

# Laryngocele mieszane – opis przypadku i aspekty foniatryczne

## Mixed laryngocoele – case report and phoniatic aspects

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**Wprowadzenie.** Pod pojęciem laryngocoele rozumiemy przepuklinę błony śluzowej krtani wypełnioną najczęściej powietrzem, rzadziej wydzieliną śluzową lub ropną, rozpoczynającą się w obrębie przedniej części kieszonki krtaniowej zwanej woreczkiem krtaniowym. Laryngocoele jest rzadkim schorzeniem krtani spowodowanym zwiększeniem ciśnienia wewnątrzkraniowego.

**Opis przypadku.** Autorzy przedstawiają opis przypadku mieszanego laryngocoele u 35-letniego mężczyzny. Głównym zgłaszanym objawem była chrypka, konieczność częstego odchrząkiwania wydzieliny, uczucie ciała obcego w krtani oraz narastająca stopniowo od kilku miesięcy duszność spoczynkowa i wysiłkowa. W badaniu fizykalnym stwierdzono znaczne uwypuklenie prawej kieszonki krtaniowej po stronie prawej obturujące światło krtani i całkowicie przesłaniające fałd głosowy oraz guz szyi powiększający się przy próbie Valsalvy. Pacjent postęgiwał się głosem o barwie matowej, bez hiperkinetyzy szyjnej, z uczynnianiem rezonatorów nasady. Czas fonacji wynosił 20 sekund. Wykonano dokładną diagnostykę obrazową (TK, NMR). Przeprowadzono analizę akustyczną głosu stwierdzając wzmocnienie tonu podstawowego oraz niewielką komponentę szumową. Chory leczony był operacyjnie z dojścia zewnętrznego. Przedstawiono zdjęcia wnętrza krtani przed i po leczeniu operacyjnym.

**Wnioski.** Leczenie operacyjne torbieli kieszonki krtaniowej zapewnia trwałe wyleczenie tego schorzenia. Jednakże, ze względu na opisywane w literaturze współistnienie laryngocoele z rakiem (4% przypadków) konieczna jest długotrwała obserwacja pooperacyjna.

**Słowa kluczowe:** laryngocoele, fonacja przedśionkowa, spektrograficzna i widmowa analiza głosu

**Introduction.** Laryngocoele represents a saccular dilatation of the larynx ventricle filled usually with air, less frequently with mucous or purulent secretion. Laryngocoele is a rare larynx pathology caused by increased intralaryngeal pressure.

**Case report.** The authors describe a rare case of mixed pneumolaryngocoele in a 35-year patient. The primary symptoms reported by the patient included hoarse voice, frequent throat cleaning, sensation of lump in the throat, and effort/resting dyspnoea increasing since several months. Physical examination revealed a right side laryngeal sac bulge obturating laryngeal lumen and completely covering the vocal fold, and a neck tumour increasing during the Valsalva test. Patient's voice was flat, without neck muscle hyperfunction, and with normal activation of supraglottic resonators. Phonation time was 20-second. Imaging diagnostics (TK, NMR) was performed, as well as acoustic voice analysis. The latter showed an increased strength of fundamental tone and light noise component. The patient was operated by an external approach. Images of larynx taken before and after the surgery are presented. Surgical treatment of laryngocoele ensures permanent recovery. However, literature data show that 4% of laryngocoele cases are accompanied by cancer and, therefore, prolonged follow-up is necessary.

**Key words:** laryngocoele, voice pathology, ventricular phonation, spectrographic and spectral method of voice analysis

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## INTRODUCTION

Laryngocoele is a cystic distension concerning lumen of the laryngeal sacculle that is a blindly ended bulge of anterior 1/3 part of fundus of the

laryngeal ventricle. Laryngocoele length is 15mm and it runs upwards between vestibular fold of the larynx and lamina of the thyroid cartilage – to its upper margin or above [1].

Possibility that abnormality origin occurred during embryonal period is considered in laryngocele etiopathogenesis. Congenital anatomical anomalies predispose to form valvar mechanism with increased pressure and to form laryngocele [2].

Laryngocele can be asymptomatic or can cause hoarseness, cough, dyspnoea, dysphagia, feeling of obstruction in the throat. External laryngocele presents as elastic neck tumor. Diagnosis of laryngocele can be established on the base of anamnesis, indirect and direct laryngoscopy, laryngostroboscopy and results of radiological examinations – CT [3,4]. Valsalva test is helpful to establish diagnosis, because bulge on the neck arises or increases during the test [1].

Laryngocele is differentiated with: prolapse of the laryngeal ventricle, cyst of the mucous glands within false vocal fold, the larynx neoplasms, branchiogenous cysts, non specific inflammations [2,3].

Treatment of laryngocele is exclusively operative, but selection of operation type depends on lesion size and localization. Small-sized internal laryngocele can be removed using direct laryngoscopy. The most effective form of treatment needs external operative access. The essence of operation consists in dissection of cyst together with its stalk, cutting and provision close at the entry to the laryngeal ventricle [1,2].

