

Summary:

Larynx plays a key role in the process of voice creating. Operations, especially in the region of the glottis, have a negative impact on postoperative voice quality. The ability to develop an effective compensatory mechanism ensures the creation of a voice after the procedure. The aim of the study is to assess the usefulness of the technique: High Speed Digital Imagine (HSDI) in the diagnosis of voice disorders after carbon dioxide (CO₂) laser cordectomy (Type III-V) with an extended scope of resection in the treatment of vocal fold cancer. In the assessment of voice quality, subjective methods were used (indirect laryngoscopy, vocal setting, VHI and GRBAS scale), objective (MPT, volume range, VLSS, HSDI) and acoustic testing. The study included a group of 29 patients (I study group) treated surgically by carbon dioxide laser chordectomy (type III-V) due to vocal fold cancer (T1N0M0). The control group (II group) consisted of 30 people with physiological (euphonic) voice record. The HSDI technique allowed for an objective assessment of the actual vibrations of vocal folds and visualization of the glottis configuration in the group of operated patients. The most common compensatory mechanism was between the healthy vocal fold and the vestibular fold on the opposite side or with the scar of the operated vocal fold. The HSDI technique demonstrated the existence of an effective compensatory mechanism in the larynx, which was confirmed by the results of GRBAS voice quality assessment. The HSDI method uniquely defined the parameters in assessment of the vocal folds mobility and the value of the OQ coefficient, confirming objectively the diagnosis of vocal fold insufficiency recorded with the VLSS technique. In the study group (group I) the most frequently recorded types in Chhetri Classification were IV⁰ and III⁰, which confirmed high level of patients satisfaction. Carbon dioxide laser cordectomy type III-V caused significant deterioration of the voice quality in the perceptual and acoustic assessment, but enabled effective communication with the environment and satisfaction in the assessment of patients. The results of voice quality assessment using the VHI questionnaire indicated satisfaction and acceptance of the voice by the majority of patients and the level of voice disability was assessed usually as low or medium. The hoarseness and roughness of the voice in the assessment of the perceptual GRBAS scale coexist with statistically significant maximal phonation time (MPT) value and the increase in fundamental frequency (F₀) (as parameters of acoustic evaluation of the voice). The reasons of the above mentioned results were caused by aperiodicity of

vibration and reduction in the mass of the operated vocal fold. HSDI technique recorded detailed visualization. Laser cordectomy type V with additional tissue resection at the level of anterior commissure had negative impact on voice quality despite the absence of a statistically significant difference in the acoustic assessment of the voice. The HSDI technique is an excellent diagnostic tool and should be used in the visualization, objective evaluation of the compensatory mechanism in patients treated with extended laser chordectomy.