day, the maximum being reached on the second day. In 1942 Bisgard and his associates [3] were able to protect a certain number of rabbits from lethal doses of diphtheria toxin when the animals were given x-rays in varying doses, particularly when irradiation was given forty-eight hours before injection of the toxin.

Glenn found that repetition of the standard dose (140 kilovolts) at twenty-four to forty-eight hour intervals produces a still further increase in the phagocytic index. This higher index can be maintained for about six days but not indefinitely. In addition to the time element, the rise in the phagocytic index varies with the kilovoltage. With a 100 roentgen dose (air) delivered at 50-90 kilovolts there is practically no change in phagocytic titer by the end of forty-eight hours. With 200 kilovolts irradiation is only half as effective as with 140 kilovolts. From 400 to 1,000 kilovolts there is practically no increase, and there may be a decrease in the normal phagocytic index.

Since whole citrated blood was used in determining the phagocytic indexes, conclusions cannot be drawn as to whether or not the effect of irradiation is on the antibody producing mechanism, on the leukocytes or on the plasma or is a result of denaturation of local tissue proteins. The data presented are of suggested clinical interest mainly in that the time interval and kilovoltage producing the maximum immunologic effect in rabbits have been determined.

TESTOSTERONE IN THE TREATMENT OF ADVANCED CARCINOMA OF THE BREAST

Lacassagne [1] has demonstrated that continued administration of estrone to young male rats belonging to a strain whose females are predisposed to mammary cancer will produce an adenocarcinoma of the breast in the majority of the males thus treated. Similar results were obtained by Loeb and his associates.[2] Nathanson and Andervont [3] were able to prevent the development of tumors in female mice of a strain with a high predisposition to cancer by administration of testosterone. The hormone had no effect on the growth of spontaneous mammary carcinoma in the female of this strain. Lacassagne suggested that, if adenocarcinoma of the breast is the consequence of a special hereditary sensitivity to the proliferative action of estrone, a therapeutic preventive might be found in an antagonistic hormone. Ulrich [4] reported remarkable improvement in a case of advanced inoperable carcinoma of the left breast and of advanced chronic mastitis (precancerous stage) of the right breast in a woman aged 45. In a case of inoperable carcinoma of the right breast and an operable malignant tumor of the left breast associated with a large bleeding uterine fibroma, Ulrich performed a hysterectomy and removal of both ovaries. He followed the operation by administering massive doses of testosterone. The improvement in the status of the right breast was such as to render the condition operable. Six women who had a family history of breast cancer and had had their breasts amputated for advanced carcinoma were treated by Loeser [5] with implantation of testosterone propionate or progesterone or both. At the time of implantation recurrences were present in 3, and, though 2 of these improved temporarily in general health, the progress of the cancer was not checked. In the other 3 patients neither recurrences nor metastases were present at the time of implantation and have not appeared in the subsequent five years. Loeser suggests that androgen should be implanted in the operation site when the breast is removed for carcinoma and implantation should be repeated when signs of masculinization disappear. Fels [6] reports a remarkable improvement in a patient with advanced carcinoma of the breast with palpable nodules in the skin and skeletal metastasis. He felt that the improvement obtained in this particular case could be attributed solely to the testosterone propionate.

Adair and Herrmann,[7] who administered large doses of testosterone propionate in 11 cases of advanced breast cancer, did not observe any toxic effects in patients with normal serum calcium level, each of whom received several thousand milligrams of testosterone propionate over a period of three months. Four patients, 1 with soft tissue and 3 with bone metastasis, manifested remarkable improvement. The evidence of improvement was seen in the regression of the primary lesions and soft tissue metastasis in 1 case and in an increase in calcification in areas of osseous metastasis in 3 cases. Disappearance of pain coincided with the osteoblastic changes. In 2 of the cases that exhibited deposition of calcium in the bone metastasis there was a coincidental elevation of the serum alkaline phosphatase.

In certain instances of advanced carcinoma of the female breast with metastasis, large doses of testosterone propionate apparently exert a favorable influence. The duration of the favorable response and the amount of the substance necessary to maintain this improved status have not been established.

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