Laryngological Oncology of the Greater Poland Cancer Centre during the period 2007–2009.

Apart from the interview and physical examination, transcutaneous and endoscopic ultrasonography were routinely performed in every patient.

In each case the clinical diagnosis was confirmed with a histopathological biopsy assessed in the Pathology Department of the Greater Poland Cancer Centre. Then the patient underwent surgery during which ultrasonography was performed. Tissue removed during the surgery was sent for histopathological assessment to verify the diagnosis and assess cleanness of margins.

4. Method

The ultrasonographic examination was performed at each stage with Aloka SSD 500 apparatus using a 7.5 MHz linear probe with 39 mm transducer surface.

During each ultrasonographic examination the following parameters were assessed: location and extent of infiltration; echogenicity (decreased, increased); echo structure (homogeneous, heterogeneous); contour (smooth, polycyclic, blurred); infiltration of neighbouring anatomical structures; presence of satellite foci.

Additionally, in the intraoperative ultrasonography margins of lesions were assessed and tissue echogenicity after completion of tumour resection was evaluated.

5. Results

A total number of 20 patients were assessed by palpation and intraoperative ultrasonography. With the palpation technique, four patients were assessed as tumour size T1, 10 as T2, three as T3, and three as T4. By intraoperative USG two patients were assessed as T1, eight as T2, four as T3, and six as T4. Generally tumour sizes assessed by intraoperative USG were more advanced than those assessed by palpation (Table 2).

A total number of 15 patients were assessed by transcutaneus USG and intraoperative USG. With the transcutaneus

Table 1 – Material.

Women			Men			Total		
n (%)	Average age	Age group range	*n* (%)	Average age	Age group range	*n* (%)	Average age	Age group range
5 (23.8%)	55.6	51–68	15 (76.2%)	54.0	12–81	20	54.8	12–81