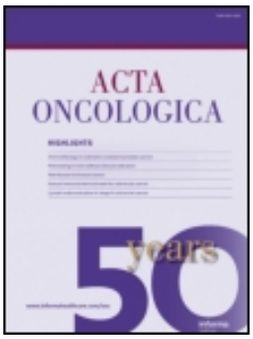

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Correspondence and Short Communications

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GERMINOMA OF THE THIRD VENTRICLE— COMPLETE RESPONSE TO RADIATION THERAPY DOCUMENTED WITH COMPUTED TOMOGRAPHY

Primary intracranial germinomas in adulthood are rare, making up less than one per cent of all intracranial tumours. Most of them occur in the pineal and suprasellar regions (3). A case of germinoma of the third ventricle in a middle-aged man, who showed a marked response to radiation therapy, is now reported.

Case report. A 40-year-old Chinese male presented with a few days history of headache and complete amnesia. Computed tomography (CT) demonstrated a mass at the third ventricle (Fig. 1 a) with enhanced attenuation after injection of contrast medium (Fig. 1 b). There was evidence of surrounding brain oedema and obstructive hydrocephalus. He responded initially to high dose dexamethasone and remained stable for six months, when he had further attacks of amnesia and headache. He was admitted for cranioparasagittal craniotomy with partial excision of the mass in the third ventricle. A right ventriculopleural shunt was also inserted to relieve the raised intracranial pressure. During the operation a large fleshy mass was found obstructing the right foramen of Monro.

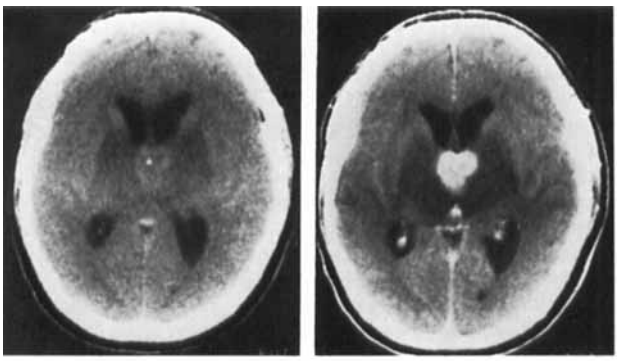

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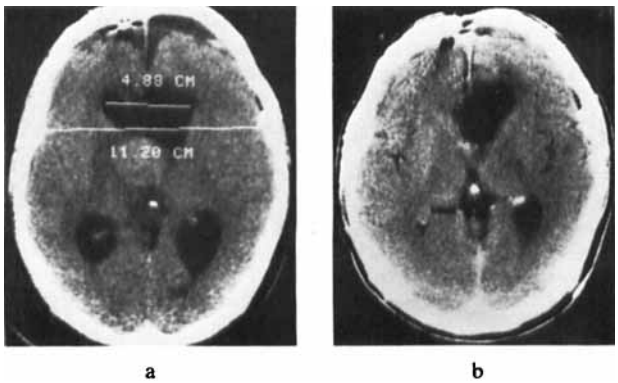
Fig. 1. Germinoma of the third ventricle. a) Before and b) after injection of contrast medium.



a b

Fig. 2. Same case as in Fig. 1. a) Post-operative CT before irradiation shows residue of tumour. b) Follow-up two months later shows complete response of the tumour.

Irregular large polygonal and finely vacuolated cytoplasm and pleomorphic nuclei with prominent nucleoli were found at histologic examination. Multinucleated tumour cells were also present. Between the tumour cells there were ill-defined groups of lymphoid cells in the stroma. The silver preparation revealed diffusely scattered fine reticulin fibrils.

Post-operative CT was performed and showed a residual tumour at the third ventricle (Fig. 2 a). The patient was subsequently referred for consideration of radiation therapy. On examination, he was disorientated in time, place and person with marked bilateral papilloedema. An urgent left ventriculopleural shunt was inserted due to blockage of the right shunt. Whole brain irradiation was commenced a month later with two laterally opposing 20 cm × 15 cm fields (6 MV x-rays) delivering 40 Gy/20 fractions/4 weeks to the mid-plane. Repeat CT after 36 Gy showed complete disappearance of the tumour.

A booster dose of 20 Gy/10 fractions/2 weeks with a three-field arrangement was given to the original tumour with margin. The treatment was completed two months after start of irradiation and follow-up CT after another two months showed complete response of the tumour (Fig. 2 b). On physical examination the patient only had mild impairment of recent memory.

Discussion. Intracranial germinomas histologically belong to the same class as germinomas of the testis and other organ sites. Such tumours are highly responsive to irradiation and potentially curable. Our patient had a complete response after 36 Gy/18 fractions in 3 1/2 weeks to the whole brain. Short of biopsy-proof of histology, a marked response to such limited dose of radiation is in itself highly suggestive of a germ cell tumour (1).

Intracranial mid-line lesions pose substantial surgical difficulty. Resection in toto is seldom possible and at times even biopsy is not possible. Radiation therapy is the main treatment, thus the higher dose of 50 to 55 Gy is usually administered because of the possible presence of teratoid elements which may be more resistant than the pure germinoma. Radiation treatment of intracranial germinomas has been reported with high survival rates (2). Therefore, adjuvant chemotherapy for these lesions is not required. Likewise, craniospinal irradiation has not been proven superior to cranial irradiation alone.

