

**Multiple Myeloma
Newer Response Criteria & New Report Forms**

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Why Myeloma?

- ◆ **Most commonly transplanted hematological malignancy**
- ◆ **Autologous >>> Allogeneic**
- ◆ **Long survival after transplant**

- ◆ **Increasing understanding of disease biology in the last few years**
- ◆ **Newer drugs**

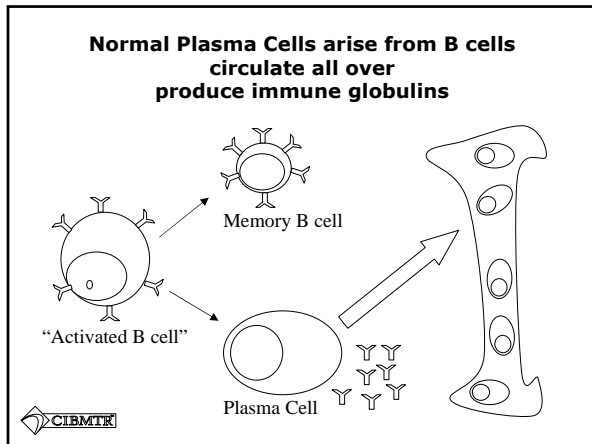
- ◆ **CHANGING RESPONSE CRITERIA & NEW REPORT FORM**

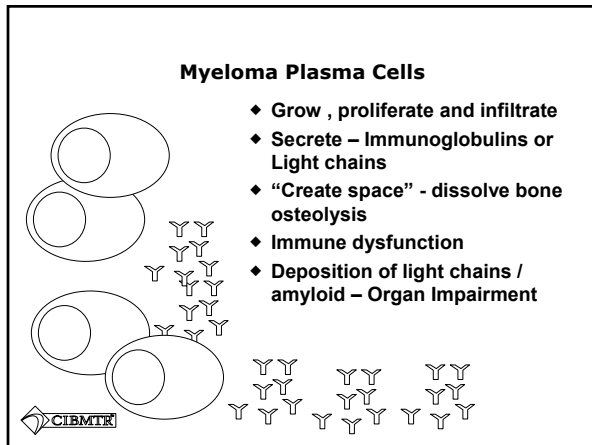


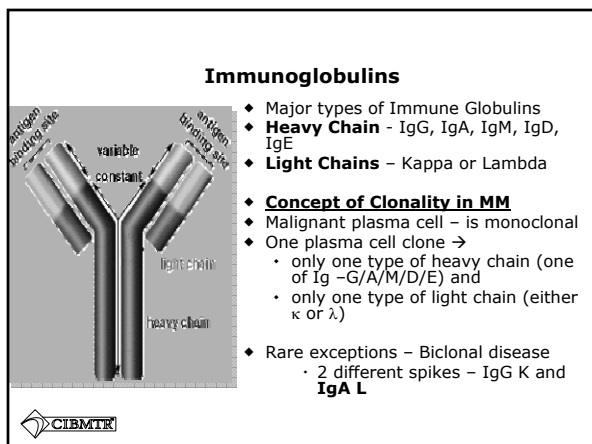
Common Problems with MYE forms

- ◆ **Assessing Disease Burden**
 - **Light chains , M spikes and Igs**
 - **Urine 24 hrs**
 - **Free Lite Chains and Urine light chains**
- ◆ **Assessing Response**
 - **CR or no CR**
 - **Immunofixation or SPEP**
 - **6 week rule – but when did CR start?**
 - **But doc says it is CR**
 - **Did they relapse? And when?**









Epidemiology of MM

- ◆ >16000 newly diagnosed patients per year
- ◆ 50000 Americans living with MM
- ◆ In 2005 – 16570 new cases and 11000 deaths
- ◆ Similar numbers from the EU
- ◆ Median Age at diagnosis
 - 70 yrs (>75% are 70yrs or above)
- ◆ Remains Incurable
- ◆ Median Survival from diagnosis 33 months
- ◆ Higher (almost double) incidence in Americans of African heritage.
- ◆ Almost no one under 20 has MM



Stepwise Progression to Myeloma

MGUS (Monoclonal Gammopathy of Unknown Significance)

