INFLUENCE OF TREATMENT MODE ON HOST IMMUNITY AFTER CURE FROM TRANSPLANTABLE TUMOURS : ADVANTAGE RADIOTHERAPY OVER SURGERY AND CHEMOTHERAPY.

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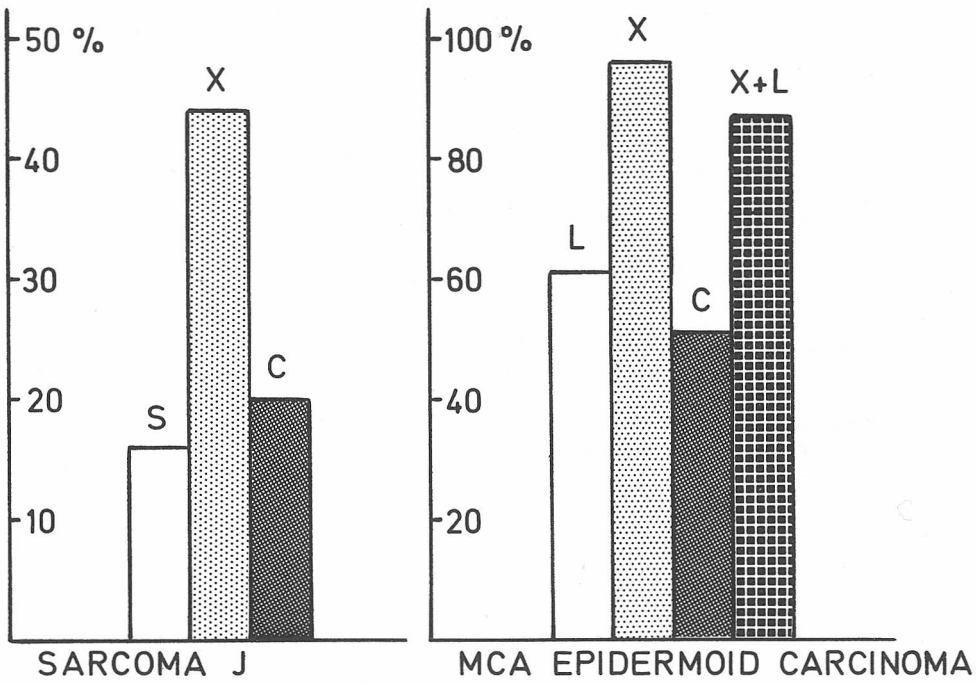
In the general prospect of assessing the influence of radiotherapy on host-tumour relationships we compared the levels of immunity conferred by different curative treatments.

The experimental systems consist of 2 transplantable murine tumours : a spontaneous sarcoma (Sarcoma J) used in allogenic situation and a syngenic methylcholantrene induced epidermoid carcinoma. Tumours growth pattern, concomitant immunity and radiation response were previously reported (1, 2, 3). Surgical excision (S), tumour ligature (L), irradiation at 35, 50, 75 Gy tumour dose (X) and chemotherapy with 25-50 mg/kg Cytoxan q 8 d x 4 (C) were used as treatment modalities. Specific anti-tumour immunity of cured animals was evaluated in vivo by a challenge graft containing about 10^6 neoplastic cells.

Figure 1 shows rejection rate of challenge graft (%) according to curative treatment.



6/37 (16%) mice cured of Sarcoma J by surgery and 4/20 (20%) cured by chemotherapy rejected the challenge graft. A 50 Gy tumour dose immunized 44% of survivors (19/43). FIGURE 1

Immunity against MCA epidermoid carcinoma was present among 61% (16/26) and 51% (20/39) of animals cured by ligature or chemotherapy respectively. After a curative dose of 35 Gy, 96% rejected the challenge graft (48/50). Tumour irradiation 48 hours prior to ligature increased immunity to 87% (20/23). FIGURE 1

In our experimental systems radiation therapy confers higher levels of immunity than surgery and chemotherapy. One may presume that the effect takes place very early if one considers the discrepancy of resistance between the ligature group and the irradiation + ligature group.

Destruction of suppressors cells by whole-body exposure as a side-effect of tumour treatment is unlikely due to the irradiation procedure.

Radiotherapy can induce antigenic alterations or unmasking (4) and release antigenic material (5). This may stimulate a particular cell subpopulation (6) or affect the balance between helper and suppressor cells (7).

Several works published in the last ten years have indicated detrimental immunodepressive consequences of radiotherapy, especially in breast cancer treatment (8).

The present results, although limited to animals systems, suggest that tumour irradiation might also exert a beneficial influence on host resistance. Owing to the question of metastasis and late recurrences it does not seem indifferent to obtain cure of a primary tumour by any way whatever.

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APPENDIX *: statistical analysis of results.*

1) Sarcoma J :
S (surgery) vs X (radiotherapy) : ***p<0.01*** *(p<0.02 with Yates correction)*
C (chemotherapy) vs X (radiotherapy) : NS 0.05 (p<0.07) ; S vs C : NS 0.05
X (radiotherapy) vs non X group (S+C) : ***p<0.01*** *(with or without Yates correction)*

2) MCA epidermoid carcinoma :
L (ligature) vs X (radiotherapy) : ***p<0.001*** *(with or without Yates correction)*
L vs XL(irradiation prior to ligature) : ***p<0.05***
C (chemotherapy) vs X (radiotherapy) : ***p<0.001*** *(with or without Yates correction)*
L vs C : NS 0.05
C vs XL : ***p<0.01*** *(p<0.02 with Yates correction)*
X group (X+XL) vs non X group (L+C) : ***p<0.001*** *(with or without Yates correction)*