Histologically the tumour in our patient resembled testicular seminoma with the typical features: Large, round or spheroidal cells with clear cytoplasm and a central nucleus with prominent nucleoli and the presence of multinucleated giant tumour cells, which may contain human chorionic gonadotrophin (4).

Computed tomography revealed a well-defined hyperdense mass with strongly enhanced attenuation after injection of contrast medium. This suggests a germinoma while variations in tissue attenuation suggestive of fat or cysts would favour a diagnosis of teratoma (5).

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ODONTOGENIC SARCOMA FOLLOWING RADIATION TREATMENT OF TONGUE CANCER—A CASE REPORT

Radiation therapy is often used in malignant head and neck tumors. After a long latency time radiation induced cancer, usually squamous cell carcinoma, has sometimes developed within the treated volume. In this report a case of odontogenic sarcoma is presented, diagnosed 6 years and 6 months after radiation treatment of tongue cancer. As far as we have found no similar case has previously been reported.

Case report. A 63-year-old man underwent right-sided hemiglossectomy for tongue cancer (T2NOMO, well differentiated squamous cell carcinoma) in July, 1971 at the Department of Otorhinology, Nagasaki University Hospital. From September 6th to 30th, 1971 the patient received radiation therapy with 10 MV x-rays from a linear accelerator from 2 lateral, parallel, opposed portals. The daily dose was 2 Gy and a total dose of 40 Gy was given. He did well until February 1978, when a tumor was found in the right mandible within the irradiated region. The tumor was partially excised and histologically diagnosed as odontogenic sarcoma. Radiation treatment with 10 MV linear accelerator x-rays was given from anterior and lateral wedged fields, with 2 Gy per day up to a total dose of 50 Gy. The tumor diminished slightly in size. The patient, however, died on March 8th, 1979 from multiple lung and bone metastases.

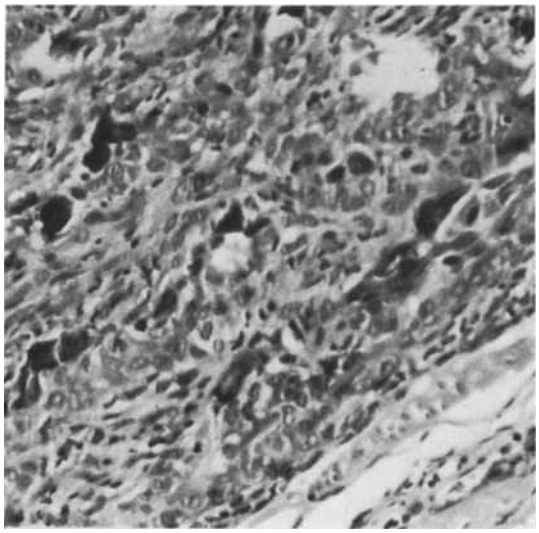

Figure. Photomicrograph demonstrating proliferation of tumor cells and calcium deposit indicating odontogenic element.

Histological examination showed proliferation of tumor cells in the submucosa with distinct mitoses in the tumor cells. The vesicular nuclei were long and had an irregular oval shape with one or several nucleoli. The borders of these tumor cells were obscure. Although distinct odontogenic epithelium was not found in the tumor, calcium deposit indicating odontogenic element was seen. The mesenchymal component was suggestive of sarcoma (Figure).

As a rule there seem to be no characteristic histologic findings of radiation induced cancer. Especially in patients primarily irradiated for a malignant tumor it can be difficult to determine if a secondary malignant tumor is radiation induced or not.

In this situation Sakai et al. (9, 10) defined radiation induced cancer as a cancer which occurs newly within the irradiated tissues after radiation therapy of a tumor and where recurrence or metastasis of the primary cancer can be excluded with reasonable probability. Depending upon whether the new cancer had an histopathology different from or similar to the primary irradiated tumor and whether it was anatomically separated from the location of this tumor or not, Sakai et al. subdivided the cases into 3 groups with different degrees of reliability. Concerning solid tumors 5 years was regarded as the shortest possible latent period. In the present case, the second malignant tumor developed in a site different from the primary cancer and had different histology. Although there remains a remote possibility of incidental metachronous multiple tumors, the second tumor can, with a high degree of probability, be considered as radiation induced. It appeared after a period of more than 5 years.

Odontogenic sarcoma derives from the odontogenic mesenchyme and is divided histologically into ameloblastic sarcoma and ameloblastic odontosarcoma. Ameloblastic odontosarcoma resembles ameloblastic sarcoma but in addition metaplastic dentine and enamel are present (2–5, 7). The present case can be classified as ameloblastic sarcoma. Ameloblastic sarcoma, first reported by Heath in 1887, is an extremely rare tumor and occurs usually in the molar region, particularly in the mandible. Although the age of the patients may range from 3 to 78 years, the tumor occurs more frequently in the younger age groups. No sex difference has been observed. The main clinical manifestations include localized swelling, pain, ulceration and bleeding. Radiologically, irregular bone destruction is seen. The mesenchymal component of the tumor is characterized by spindle-shaped or polygonal cells rich in chromatin and, in these cells, atypical and numerous mitoses are seen.

The epithelial component consists of odontogenic epithelium arranged irregularly into funicular or insular forms and it does not show any malignant features. However, when the tumor grows or recurs repeatedly, the epithelial component becomes embedded into the mesenchymal component and is sometimes indistinguishable from it.

