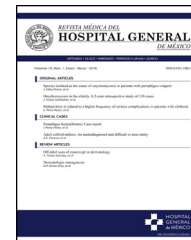




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ORIGINAL ARTICLE

## Relapse and gastrointestinal toxicity associated with radiotherapy treatment in stage I seminoma patients

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### KEYWORDS

Seminoma;  
Radiotherapy;  
Toxicity;  
Modified dog-leg  
technique

### Abstract

**Background:** The results preceding this study documented that patients with early stage classical seminoma treated with radiotherapy in the Hospital General de México, using doses of 30 Gy in 15 fractions using the modified dog-leg technique have lower gastrointestinal toxicity than the conventional dog-leg technique, but with no difference in overall survival and disease-free survival, both resulting in 100% 60 month-survival.

**Objective:** To determine the results of treatment in terms of relapse and gastrointestinal toxicity, comparing radiotherapy with conventional dog-leg, modified dog-leg and inverted-Y techniques.

**Material and methods:** retrospective, observational, comparative, analytical, retrolective study; 40 patients were analysed, all diagnosed with stage I seminoma treated at the RT Hospital General de México between October 2009 and May 2016.

**Results:** The age of the patients was  $33 \pm 8$  years; 32 (80%) were treated in Accelerator linear and 8 patients (20%) in Cobalto60. The modified dog-leg technique was used in 24 patients (60%), conventional dog-leg technique in 12 patients (30%), and inverted-Y technique in 4 patients (10%). The radiation dose in 87% of patients was 25.2 Gy. The most commonly found acute gastrointestinal toxicity was grade 2, present in 22% with modified dog-leg technique, 13% conventional dog-leg technique, and 3% for the inverted-Y technique ( $p=0.95$ ). There was one relapse associated with the modified dog-leg technique; predicting factors for relapse including rete testis invasion, trans-scrotal violation, and lymphovascular invasion had no statistically significant impact.

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**Conclusions:** Radiotherapy continues to be the treatment of choice in patients with early stage seminoma, with a low probability of relapse and acceptable gastrointestinal toxicity. There is no difference in relapse or gastrointestinal toxicity associated with the different radiation techniques in patients with stage I seminoma, therefore the modified dog-leg technique is recommended as the field of irradiation is already reduced without a negative impact on relapse. © 2016 Sociedad Médica del Hospital General de México. Published by Masson Doyma México S.A. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## PALABRAS CLAVE

Seminoma;  
Radioterapia;  
Toxicidad;  
Técnica hemi Y  
modificada

## Recaída y toxicidad gastrointestinal asociada al tratamiento con radioterapia en pacientes con seminoma etapa I

### Resumen

**Antecedentes:** Los resultados que preceden a este estudio documentan que pacientes con seminoma clásico en etapa temprana tratados con radioterapia en el Hospital General de México, usando dosis de 30 Gy en 15 fracciones con técnica de tratamiento hemi Y modificada tienen menor toxicidad gastrointestinal frente a la técnica hemi Y convencional, ambas sin diferencia en sobrevida global ni sobrevida libre de enfermedad siendo ambas del 100%, a 60 meses.

**Objetivo:** Determinar los resultados de tratamiento en términos de toxicidad gastrointestinal y recaída, al comparar la técnica de radioterapia con hemi Y convencional, hemi Y modificada e Y invertida.

**Material y métodos:** Estudio retrospectivo, observacional, comparativo, analítico y retrolectivo; se analizaron 40 pacientes con diagnóstico de seminoma etapa I tratados en el Servicio de Radioterapia del Hospital General de México entre octubre 2009 y mayo 2016.

**Resultados:** La edad de los pacientes fue de  $33 \pm 8$  años; treinta y dos (80%) fueron tratados en acelerador lineal y 8 pacientes (20%) en Cobalto<sup>60</sup>. La técnica hemi Y modificada se utilizó en 24 pacientes (60%), hemi Y convencional en 12 pacientes (30%), Y invertida en 4 pacientes (10%). La dosis de irradiación en el 87% de los pacientes fue de 25.2 Gy. La toxicidad aguda gastrointestinal más frecuente encontrada fue grado 2, presente en el 22% con técnica hemi Y modificada, 13% hemi Y convencional y 3% Y invertida ( $p=0.95$ ). Se presentó una recaída asociada a técnica de hemi Y modificada; los factores pronósticos para recaída como invasión a rete testis, invasión linfocascular y violación transescrotal no mostraron diferencias estadísticamente significativas.

**Conclusiones:** La radioterapia sigue siendo una opción de tratamiento en pacientes con seminoma etapa temprana, con baja probabilidad de recaída y con toxicidad gastrointestinal aceptable. No existe diferencia en cuanto toxicidad gastrointestinal ni recaída asociada a las diferentes técnicas de irradiación en pacientes con seminoma Etapa I, por lo que se recomienda la técnica de hemi Y modificada ya que el campo de irradiación es más reducido sin impacto negativo en recaída.

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## Introduction

Testicular cancer has a low incidence, in 2016 an incidence of 8720 cases and mortality in 380 cases is estimated.<sup>1</sup> In Europe, the incidence is 8%, Australia 6%, Asia and Africa <1%.<sup>2</sup> In 2006 in Mexico, 1361 cases were recorded, corresponding to 1.2%.<sup>3</sup> In a 2009 case study at our hospital, it was found that most patient presented in stage I (73%), stage IIA 13%, IIB 6%, and IIC 8%.<sup>4</sup> The mean age at onset was 32 years ranging from 20 to 48 years.

Germinal testicular cancer accounts for 90–95% of the cases, of which seminoma has a frequency between 40% and 60%. There are three histological varieties: classical 85%, anaplastic 10–12%, and spermatocytic 4–6%,<sup>5,6</sup> it mainly

spreads through the lymph nodes.<sup>5</sup> It has been documented worldwide that 80% of patients present in stage I,<sup>7</sup> a result which is in agreement with what was found in our hospital.

The clearly identified risk factors are: cryptorchidism with a relative risk 5- to 10-fold the general population; immediate family history of testicular cancer (father relative risk 4, brother relative risk 9); chemical substances: naphthylamine, benzidine, and gasoline derivatives relative risk 5-fold<sup>5</sup>; contralateral intratubular neoplasia; infertility and Klinefelter syndrome.<sup>6</sup>

The diagnostic protocol uses the medical history, physical examination, testicular ultrasound, and tumour markers: alpha fetoprotein (AFP) which is raised in non-seminoma or mixed histology, its half-life is 5–7 days,<sup>5</sup> a fraction  $\beta$  of

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