Hodgkin and Non Hodgkin Lymphomas: a new Role for Radiation Therapy?

Radiotherapy in non Hodgkin lymphoma: Radiotherapy: Volumes

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Radioterapia Oncologica
Università “La Sapienza”
Roma
STAGING AND MANAGEMENT OF LOCALIZED NON-HODGKIN'S LYMPHOMAS: VARIATIONS AMONG EXPERTS IN RADIATION ONCOLOGY

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Purpose: To examine the opinions of radiation oncology experts on the management of lymphomas with respect to staging procedures, treatment plan, radiation target volume, and dose prescription. Our aim was to identify the patterns of practice and areas of controversy that may need to be resolved and be amenable to prospective clinical trials.

Conclusions: This survey demonstrated a high degree of consensus regarding the overall management plan of localized lymphomas among the sampled expert radiation oncologists. However, the recommendations regarding the specifics of chemotherapy and RT remain variable. There is clearly no agreement on the most appropriate RT dose and volume. The large variation in the treatment of leptomeningeal relapse of diffuse large B-cell lymphoma suggests that the optimal treatment in this situation is poorly defined, and the clinical outcome with RT, as well as the rationale for decision making, should be examined in more detail. © 2002 Elsevier Science Inc.
The observations in our study suggest that the radiation target volume in lymphoma should be defined more rigorously.

“The definitions of involved-field radiotherapy require revision and uniform application”
WHICH VOLUME?

Nodal lymphoma
Localized large cell lymphoma: is there any need for radiation therapy?
Daniel O. Persky and Thomas P. Miller

Table 1 Clinical trials in localized large cell lymphoma involving radiation therapy

<table>
<thead>
<tr>
<th>Trial</th>
<th>Phase</th>
<th>Age (median)</th>
<th>Risk factors</th>
<th>Treatment arms</th>
<th>In-field relapse (%)</th>
<th>In-field cancers</th>
<th>N</th>
<th>PFS (years)</th>
<th>OS (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWOG 8736</td>
<td>III</td>
<td>59</td>
<td>68% stage I, 3% bulky</td>
<td>CHOP x 3 + IFRT</td>
<td>76 (5)</td>
<td>82 (5)</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CHOP x 2</td>
<td></td>
<td></td>
<td>251</td>
<td>77 (5)</td>
<td>81 (5)</td>
</tr>
<tr>
<td>BCCA</td>
<td></td>
<td>64</td>
<td>61% stage I</td>
<td>CHOP (like) + IFRT</td>
<td>18</td>
<td>6/40</td>
<td>308</td>
<td>81 (5)</td>
<td>80 (5)</td>
</tr>
<tr>
<td>ECOG 1484</td>
<td>III</td>
<td>59</td>
<td>32% stage I, 31% bulky</td>
<td>CHOP x 8 + IFRT (CR only)</td>
<td>18</td>
<td>79</td>
<td>73 (6)</td>
<td>87 (5)</td>
<td></td>
</tr>
<tr>
<td>LNHI 93-1</td>
<td>III</td>
<td>47</td>
<td>67% stage I, 11% bulky</td>
<td>CHOP x 3 + IFRT</td>
<td>28</td>
<td>1/9d</td>
<td>329</td>
<td>74 (5)</td>
<td>81 (5)</td>
</tr>
<tr>
<td>LNHI 93-4</td>
<td>III</td>
<td>68</td>
<td>65% stage I, 8% bulky</td>
<td>ACVBP + consolidation</td>
<td></td>
<td></td>
<td>318</td>
<td>82 (5)b</td>
<td>90 (5)b</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CHOP x 4 + IFRT</td>
<td></td>
<td></td>
<td>295</td>
<td>64 (5)</td>
<td>72 (5)</td>
</tr>
</tbody>
</table>

CR: Complete Remission; IFRT: involved field radiation therapy; OS, overall survival; PFS, progression-free survival.