- SOLITARY PLASMACYTOMA
- SMOLDERING MYELOMA
- ACTIVE SYMPTOMATIC MYELOMA
 - EXTRAMEDULLARY MYELOMA
 - PLASMA CELL LEUKEMIA



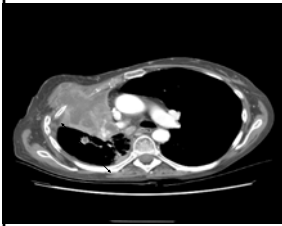
Specify disorder(s):

	yes	no	unknown		Month
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prior solitary extramedullary plasmacytoma (in absence of bone marrow findings diagnostic for multiple myeloma or plasma cell leukemia)?	<input type="text"/>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prior monoclonal gammopathy of unknown significance (MGUS)?	<input type="text"/>
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Plasma cell leukemia at diagnosis (blood plasma cells > 20% of WBC differential or absolute blood plasma cells > 2.0x10 ⁹ /L [x10 ⁹ /mm ³])?	<input type="text"/>

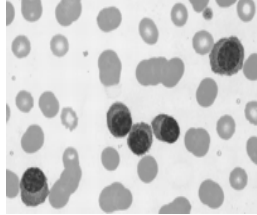
Prior plasma cell problem?
Plasmacytoma
MGUS



Plasmacytoma



Plasma Cell Leukemia



- ◆ Plasma Cell Leukemia
 - >2000 plasma cells/cu mm or $\geq 20\%$ PC in WBC diff
 - WBC counts & differential count for total plasma cell number
- ◆ Peripheral Smear Report
 - Circulating Plasma Cells seen – THIS IS NOT PLASMA CELL LEUKEMIA



MGUS

- ◆ Monoclonal Gammopathy of Undetermined Significance (MGUS)
 - Presence of monoclonal protein at concentration of $\leq 3\text{g/dl}$ in serum or urine without evidence of MM
 - Incidence:
 - up to 2% individuals ≥ 50 yr old
 - <3 g/L monoclonal Ig, little or no proteinuria
 - <10% monoclonal bone marrow plasma cells if done
 - Absence of anemia, renal failure, hypercalcemia, and lytic bone lesions
 - No suppression of uninvolved immunoglobulins
 - Observation with treatment beginning at progression



Symptomatic Multiple Myeloma

- ◆ Monoclonal Plasma Cells in Marrow ($\geq 10\%$) or biopsy proven plasmacytoma
- ◆ Monoclonal protein in serum / urine
 - If no monoclonal protein (nonsecretory) – need 30% plasma cells in marrow or plasmacytoma
- ◆ Myeloma related organ dysfunction – at least one
 - “CRAB”
 - Calcium (elevated >10.5)
 - Renal (Kidney Disease)
 - Anemia (Hb <10 or 2g/dl below normal)
 - Bone Disease (lytic lesions / advanced osteoporosis)



Smoldering MM

- ◆ Serum M protein
- ◆ Bone marrow plasma cells
- ◆ Absence of CRAB
- ◆ Not MGUS / MM or plasmacytoma
- ◆ Observation, with treatment beginning at disease progression

Solitary Plasmacytoma

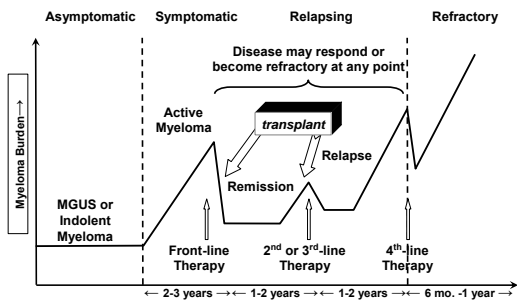
Table 4 Solitary plasmacytoma of bone Diagnostic criteria: all three required

1. Biopsy-proven monoclonal plasmacytoma of bone in a single site only. X-rays and MRI and/or FDG PET imaging (if performed) must be negative outside the primary site. The primary lesion may be associated with a low* serum and/or urine M-component
2. The bone marrow contains <10% monoclonal plasma cells
3. No other myeloma-related organ dysfunction

*Low is defined as serum IgG <3.5 g/dl; serum IgA <2.0 g/dl; urine monoclonal kappa or lambda <1.0 g/24h.



