

Magdalena Zaborowska-Szmit, Aleksandra Piórek, Dariusz M Kowalski, Maciej Krzakowski

Department of Lung and Thoracic Cancers, Maria Skłodowska-Curie Institute — Oncology Center in Warsaw

Tracheal cancer in a 25-year-old woman — diagnostic difficulties

Address for correspondence:

Dr n. med. Magdalena Zaborowska-Szmit
 Klinika Nowotworów Płuca i Klatki Piersiowej
 Centrum Onkologii — Instytut
 im. M. Skłodowskiej-Curie w Warszawie
 ul. Wawelska 15B, 02–034 Warszawa
 e-mail: m.zaborowska3@gmail.com

Oncology in Clinical Practice
 2018, Vol. 14, No. 5, 286–289
 DOI: 10.5603/OCP.2018.0037
 Translation: dr n. med. Dariusz Stencel
 Copyright © 2018 Via Medica
 ISSN 2450–1654

ABSTRACT

Tracheal cancers, in particular adenoid cystic carcinoma, are rare, hence the lack of unambiguous guidelines for diagnostic and therapeutic procedures. The article presents the case of a 25-year-old woman diagnosed at the stage of local advancement, after 2 years of treatment of misdiagnosed bronchial asthma. The patient underwent surgical treatment, which turned out to be non-radical microscopically. The decision to use postoperative radiotherapy was based on the estimated recurrence risk.

Key words: tracheal cancer, adenoid cystic carcinoma, postoperative radiotherapy, bronchial asthma

Oncol Clin Pract 2018; 14, 5: 286–289

Introduction

Tracheal cancers are rare; they account for 0.1 to 0.4% of all thoracic proliferative diseases [1] and in 60–83% of cases have a malignant nature [2]. The most common tracheal cancer is squamous cell carcinoma. The second most frequent is derived from the salivary glands. The frequency of tracheal cancer is the same in both sexes, and the average age of onset is in 4th–5th decade of life. The occurrence of cancer in a person aged 25 years is not only a great rarity, but also a serious diagnostic and therapeutic challenge.

Case report

A 23-year-old female patient — physically very active, without obesity, never smoking, no history of recurrent respiratory infections — started in 2011 to report for further specialist medical consultations due to wheezing, coughing, and effort dyspnoea. Based on medical history and spirometry, bronchial asthma was diagnosed. The patient received bronchodilators with no significant improvement. In spite of progressive loss of body weight by about 19 kg during the following year,

thoracic imaging tests were not performed. After two years of symptom duration, the patient was emergently admitted to the regional hospital due to increasing respiratory failure in the course of bilateral pneumothorax and subcutaneous emphysema.

After initial diagnosis in emergency and surgery departments, the patient was referred to an oncological reference centre with suspected trachea cancer. The bronchoscopy and computed tomography (CT) of the chest (Table 1) confirmed the preliminary diagnosis. Based on material sampled during bronchoscopy, adenoid cystic tracheal carcinoma (carcinoma adenoides cysticum tracheae) was diagnosed. Subsequent sternotomy was performed with segmental resection of the trachea together with the tumour. Pathomorphological examination of postoperative material confirmed the presence of adenoid cystic carcinoma and showed that the resection was non-radical microscopically (R1 feature).

A multidisciplinary team decided to qualify the patient for postoperative adjuvant radiotherapy. Under conditions X 6MeV from four oblique fields, a dose of 6600 cGy in fractionation at 200 cGy/t was administered to the mediastinal area with the R1 feature. The patient remained under observation. In January 2015, after 17 months of observation, computed tomography of the

Table 1. Description of computed tomography imaging and bronchoscopy (basic evaluations in diagnosis of tracheal cancer)

Imaging tests	Description
Chest computed tomography (19.04.2013)	Approximately 4.5 cm below the vocal folds, the membranous part and lateral wall of the cartilaginous part of trachea on the right side and some segments of frontal wall deformed by irregular nodular changes of app. 16 mm thick, extending over a length of app. 3.5 cm Tracheal lumen narrowed to 11 mm in the antero-posterior dimension The lesions include the pre-vertebral space closely adhering to vertebral bodies Th1 and Th2 and oesophagus — in the study without contrast, the oesophagus is non-separable
Bronchoscopy (18.04.2013)	In the middle section of the trachea, on a length of 4 cm, visible tumour masses including the frontal, lateral, right and posterior walls. The tracheal lumen in this section is slightly narrowed

Table 2. Diagnostic and therapeutic procedures in presented patient

Examinations for cancer detection	Chest CT, bronchoscopy, tumour biopsy, histopathological examination and IHC
Differential diagnosis	Symptomatology: asthma, chronic bronchitis Imaging study: thymic cancer, embryonal carcinoma, tracheal squamous carcinoma, lymphoma
Management	Segmental resection of trachea from a sternotomy approach with complementary radiotherapy
Results and observation	The treatment was terminated without early complications. After 17 months of observation, the disease progressed

chest revealed disease progression in the form of dissemination to both lungs (multiple, minor metastases in the parenchyma of both lungs). From February to April 2015, the patient underwent chemotherapy with four cycles of carboplatin and paclitaxel, with subsequent disease stabilisation according to the RECIST 1.1 criteria. The patient underwent further observation. In the imaging studies, a slight increase in metastatic changes in both lungs was observed as part of the stabilisation according to the RECIST 1.1 criteria.