*a* BCCA is sequential experience, not a trial, and no patients with bulky disease were reported.

*b* Statistically significant (*P* < 0.05). In-field cancer rate is proportion of solid cancers occurring in the radiation field (d, only deaths from such cancers were reported in the study).
LOCALIZED NODAL DIFFUSE B NHL

WHICH VOLUME?

INVOLVED FIELD (IFRT)
LOCALIZED NODAL DIFFUSE B NHL

INVOLVED FIELD (IFRT)

IFRT included all visible sites of disease determined before biopsy and treatment with chemotherapy and uninvolved lymph nodes of the same nodal region.
LOCALIZED NODAL DIFFUSE B NHL

INVOLVED FIELD (IFRT)
LOCALIZED NODAL DIFFUSE B NHL

INVOLVED FIELD (IFRT)

3DCRT
## LOCALIZED NODAL DIFFUSE B NHL

Radiotherapy in the Rituximab era

Trials incorporating anti-CD20

<table>
<thead>
<tr>
<th>Author</th>
<th>patients</th>
<th>therapy</th>
<th>Radiation field</th>
<th>PFS</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persky JCO 2008 SWOG 0014</td>
<td>60</td>
<td>R-CHOP x3</td>
<td>IFRT</td>
<td>93% 2 yrs</td>
<td>95% 2 yrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rituximab x1</td>
<td>“only lymph node region(s) affected by disease”</td>
<td>88% 5 yrs</td>
<td>92% 5 yrs</td>
</tr>
<tr>
<td>SWOG 8736</td>
<td>200</td>
<td>CHOPx3</td>
<td>IFRT</td>
<td>76% 5 yrs</td>
<td>82% 5 yrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“included all visible sites of disease determined before biopsy and treatment with CHOP”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ADVANCED DIFFUSE LARGE B CELL LYMPHOMAS

Radiotherapy has generally been used selectively for bulky sites/ residual masses

Bulky is an adverse prognostic factor

Wilder, Cancer 2001, Moser IntJRadBiolPh 2005

Bulky is defined at least > 5 cm

Wilder, Ferreri, Zinzani, Krol, Van der Maazen, Kamath

Bulky > 10 cm worse prognosis also in rituximab era

Pfreundschuh, Lancet Oncol 2008, MInt study
## ADVANCED DIFFUSE LARGE B CELL LYMPHOMAS
### BULKY LESIONS

<table>
<thead>
<tr>
<th>Author</th>
<th>patients</th>
<th>therapy</th>
<th>N° pts</th>
<th>Radiation field</th>
<th>DFS</th>
<th>OS 5 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviles Int J rad 1994</td>
<td>88/218</td>
<td>CEOP/Bleo-DAC RT</td>
<td>43</td>
<td>IFRT with boost to region of bulky</td>
<td>72%</td>
<td>81%</td>
</tr>
<tr>
<td>randomized</td>
<td>III/IV</td>
<td>CEOP/Bleo-DAC</td>
<td>45</td>
<td></td>
<td>35%</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>CR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>55%</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Aviles Lek Lymph 2004</td>
<td>94</td>
<td>CHOP-Like RT</td>
<td>40</td>
<td>28/40 limited to bulky 12/40 EFRT (mantle, inverted Y, STNI)</td>
<td>41 mht</td>
<td>73%</td>
</tr>
<tr>
<td>Oncology 2000 Not randomized</td>
<td>III/IV</td>
<td>CHOP-Like</td>
<td>54</td>
<td></td>
<td>18 mth</td>
<td>p=0.05</td>
</tr>
<tr>
<td>CR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>57%</td>
<td>p=0.05</td>
</tr>
<tr>
<td>Rube Ann Hematol 2001</td>
<td>153</td>
<td>CHOPx6 RT</td>
<td>84</td>
<td>Lymph nodes area of the initial bulk with a field size reduction to the post-chemotherapy tumor volume</td>
<td>74.1</td>
<td>77.3</td>
</tr>
<tr>
<td>Not randomized</td>
<td></td>
<td>No bulk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schlembach RR 2000</td>
<td>59</td>
<td>CHOPx6 RT</td>
<td>28</td>
<td>Prechemotherapy volume</td>
<td>85</td>
<td>87</td>
</tr>
<tr>
<td>Not randomized</td>
<td></td>
<td></td>
<td>31</td>
<td></td>
<td>51</td>
<td>81</td>
</tr>
<tr>
<td>Aviles Lek Lymph 2004</td>
<td>341</td>
<td>CHOP-B</td>
<td>173</td>
<td>Were designed with the knowledge of the frequent widespread distribution of disease</td>
<td>55</td>
<td>66</td>
</tr>
<tr>
<td>randomized</td>
<td>IV</td>
<td>CHOP-B +RT</td>
<td>168</td>
<td></td>
<td>82</td>
<td>87</td>
</tr>
</tbody>
</table>
Residual mass

