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Review

Radiotherapy for Stage IIA seminoma: The Northern Israel Oncology Center Experience, 1971–2010

Moshe E. Stein[a,*], *Jamal Zidan*[b], *Tomer Charas*[a], *Rahamim Ben-Yosef*[a]

[a] *The Northern Israel Oncology Center, Rambam Health Care Campus and Faculty of Medicine, Haifa, Israel*
[b] *Department of Oncology, Safed Medical Center, Safed, and Israel Faculty of Medicine in the Galilee, Bar-Ilan University, Israel*

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ABSTRACT

Aim: To evaluate treatment details, outcome, relapse rate and side-effects in Stage IIA seminoma irradiated and followed for a period of 39 years.

Background: Seminoma is a very radiosensitive disease and radiation therapy alone is able to achieve long-term disease-free survival, even in advanced Stage disease. Due to the lack of long-term prospective studies, it is of value to follow patients and try to determine the appropriate volume to be irradiated and the dose which can achieve total cure with minimal acute and chronic side-effects.

Patients and methods: A retrospective review of 24 Stage IIA seminoma patients irradiated between 1971 and 2010 was performed. All patients underwent orchiectomy and meticulous clinical, biochemical and radiological staging.

Results: Median age at diagnosis was 36 years and median follow-up was 84 months. A majority of patients received the "hockey-stick" irradiation schedule (para-aortic lymph nodes and hemi-pelvis) to a total dose of 2250–2500 cGy and a boost to radiologically involved nodes of 500–1000 cGy. Treatment was well-tolerated. Twenty-one (88%) patients are alive with no evidence of disease. Two patients died due to unknown causes, while one patient died due to head of the pancreas carcinoma, most probably radiation-induced.

Conclusions: In Stage II seminoma, radiotherapy can provide excellent results with low rates of toxicity. Reduction of total dose and size of fields without affecting the good results should be considered. Due to prolonged survival, awareness of second primary tumor is indicated.

* *Corresponding author at*: Northern Israel Oncology Center, POB 9602, Haifa 31096, Israel. Tel.: +972 50 2063266; fax: +972 4 8541810.
E-mail address: m_stein@rambam.health.gov.il (M.E. Stein).

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1. Background

Testicular seminoma accounts for 40% of primary testicular neoplasms, with 70–85% of patients presenting with disease confined to the testis (Stage I), while 15–20% present with infra-diaphragmatic lymphadenopathy (Stage II).[1] Due to the high radiosensitivity of seminoma, radiotherapy has become the mainstay of treatment in limited nodal involvement.[1,2] Cause-specific survival usually exceeds 90% and, in recent years, has been approaching 100%. Relapse rates reported in the literature vary according to stage and treatment modality with 11%, 19%, and 39% in Stage IIA, IIB, and IIC, respectively.[1] Stage IIB (2–5 cm in size lymph nodes) can be treated successfully with platinum-based chemotherapy or high-dose radiotherapy to high-volume fields with chemotherapy held for relapse. In this retrospective study, we review our clinic's experience in radiotherapy treatment, outcome and toxicity in 24 Stage IIA post-orchiectomy seminoma patients over a period of 39 years.

2. Patients and methods

We report the radiotherapy treatment of 24 Stage IIA testicular seminoma patients, treated successfully with radiotherapy. Median age at diagnosis was 36 years (range, 23–58 years) (Table 1

). Preoperative staging consisted of family history, anamnestic details concerning prior diseases or surgical procedures in pelvic or inguinal regions, physical and neurologic examination, testicular ultrasound, blood count, biochemistry profile including measurement of B-human-choriogonadotropin (β-HCG), alpha-feto-protein (AFP) and lactate dehydrogenase (LDH) (Table 2). The majority of patients presented preoperatively with painless testicular swelling or mass for a mean duration of symptoms of three months. Post-orchiectomy staging consisted of whole-body computerized tomography (CT scan) for all patients diagnosed after 1980. In the last 10 years, eight patients have undergone fluoro-deoxyglucose positron emission tomography (PET-CT) as a part of staging. Before 1980, lymphography was used as the main goal of staging. Staging was determined using the American Joint Committee on Cancer (AJCC), 7th edition: Stage IIA with pathologic abdomino-pelvic lymphadenopathy up to 2 cm in size.

Radiotherapy was delivered either with cobalt-60-teletherapy (two patients before 1994) or with 6–18 MV linear accelerator (Linac). Treatment decision parameters and irradiated volume were done according to Wilder et al.[3] Irradiated volume included the para-aortic lymph nodes (upper field: interface T12/T11; lower border: bottom of L5; width: 9–11 cm). The ipsilateral hemipelvis was irradiated ("hockey-stick" method) in 20 (83%) patients, with the lower border downward to the mid-obturator level. Since 1990, the hemipelvis field has been omitted and the lower border set at the cranial rim of the ipsilateral acetabulum (Fig. 1A and B).[4] The whole pelvis ("inverted-Y" method) was irradiated in three patients due to scrotal violation and previous inguinal repair in the presence of an undescended testis.

Table 1 – Anamnestic details, symptoms, diagnostic and therapeutic measures.

Age [years], median, range	36, 23–58
	# of patients
Religion	
Jews	22
Moslem	1
Christian	1
Ethnic origin	
Ashkenazi Jews	23
Sephardic Jews	1
Place of birth	
Israel	17
Europe	3
North Africa	2
North America	2
Referring hospital	
Rambam	10
Jerusalem (Hadassah)	4
Safed	3
Nahariya	3
Haifa (Bnei-Zion)	2
Haemek	2
Etiology	
Cryptorchidismus	2
Torsion	1
Side of tumor	
Left	16
Right	6
Bilateral	2
Symptoms	
Hard, painful testicle	5
Testicular swelling	12
Slow growing, painless mass	7
Duration of symptoms (months)	
Median	77
Range	1–12
Work-up	
Tumor markers[a]	
β-HCG	23
LDH	6
Radiology	
Testicular US	15
CT scan	23
PET-CT	9
Lympho-angiography	7
Abdominal US	2
Mode of surgery	
Inguinal orchiectomy	23[b]
Scrotal orchiectomy	1
Pathology	
Classical seminoma	23
Anaplastic seminoma	1
ITGCN	7[c]
Stage of disease	
IIA	24
Schedule of radiotherapy	
total/daily dose (cGy)/# treatments	
Hockey Stick	
2500/125/20	11
3000/200/15	2
2550/170/15	3
2550/150/17	1
2250/150/15	1
2250/170/13	1
2000/125/16	1