Discussion

Salivary-type neoplasms, which include adenoid cystic carcinoma, derive from small salivary glands and serous glands present in the submucosa of the trachea. Adenoid cystic carcinoma is the second most common histopathologic type of tumour originally developing in the trachea and accounts for one third of all tumours in this localisation [11]. It most often develops in people in the fourth and fifth decade of life and occurs with similar frequency in men and women [9]. The ethology is unknown. Cancer is not associated with smoking. The disease is usually diagnosed late due to the large functional reserve of tracheal lumen. The first symptoms appear only when it is closed in 50–75% [9]. In addition, the presented symptoms are non-specific and may lead to a misdiagnosis of asthma, chronic obstructive pulmonary disease, or bronchitis, which often causes delay of diagnosis for up to several months [9].

In the presented case the patient was treated for two years due to bronchial asthma. The diagnosis was not extended despite the lack of treatment effectiveness and the accompanying significant body weight loss. The diagnosis was made only when the patient was hospitalised in a life-threatening condition.

Symptoms such as exercise dyspnoea or wheezing and not responding to bronchodilators should arouse oncological alertness and lead to extended diagnosis. The basis for diagnostics is direct visualisation of the airways or with use of imaging examinations. Computed tomography is a standard technique of tracheal imaging helpful in the diagnosis and assessment of cancer stage, including involvement of neighbouring and distant structures. In some situations (e.g. localisation of lesion in lung apex) magnetic resonance imaging may have an advantage in assessing the local cancer extent. Conventional X-ray examination is not a recommended test because tracheal tumours can be easily omitted (abnormalities are visible only in 1/3 of patients) [9, 13]. Diagnosis is based mainly on bronchoscopy, which allows precise location and determination of the extent of the lesion and the collection of a tissue sample for pathomorphological examination. Macroscopically, adenoid cystic tracheal carcinoma is usually in the form of an exophytic tumour and leads to narrowing of tracheal lumen [12]. Characteristics of this cancer include spreading along the nerves and the possibility of relapse after radical surgery. Only in 10% of patients are metastases in regional lymph nodes or distant organs present at diagnosis [9].

The presented patient was diagnosed with locally advanced cancer. The main method of treatment in this case is surgical treatment. An important prognostic factor in patients with tracheal cancer is not only the initial stage of disease, but also the completeness of surgical resection (often difficult to achieve due to the characteristic growth of cancer).

A report by Maziak et al., based on their experience from treatment of 38 patients with tracheal adenoid cystic carcinomas, showed that the average overall survival in this group of patients depends mainly on surgery radicality. In patients undergoing radical resection the median survival time was 9.8 years, and in patients undergoing incomplete resection it reached 7.5 years. Ten-year survival rate was 69% in patients undergoing total resection and 30% in subjects undergoing incomplete resection, respectively [6].

Honings et al. described 108 cases of patients with tracheal adenoid cystic carcinomas. The aim of this report was to determine the prognostic value of surgery radicality and postoperative pathomorphological evaluation. Nine patients (8.3%) underwent macroscopically non-radical surgery (R2), and postoperative pathological evaluation showed R1 resection in a further 59 patients (55%), and in only 40 patients (37%) radical surgery (R0). The median overall survival in patients undergoing radical resection was longer than in patients with either R1 or R2 (20.4 vs. 13.3 years, $p = 0.007$). Five-year and 10-year survival rates in patients with R2, R1, and R0 resection were 56%, 75%, and 86% and 28%, 65%, and 71%, respectively [7]. In 89 patients (82%) from the R0, R1, and R2 groups supplementary radiotherapy was performed.