It is thus possible that in the present case the epithelial component could not be recognized due to rapid growth of tumor cells. Ameloblastic sarcoma is regarded as a malignant transformation of the mesenchymal components in ameloblastic fibroma, ameloblastic odontoma and ameloblastic fibro-odontoma. However, it is not clear whether all tumors derive from malignant transformation of benign lesions (1, 6).

Ameloblastic sarcoma seems to be a tumor of low-grade malignancy but with unfavorable prognosis (8). Metastases to the lung and bones, as in our case, are unusual.

We have found no case of radiation induced odontogenic sarcoma previously reported in the literature.

Key words: Radiations, injurious effects, neoplastic; postirradiation odontogenic sarcoma.

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EFFECT OF PATIENT POSITIONING ON BEAM MODIFYING DEVICES

The quest for sharper and sharper penumbra in photon therapy beams is a common occurrence in precision radiation therapy. Ideally one would wish for a beam with a 'sharp' penumbra, such that 100% of the desired dose is delivered within the intended volume and 0% without. The decrease in width of penumbra from cobalt-60 beams to high energy x-ray beams from linear accelerators represented a major improvement. However, the quest continued and additional devices were invented to promote further improvements (1, 2).

Although photon beams can, at least in principle, be tailor-made to have very narrow geometric penumbra, limited by source size and lateral electron diffusion, this applies only to the characteristics of the beam. Whether this is realized in the actual delivery of the dose depends not only on beam characteristics but also critically on the set-up of the patient. Precision placement of patient on the treatment table is a complex problem. This is further complicated by the fact that contemporary treatment involve multiple fractions. Since there are inevitable fluctuations in patient positioning from fraction to fraction, the resultant effect is a modification in the beam profile, especially in the penumbra region. This modification is generally a widening of the penumbra.

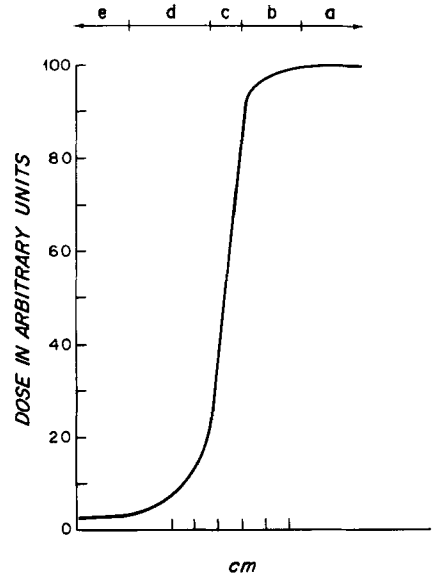


Fig. 1. A typical half beam profile separated into 5 regions; see text for description of each region.

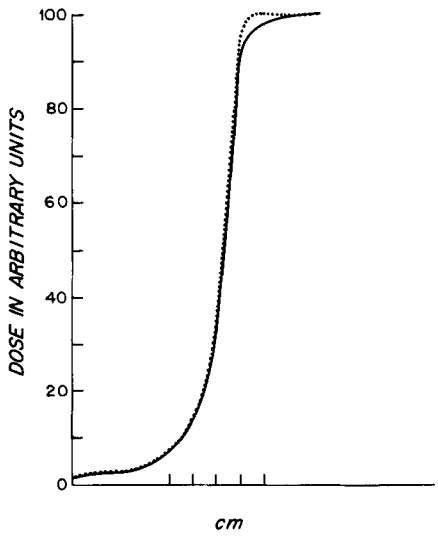
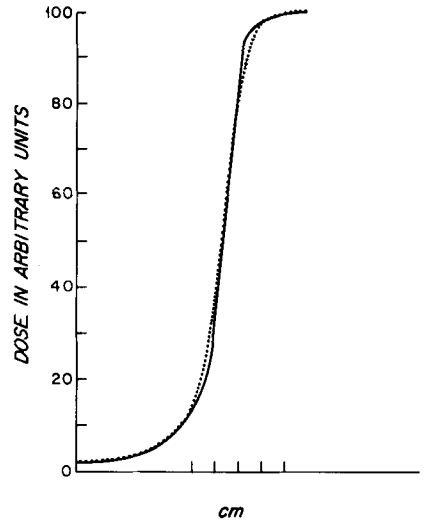


Fig. 2. Half beam profiles of a 'normal' beam (——) and improved 'sharp' beam (· · · ·).

Beam profiles (Fig. 1) can in general be divided into 5 separate regions. The extent of these regions are not sharply demarcated and they tend to evolve from one region into its neighbors governed primarily by the scattering characteristics of the beam modality and the geometry, such as the collimators and the phantom. They are: a) the region inside the beam and far away from the geometrical edges; b) the region inside the beam but near the geometrical edges; c) the region around the geometrical edges; d) the region immediately outside the geometrical edges and e) the region outside the beam and far away from the geometrical edges. For most beam profile improving devices the regions of interest are a), b) and c). We will, therefore, confine our discussions to these 3 regions only. Region a) is primarily determined by the flattening filter and is generally relatively uniform, especially when compared with regions b) and d). Regions b) and c) are determined by solid angle considerations (geometrical penumbra) and scattering. Since scattering is in general uncontrollable, beam profile improvement devices are usually, therefore, devices that modify the beam geometrical penumbra.