The presence of residual mass following chemotherapy is not infrequently associated with the presence of bulky disease at diagnosis.

<table>
<thead>
<tr>
<th>Author</th>
<th>patients stage</th>
<th>therapy</th>
<th>N° pts</th>
<th>Radiation field</th>
<th>DFS 5 yrs</th>
<th>OS 5 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviles Med Oncol 2005</td>
<td>III/IV</td>
<td>CHOP RT CHOP</td>
<td>43/45</td>
<td>IFRT</td>
<td>86%/32%</td>
<td>89%/68%</td>
</tr>
<tr>
<td>Wilder Int J R 2001</td>
<td>44/294</td>
<td>CHOPx6 RT CHT</td>
<td>32/12</td>
<td>IFRT</td>
<td>67%/8%</td>
<td>70%/50%</td>
</tr>
<tr>
<td>Moser In J Rad Biol Ph 2006</td>
<td>238</td>
<td>RT CHT</td>
<td>114/68</td>
<td>IFRT</td>
<td>61%/32%</td>
<td>61%/32%</td>
</tr>
</tbody>
</table>
BULKY LESIONS IN RITUXIMAB ERA

Prognostic significance of maximum tumour (bulk) diameter in young patients with good-prognosis diffuse large-B-cell lymphoma treated with CHOP-like chemotherapy with or without rituximab: an exploratory analysis of the MabThera International Trial Group (MinT) study

Michael Pfreundschuh, Anthony D Ho, Eva Cavallin-Stahl, Max Wolf, Ruth Pettengell, Ingrid Vasova, Andrew Belch, Jan Walenik, Pier-Luigi Zinzani, Walter Mingrone, Stein Kvaloy, Olaf Silver, Ulrich Jaeger, Mats Hansen, Guido Czauderna, Adriano Scheliga, Markus Loeffler, Evelyn Kuhne; for the MabThera International Trial (MinT) Group

Lancet Oncol 2008; 9: 435-44

For additional clinical studies. Only a randomised trial like the ongoing UNFOLDER (UNFavourable young Low-risk patients treated with DEnsification of R-chemo regimens) study by the DSHNHL, which specifically addresses this question, will show whether the benefit of additional radiotherapy for these patients studied in the pre-rituximab era can be confirmed if rituximab is part of the therapeutic approach.
The role of radiotherapy to bulky disease in the rituximab era: results from two prospective trials of the German high-grade non-Hodgkin lymphoma study group (DSHNHL) for elderly patients with DLBCL

Pfreundschuh, Blood 2008, abs 584

The patients with bulky disease in the R-CHOP-14-Rx trial assigned to receive additional radiotherapy to bulky disease had better 18-months EFS (68% vs 43%) and a 4% better OS (80% vs 76%) compared with R-CHOP-14-noRx.

