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Bronchopulmonary carcinoid tumour

Bronchial carcinoid tumours, also called bronchopulmonary carcinoids, account for 1–5% of all lung cancers (2, 3, 10, 13) and 5–15% of all argentaffinomas (1, 4, 5). It is thought that cells of argentoffinomas originate from the mother, undifferentiated, multipotential epithelial cell differentiating to neuroendocrine cells. The neuroendocrine cells which are characteristic of many endocrine glands are disseminated in the airways, digestive tract, nervous and genitourinary system. They are collectively called the disseminated neuroendocrine system. The neuroendocrine cells belong to the amine precursor uptake decarboxylation (APUD) system thanks to their ability to synthetize, store and transfer specific substances responsible for endocrine paraneoplastic syndromes (7). Carcinoid is a potentially malignant neoplasm, which is often the source of diagnostic errors. It is characterized by the tendency to infiltrate, sometimes by the development of late local recurrences (11, 12). This is particularly true about atypical carcinoid which in likely to metastasize to the lymph nodes, liver, bones, brain, skin, adrenals, uterus, kidneys, pancreas, spleen and peritoneum. The 5-year survival is on average 60–80%, irrespective of the type (8).

The cell membrane of neuroendocrine cells contains the antigen reacting with MOC-1 antibody. A similar antigen is present in the cell membrane of small-celled carcinoma. Atypical carcinoid was first identified and histologically defined by Arrigoni in 1972 (5).

MATERIAL AND METHODS

In the years 1990–2000, 67 patients (23 men – 34.3%, 44 women – 65.7%) underwent surgical procedures due to bronchial carcinoids in the Department of Thoracic Surgery in Bystra Śląska. Their age ranged from 19 to 74 years, average 47. In 20 (29.9%) patients the disease was asymptomatic and in 47 (70.1%) various symptoms developed in the period of 3 weeks to 3 years before hospitalization.

The most common symptoms included: cough, fever, haemoptysis, thoracic pain and stabbing sensations, recurrent pneumonia and effort dyspnoea. None of the patients showed symptoms of the carcinoid syndrome. Amongst 20 asymptomatic patients, the lesion was detected accidentally in 17 cases; in 3 cases "the round shadow" was observed in the period of 9 months to 6 years.

The X-ray examination showed: non-characteristic infiltration in 19 cases, segmental or lobar atelectasis in 12, dilated pulmonary hilus in 7, the central tumour without atelectasis was found in 6 and peripheral tomour in the form of "round shadow" in 20 patients. Bronchoscopy was normal in 22

Table 1. Differential diagnosis of carcinoid tumours

Characteristic features	Typical carcinoid	Atypical carcinoid
Age	younger	older
Incidence	70–90%	10–30%
Tumour size	bigger	smaller
Tumour location	more often – central	more often – peripheral
Architecture	distinctive	abnormal and blurred
Character of growth	regular	less regular, focal cell infiltration
Stroma	visible fibrosis	visible fibrosis
Necrosis	(-)	visible: cellular or focal
"Crush" artifact	(-)	minimal
Impregnation of stroma and vessels	(-)	minimal
Cell	monomorphic, round	slight polymorphism, monomorphic, spindle cell
Cytoplasm	rich	moderate
Nucleus	central, oval or round	polymorphic, atypical
Chromatin	microscattered	slight hyperchromatism
Mitoses	very rare	up to 10/10 of visual fields (high magnification)
Nuclear-cytoplasmic ratio	low	moderate
Node metastases	5–20%	30–70%
Remote metastases	5–6%	15–70%
5-year survival	>90%	40–60%

patients (32.8%); in 38 (56/7%) the tumour was exophytic, polypoid, growing towards the bronchial lumen and in 7 (10.5%) its form was that of bronchial infiltration. The tumour was localized in the right lung in 37 (55.2%) patients and in the left lung in 30 (44.8%) patients. The level of HIO acid was determined in 7 patients, in 3 of them it was found to be slightly increased.

