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Letters

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Comments on *Variations in Tumour Oxygen Tension (pO_2) During Accelerated Radiotherapy of Head and Neck Carcinoma*, Lartigau *et al.*, *Eur J Cancer* 1998, 34, 856–861

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WE READ with interest the recent paper by Lartigau and associates entitled "Variations in tumour oxygen tension (pO_2) during accelerated radiotherapy of head and neck carcinoma" [1]. The authors reported an increase of pO_2 during the first two weeks (32 Gy) of accelerated radiotherapy. This result is remarkable as we recently found a significant decrease of pO_2 after 30 Gy in a conventionally fractionated radiochemotherapy schedule for patients with head and neck carcinoma [2].

The authors compared the oxygen distribution in primary tumours and in metastatic neck nodes and stated "...that the relative increase in tissue oxygenation was more pronounced for primary tumours than for neck nodes...." However, these two groups are not comparable as they were treated in different ways: four of six primary tumours but only one of eight metastatic neck nodes were treated with carbogen-breathing. Moreover, the authors wrote that "...reoxygenation seems to occur during hyperfractionated radiotherapy such as the protocol used in our study, with which there is a marked increase in tumour oxygenation...". This statement suggests that an increase in pO_2 is an indicator of reoxygenation and consequently the reader might conclude that a decrease in pO_2 indicates a lack of reoxygenation.

However, an increase of pO_2 (measured by using the Eppendorf-histograph) indicates only that the relationship between well and poorly oxygenated tissue (cells?) has changed in favour of a higher proportion of well oxygenated tissue (cells?). Such an improvement in pO_2 does not necessarily indicate reoxygenation. Providing the well oxygenated tissue does proliferate faster than the hypoxic tissue, the proportion of well oxygenated tissue (and so the pO_2) increases as well.

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Reoxygenation, however, is followed by an absolute decrease in hypoxic cells. The change of the relationship between well and poorly oxygenated cells (or tissue) is less important. In our recent study there was a significant decrease of the median pO_2 after 30 Gy [2]. This finding was in accordance with reoxygenation, as proposed by the standard textbook of Hall [3]. Therefore, any change of the pO_2 during therapy is compatible with reoxygenation or lacking reoxygenation.

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Response from E. Lartigau and M. Guichard

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We thank Dr P. Stadler for his comments on our paper [1]. Our results on an increase in pO_2 during radiotherapy were not remarkable, as comparable results have been found in previously published papers with measurements performed in various tumour types [2–5]. Such an increase in oxygen tension is not surprising when treatment of tumours result in clonogenic cell kill and variations in interstitial pressure and blood flow.

Dr Stadler's results have been published [6] and the treatment protocol is certainly not comparable to the one we used [7]. Many differences could in part explain the differences observed on the biological endpoint, i.e. increase in pO_2: continuous highly accelerated radiotherapy versus combined chemo-radiotherapy with split course, measurements during radiotherapy or at the end of the split course etc.

We agree with Dr Stadler that the two groups (primary tumours and metastatic neck nodes) evaluated in our study were not comparable, that is why the sentence was extremely careful "...due to the limited number of patients, it is difficult to compare...". Similarly, we avoided using the term 'reoxygenation', because of its very strict biological definition [8]

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but preferred "...variations in pO_2, increase in partial oxygen pressure...". Reoxygenation was used only once (and should not have been) and we agree with Dr Stadler that an increase in pO_2 is not strictly reoxygenation and that the latter should never be used in clinical practice.

Finally, the relative change between well- and poorly-oxygenated areas of the tumours could be the most relevant parameter on clinical outcome. Whatever the biological significance of tumour pO_2 variations during treatment, it has been demonstrated that a correlation does exist between tumour pO_2 before treatment and clinical outcome in head and neck cervix tumours [9, 10]. It remains to be confirmed whether any variation in tumour oxygen tension during treatment plays a role in clinical outcome.

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Height and Breast Cancer Risk—the Bias of Self-reported Versus Measured Results. Comments on *Height and Breast Cancer Risk*, Tavani *et al.*, *Eur J Cancer* 1998, 34, 543–547

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TAVANI AND colleagues recently reported data from two case–control studies indicating no relationship between height and breast cancer risk [1]. The results were derived from 5984 cases and 5504 controls, admitted to hospital for non-hormone related diseases. All participants completed structured questionnaires in which information was sought on various personal characteristics and habits, including adult height and weight. When divided into quintiles, the odds ratio (OR) for breast cancer did not differ significantly from unity. After adjustment for study centre and age the OR of the tallest versus the shortest quintiles was 1.05 which fell to 0.96 after controlling for other potential confounding factors. For each 5 cm increment in height the OR was 0.98. As a result the authors concluded that adult height was not a breast cancer risk factor in Northern Italian women.

It is possible that in this study, as in many others, the investigators were the victim of inaccurate self-reporting of height. We have previously observed and reported this phenomenon, which became evident in the Guernsey study [2]. Two cohorts of ostensibly normal female volunteers were recruited between 1961–1968 (4923 women) and 1968–1976 (5149 women). In the earlier cohort, individual height was self-reported, whereas in the second group this was measured at the time of attendance for interview and venesection. Because there were 2731 women who were members of both cohorts this enabled a comparison of self-reported and measured heights to be conducted. Although there was a correlation between the two heights, there was considerable divergence at both extremes. Shorter women were more likely to overestimate their height, whereas taller women tended to underestimate their stature. In postmenopausal women, there was a relationship between height and risk. Within this group the trend towards a relationship between measured height and breast cancer risk ($\chi^2 = 0.09$) was markedly attenuated when self-reported height was used ($\chi^2 = 0.24$).

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