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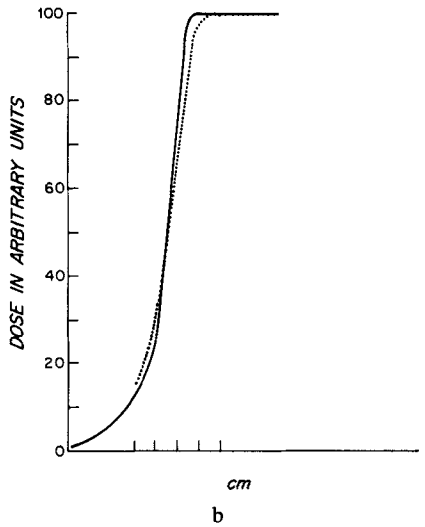

b

Fig. 3. a) Half beam profiles of a 'normal' beam (——) and a 'normal' beam convolved with patient position fluctuations (· · · ·). b) Half beam profiles of an improved 'sharp' beam (——) and an improved beam convolved with patient position fluctuations (· · · ·).

We will describe in this report the effect of patient position fluctuations on beam profiles, specifically in regions a), b) and c) with emphasis on their influence on the design of profile modifying devices.

Methods and Results. The effect of patient position fluctuations on a beam profile was calculated by the following method. The distribution of the fluctuations was assumed to be a 'gaussian' of a certain width ($\pm\sigma$) and with a sharp cut-off at $\pm 3\sigma$s. We believe this represents very closely the semi-random fluctuation one encounters in the fraction-to-fraction set-up of patients. A value of $\sigma = 5$ mm was used for the following calculations.

These distributions were then convolved with the beam profiles of interest. The resultant profiles then represented the 'true' beam profile the patient will get after a large number of treatment fractions.

Since beam profiles are generally multi-parametric functions, dependent on energy, treatment machine characteristics, scattering, depth of profile in scattering medium and so forth, we decided to use 2 typical beam profiles (Fig. 2) to illustrate the effect of the convolution mentioned above. The 2 profiles are labeled 'normal' and 'sharp' to represent a typical unmodified beam and a modified beam respectively. They closely resemble the examples that were described in references 1 and 2.

The effect of the convolution on a beam profile can be discussed separately for the 3 regions a), b) and c) mentioned above. Region a), the relatively flat region, is usually not greatly affected by the convolution except for very narrow beam (compared to σ). In region c), the geometrical penumbra region, the profile is generally linear and the effect of the convolution is just a decrease in slope of this linear line. Region b) involves one of the clinically more significant regions, a region where the magnitude is ~95% to 100% of the maximum value in the beam. The shape of this region is generally governed by scattering from the collimators and to a larger extent from the imbalance of in and out scattering in the phantom. Depending on its exact shape, the result of the convolution can be quite varied, the most interesting of which is that there can be no change after the convolution as shown in Fig. 3 a. Otherwise, the effect of convolution is always a decrease in the concavity of the shape of this region toward the center of the beam (region a) (Fig. 3 b). Interpreting this slightly differently, the width of the beam profile at the ~95% level, for example, may or may not be modified by the convolution, and if is is, it is always reduced.

The effect of patient position fluctuations on beam modification devices can now be explained in the following manner. For a 'normal' or unmodified beam, the effect due to patient position fluctuations is small or non-existent at the $\geq$95% levels due to the 'unsharpness' of the beam in this region (Fig. 3 a). However, for a 'sharp' or modified beam, the effect due to patient position fluctuation is not small and can be substantial (Fig. 3 b), thus causing a corresponding reduction in beam width in the $\geq$95% levels. As a result, the increase in beam width at these levels by using a beam profile modifying device can be substantially compromised: sometimes reduced by as much as 1/2 to 2/3 (compare Fig. 3 a and b).

Conclusions. Beam modifying devices were all designed using static beam parameters, i.e. without taking patient position fluctuation from fraction to fraction into consideration. As a matter of fact, all beam parameters in use are of a static beam nature. These, however, should not be universally applied to in vivo patient dosimetry due to use of multi-fraction treatment scheme. We have shown that at least in the case of designing beam profile modifiers the difference between using static and non-static beam, that is, with patient position fluctuations convolved, can be significant.

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THE INTERACTION BETWEEN RSU-1069, HYDRALAZINE AND HYPERTHERMIA IN A C3H MAMMARY CARCINOMA AS ASSESSED BY TUMOUR GROWTH DELAY

Radioresistant hypoxic cells found in many solid tumours (3) are known to be sensitive to a variety of other modalities, including certain drugs (10) and hyperthermia (8). Interest is now being focused on increasing tumour hypoxia before subsequent exposure to these agents. Hydralazine is a drug which has been used clinically as an anti-hypertensive agent (9). It has also been shown to compromise the oxygenation status of malignant tissues and increase the tumour damage produced by the hypoxic cell cytotoxin RSU-1069 (2) as well as by hyperthermia (Horsman, in preparation). Additional evidence suggests that nitroaromatic compounds like RSU-1069 can also interact with hyperthermia and thus enhance tumour cell killing both *in vitro* (7) and *in vivo* (1). We now report results in which we have investigated the possible interaction occurring when RSU-1069, hydralazine and hyperthermia are combined together.

