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CHEST WALL RECURRENCES AFTER OPERATION AND POSTOPERATIVE IRRADIATION OF MAMMARY CARCINOMA

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Treatment of mammary carcinoma has at present no uniform schedule in different clinics. The majority of hospitals still use the radical Halsted resection (KREBS 1975). Postoperative radiation therapy does not improve the prognosis (EASSON 1968). Several authors use the combination of simple mastectomy and postoperative irradiation (HARRINGTON 1952, GUTTMAN 1967, WATSON 1967, HEILMAN 1975). The five-year survival is about the same with all different treatment schedules, even after conservative surgery combined with postoperative radiation therapy.

Recurrence of mammary carcinoma in the operation area in the chest wall has been reported in a varying number of cases. After radical mastectomy and radiation therapy chest wall recurrences in 10 to 17 per cent of the patients have been reported (SPRATT 1967, KAAE & JOHANSEN 1969). In the material recently published by Høst & BRENNHOVD (1975) in stage I after radical operation recurrence in the chest wall occurred in 3.5 per cent of the cases given postoperative irradiation and in 4 per cent of those not irradiated. The corresponding figures in stage II were 8.2 and 15.2 per cent, respectively.

In RISSANEN's (1969) material after radical operation combined with postoperative radiation therapy 10 per cent of stage I cases developed recurrences in the chest wall and after tumorectomy, and irradiation recurrences occurred in 25.8 per cent of the cases.

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The frequency of recurrences in the chest wall after surgery combined with irradiation of the operation area and after operation alone was analysed and the results are now reported.

Material and Methods

The material consisted of 463 patients with operable mammary carcinoma treated in the Clinics of Surgery and Radiation Therapy of this University during 1966 to 1973; 188 cases (41 %) belonged to stage I, 189 (41 %) to stage II and 86 (18 %) to stage III. Of the 463 patients, 341 had ductal carcinoma, 107 scirrhous or solid carcinoma, 8 medullary and 7 other carcinoma.

Radical mastectomy (Halsted) was performed in 355 cases and simple mastectomy in 108 cases.

Postoperative irradiation was delivered in three different ways:

I. During 1966 to 1968 98 patients received conventional roentgen radiation (200 kV) to the chest wall consisting of 24 to 31 Gy during 3 to 4 weeks. In half (49) of these patients the regional lymph nodes were given roentgen irradiation at a dose of 25 Gy in 3 to 4 weeks. The other half (49) of the patients in this group received cobalt treatment at a dose of 35 to 40 Gy in 4 weeks to the regional nodes. The observation time in this group was 5 years.

II. Cobalt irradiation was given to 98 cases during 1970 to 1972, the dose being 40 to 45 Gy in 4 to 5 weeks to the regional lymph nodes, but the operation area in the chest wall was not irradiated. The observation time was 4 to 5 years.

III. During 1970 to 1973, 267 patients received the same treatment as the foregoing group with cobalt at a dose of 40 to 45 Gy to the regional nodes but in addition 30 to 39 Gy electron treatment was administered from an 8 MeV accelerator to the chest wall in 4 weeks. The observation time was 2 to 5 years.

All local recurrences observed in the chest wall were examined microscopically.

Results

Recurrences in the chest wall developed in all groups. Patients in stage I with no radiation therapy to the operation area developed recurrences in 9 of 75 (12.7 %) cases, but only one of the 41 (2.5 %) who had received conventional roentgen irradiation to the operation area developed a recurrence. The difference is almost significant ($p < 0.1$).

Of the cases with stage I treated with electrons to the operation area, 4 of 72 (5.5 %) developed chest wall recurrences. This was considerably less than among cases with no irradiation, but the difference is statistically significant on the level $p < 0.15$ only.

In stage II the corresponding figures for chest wall recurrences were 2 of 15 (13.3 %) without chest wall irradiation, 2 of 23 (9.0 %) with roentgen irradiation and 24 of 151 (16.0 %) with electron treatment. These differences are not significant.