In the rituximab era additional radiotherapy to bulky disease has no role for elderly patients in CR/CRU after completion of 6xCHOP-14, but appears to be beneficial for patients with bulky disease achieving PR.
Site of persistent disease (PET Pos and Neg)
No surrounding uninvolved nodal regions

do the FDG-avid sites of disease before undergoing HDT/ASCT
ADVANCED DIFFUSE LARGE B CELL LYMPHOMAS

bulky sites/ residual masses

GTV: residual disease
CTV: GTV + 2-3 cm of margin
ADVANCED DIFFUSE LARGE B CELL LYMPHOMAS

bulky sites/ residual masses
PET era

GTV: residual PET positive disease
CTV: GTV + 2-3 cm of margin
WHICH VOLUME?

Primary mediastinal B cell lymphoma
Primary mediastinal B cell lymphoma

Well defined clinical and hystological entity

Very large mediastinal bulky disease at the onset
# PRIMARY MEDIASTINAL B CELL LYMPHOMA

<table>
<thead>
<tr>
<th>author</th>
<th>patients</th>
<th>treatment</th>
<th>Radiation volume</th>
<th>Os (%) 5 yrs</th>
<th>DFS (%) 5 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinzani Hematologica 2002</td>
<td>426</td>
<td>CHOP/MACOP-B HD-ASCT plus RT</td>
<td>The original sites of involvement</td>
<td>71 10 yrs</td>
<td>67 10 yrs</td>
</tr>
<tr>
<td>Todeschini BJC 2004</td>
<td>138</td>
<td>CHOP MACOP-B VACOP-B plus RT</td>
<td>Whole original disease</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>Mazzarotto IntJRadBiolPh 2007</td>
<td>53</td>
<td>MACOP-B VACOP-B plus RT</td>
<td>Mediastinum + supraclavear ln</td>
<td>86.6</td>
<td>93.4</td>
</tr>
<tr>
<td>De Sanctis IntJRadBiolPh 2008</td>
<td>92</td>
<td>MACOP-B plus RT</td>
<td>Only the residual disease</td>
<td>87</td>
<td>81</td>
</tr>
</tbody>
</table>
PRIMARY MEDIASTINAL B CELL LYMPHOMA

Only residual disease post chemotherapy

GTV: residual disease
CTV: GTV + 1-2 cm of margin
WHICH VOLUME?

Extranodal lymphoma
EXTRANODAL NHL

“Although not considered in any prognostic system, the site of origin of non-Hodgkin’s lymphoma probably affects the biologic characteristics of the tumor and the outcome of treatment”

Nancy L. Harris
PRIMARY HEAD AND NECK LYMPHOMA

RT EFRT alone \longrightarrow CT and RT EFRT
doubling survival

Standard treatment based on the currently available evidence suggests the use of combined multi-agent CT followed by

adjuvant radiotherapy to the
primary site and bilateral neck nodes
PRIMARY HEAD AND NECK LYMPHOMA
WHICH VOLUME?

2 opposed lateral field comprising of whole of WR with adjacent base of skull, preauricular, sub-mandibular, upper and posterior cervical nodes

Whole WR with cervical lymph nodes including occipital and submental lymph nodes. Three-field technique with bilateral portal for the primary and upper neck and a junction matched direct anterior lower neck field. For bulky lower neck or axillary or mediastinal nodes a mantle or mini-mantle field were selected

Bilateral neck fields including supraclavicular region

Entire WR and the lymphatic drainage area (bilateral level Ib to level V neck nodes
PRIMARY HEAD AND NECK LYMPHOMA

WHICH VOLUME?