## CASE REPORT

Patient L. K. aged 35, reported symptoms: hoarseness, cough, throat's pain, necessity of persistent swallowing the secretion, feeling of obstruction in the larynx and gradually for several months increasing effort and rest dyspnoea.

Physical examination revealed significant bulge of the right laryngeal ventricle obstructing the larynx lumen and completely covered vocal fold. Examination also showed the neck tumor enlarging during Valsalva test.

Patient used voice of flat timbre, without cervical hyperkineses, with activation of base resonators and with phonation time of 20s. Patient chronically used ventricular phonation during speech. Acoustic voice analysis was performed, finding increased fundamental frequency and inconsiderable noise component part. The objective acoustic analysis of the patient's voice has been carried out by recording the audible signal on magnetic tape. For the purpose of recording, measurement tape recorder type Nagra IV SJ by Kudelski SA has been used. Then, the recorded signal has been processed in laboratory conditions, using for that purpose

the sound analysers type 2034 and 2133, as well as plotter produced by Bruel & Kjaer, using the technique of signal processing and spectral analysis in the Department of Technical Acoustics, Laser Technology, and Radiometry of the Main Institute of Mining, Katowice, Poland. (Zakład Akustyki Technicznej, Techniki Laserowej i Radiometrii Głównego Instytutu Górnictwa). The verbal test applied by us, performed for our patient, has been composed of two parts:

1. Spectral analysis (cross-section) for the vowel "a" – the vowel "a" pronounced three times in isolation has been recorded and transformed into digital form
2. Spectrographic analysis of the test sentence „the first two days of autumn”

The field contained under the diagram constitutes the acoustic energy used for uttering the vowel/phoneme "a".

As can be seen, the amount of generated acoustic energy (the shape of the acoustic spectrum) is very substantial in the full range of frequencies, which means that the laryngocele because of increase of the elasticity of the laryngeal pouch tissues filled with air causes increased acoustic energy generated by the larynx, while the degree of dysphonia is substantial.

On the other hand, the spectrographic analysis of the test sentence revealed very poorly developed harmony and intonation structure and speech signal, with accompanying substantial noise component.

CT of the larynx revealed the presence of laryngocele on the right side, of diameter about 2,5-3cm, placed in soft tissues of the neck on the right side with perforation of the thyrohyoid membrane. Air and thick secretion were visible within laryngocele. This lesion directly adhered to the parotid gland on the right side, partially adhered to the thyroid cartilage and directly adhered and partially comprised the hyoid bone on this side. Laryngocele also caused asymmetry of soft tissues in the subglottic region with their paracentral bulging into the larynx. Described above laryngocele directly borders on the common carotid artery on the left side and the external carotid artery, but it also causes modelling of the jugular vein. Above all, laryngocele causes lateral and anterior flexion of the major horn of the hyoid bone on the right side.

Patient was operated on using external approach.

Result of post-operation histopathological examination was: 1886/2006/H: Cystis in stadio inflammationis.

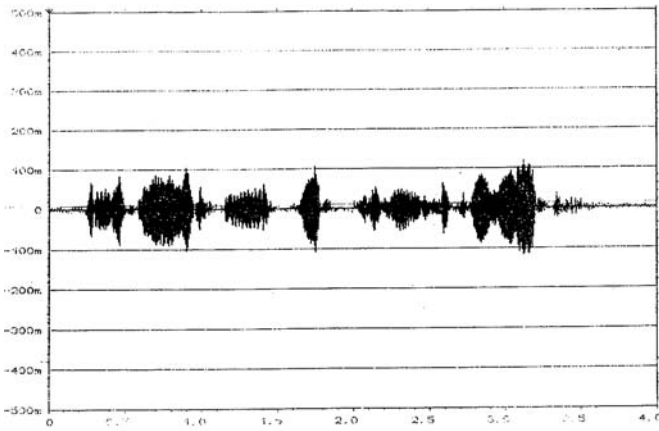


Fig. 1. Spectrographic analysis of test sentence: “The first two days of the autumn”. Very poorly developed harmony and intonation structure, with substantial noise component can be seen. Horizontal axis presents the distribution of acoustic energy in time (up to 4 seconds), while the vertical axis shows the amplitude expressed in mV.

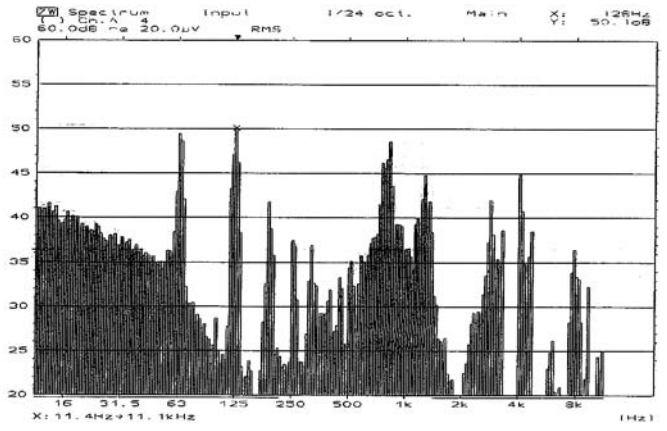


Fig. 2. Spectral cross-section of vowel “a” in treated patient before surgery. Diagram of the dependence between the increase of acoustic pressure in dB SPL on the frequency in ranges of 1/24 of octave, from 11.4 Hz to 11.1 kHz. Huge amount of emitted acoustic energy can be seen.