Material and Methods. All experiments were performed on 10 to 12-week-old female C3D2F1/Bom (C3H/Tif female×DBA/2 male) mice. The tumour model used was the C3H/Tif mammary carcinoma. Its derivation and maintenance has been previously described (6). For experimentation, the tumour was grown in the foot of the right hind limb of the experimental animals and treatments were carried out when tumours had reached a volume of about 200 mm^3. Tumour heating was achieved by placing non-anaesthetized mice in a lucite jig, with their tumour bearing legs exposed and loosely attached to the jig with tape. Hyperthermia was delivered by immersing the leg into a circulating waterbath (type Te 623, from Heto, Birkerød, Denmark) stabilized to ± 0.2°C of the adjusted temperature. The response of tumours to heart treatment was determined, as previously described (4), calculation of the time taken for tumours to reach 5 times their treatment volume. All drugs were freshly prepared before each experiment by dissolving in sterile saline (0.9% NaCl). Hydralazine (1-hydrazinophthalazine) was supplied by Ciba-Geigy Corp., Copenhagen, Denmark, and injected intravenously (i.v.) at a constant injection volume of 0.02 ml/g body weight of mice. RSU-1069 [1, (2-nitro-1-imidazolyl)-3- (1-aziridinyl)-2-propanol] was supplied to us by Drs Adams, Stratford and Jenkins (MRC Radiobiology Unit, Chilton, Didcot, Oxon, U.K.) and injected intraperitoneally (i.p.) at a volume of 0.01 ml/g body weight.

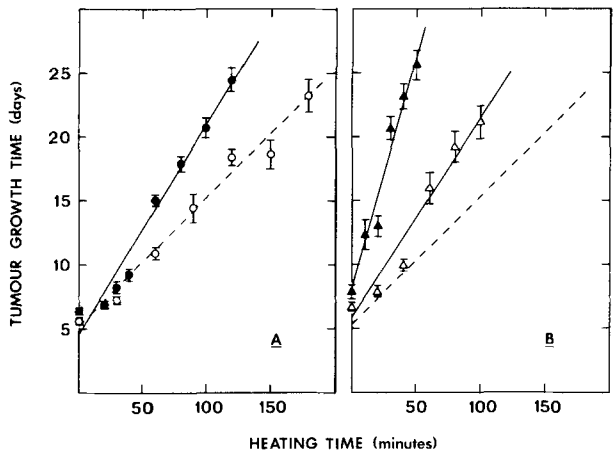

Figure. Change in tumour growth time as a function of heating time at 42.5°C, when RSU-1069, hydralazine and heat are combined. Tumours were locally heated for various times 30 min after giving an i.p. injection of saline or RSU-1069 (100 mg/kg), followed immediately by an i.v. injection of saline or hydralazine (5 mg/kg). The time taken to regrow to 5 times the treatment volume was recorded. ○, heat alone; ●, hydralazine + heat; △, RSU-1069 + heat; ▲, RSU-1069 + hydralazine + heat. Symbols represent the mean value (±1 SE) for groups of between 6 to 26 mice. Lines were drawn from linear regression analysis of the data. The dashed line in panel B is the heat alone curve from panel A.

Results. The relationship between tumour growth time and time of heating at 42.5°C under the different treatment conditions is shown in the Figure, with the characteristics of each curve summarized in the Table. Untreated tumours take on average 5 to 6 days to reach 5 times their treatment volume. If tumours are heated at 42.5°C for increasing time periods there is a concomitant increase in tumour growth time, with the suggestion of a linear relationship (Fig. 1 A). This was also true for the combination of hydralazine and heat, except that in this instance the curve was characterized by a much steeper slope than seen with heat alone. An equivalent increase in heat sensitization was also produced when the hydralazine was replaced by RSU-1069 (Fig. 1 B). This effect was further enhanced when all 3 agents were administered to the mice. Addition of the slope ratios obtained

Table

Characteristics of the dose–response curves shown in the figure

Treatment[1]	Intercept[2] (days)	Slope[2] (min^{-1})	Slope ratio[3]
Heat alone	5.29 (±2.58)	0.100 (±0.004)	-
HDZ + heat	4.57 (±2.59)	0.164 (±0.006)	1.64 (±0.19)
1069 + heat	5.83 (±3.03)	0.157 (±0.011)	1.57 (±0.26)
1069 + HDZ + heat	8.01 (±2.77)	0.367 (±0.023)	3.67 (±0.54)

[1] Treatments were either
a) Heat alone (42.5°C; 1 h).
b) Hydralazine (HDZ; 5 mg/kg; i.v.)–30 min–heat.
c) RSU-1069 (1069; 100 mg/kg; i.p.)–30 min–heat.
d) 1069–0 min–HDZ–30 min–heat.
[2] ±1 SE.
[3] Ratio of the slope obtained for that particular treatment, compared to that for heat alone (±95% confidence interval).

for hydralazine + heat and RSU-1069 + heat, gives a value of 3.21, which is not significantly different from the slope ratio for RSU-1069 + hydralazine + heat, suggesting at least an additive response of combining all 3 agents.