CTV Whole Waldeyer Ring and the bilateral neck nodes
Involved lesion radiation therapy

GTV: pre-chemotherapy gross volume
CTV: GTV with 1 cm of margin and was restricted by post chemotherapy anatomic limits

Il Yu, IntJRadBiolPhys, 2010
Involved lesion radiation therapy
**PRIMARY HEAD AND NECK LYMPHOMA**

**local field**

<table>
<thead>
<tr>
<th>author</th>
<th>patients</th>
<th>Fup months</th>
<th>therapy</th>
<th>Relapse</th>
<th>Moucosite (G3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL Yu</td>
<td>91</td>
<td>63</td>
<td>R-CHOPx4+RT</td>
<td>3</td>
<td>1 pt</td>
</tr>
</tbody>
</table>

Comparable results to those of historical trials. Thus, using a small radiation target volume might decrease long-term RT complications without compromising outcomes

*Il Yu, IntJRadBiolPhys 2010*
PRIMARY HEAD AND NECK LYMPHOMA

PET-TAILORED RT VOLUME?

Fluorine-18 Fluorodeoxyglucose PET/CT Patterns of Extranodal Involvement in Patients with Non-Hodgkin Lymphoma and Hodgkin’s Disease

Elinat Even-Sapir, MD, PhD*, Genady Lievshitz, MD*, Chava Perry, MD, Yair Herishanu, MD, Hedva Lerman, MD, Ur Metser, MD

CAN BE USEFUL TO REDUCE THE RADIATION VOLUME?
Role of radiotherapy in the treatment of lymphomas of the gastrointestinal tract

Berthe M.P. Aleman, MD, PhD, Radiation Oncologist (Staff Position) at Specialised Cancer Institute a, c, Rick L.M. Haas, MD, PhD, Radiation Oncologist (Staff Position) at Specialised Cancer Institute a, Richard W.M. van der Maazen, MD, PhD, Radiation Oncologist (Staff Position) at University Hospital b, 1

Best Practice & Research Clinical Gastroenterology 24 (2010) 27-34

Practice points

- Eradication of H. pylori is the standard first-line treatment for localised low-grade gastric MALT lymphoma confined to the (sub) mucosa.
- Radiotherapy is recommended in case of insufficient effect of H. pylori eradication, after recurrence after H. pylori eradication or in case of the absence of H. pylori infection in patients with low grade gastric MALT lymphoma stage I or II.
- In case radiotherapy is indicated the target volume consists of the entire stomach, the pathological lymph nodes (if present) and effectively the perigastric lymph nodes.
- A radiation dose of 30-40 Gy in fractions of 2 Gy is recommended.
- Modern radiation techniques enable adequate sparing of kidneys and other normal tissues.
- During follow-up depending on the irradiated volumes and dose special attention is needed for possible damage normal tissues.
- The treatment of choice for gastric DLBCL is a combination of rituximab plus anthracycline based chemotherapy.
- The role of gastrectomy is limited due to the similar effectiveness of organ-preserving chemotherapy treatment, alone or in combination with radiation.
Netherlands Cancer Institute

- 24 pts LNH
- stage I
- Exclusive radiotherapy
  WART 20 Gy (1.3 Gy/fr) in to 3 wks
  boost 20 Gy (2 Gy/fr) in to 2 wks
  stomach e Ln paraaortic (L2-L3)
- DFS 4-yrs 83%  median follow-up 48 mesi

Burgers, 1988
PRIMARY GASTRIC MALT LYMPHOMA

Stage IE

GTV: stomach and perigastric lymph nodes.
CTV: GTV plus 1-2 cm of margin
PRIMARY GASTRIC MALT LYMPHOMA

STAGE IIE

GTV: stomach and perigastric lymph nodes plus primary involved lymph nodes (perihepatic, peripancreatic and/or lomboaortic)

CTV: GTV plus 1-2 cm of margin
PRIMARY BONE LYMPHOMA

<1% of all NHL and 7% of all bone tumors

Most PBLs are primary bone diffuse large B-cell lymphomas (PBDLBCL) with a rare occurrence of follicular, marginal zone, anaplastic large cell, Hodgkin, and T-cell lymphomas.
PRIMARY BONE LYMPHOMA