Few data are available regarding adjuvant treatment in patients with tracheal adenoid cystic carcinomas. Adjuvant chemotherapy for adenoid cystic carcinoma is of limited importance due to low response rate and short treatment duration. Chemotherapy is therefore reserved for patients with unresectable relapse or metastases only in the situation of rapid progression or in patients with clinical symptoms [17, 18]. It has been demonstrated that the use of post-operative radiotherapy in cases of adenoid cystic carcinoma of the head and neck region improves local control. For this reason, it is widely used in most cases except for very early changes after radical surgery with an adequate margin and without nerve involvement. However, the beneficial effect of postoperative treatment on patient survival is less pronounced, mainly due to often possible and effective rescue surgical treatment and high risk of distant metastases, which commonly appear independently of local cancer control [14]. In other studies, postoperative radiotherapy is recommended for microscopically unradical resections; however, this procedure is not based on the results of prospective randomised, controlled studies. Due to the

usually young age of patients and lack of unambiguous guidelines for adjuvant therapy, the possible negative effects of radiotherapy should also be taken into account. Radiotherapy of the chest area may be associated with many acute and chronic late complications, which in the future may affect the quality of life of patients with good prognosis regarding long-term survival. The most dangerous are pulmonary and circular complications as well as secondary neoplasms. Some of them, such as radiation pneumonia, radiation myocarditis or pericarditis, and coronary vessel damage, can be a direct threat to life. Late pulmonary fibrosis may result in severe disability associated with respiratory failure. There is little information about the negative effects after radical radiotherapy of tracheal tumours. Among severe toxicities the following are described: bronchitis, fistulas, and tracheal necrosis. QUANTEC analysis, which is one of the latest summaries of current knowledge about radiation complications in healthy tissues, suggests that in order to reduce the risk of airway narrowing, the dose should not exceed 80 Gy with standard fractionation [15–17]. The standard total dose in adjuvant treatment is 60 Gy in conventional fractionation (2 Gy/fraction) for six weeks [9]. In the case of larger residual changes, the dose should be increased to 68–70 Gy (2 Gy/fraction) [9]. Among other things, due to the risk of the aforementioned complications, there is a need for careful observation, usually lasting for the life of the patient.

Currently, there are no official guidelines for adjuvant therapy or observation of patients after non-radical resection of tracheal adenoid cystic carcinoma. The literature mentions imaging examinations carried out every six months for the first two years, and then every year.

Summary

The purpose of this case report was to show the clinical relevance of tracheal cancer in a young person in terms of diagnosis and therapy.

References

1. Chang CY, Cheng SL, Chang SC. Adenoid cystic carcinoma of trachea treated with tumor curettage and adjuvant intensity modulated radiation therapy. *South Med J*. 2011; 104(1): 68–70, doi: [10.1097/SMJ.0b013e3181fcd4d1](https://doi.org/10.1097/SMJ.0b013e3181fcd4d1), indexed in Pubmed: [21079533](https://pubmed.ncbi.nlm.nih.gov/21079533/).
2. Regnard JF, Fourquier P, Levasseur P. Results and prognostic factors in resections of primary tracheal tumors: a multicenter retrospective study. *The French Society of Cardiovascular Surgery. J Thorac Cardiovasc Surg*. 1996; 111(4): 808–813; discussion 813, doi: [10.1016/s0022-5223\(96\)70341-0](https://doi.org/10.1016/s0022-5223(96)70341-0), indexed in Pubmed: [8614141](https://pubmed.ncbi.nlm.nih.gov/8614141/).
3. Yamamoto Y, Wistuba II, Kishimoto Y, et al. DNA analysis at p53 locus in adenoid cystic carcinoma: comparison of molecular study and p53 immunostaining. *Pathol Int*. 1998; 48(4): 273–280, indexed in Pubmed: [9648155](https://pubmed.ncbi.nlm.nih.gov/9648155/).
4. Kim B. Palliative radiotherapy in a patient with pulmonary adenoid cystic carcinoma. *Cancer Res Treat*. 2007; 39(4): 185–188, doi: [10.4143/crt.2007.39.4.185](https://doi.org/10.4143/crt.2007.39.4.185), indexed in Pubmed: [19746187](https://pubmed.ncbi.nlm.nih.gov/19746187/).