Discussion. Hydralazine has been shown to be capable of sensitizing the Lewis lung tumour to RSU-1069 (2), the effect being attributed to an increase in tumour hypoxia as a result of the hydralazine inducing a decrease in tumour blood flow. Our own experiments with the C3H mammary carcinoma (Horsman, in preparation) have demonstrated that a single intravenous injection of 5 mg/kg hydralazine could also significantly increase tumour heat damage. Furthermore, it produced up to an 80–90% reduction in tumour blood perfusion within 30 min following injection of the drug, and this decrease correlated well with the development of full radiobiological tumour hypoxia.

The finding that RSU-1069 could significantly enhance tumour heat damage is not surprising since several studies have shown that misonidazole and hyperthermia can interact to increase tumour cell killing both *in vitro* (7) and *in vivo* (1). However, the mechanism for this interaction is not clear. The drug RSU-1069 is generally believed to interact with cells under aerobic conditions to produce an adduct which may be subsequently excised or under hypoxia, metabolised to more potent cytotoxin (5). The application of heat might either inhibit the excision process or alternatively increase the rate of production of the toxic species. On the other hand, we have data (Horsman, unpublished observations) obtained using the ^{86}RbCl extraction procedure in this C3H mammary carcinoma, which clearly shows a decrease in vascular perfusion of the tumour following heating at 42.5°C for 1 h. Blood flow was found to decrease by as much as 75% within 5 min of terminating the heat treatment, reaching almost a 90% reduction by 1 h and not showing any increase until at least 24 h had elapsed. Such a decrease in blood flow would certainly produce full radiobiological hypoxia. Since the toxicity of RSU-1069 is known to persist in tumours and spheroids even 10 h after the initial drug exposure (5), the enhanced effect seen with RSU-1069 and heat may simply reflect an increase in drug toxicity as a result of this elevated and prolonged level of hypoxia.

Whatever the mechanism responsible for the observed interaction and although the effect of combining all 3 agents may be no greater than additive, we clearly see an enhancement of tumour damage. Naturally, additional testing in other tumour models and normal tissues is required to establish if such an approach to cancer therapy has any clinical potential.

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PATIENTS MAKING DECISIONS—DO SPECIALIST NURSES HELP?

The background of this paper is in relation to nursing patients with breast cancer in the United Kingdom. Its title poses 2 questions which need to be dealt with separately but are closely linked. The first is whether patients are asked to make decisions about their own treatment, i.e. whether they are offered a choice. This raises further questions about whether patients want choices and whether they are capable of making decisions about their own health. The second issue assumes that the patients are given a choice and that they are offered support while making this choice. Many people believe that specialist nurses are in the best position to offer this support as they have the knowledge and skills to guide patients through the process. This paper suggests that evidence is needed to support this theory so that specialist nurses are welcomed in more areas. Conversely it may point out deficiencies in the service where nurses may need extra training.

The pattern of relationships that doctors develop with their patients has been described by Szasz & Hollander (9). They give 3 models—the 'active'–passive' model, the 'guidance–co-operation' model and the 'mutual–participation' model. The 'active–passive' model is where the patient is generally unconscious and has procedures carried out upon him without his co-operation. The 'guidance–co-operation' model is where the doctor tells the patient what to do and the patient co-operates. This is appropriate in acute situations such as infection. It is a paternalistic role for the doctor and he relates to the patient as parent to child. In chronic illnesses patients generally take more responsibility for their own health and the 'mutual–participation' model comes into play where the patient is helped to help himself on an adult to adult basis.

In recent years cancer patients have begun to demand a more active role in their health care particularly with the increase in general knowledge about cancer due to the wealth of literature available. Cancer is also now being seen in terms of a chronic

illness where the patient may be balancing on a continual health–illness scale for many years. Many people are becoming more vocal in demanding to guide their own health care due to the increase in the feminist and consumerist movements. Patients also express the need for time to consider treatment options and discuss any problems (3). They feel decisions may be made without full consideration of the implications of mental and physical results. For example, Valanis & Rumpler (10) suggest that in breast cancer the doctor's focus is on maintaining life; but that the women may feel the loss of a valued body part is equally important and should be considered.

The best adjustments to the medical decision are made when:
a) the patient devolves all responsibility for decision making to the doctor
b) the patient who takes joint responsibility for decisions is given:—full information, a choice to discuss the decision with medical staff and chances to discuss it with close family or friends.
c) the patient knows what the consequences of treatment may be, has faced them without fear and accepted the decision accordingly.

The above statements imply that some patients prefer to accept that the doctor is in the best position to make medical decisions in view of his skills, training and objectivity. This is despite of the fact that his decision may have profound effects on the patients life. Others prefer to be guided by the professional but to retain some control over what happens to them. Yet other patients (11) want to be involved in the decision making process but not to actually make the final decision.

To help patients who want to be involved in the decision making process, medical staff need to be able to spend time giving information and discussing implications with the patient.

The nurse is traditionally seen as a giver of information and in counselling cancer patients, especially in the field of breast cancer. Many people have shown the need for counselling among these patients (1, 2, 13) and others have described ways in which they can help patients (10) or given details of their own work in this field (12) but few have shown any objective evidence of what these nurses achieve. Maguire et al. (5) have shown that psychological morbidity is not necessarily reduced in mastectomy patients by that depressive states are picked up and treated earlier. Maguire also suggests that nurses are better at this than doctors are (4). This is one lead for supporting the work of nurse counsellors.

