Testicular radiation for primary seminoma in a solitary testis

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Orchiectomy is the standard of care for patients with a second primary testicular tumor. We report a case of a man, with previous history of stage I left testicular germ cell tumor, who developed a contralateral seminoma and desired preservation of the remaining testis. Partial orchiectomy was not feasible due to tumor size and percutaneous needle biopsy revealed classical seminoma. He was treated with radiotherapy to the testis. Post treatment biopsy revealed no evidence of disease. At 32 months follow-up, he has not required androgen replacement. He has preservation of total testosterone level and libido.

Key Words: seminoma, radiotherapy, hormone preservation

Introduction

Up to 5% of patients with germ cell neoplasms of the testis develop a synchronous or metachronous contralateral tumor.[1] The standard treatment is orchiectomy to remove the primary tumor for treatment and for pathological assessment resulting in sterility and the need for continuous hormone replacement.[2,3] Partial orchiectomy followed by radiotherapy to the affected testis has been used for treatment of patients with second contralateral tumors, where radiotherapy is used to eradicate testicular intraepithelial neoplasia (TIN).[4] We present a case of a man with previous testicular tumor and subsequent contralateral new primary seminoma, radiotherapy was used to treat the patient with the primary tumor in situ.

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Case report

A 32-year old man presented with a 6-week history of a new mass in his right testis. He had previously been treated with left radical orchiectomy and surveillance for stage I mixed germ cell tumor. After 1 year on surveillance he became non-compliant with follow-up until the contralateral mass was detected. A testicular ultrasound confirmed a 2.7 cm lesion in the upper pole extending to the equator of the testicle. Staging investigations including tumor markers were negative. Fertility was not an issue for the patient but he declined radical orchiectomy wishing to preserve his remaining testis and requested that in situ radiation be considered if percutaneous transcrotal needle core biopsy showed seminoma. An ultrasound-guided needle biopsy of the lesion obtaining two cores, showed classical seminoma. Pre-treatment serum total testosterone level was 27.6 nmol/l (14-35) and free testosterone level nmol/l was 55 pmol/l (62-135), serum LH and FSH was 11.6 IU/l (1.5-9.3) and 27.2 IU/l (1.4-18.1), respectively. With informed consent including the uncertainty of successful eradication of disease and androgen preservation, he underwent a course of radiotherapy to the right testis encompassing the scrotum to a dose of 30 Gy in 15 daily fractions. He tolerated the treatment without any acute toxicity.

Following completion of treatment he is on our surveillance protocol for stage I seminoma for nodal and distant relapse.[5] He has serial scrotal ultrasounds; at 3 months there was a volume reduction of >60% of the previous mass. Biopsy at 6 months post treatment showed no evidence of tumor and his testis was normal to palpation. At 32 months after radiotherapy, his total and free testosterone level is 24.4 nmol/l and 41.4 pmol/l, respectively. The LH level is further elevated to 18.1 IU/l (1.5-9.3). The most recent ultrasound shows an indistinct small abnormality, and his testis is normal to palpation. The patient to date has not required testosterone replacement.

Discussion

This is an unusual case in that the patient wanted a non-standard approach to his management with testis preservation. There is obviously concern with regard to the adequacy of needle cores for definitive diagnosis, as not every area of the tumor will be sampled. However, even with open biopsy, sampling remains an issue and may have increased morbidity compared to needle biopsy. Thus there is some risk associated with this approach. Although only a minority of patients with testicular cancer will develop a contralateral tumor, the impact of a second orchiectomy should not be under-estimated. The morbidity of androgen replacement therapy in patients treated for bilateral testicular cancer was documented in a series of 43 patients.[2] While psychosocial and sexual adjustment was satisfactory in the majority of patients, approximately 20% had evidence of moderate to severe psychological distress. A recent review of hormone replacement therapy in men highlighted a concern that androgen replacement might exacerbate sleep apnea and also induce prostate cancer.[6] The recommendations for assessing patients prior to therapy included performing screening for prostate cancer and a prostate biopsy if the PSA was >4 ng/ml. While on therapy, monitoring recommendations included a yearly PSA with prostate biopsy if the PSA was to rise $\geq$1 ng/ml. This may be a concern in older patients and may not necessarily have significant impact at the present time in our patient. Maintaining physiological levels of testosterone may obviate the necessity of this close monitoring and may improve quality of life as compared to pharmacological androgen replacement. However, modern transdermal preparations of testosterone may allow near normal physiological replacement.

Partial orchiectomy followed by radiotherapy to residual testicular parenchyma has been investigated for patients with second contralateral tumors in order to preserve hormonal production.[4] However this did not appear to be possible in our patient due to the size and position of the tumor.

Treatment for testicular germ cell tumors has evolved; there is now considerable interest in minimizing treatment related toxicity, while maintaining an optimal cure rate. This approach is in line with that philosophy and given the exquisite radiosensitivity of seminoma it would seem a reasonable strategy. However the dose required in this setting to eradicate macroscopic seminoma may affect hormone production and ultimately the patient may require hormone replacement. Our patient already had evidence of sub-clinical hypogonadism prior to radiotherapy. In the only other similar report, a dose of 26 Gy was used with no evidence of disease at follow-up of 18 months.[7]

It has been estimated that a dose of 33 Gy will result in reduction of testosterone levels in 50% of men.[8] The management of testicular intra-epithelial neoplasia (TIN) may be helpful in determining the dose response for hormone production after testicular radiation. A recent study of dose reduction in the treatment of TIN

where doses of 14-20 Gy were used showed an overall 3.6% per year decline in testosterone production and 40% of men requiring testosterone replacement for androgen insufficiency syndrome.[9] It appears from the data available that our patient may have at least a 50% risk of requiring testosterone replacement and indeed his pre-radiotherapy free testosterone level was already abnormal.

To date this patient has had a good result to the treatment. It remains to be seen whether he will ultimately require androgen replacement. Long-term follow up is required to assess the effectiveness of treatment in this patient. □

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