The preoperative histological diagnosis was established in 39 patients: in 38 based on bronchoscopic biopsy and in 1 – using the bronchial asipirate. The diagnosis of bronchial carcinoid was confirmed in 34 patients; squamous metaplasia was found in 2 cases and small-celled carcinoma and adenocarcinoma in one case each, which means that 5 patients were misdiagnosed.

All the patients underwent surgical treatment. The types of procedures are presented in Table 2. Pre-and postoperative histopathological examinations were conducted in the Department of Pathomorphology, Collegium Medicum, Jagiellonian University in Cracow (head: Bolesław Papla, PhD). The TNM classification includes the postoperative results.

Table 2. Surgical treatment of carcinoids

Type of procedure	Typical carcinoid (62)				Atypical carcinoid (5)			
	T1N0M0	T2N0M0	T1N1M0	T2N2M0	T1N0M0	T2N0M0	T1N1M0	T2N2M0
Bilobectomy (1)	-	1	-	-	-	-	-	-
Lobectomy (36)	23	8	1	-	2	1	1	-
Lobectomy with pulmonary artery sleeve resection (1)	-	-	-	-	-	-	-	1
Segmentectomy (3)	3	-	-	-	-	-	-	-
Wedge resection (13)	12	1	-	-	-	-	-	-
Bronchotomy (10)	-	10	-	-	-	-	-	-
VATS (1)	1	-	-	-	-	-	-	-

RESULTS

Sixty-two (82.5%) patients were diagnosed with typical carcinoid and 5 (7.5%) with atypical one. N1 was found in two patients, N2 in another two. In 11 cases the operative material showed infiltration of the bronchus in the incision line (R1). The postoperative course was complicated by: bronchial fistula in one patient after lobectomy, pleural empyema in two and wound suppuration in four. One patient underwent radiation as an complementary treatment after lobectomy due to atypical carcinoid with T1N1MO and R1.

In the group of 67 patients treated surgically, the clinical data were obtained from 38 (56.7%). The observation period ranged from 3 months to 9 years. In 35 of them (%) no recurrences were observed. The recurrence was found in three women with typical carcinoid with T1N0M0 and R0. One of them underwent pneumonectomy 7 years after resection of the middle lobe. Another patient underwent lobectomy 7 months after bronchotomy. The third patient with recurrence after resection of the middle lobe did not consent to the treatment. Such good results of treatment of our patients are likely to result from a low percentage of atypical carcinoid cases. The assessment of long-term results may not be accurate due to the lack of data referring to over a half of the patients treated.

DISCUSSION

Carcinoid is a potentially malignant neoplasm which may be the source of diagnostic errors. The development of carcinoid is locally infiltrating but relatively slow. Its symptoms depend mainly on the tumour location, more precisely on the degree of bronchial stenosis. In our material the time from the onset of symptoms to surgical procedures ranged from 3 weeks to 6 years. The paper presents the case of pulmonary carcinoid diagnosed 21 years after recurrent pulmonary infections (7).

Our population contained more women (65.7%) than men (34.3%). The average age was 47 years. Carcinoids were more often located centrally (67.2%) than peripherally (32.8%); likewise, the right side location (55.2%) was more common than the left side one (44.8%). These values are comparable with literature data (4, 8, 9, 11). Carcinoids were confirmed preoperatively in 75.5% of patients with central tumours compared to 14–85% reported by other authors (1, 10, 13). Peripheral carcinoids were not preoperatively diagnosed in our material. In the operative material typical carcinoids were diagnosed in 92.5% of cases, with N1/N2 in 3.2% while atypical carcinoids were detected in 7.5% of patients, 40% of which had N1/N2.

The most common surgical procedure was resection of the lobe (or two lobes) (56.7% – which is slightly lower than the literature data, 65.0–72.0%) (1, 15). Infiltration in the line of bronchial incision (R1) was found in the postoperative material in 11 patients. Recurrences are reported even 30 years after surgery (8). In our material recurrences developed in 3 patients in the period of 7 months (after bronchotomy) to 7 years (after lobectomy). The majority of authors stress that the follow-up period should be lengthened to more than 5 years due to the tendency of late recurrences and possible late remote metastases. Some authors think that bronchoplastic procedures are of low oncological radicalness and should be performed only in patients with impaired respiratory function (13).

