Deauville Criteria for end of therapy

Sally Barrington
5 Point Scale / Deauville criteria

Report on the First International Workshop on interim-PET scan in lymphoma

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(Received 8 May 2009; accepted 12 May 2009)
Concern that MBP $\geq 2\text{cm}$ background $< 2\text{cm}$ was too low a threshold
Take account of varying FDG uptake during tx
Graded method of assessment
Flexible suited for trial
Role of Imaging in the Staging and Response Assessment of Lymphoma: Consensus of the International Conference on Malignant Lymphomas Imaging Working Group


Recommendations for Initial Evaluation, Staging, and Response Assessment of Hodgkin and Non-Hodgkin Lymphoma: The Lugano Classification

Bruce D. Cheson, Richard I. Fisher, Sally F. Barrington, Franco Cavalli, Lawrence H. Schwartz, Emanuele Zucca, and T. Andrew Lister

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DOI 10.1200/JCO.2013.54.8800
Deauville criteria/5-PS for end tx

Good interobserver agreement
Score 3 in patients receiving standard treatment likely represents CMR
Especially with modern cameras
One method preferred for response assessment (score 2 similar to IHP criteria)

Five Point Scale

**Staging**
- Score 1: No uptake
- Score 2: FDG < MBP
- Score 3: FDG > MBP ≤ liver
- Score 4: FDG > liver
- Score 5: FDG >> liver

**Response**
- Score 1: No uptake
- Score 2: Partial response
- Score 3: Stable disease
- Score 4: Progression
- Score 5: Complete remission
5 Point Scale (Deauville criteria)

1. no uptake
2. uptake ≤ mediastinum
3. uptake > mediastinum but ≤ liver
4. moderately increased uptake compared to liver
5. markedly increased uptake compared to liver and/or new lesions

**markedly increased uptake is taken to be uptake > 2-3 times the SUV max in normal liver**
SUVmax lesion 8.51

SUVmax liver 2.50

Score 5
High physiological FDG uptake can occur in some sites...

e.g. Waldeyers ring, gut, bone marrow after chemotherapy or GCSF treatment with ‘physiologic’ uptake > normal liver

In this case, CMR may be inferred if uptake at sites of initial involvement is no greater than surrounding normal tissue

Barrington et al JCO 2014 in press
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>PET – CT based metabolic response</th>
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<tbody>
<tr>
<td>CMR</td>
<td>Score 1,2,3* in nodal or extranodal sites with or without a residual mass mass using 5-PS</td>
</tr>
<tr>
<td></td>
<td>Score 4 or 5, with reduced uptake compared with baseline and residual mass(es) of any size. At interim, these findings suggest responding disease. At end of treatment these findings indicate residual disease. Bone marrow: Residual marrow uptake &gt; normal marrow but reduced compared with baseline (diffuse changes from chemotherapy allowed). If there are persistent focal changes in marrow with a nodal response, consideration should be given to MRI, biopsy or interval scan.</td>
</tr>
<tr>
<td>NMR</td>
<td>Score 4 or 5 with no significant change in uptake from baseline. At interim or end of treatment</td>
</tr>
<tr>
<td>PMD</td>
<td>Score 4 or 5 with an increase in uptake from baseline and/or New FDG-avid foci consistent with lymphoma. At interim or end of treatment</td>
</tr>
</tbody>
</table>

* Score 3 in many patients indicates a good prognosis with standard treatment. However, in trials involving PET where de-escalation is investigated, it may be preferable to consider score 3 as inadequate response to avoid under-treatment. Cheson et al JCO 2014 on line
Response according to 5-PS

Score 1, 2 is Complete Metabolic Response (CMR)
Score 3 is probably also CMR with standard treatment
But in response-adapted trials exploring de-escalation, score 3 may be deemed inadequate response to avoid under-treatment
Interpretation of score 3 depends on timing of assessment, clinical context & treatment.