5. Chargari C, Riet F, Mazevet M, et al. Complications of thoracic radiotherapy. *Presse Med.* 2013; 42(9 Pt 2): e342–e351, doi: [10.1016/j.lpm.2013.06.012](https://doi.org/10.1016/j.lpm.2013.06.012), indexed in Pubmed: [23972736](https://pubmed.ncbi.nlm.nih.gov/23972736/).
6. Maziak D, Todd T, Keshavjee S, et al. Adenoid cystic carcinoma of the airway: Thirty-two-year experience. *The Journal of Thoracic and Cardiovascular Surgery.* 1996; 112(6): 1522–1532, doi: [10.1016/s0022-5223\(96\)70011-9](https://doi.org/10.1016/s0022-5223(96)70011-9).
7. Honings J, Gaissert HA, Weinberg AC, et al. Prognostic value of pathologic characteristics and resection margins in tracheal adenoid cystic carcinoma. *Eur J Cardiothorac Surg.* 2010; 37(6): 1438–1444, doi: [10.1016/j.ejcts.2010.01.005](https://doi.org/10.1016/j.ejcts.2010.01.005), indexed in Pubmed: [20356756](https://pubmed.ncbi.nlm.nih.gov/20356756/).
8. Kanematsu T, Yohena T, Uehara T, et al. Treatment outcome of resected and nonresected primary adenoid cystic carcinoma of the lung. *Ann Thorac Cardiovasc Surg.* 2002; 8(2): 74–77, indexed in Pubmed: [12027791](https://pubmed.ncbi.nlm.nih.gov/12027791/).
9. Webb BD, Walsh GL, Roberts DB, et al. Primary tracheal malignant neoplasms: the University of Texas MD Anderson Cancer Center experience. *J Am Coll Surg.* 2006; 202(2): 237–246, doi: [10.1016/j.jamcollsurg.2005.09.016](https://doi.org/10.1016/j.jamcollsurg.2005.09.016), indexed in Pubmed: [16427548](https://pubmed.ncbi.nlm.nih.gov/16427548/).
10. Shimizu J, Oda M, Matsumoto I, et al. Clinicopathological study of surgically treated cases of tracheobronchial adenoid cystic carcinoma. *Gen Thorac Cardiovasc Surg.* 2010; 58(2): 82–86, doi: [10.1007/s11748-009-0467-4](https://doi.org/10.1007/s11748-009-0467-4), indexed in Pubmed: [20155344](https://pubmed.ncbi.nlm.nih.gov/20155344/).
11. Junker K. Pathology of tracheal tumors. *Thorac Surg Clin.* 2014; 24(1): 7–11, doi: [10.1016/j.thorsurg.2013.09.008](https://doi.org/10.1016/j.thorsurg.2013.09.008), indexed in Pubmed: [24295655](https://pubmed.ncbi.nlm.nih.gov/24295655/).
12. Macchiarini P. Primary tracheal tumours. *Lancet Oncol.* 2006; 7(1): 83–91, doi: [10.1016/S1470-2045\(05\)70541-6](https://doi.org/10.1016/S1470-2045(05)70541-6), indexed in Pubmed: [16389188](https://pubmed.ncbi.nlm.nih.gov/16389188/).
13. Samant S, van den Brekel MW, Kies MS, et al. Concurrent chemoradiation for adenoid cystic carcinoma of the head and neck. *Head Neck.* 2012; 34(9): 1263–1268, doi: [10.1002/hed.21905](https://doi.org/10.1002/hed.21905), indexed in Pubmed: [22083968](https://pubmed.ncbi.nlm.nih.gov/22083968/).
14. Mornex F, Coquard R, Danhier S, et al. Role of radiation therapy in the treatment of primary tracheal carcinoma. *Int J Radiat Oncol Biol Phys.* 1998; 41(2): 299–305, doi: [10.1016/s0360-3016\(98\)00073-x](https://doi.org/10.1016/s0360-3016(98)00073-x), indexed in Pubmed: [9607345](https://pubmed.ncbi.nlm.nih.gov/9607345/).
15. Napieralska A, Miszczyk L, Blamek S. Tracheal cancer — treatment results, prognostic factors and incidence of other neoplasms. *Radiol Oncol.* 2016; 50(4): 409–417, doi: [10.1515/raon-2016-0046](https://doi.org/10.1515/raon-2016-0046), indexed in Pubmed: [27904449](https://pubmed.ncbi.nlm.nih.gov/27904449/).
16. Marks LB, Yorke ED, Jackson A, et al. Use of normal tissue complication probability models in the clinic. *Int J Radiat Oncol Biol Phys.* 2010; 76(3 Suppl): S10–S19, doi: [10.1016/j.ijrobp.2009.07.1754](https://doi.org/10.1016/j.ijrobp.2009.07.1754), indexed in Pubmed: [20171502](https://pubmed.ncbi.nlm.nih.gov/20171502/).
17. Papaspyrou G, Hoch S, Rinaldo A, et al. Chemotherapy and targeted therapy in adenoid cystic carcinoma of the head and neck: a review. *Head Neck.* 2011; 33(6): 905–911, doi: [10.1002/hed.21458](https://doi.org/10.1002/hed.21458), indexed in Pubmed: [20652885](https://pubmed.ncbi.nlm.nih.gov/20652885/).
18. Laurie SA, Ho AL, Fury MG, et al. Systemic therapy in the management of metastatic or locally recurrent adenoid cystic carcinoma of the salivary glands: a systematic review. *Lancet Oncol.* 2011; 12(8): 815–824, doi: [10.1016/S1470-2045\(10\)70245-X](https://doi.org/10.1016/S1470-2045(10)70245-X), indexed in Pubmed: [21147032](https://pubmed.ncbi.nlm.nih.gov/21147032/).