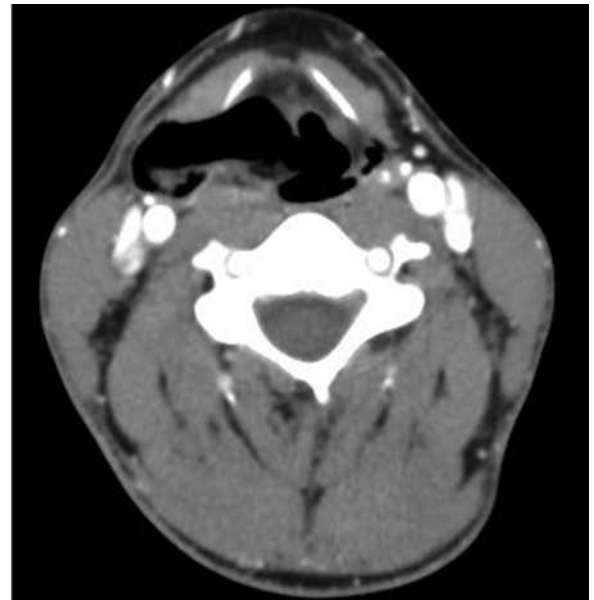
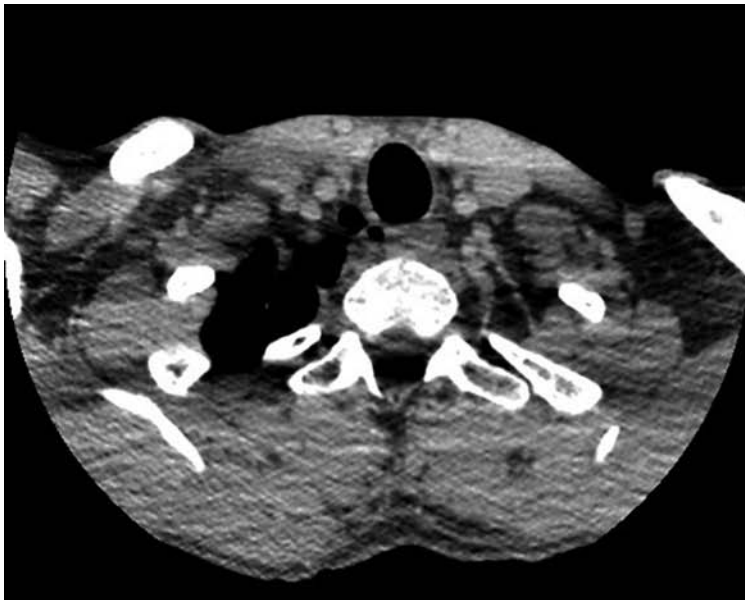


Fig. 3. The larynx CT examination



Fig. 4. Laryngoscopy image before (A) and after (B) operation

## DISCUSSION

Laryngocele is a rare disease – an abnormal saccule dilatation of the ventricle in direct communication with the laryngeal lumen. The first description of laryngocele was provided in 1829 by Larrey, who as a surgeon of the Napoleon army in Egypt noticed the occurrence of elastic bulging on the necks of Egyptian street tub-thumpers, blind Koran singers, and soldiers' drill instructors.

Authors describe case of mixed laryngocele in aspects of abnormalities of voice [5,6]. The laryngocele often caused of ventricular phonation. The increasing of intralaryngeal pressure caused exposing the ventricles to pathologically high air pressure. Surgical procedures – removing of ventricle dilatation - restore proper anatomical configuration and correct intralaryngeal air pressure. Then voice is again physiological create by vocal fold occlusion.

Considering possibility of the larynx cancer coexistence with laryngocele (4%), authors emphasize necessity to analyze histopathological examination of postoperative material and long-term postoperative care for patient [4].

Computer tomography is at present the best method for detection of laryngoceles (both symptomatic and asymptomatic), allowing also to establish differential diagnosis by comparing it with other conditions (branchiogenic cyst, neoplastic lesions). All authors indicate the role of accessory examinations – imaging diagnostics (CT of the larynx) in diagnosis, differentiation and planning technique of laryngocele surgery treatment [1,7,8].

Internal laryngoceles in many cases do not result in any complaints and are detected by accident, however, sometimes they are the underlying cause of acute or chronic respiratory insufficiency [9].

## Piśmiennictwo

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