TARGET VOLUME:
Long bone:
- GTV: primary
- CTV: GTV plus 5 cm margin

Short bone:
- GTV: primary
- CTV: GTV plus all the bone
PRIMARY TESTICULAR LYMPHOMA

1-2% of all NHL and 1-7% of all testicular tumors

Patterns of Outcome and Prognostic Factors in Primary Large-Cell Lymphoma of the Testis in a Survey by the International Extranodal Lymphoma Study Group


Conclusion: Testicular DLCL is characterized by a particularly high risk of extranodal relapse even in cases with localized disease at diagnosis. Anthracycline-based chemotherapy, CNS prophylaxis, and contralateral testicular irradiation seem to improve the outcome. Their efficacy is under evaluation in a prospective clinical trial.
PRIMARY TESTICULAR LYMPHOMA

TARGET VOLUME: contralateral testicle

No prophylactic nodal irradiation
PRIMARY BREAST LYMPHOMA

Primary diffuse large B-cell lymphoma of the breast: prognostic factors and outcomes of a study by the International Extranodal Lymphoma Study Group


Background: Primary diffuse large B-cell lymphoma (DLBCL) of breast is rare. We aimed to define clinical features, prognostic factors, patterns of failure, and treatment outcomes.

Patients and methods: A retrospective international study of 204 eligible patients presenting to the International Extranodal Lymphoma Study Group-affiliated institutions from 1990 to 2003.

Results: Median age was 64 years, with 95% of patients presenting with unilateral disease. Median overall survival (OS) was 8.0 years, and median progression-free survival 5.5 years. In multivariable analysis, favourable International Prognostic Index score, anthracycline-containing chemotherapy, and radiotherapy (RT) were significantly associated with longer OS (each \( P \leq 0.03 \)). There was no benefit from mastectomy, as opposed to biopsy or lumpectomy only. At a median follow-up time of 5.5 years, 37% of patients had progressed—16% in the same or contralateral breast, 5% in the central nervous system, and 14% in other extranodal sites.

Conclusions: The combination of limited surgery, anthracycline-containing chemotherapy, and involved-field RT produced the best outcome in the pre-rituximab era. A prospective trial on the basis of these results should be pursued to confirm these observations and to determine whether the impact of rituximab on the patterns of relapse and outcome parallels that of DLBCL presenting at other sites.
Primary diffuse large B-cell lymphoma of the breast: prognostic factors and outcomes of a study by the International Extranodal Lymphoma Study Group


<table>
<thead>
<tr>
<th>RT Fields (n = 130)</th>
<th>Initially involved breast only</th>
<th>Initially involved breast and regional lymph nodes</th>
<th>Ipsilateral axillary nodes only</th>
<th>Chest wall only</th>
<th>Both breasts ± regional nodes (bilateral presentation)</th>
<th>RT fields unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65</td>
<td>45</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>35</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>
PRIMARY BREAST LYMPHOMA

CTV: whole breast

No prophylactic nodal irradiation
PRIMARY CUTANEOUS LYMPHOMA
Follicular or MALT lymphoma

TARGET VOLUME
bolus
Lesion or surgical scar with 2-3 cm of margin
PRIMARY CUTANEOUS LYMPHOMA

Diffuse large B cell lymphoma

Pre chemotherapy

Post chemotherapy

Target volume
"RT VOLUMES"

GTV consisted of the primary tumor

CTV: GTV with at least a 2 cm of margin for lymphoma of the parotid gland, thyroid, other areas of head and neck, lung, thymus and uterus.

