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Letters

Serum Ferritin Levels in Lung Cancer Patients

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ELEVATED SERUM levels of ferritin have been found in patients with a variety of tumours, [1–4] including lung cancer [5,6]. Our aim was to define the clinical usefulness of ferritin assays compared with 31 other clinical and biological variables, including the carcinoembryonic antigen (CEA) and tissue polypeptide antigen (TPA).

We measured serum ferritin in 168 new patients (149 men and 19 women) with histologically proven bronchogenic carcinoma (87 squamous cell, 23 small cell, 21 adeno, 12 large cell, and 25 unclassified carcinomas). 81 had post-treatment ferritin measured. For all patients, staging included clinical examination and performance status evaluation, complete haemogram and blood chemistry, chest X-rays, fibre-optic bronchoscopy, computed tomography of the chest, upper abdomen and brain and mediastinoscopy for selected surgical candidates. Bone scan and bone marrow biopsy were added for small cell lung cancer (SCLC) patients. All patients were classified according to 1987 UICC staging. 16 patients with non-small cell lung cancer (NSCLC) underwent surgical resection, 6 patients had radiotherapy as primary treatment, 48 patients were treated with methotrexate, doxorubicin, cyclophosphamide plus lomustine (MACC) [7]. The remaining 75 NSCLC patients had only supportive care, symptomatic irradiation or individualised chemotherapy. SCLC patients were treated with various programmes of radio-chemotherapy. Standard criteria for objective response were used [8]. Survival was recorded from the time of histological diagnosis to death, or the last point of follow-up.

CEA was measured in stored serum samples with CEAK-PR-S bits from International CIS (France). TPA was measured with a radioimmunoassay from Sangtec Medical (Sweden). Ferritin was measured with AIA-PACK-FER Eurogenetic kits (Italy). Spearman's rank correlation was used as appropriate. Univariate survival analyses were based on the Kaplan–Meier product-limited estimates of the survival distribution. Differences between survival curves were tested with the Mantel logrank test and the Breslow–Gehan test. Multivariate survival tests were done with Cox's proportional hazards regression.

Serological levels of ferritin at diagnosis were significantly associated with some indicators of inflammation, among the most significant were: erythrocyte sedimentation rate, neutrophils, white blood cell count and tumour cavitation ($P < 0.001$, 0.02, 0.05 and 0.05, respectively). Ferritin concentrations did not change significantly as a function of tumour histology, clinical stage and number of metastases, although they did increase proportionally with the degree of lymph-gland involvement ($R_s = 0.20$). There was no correlation between ferritin and response to treatment. Patients with low serum ferritin values (< 236 ng/ml) had longer median survival compared with those with higher levels (Fig. 1). However, levels of both CEA and TPA were significantly associated with staging, monitoring and predicting prognosis. Multiple univariate analyses of survival showed that 20 of the 31 recorded variables were prognostically significant. Cox's regression selected stage, performance status, weight loss and lactate dehydrogenase as independent prognostic factors (coefficients 0.0800, 0.4867, −0.0471 and 0.0004, respectively). A second multivariate analysis with the same covariates but excluding stage of disease and T, N, and M factors, selected ferritin as the fourth independent variable.

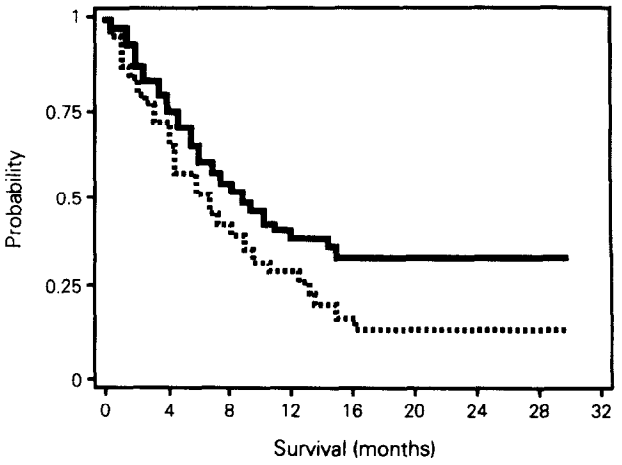

Fig. 1. Actuarial survival of patients with low and high pretreatment levels of ferritin.

We conclude that while measurements of serum ferritin seem to have no utility in the staging and monitoring of bronchogenic carcinoma, they may have prognostic significance.

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1. Jacobs A, Slater A, Whittaker JA, *et al.* Serum ferritin concentrations in untreatd Hodgkin's disease. *Br J Cancer* 1976, **34**, 162–166.
2. Parry DH, Worwood M, Jacobs A. Serum ferritin in acute leukemia at presentation and during remission. *Br Med Bull* 1975, **1**, 245–249.
3. Jacobs A, Jones B, Ricketts C, Bulbrook RD, Wang DY. Serum ferritin concentrations in early breast cancer. *Br J Cancer* 1976, **34**, 286–289.
4. Wahren B, Alpert E, Esposti P. Multiple antigens as marker substances in serminal tumors of the testis. *J Natl Cancer Inst* 1977, **58**, 485–493.
5. Cox R, Gyde OH, Leyland MJ. Serum ferritin levels in small cell lung cancer. *Eur J Cancer Clin Oncol* 1986, **22**, 831–835.
6. Gropp C, Havemann K, Lehmann FG. Carcinoembryonic antigen and ferritin in patients with lung cancer before and during therapy. *Cancer* 1978, **42**, 2802–2808.
7. Chahinian AP, Arnold DJ, Cohen JM, *et al.* Chemotherapy for bronchogenic carcinoma: methotrexate, doxorubicin cyclophosphamide and lomustine. *JAMA* 1977, **237**, 2392–2396.
8. Miller AB, Hoogstraten B, Staquet M, Winkler A. Reporting results of cancer treatment. *Cancer* 1981, **47**, 207–214.