Of patients in stage III without irradiation of the operation area 5 of 8 (62.5 %) developed recurrence in the thoracic wall and after roentgen treatment alone the figures were 6 of 34 (18 %). The difference is significant ($p < 0.01$). Of the cases with stage III given electron therapy, 14 of 44 (31.8 %) developed recurrences. The difference between electron-treated and non-irradiated patients is almost significant ($p < 0.1$).

Discussion

FLETCHER (1972) has reported that even a relatively small dose of radiation, 45 Gy in 5 weeks, may destroy at least 90 per cent of subclinical aggregates of mammary carcinoma cells. In his investigation a dose of 30 to 35 Gy in 4 weeks controlled 60 to 70 per cent of subclinical disease. The postoperative roentgen irradiation delivered in the present series, although the doses were moderate (only 24 to 31 Gy), seemed to prevent the development of recurrence in the thoracic wall. The difference between roentgen irradiation (2.5 %) and no irradiation (12.7 %) of the chest wall in stage I was statistically almost significant. On the contrary, in the investigation presented by HØST & BRENNHOVD (1975) no difference at all was found between cases given roentgen irradiation to the chest wall and cases not irradiated.

The results of roentgen irradiation of stage II patients were about the same in the present investigation and the report of HØST & BRENNHOVD. The irradiated cases developed thoracic wall recurrences in 9.0 and 8.2 per cent, respectively, and without irradiation the frequency was 13.3 and 15.2 per cent, respectively. These differences are not statistically significant.

In stage III the advantage of radiation therapy of the operation area was quite evident in the present material, as 62 per cent of the cases developed recurrences of the chest wall without irradiation as opposed to only 18 per cent after roentgen therapy and 31.8 per cent after electron therapy.

Postoperative treatment with 8 MeV electrons has appeared to be suitable as the thoracic wall, 2 cm thick, receives a rather homogeneous dose of irradiation without injury to the lungs.

TAPLEY & MONTAGUE (1976) have applied low-energy electrons of 7 MeV postoperatively and consider a dose of 55 Gy in 4 weeks appropriate to prevent the appearance of chest wall recurrences in about 90 per cent of the patients.

No explanation can be presented for the fact that roentgen therapy seems to be more effective in the present material in preventing chest wall recurrences than electron treatment, even when the observation time for roentgen-treated patients was longer than the observation time for electron-treated patients.

The reason may be the considerably low RBE value for 8 MeV electrons, about 0.6 at a dose of 2 to 3 Gy, as RYTILÄ & VOUTILAINEN (1968) and WIDERØE (1976) have pointed out. The chest wall dose with electron treatment was only 30 to 39 Gy in the present material but is currently increased to 45 Gy. The patients receive an

additional dose of 5 Gy to the chest wall during cobalt treatment of the regional lymph nodes.

Even when the figures for 5 or 10-year survival of the patients with mammary carcinoma are not affected with any kind of postoperative irradiation (EASSON 1968, FISCHER 1971), the morbidity of the patients irradiated to the operation area remains lower because of fewer chest wall recurrences during the latency time before distant dissemination. Thus, postoperative irradiation of the operation area still seems to be indicated.

SUMMARY

The frequency of recurrences in a material of 463 patients with mammary carcinoma following treatment by surgery with or without postoperative roentgen or cobalt irradiation to the operation area and regional lymph nodes is analysed. Postoperative irradiation to the operation area seems to prevent the chest wall recurrences even in stage I mammary carcinoma.

ZUSAMMENFASSUNG

Die Rezidivfrequenz wurde in einem Material von 463 Patienten mit Mammakarzinom nach chirurgischer Behandlung mit oder ohne postoperativer Röntgen-oder Koboltbestrahlung des Operationsgebietes und der regionalen Lymphknoten analysiert. Die postoperative Bestrahlung des Operationsgebietes scheint Rezidive der Brustwand auch bei Mammakarzinom im Stadium I zu verhindern.

RÉSUMÉ

Les auteurs ont étudié la fréquence des récidives dans la région opératoire et dans les ganglions lymphatiques régionaux sur une série de 463 malades atteintes de cancer du sein après traitement chirurgical, avec ou sans Roentgenthérapie ou Cobaltthérapie post-opératoire. L'irradiation post-opératoire de la région opératoire paraît prévenir les récidives de la paroi thoracique même au stade I du cancer du sein.

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