CONCLUSIONS

1. Despite its recognized lesser malignancy, bronchopulmonary carcinoid should be treated as non-small-celled pulmonary carcinoma.
2. Due to possible late recurrences the patients should be provided with long-term ambulatory care.

REFERENCES

1. Andrzejak R. et al. Nietypowy przypadek rakowiaka oskrzela. Przegl. Lek., 54, 867, 1977.
2. Arruda W. O., Rosa J. F. T.: A 44-year-old woman with diarrhoea and double vision. The Lancet, 349, 1882, 1998.
3. Dawila D. G. et al.: Bronchial carcinoid tumors. Mayo Clin. Proc., 68, 795, 1993.
4. Gawrychowski J. et al.: Odległe wyniki leczenia rakowiaków oskrzelowo-płucnych. Wiad. Lek., 46, 568, 1993.
5. Jassen E. et al.: Rakowiak oskrzela. Pneumonol. i Alergol. Pol., 65, 406, 1997.
6. Jędruszczak B. et al.: Przypadek rakowiaka płuca rozpoznany po 21 latach nawracających zakażeń płuc. Pneumonol. I Alergol. Pol., 63, 64, 1995.
7. Kulke M. H., Mayer R. J.: Carcinoid tumors. The New Engl. J. Med., 11, 858, 1999.
8. Lim E. et al.: The impact of stage and cell type on the prognosis of pulmonary neuroendocrine tumors. J. Thorac. Cardiovasc. Surg., 130, 969, 2005.
9. Oliaro A. et al.: Atypical bronchial carcinoids. Review of 46 patients. J. Cardiovasc. Surg. (Torino), 41, 131, 2000.
10. Sobolewska E. et al.: Chirurgiczne leczenie rakowiaka – złośliwego nowotworu płuca. Pol. Przegl. Chir., 11, 1138, 1996.
11. Vadasz P. et al.: Diagnosis and treatment of bronchial carcinoid tumors: clinical and pathological review of 120 operated patients. Eur. J. Cardiothorac. Surg., 7, 8, 1993.
12. Wagner R. B., Knox G. S.: Pneumothorax: an unusual manifestation of a bronchial carcinoid. Md. Med. J., 39, 263, 1990.
13. Weissberg D. (ov).: Nowotwory gruczołów oskrzelowych. Pol. Przegl. Chir., 9, 871, 2000.

SUMMARY

The authors presented the ways and results of treatment of bronchopulmonary carcinoid in a big clinical material of 67 patients treated in one centre during 11 years. Moreover, pathophysiology and differential diagnosis of this rare pulmonary neoplastic disease was described. The most common method of treatment was resection of the pulmonary parenchyma, including lobectomy – 36, marginal

resection – 13 or bronchotomy and tumour excision with the lung spared – 10 patients. In the group treated surgically only 3 cases of recurrences were observed (2.47%). Despite lower invasiveness of the neoplasm, the management is similar to that in non small-celled carcinoma of the lung. It was demonstrated that the methods of treatment we applied and results obtained are not significantly different from the literature data.

Rakowiak oskrzelowo-płucny

Autorzy przedstawili sposoby i wyniki leczenia rakowiaka oskrzelowo-płucnego na dużym materiale klinicznym – 67 osób leczonych w jednym ośrodku krajowym w ciągu 11 lat. Opracowanie poprzedzono wstępem opisującym patofizjologię i diagnostykę różnicową nowotworu w dość rzadko występującej chorobie nowotworowej płuc. Leczenie polegało najczęściej na wykonaniu resekcji miąższu płuca; w tym lobektomii – u 36 chorych, resekcji brzeżnej – u 13 lub bronchotomii i wycięciu guza z zachowaniem płuca – u 10. Spośród badanej grupy leczonej operacyjnie zanotowano tylko trzy przypadki (2,47%) wznowy nowotworu. Pomimo mniejszej inwazyjności nowotworu postępowanie jest podobne jak w leczeniu niedrobnokomórkowego raka płuca. Wykazano, że sposoby leczenia jak i wyniki leczenia stosowane przez nas nie różnią się zasadniczo od danych w piśmiennictwie.