Barrington et al JCO 2014 on line
**Early stage HL**

**RAPID: PFS in PET-ve population (per protocol analysis)**

- **Favorable - PET2 negative**
  - 1-yr PFS: 94.9% vs. 100.0%
  - HR = 9.36 (79.6% CI: 2.45-35.73)
  - P-value = 0.017 < 0.102

- **Unfavorable - PET2 negative**
  - 1-yr PFS: 94.7% vs. 97.3%
  - HR = 2.42 (80.4% CI: 1.35-4.36)
  - P-value = 0.026 < 0.098

Radford et al, Blood 2012; 120: a547

n = 739 PR ≥ 2.5 cm

PET−ve
548 (74%)

PET +ve
191

11% had RT

Originally published by the Lancet
[Engert A et al 2012 379(9828), May12 pp1791-9]
Recommendations:

The decision to omit RT from the management of IA/IIA non-bulky patients should involve discussion with a radiation oncologist (1B) and patients choosing to omit RT need to be aware of the balance of risks between RT and additional cycles of chemotherapy. (1B)

Patients treated with escalated BEACOPP who achieve an end-of-treatment PET-negative remission do not require consolidation RT to residual tissue (1A)

‘It is recommended therefore that score 1 or 2 is used to define a complete metabolic response (CMR) if omission of ‘standard’ radiotherapy treatment is being considered in discussion with patients.’
PFS according to response at I-PET and F-PET.

Interim

End

PPV 82 %
NPV 100 %
Using **Score 1,2 3** to define CMR
At **END**

Prospective evaluation of the predictive value of PET in 141 patients with DLBCL under R-CHOP-14 (SAKK 38/07)

Score 1, 2, 3 used to define CMR
Follicular Lymphoma

Score 1, 2, 3 best to define CMR

Dupuis J et al. JCO 2012; 10;30(35):4317-22
Comparison of criteria for end tx in FL

Local review

IHP

MBP (CMR score 1, 2)  Liver (CMR score 1, 2, 3)

Tychyj-Pinel C EJNMMI 2014 Mar;41(3):408-15
Baseline

Response

Score 1

CMR
Response according to 5-PS

Score 4, 5 with reduced uptake from baseline is partial metabolic response (PMR)
- At interim this suggests responding disease
- At end of treatment this suggests residual metabolic disease

Barrington et al; Cheson et al JCO 2014 on line
Response according to 5-PS

Score 4, 5 with no change in uptake from baseline means no metabolic response (NMR)
Score 4, 5 with an increase in uptake from baseline &/or new lesions is progressive metabolic disease (PMD)
-At interim and end of treatment NMR and PMD indicates treatment failure

Barrington et al; Cheson et al JCO 2014 on line
Baseline

Response

Score 5

NMR
Baseline

Post 2

PMD?
Residual masses

Biopsy of residual metabolically active tissue is recommended if salvage treatment is considered or an interval scan where clinical likelihood of disease is low to decide on treatment (or not)

Barrington et al; Cheson et al JCO 2014 on line
Guiding a biopsy

Baseline

End PET
Residual masses

Residual size mass and location should be recorded in PET-CT reports where possible as significance of the size of masses is unclear but may be complementary to metabolic information and data should be collected prospectively in clinical trials

Barrington et al; Cheson et al JCO 2014 on line
Progression-free survival in positron emission tomography (PET) –positive and PET-negative patients and 40% reduction of the largest tumor diameter.

Kobe C et al. JCO 2014;32:1776-1781
Influence of residual mass?
Timing of PET-CT scans

Should be:

as long as possible after the last chemotherapy administration for interim scans
6-8 weeks post chemotherapy at end of treatment ideally (but a minimum of 3 weeks)
≥ 3 months after radiotherapy

Barrington et al JCO 2014 on line
Summary

- DC are recommended for response assessment in 2014 ICML guidelines
- Can be used to assign metabolic response categories
- Score 3 likely represents CMR in patients receiving standard therapy BUT score 1,2 may be preferred to define CMR using de-escalation strategies to avoid undertreatment
- End of treatment residual or new metabolic disease requires biopsy confirmation before salvage therapy where feasible or an interval scan if clinical index of residual disease is low
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