Further lines of research that need to be followed are many and complex. The most difficult question to answer is how to differentiate between patients who want to take an active part in their own choice of treatment and those who do not. The second is whether the patients are receiving adequate information and the third is whether the guidance and support they are given is sufficient.

One first needs to consider how much the patient wants to know. With the current British paternal attitudes it is assumed that the patient does not want to know the full details of their disease but research shows that patients generally want to know more than they have been told (7). McIntosh (6) demonstrated that in cancer patients those who knew their diagnosis said they preferred to know. This is an ongoing question as the more that patients are given information then their need for further information may change. This may increase their need or decrease it if they find they are hearing things they did not want to know. It is also ultimately tied up with how much the patient wants to be able to take their own decisions. It may be found that the patients' need for information is proportional to their desire to be in control of their own health.

Messerli et al. (7) sent out questionnaires to women after mastectomy to find out whether they were happy with the information given at surgery; 86% indicated they would have liked more information and most would have preferred written information. Unfortunately, it was a self-selected group that replied to the questionnaire indicating either people highly motivated about their health or those dissatisfied with their treatment. The real figure may be much lower. Further studies need to be done to improve these findings. Newall's study (8) showed 70% of patients detained information from non-medical sources and 30% of doctors have no time to discuss diagnosis. Concurrent with this it would also be useful to look at who is best at giving this information. It has been assumed that the specialist nurse has not only the knowledge but also the time and the skills to put this information across. Studies to compare patient satisfaction with information could be done where the doctor only gives information and where the nurse is available to back up and clarify what the doctor has said. Long-term follow-up of these patients to assess the adequacy of their support would also be useful to establish the advantages of being seen by a nurse specialist. Many smaller questions may also be asked to provide a complete picture of support. Once the patient has received information do they have time to discuss this with medical staff or family members before making a decision. Does this time help or does it make them more anxious? Do the patients find their own support group or friends and family more useful than medical staff? If the support given by medical staff was better would the patient prefer to turn to medical staff or would they prefer still to turn to family members? If this is so, then perhaps the information needs to be given to the family rather than the patient. Ultimately, once the patients have the information and support they require, do they then wish to make their own decisions or does it increase their confidence in the medical staff sufficiently to leave choice in the hands of the professionals.

Some of these questions are being approached, but more research needs to be done now if medical attitudes are not to lag sadly behind changes in public opinion and so that doctors and nurses work together to build an atmosphere of trust between patients and medical staff so patients are fully supported when decisions need to be made about their health and treatment.

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ACUTE LEUKEMIA IN MULTIPLE MYELOMA

The association of acute leukemia and myelodysplastic syndromes with chemotherapy for lymphoma and solid tumors has been frequently recognized. However, there are only a few reports about the incidence of acute leukemia in multiple myeloma (1–3). The purpose of the present study was to estimate the risk of acute leukemia in patients with multiple myeloma in Spain.

Between January 1976 and February 1987, 350 patients with multiple myeloma were treated with chemotherapy associated or not associated with radiotherapy. The initial treatment consisted of intermittent courses of melphalan and prednisone in 219 patients; cyclophosphamide, doxorubicin, vincristine and prednisone in 97, and the M2 protocol (vincristine, melphalan, cyclophosphamide, carmustin, prednisone) in 34. Chemotherapy was discontinued if a plateau phase was achieved.

Among the 350 patients in this study one developed acute leukemia (FAB:M6) and one sideroblastic anemia after 4 and 1 1/2 years from the diagnosis respectively. This represents one case of acute leukemia among the 77 observed 4-year survivors (1.3%). The observation included 809 person-years of survival. The incidence was about 30 times higher than could be expected for a group of persons with similar age in the general population (4).

The reported incidence of acute leukemia in patients treated for multiple myeloma ranges from 0.2 to 7% (6), with a peak occurring from 3.5 to 5 years after the start of therapy. Some authors have reported that the incidence is higher in patients receiving continuous chemotherapy than in those receiving intermittent chemotherapy (5). The low incidence in our series may be due to the fact that we did not give maintenance chemotherapy in the plateau phase and that the chemotherapy was administered as intermittent courses.

Key words: Multiple myeloma; chemotherapy, acute leukemia.

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EDUCATION AND TRAINING IN SWITZERLAND FOR NURSES WITH DIFFERENT LEVELS OF KNOWLEDGE IN CANCER NURSING

During recent years, continuing education and training facilities in oncology nursing have been a subject of intensive development. Even though we live in a small country with a complicated and decentralised structure and with 4 different languages, it has been possible, thanks to the efforts of some highly motivated and creative nurses, to develop oncology nursing to a significant standard.

The Swiss Oncology Nursing Society was founded in 1977. This was the time when growth and development of specialisation in cancer nursing was initiated. Two special post-graduate education programmes in cancer nursing have been offered in Switzerland since 1980. A network of local groups for oncology nurses was built up in 1985. These local groups organize meetings for professional exchange and continuing education.

The Swiss Oncology Nursing Society was recognized officially by the Swiss Nurses' Association in 1987. At the same time, the 2 post-graduate education programmes in oncology were acknowledged through the same society. At present the following organizations and programmes are of special in breast for the educations in cancer nursing in Switzerland.

The Swiss Oncology Nursing Society consists of 2 representatives from every oncology centre in Switzerland. From the same centres, oncologists working actively in clinical cancer research are grouped in an association called SAKK (Swiss Association for Clinical Cancer Research). The Oncology Nursing Society collaborates activity with this group.

