PLASMA GROWTH HORMONE LEVEL AND HYPERTROPHIC OSTEOARTHROPATHY IN PATIENTS WITH CARCINOMA

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Hypertrophic osteoarthropathy (HOAP) is one of the most frequently met paraneoplastic syndromes in pulmonary carcinoma (1, 7). It is marked clinically by joint pains, drumstick (clubbed) fingers, periostosis of long bones and neurovegetative disturbances — usually perspiration and reddening or paleness of the palms and soles (4). Although the pathogenesis of hypertrophic osteoarthropathy is not fully clarified, it is presumed that enhanced growth hormone secretion from the neoplastic cells plays an essential role (2, 3, 6).

To furthermore clarify the role of growth hormone in the pathogenesis of hypertrophic osteoarthropathy, we undertook the task to study the plasma level of this particular hormone in pulmonary carcinoma patients.

Material and method

The plasma level of the somatotrophic hormone was investigated in a series of eighteen patients with lung carcinoma — males aged from 47 to 77 years. The tumour displayed central localization in seven cases, and peripheral — in three. Diagnosis was established following thorough clinical, X-ray and bronchoscopic study. In twelve patients the diagnosis was confirmed histologically. Ten patients presented manifestations of hypertrophic osteoarthropathy while in the remainder they were lacking. Growth hormone investigations in the plasma were conducted using the radioimmune method. According to earlier researches with the latter, the values of growth hormone (GH) in healthy individuals range from 1.6 to 4 ng/ml.

Results

The mean GH level in the plasma of patients with lung carcinoma and HOAP amounts to 11.2 ± 5.1 ng/ml, with variations ranging from 4.9 to 22.5 ng/ml. The impression is that the highest GH values are recorded in patients with strongly manifested and widespread HOAP (Table 1).

In all patients of the series the plasma GH level is above the uppermost limit for healthy individuals.

In group II, including patients with lung carcinoma free of HOAP, the GH level averages 2.0 ± 1.0 ng/ml, with variations ranging from 0.4 to 3.1 ng/ml In all cases of this group the GH values are either within normal limits, or reduced (Table 2).

Table 1

Plasma Growth Hormone Level in Patients with Pulmonary Carcinoma and Hypertrophic Osteoarthropathy.

Name	GH level ng/ml	Drum-stick fingers	Arthral-gia	Periostosis					Histological appearance
				Phalan-ges	Wrists	Fore-arms	Legs	Feet	
1. V. A.S.	22,5	+++	—	+++	—	—	+++	—	Adenocarcinoma
2. I.I.I.	15,9	—	—	—	+	+++	++	—	Adenocarcinoma
3. J. I. I.	13,0	—	+	++	+	—	++	+	Flat-cell
4. G. S. P.	12,3	+++	+++	+++	++	++	+++	+	—
5. G. G. S.	11,4	+++	+++	+++	+	++	—	—	—
6. V. S. M	9,8	+++	+++	+++	+	—	—	—	Flat-cell
7. P. G. T.	8,6	+	—	—	+	—	—	—	Flat-cell
8. G. I. P.	8,8	+	+	—	+	—	+	—	Undifferentiated
9. D. A. B.	6,2	—	+	+	—	—	—	—	Flat-cell
10, V. A. K.	4,9	—	+	+	—	—	—	—	Flat-cell

Table 2

Growth Hormone Level in Patients with Pulmonary Carcinoma Free of Hypertrophic Osteoarthropathy

Name	GH level ng/ml	Drum-stick fingers	Arthral-gia	Periostosis					Histological appearance
				Phalan-ges	Wrists	Fore-arms	Legs	Feet	
1. G. P. I.	3,1	—	—	—	—	—	—	—	—
2. Y. N. K.	3,1								—
3. G. S. K.	3,0								Undifferentiated
4. I. K. I.	2,2								Undifferentiated
5. T. G. R.	2,0								—
6. Ch. H. Bh.	1,3	—	+	—	—	—	—	—	Undifferentiated
7. D. A. M.	1,2	—	+						—
8. I.G. S.	0,4	—	—	—	—	—	—	—	Flat-cell

$\bar{X} \pm 2.0 \pm N$, O. ng/ml

Discussion

The results of the study demonstrate the close relationship existing between the manifestations of hypertrophic osteoarthropathy and plasma GH level. A reliable GH rise is recorded among patients with lung carcinoma and HOAP, as compared to patients with lung Ca without HOAP. Moreover, the heavier degree of HOAP is usually associated with a higher GH level in the plasma. This is a convincing proof that enhanced GH secretion is the cause of HOAP in pulmonary carcinoma patients. Literature data on the issue point to the fact that most likely, the intensified secretion is accomplished by the tumorous cells themselves (2, 5) and by no means by the pituitary gland. Steiner et al (6) published a case report concerning a patient with pulmonary carcinoma+ hypertrophic osteoarthropathy and elevated plasma GH level. Following operative removal of the neoplasm, the level of the hormone returned to normal,

and all articular phenomena subsided. Greenberg (2) succeeded in demonstrating that isolated cells from pulmonary carcinoma in cell culture secrete growth hormone.

The relationship between histological appearance of lung carcinoma and its capacity to secrete growth hormone is not sufficiently elucidated as yet.

Sparagna and co-workers (5) established a considerably elevated GH content in the neoplastic tissue of a patient with lung carcinoma and hypertrophic osteoarthropathy. Among our patients with carcinoma and HOAP there are cases with adenocarcinoma, although patients with flat cell carcinoma predominate, as well as a case with undifferentiated prickle cell carcinoma. Out of the three patients with carcinoma, free of hypertrophic osteoarthropathy, subjected to histological investigation, two are with undifferentiated carcinoma, and one—with flat cell carcinoma. It seems that flat cell carcinoma is often associated with hypertrophic osteoarthropathy, but the limited number of patients studied does not justify a definitive statement on the issue.

Conclusions

1. In patients with lung carcinoma+hypertrophic osteoarthropathy the plasma level of GH is elevated, whereas in patients with lung carcinoma, free of hypertrophic osteoarthropathy, it is within normal limits.

2. No relationship whatsoever is established between histological appearance of the carcinoma and plasma GH level.

3. The occurrence of hypertrophic osteoarthropathy in conjunction with pulmonary carcinoma is most likely provoked by the paraneoplastic secretion of growth hormone.

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УРОВЕНЬ СОМАТОТРОПНОГО ГОРМОНА В ПЛАЗМЕ КРОВИ И ГИПЕРТРОФИЧЕСКАЯ ОСТЕОАРТРОПАТИЯ У БОЛЬНЫХ С РАКОМ ЛЕГКОГО

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РЕЗЮМЕ

Исследован уровень соматотропного гормона в плазме крови у 18 мужчин с раком легкого, среди которых 10 с гипертрофической остеоартропатией. Установлено, что у больных с гипертрофической остеоартропатией соматотропный гормон достоверно повышен, в сравнении со здоровыми лицами, в то время как у больных без гипертрофической остеоартропатии он находится в пределах нормы; не обнаружена связь между гистологическим видом рака и уровнем соматотропного гормона в плазме крови. Предполагается, что появление гипертрофической остеоартропатии при раке легкого вызвано паранеопластической секрецией соматотропного гормона.