RADIATION THERAPY OF TESTICULAR GERMINOMAS,

STANFORD UNIVERSITY SERIES (1956-1980)

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ABSTRACT

Over the twenty-five years of experience with pure testicular germinomas reported in this paper, dramatic changes have occurred, both in survival of patients and in the understanding of the natural course of the disease. Current results of our experience with 128 patients who were treated with radiation therapy during this period show an 84% overall actuarial survival ten years after treatment. This high ten year actuarial survival rate is distributed by stage as follows: Stage I (89.5% survival); Stage II (81% survival); Stage III (31% survival). These results compare well with other series of over 100 patients treated by radiotherapy. Stage IV patients may benefit from palliative radiotherapy to metastases of bone or brain. Clinical experience with these tumors has shown that attention to careful staging can optimize both survival and life extension to a significant degree.

INTRODUCTION

Testicular germinomas formerly were considered one of the most lethal cancers in men. With advances in diagnostic and therapeutic radiology, as well as in chemotherapy and diagnostic laboratory tests, this neoplasm is now considered usually curable. This paper deals with the role of radiotherapy in this success story; while surgical removal (inguinal orchiectomy) is the treatment of choice for the primary tumor, radiotherapy has provided an adjuvant treatment capable of sterilizing regional lymphadenopathy and other potential sites of metastatic disease, resulting in improved survival with reduced morbidity.
THE STANFORD LINEAR ACCELERATOR CAPABILITY (1956-1980)

In January 1956, a 4.8 million electron volt (Mev) linear accelerator was installed at the Stanford-Lane Hospital in San Francisco. The beam was characterized by a maximum dose at 1.2 cm beneath the skin surface. It had two advantages over conventional 200-400 Kv orthovoltage equipment: skin sparing due to more efficient deposition of ionizing radiation at varying depths beneath the skin, and a more sharply defined radiation field and target volume with attendant sparing of surrounding normal tissues. This unique home-made accelerator was later replaced by a 6 Mev, commercially manufactured, linear accelerator (Varian Clinac 6), with which the maximum dose occurred 1.5 cm beneath the skin. Source-to-skin distances could be increased from 100 cm to 140-165 cm, as larger and longer fields were used. Patients could be treated daily, receiving a total dose of from 150 to 220 rads through opposing anterior and posterior fields.

Patient Selection

During the period 1956-1980, 176 patients were referred to the Division of Radiation Therapy with a diagnosis of testicular seminoma (more recently we have adopted "germinoma" to replace "seminoma"). Certain of these data we have published previously[1,2,3]. In reviewing and updating our treatment results we excluded 40 patients for the reason that 13 were seen for consultation only, 16 had had previous treatment elsewhere, and 11 had pathology other than pure testicular germinoma, thus leaving 136 patients for study. The median age was 36 years (Figure 1). Initial evaluation included physical examination, chest x-ray and an intravenous pyelogram. Lymphangiography was added in the late 1960's. In the late 1970's, tumor markers, beta-human chorionic gonadotropin (B-HCG) and alpha-fetoprotein (AFP) were determined for each patient. Chest tomography or CT scans were used, as indicated. Of the original 136 eligible patients, 8 were lost to follow-up, leaving 128 to be described in this report. Ninety patients were classed at Stage I, 29 as Stage II, and 9 as Stage III (Table 1). Thus, about 2/3 of these patients had Stage I, while nearly another third had Stage II disease, leaving a small group of 9 patients who had serious Stage III disease with distant metastases.

Treatment Methods

Stage I. These patients received 3000 to 3500 rads* over 3 to 3-1/2 weeks via a single field encompassing the para-aortic and

*1 rad = 100 ergs/gm unit of absorbed dose.