The members of the Oncology Nursing Society work in the following areas: in- and out-patient services in medical oncology, radiotherapy, pediatrics, bone marrow transplantation units, home care services, education and management. It is considered important for representatives in the society to be still actively involved in clinical care on a daily basis instead of just holding administrative positions.

The members of the the Swiss Oncology Nursing Society meet twice a year for a professional exchange of information. The delegates of EONS, ECTG, etc. share news from meetings and international conferences, as well as new information. Discussion takes place about experience of new methods in patient care, new utensils and results from various studies.

The Swiss Oncology Nursing Society sets the following goals:

- Improvement of the quality of patient care in oncology
- Support and consultation for straff in cancer centres and regional hospitals
- Organization of continuing education in the region
- Organization of an Annual Swiss Congress on Oncology Nursing
- Improvement of teaching strategies in oncology nursing
- Building up a 'cancer nursing philosophy'
- Interdisciplinary collaboration
- Enhancing professional and personal skill and competence

Local groups of interested nurses have been developed within the last two years in several large cities of Switzerland. The group leaders are representatives of the Swiss Oncology Nursing Society who can thus directly rely on the newest information. Meetings are organized about every 2 to 4 months. They may last a few hours, if necessary all day, usually attended by 20 to 100 persons. The event is open to all nurses with an interest in supportive, comprehensive cancer nursing. The nurses attending these meetings are frequently nurses from smaller hospitals or from the community, who are not confronted daily with cancer patients, but are uncertain how to handle the problems. They want to learn how they can manage the various problems of their patients in their non-specialized settings.

While such meetings give an opportunity to transmit basic knowledge in oncology nursing, their main benefit lies in the personal contacts which originate here. Trained oncology nurses can offer support and consultation rather informally, which diminished anxiety and hesitation on the part of less specialized nurses. Accordingly, they feel more at ease to call their specialized colleagues again later for additional information and support or confirmation of their own approaches. They also learn to assess better the delineation between sufficient nursing care and the need of specialized nursing care.

Two programs of post-graduate education in oncology nursing exist in Switzerland, one in Geneva and the other in St. Gallen. In both programmes, the theoretical background of oncology nursing is transmitted about 200 teaching hours. The duration of the Geneva programme is 9 months, 2 days per month. The programme in St. Gallen focuses, besides the 200 teaching hours, on clinical practice. For 2 years the students work in an oncology department and thus gain on-the-job oncology nursing experience with the whole spectrum of cancer pathology, care and treatment. During their studies and practice, they are supported, trained and advised by competent professional health care personnel. To qualify after 2 years of studies, they have to take a written test and complete a research project in cancer care. Graduates generally find employment as oncology nurses at various hospitals or in community services.

It seems that we in Switzerland have a very adequate system for education and training of oncology nurses. It is still relatively new and we can only hope that collaboration within this nursing network, as well as the development of our skills and knowledge, will further improve in order to respond even better to the requirements of patients and colleagues.

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RISK OF TUMORS OF THE NERVOUS SYSTEM AMONG MERCURY AND OTHER SEED DISINFECTANT APPPLICATORS IN SWEDISH AGRICULTURE

A Swedish study has found an increased risk of glioblastoma among dentists and dental nurses (1). This, together with the fact that older organic mercury compounds were able to pass through the blood-brain barrier and that mercury is accumulated in the brain, suggests that metallic mercury could be an etiologic factor for tumors of the nervous system.

In Swedish agriculture different mercury compounds have been used as seed disinfectants for more than 60 years. Since their environmental hazardous effects became known, the use has decreased and in the mid 1960s alkyl mercury compounds were forbidden and limitations were placed on mercury disinfection.

Swedish farmers have experienced a decreasing relative risk for tumors of the nervous system over time, from a relative risk of 1.11 in the period 1961–1973 to a relative risk of 0.90 in 1974–1979 (2). A study of Swedish licensed pesticide applicators (in which about 14% had used mercury) found a relative risk of 1.45 (95% confidence interval: 0.96–2.09) among those who had their licenses issued the first two years of the license compulsion (1965 and 1966) and thus could be assumed to have used mercury to a greater extent. (Unpublished data by Wiklund, Dich, Holm and Eklund.) Persons who have a license for applying mercury and other seed disinfectants are more exposed to mercury than farmers and pesticide applicators in general. We have therefore studied the risk of tumors of the nervous system in this group.

Material and methods. A total of 1657 persons having a license for seed disinfection issued between 1965 and 1976 were followed up in the Swedish Cancer Registry from date of license until death or December 31, 1982. The study included all registered cases of tumors in the nervous system (ICD7: 193).

Expected number of cases was based upon annual cancer incidence in 5-year age groups for the whole Swedish population. The standardized incidence ratio was calculated as the ratio of observed to expected number of cases. The 95% confidence interval was derived from a Poisson distribution table.

Results. The number of person-years was 24429 and the mean follow-up time was 14.7 years. Five tumors of the nervous system were observed versus 4.98 expected (standardized incidence ratio = 1.00 (95% confidence intervals 0.33–2.34). With the present follow-up period no increased risk of tumors in the nervous system was observed in this study of Swedish mercury and other seed disinfectant applicators.

Key words: Brain tumors; cohort study, licensed seed disinfectant applicators, mercury.

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