Prophylactic irradiation of the lymph nodes was not performed
Early-stage MALT lymphoma
Parotid gland

**stage IE**
- Whole parotid (with deep lobe)

**stage IIE**
- also omolateral cervical nodes
Early-stage MALT lymphoma

**ORBITAL LYMPHOMA: IS IT NECESSARY TO TREAT THE ENTIRE ORBIT?**

M. Raphael Pfeffer, M.B., B.S.,* Tatiana Rabin, M.D.,* Lev Tsvang, M.Sc.,* Janna Goffman, M.Sc.,* Nahum Rosen, M.D.,† and Zvi Symon, M.D.*

Purpose: Conformal radiotherapy (RT) has been used for all patients with orbital lymphoma treated at our institution since 1997. We retrospectively reviewed the charts of 23 consecutive patients to test the hypothesis that partial orbit RT is effective and less toxic than whole orbit RT.

Methods and Materials: Twelve patients with limited lesions were treated to partial orbital volumes and 11 patients (1 with bilateral disease) with more extensive lesions received whole orbit RT. The dose was 20–30 Gy (median, 25.2 Gy) for 19 patients with low-grade lymphoma and 24–40 Gy (median, 39.6 Gy) for 5 patients with intermediate- to high-grade lymphoma. The follow-up was 12–68 months (median, 34 months).

Results: All patients had a complete response to RT. Intraorbital recurrence developed in previously uninvolved areas not included in the initial target volume in 4 patients (33%) treated with partial orbit RT. All were salvaged by repeat RT or surgery. No patient treated with whole orbit RT developed intraorbital recurrence. The acute and long-term toxicity was similar in both groups. All but 1 patient retained good vision.

Conclusion: Patients with orbital lymphoma should be treated to the entire orbit. An effective dose of RT for low-grade lesions is 25 Gy, which results in minimal morbidity even when delivered to the entire orbit.

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Early-stage MALT lymphoma

Orbital lymphoma

Lacrimal gland

conjunctive
Prognostic significance of anatomic subsites: Results of radiation therapy for 66 patients with localized orbital marginal zone B cell lymphoma

Heerim Namª, Yong Chan Ahnª*, Yoon-Duck Kimª, Younghyeh Koª, Won Seog Kimª

ª Department of Radiation Oncology, Sungkyunkwan University School of Medicine, Seoul, South Korea
ª Department of Ophthalmology, Sungkyunkwan University School of Medicine, Seoul, South Korea
ª Department of Pathology, Sungkyunkwan University School of Medicine, Seoul, South Korea
ª Division of Hematology-Oncology, Department of Internal Medicine, Sungkyunkwan University School of Medicine, Seoul, South Korea

Radiotherapy and Oncology 90 (2009) 236-241

Conclusions:
We propose that except for tumor with conjunctival location, partial orbital irradiation might be considered after careful examination and meticulous review of imaging studies
NON HODGKIN’ LYMPHOMA
RADIATION VOLUME

ADAPTIVE RADIATION THERAPY
4D CRT
4D CRT

**SPLENIC LYMPHOMA**

Target volume
cc 3730

Target volume
cc 2635 (2 Gy)

Target volume
Cc 1800 (4.4 Gy)
WHICH VOLUME?

Nodal lymphoma

LOCALIZED

INVOLVED FIELD (IFRT):
pre chemotherapy nodal site(s) of involvement plus uninvolved lymph nodes of the same nodal region

ADVANCED Bulky/residual disease

post chemotherapy site(s) of residual disease only
 WHICH VOLUME?

Primary mediastinal B cell lymphoma

post chemotherapy site of residual disease only
WHICH VOLUME?

Extranodal lymphoma

extranodal (plus nodes if initially involved ) site of involvement only
WHICH VOLUME IN NON HODGKIN’S LYMPHOMA?

RITUXIMAB era

PET era

TAILORED- RADIOTHERAPY
(for indication and volume)
“Target volume definition was considered adequate if the report included a description of the lymph node stations or anatomic boundaries used in designing the radiation fields.”

Only 38% of 61 reports described the target volume
Only 8% of the 48 reports involving IFRT adequately described the target volume
“despite the need for improvement in reporting of RT in RCTs, a consensus regarding reporting guidelines specific to trials involving RT has not been established”
Radiotherapy: Volumes

Thank you for your attention