Multiple Myeloma Course of Disease Treatment and Progression



Myeloma Inert and Post Transplant Form – follows the natural history of this disease

- ◆ Initial
 - Myeloma diagnosis – how? When?
 - Disease Burden
 - Organ function -- Symptomatic MM
 - Prognostic Factors
- ◆ Therapy pre transplant
- ◆ Response
- ◆ Transplant
- ◆ Post transplant –
 - maintenance / response / relapse



"pathological fracture"

MRI Scan – do I report?



"compression fracture"



Techniques for measuring myeloma burden

- ◆ Immune Electrophoresis (SPEP, PEP)
- ◆ Immunofixation (IFE)
- ◆ Bone Marrow Aspirate or Biopsy

- ◆ And now a new one....
- ◆ Serum Free Light chains

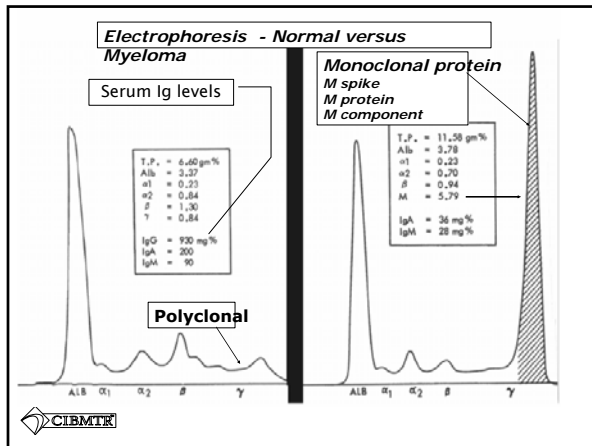
(FAQ: How do we report it ?)

No box in current MYE form

Write in:

Kappa Light Chains (mg/L)
Lambda Light Chains





Protein Electrophoresis and Immunofixation

- ◆ **Immunochemical subtype**
 - Heavy chain – G/A/M/D or E
 - Light chain – kappa or lambda
- ◆ **Sometimes NONE – Non Secretory**

Specify the immunochemical type:

non-secretory
 secretory →

Specify paraproteins present:	Chain type					Source	
	IgG	IgA	IgM	IgD	IgE	Serum	Urine
9. Heavy chain (first paraprotein)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Heavy chain (second paraprotein)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Light chain (first paraprotein)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Light chain (second paraprotein)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How much Myeloma?

23. Serum monoclonal Ig (only from electrophoresis)

1 known → _____ mg/dL
 2 not known → _____ mg/dL

24. Urinary monoclonal light chains:

1 known → _____ g / 24 hours
 2 not known → _____ g/L

25. Serum free light chains – kappa (κ):

1 known → _____ mg/dL
 2 not known → _____ mg/dL

26. Serum free light chains – lambda (λ):

1 known → _____ mg/dL
 2 not known → _____ mg/dL

- ◆ **Crucial** to follow responses over time
 - Protein electrophoresis – measures the monoclonal Ig (M-spike/M-protein)
 - Free-lite test also measures myeloma burden?

32. Plasma cells in bone marrow (Aspirate): %

33. Source (aspirate vs biopsy) unknown

34. Plasma cells in bone marrow (Biopsy): %

**Primary Source:
Initial Marrow Biopsy
Not Flow Cytometry
Use Aspirate differential count
Or Biopsy estimate**

40. Urinary monoclonal light chains: g/24h

41. Serum β_2 -microglobulin:

42. C-reactive protein:

43. Labeling index:

24 hr Urine Light chain result :
Not 24 hr urine protein excretion
Electrophoresis results on the 24hr urine sample
Reported as xxx mg in 24hr of k or l light chains
Or mg/dl in which case multiply by volume of urine
 e.g. 145mg/dl of lambda light chains & Total urine vol - 1500 ml.
 so 24hr value = 145 * 150 mg.

Free Light Chains and Free lite™ :
Polyclonal Antibodies to Free Light Chains

heavy chain
light chain
Kappa
Lambda
exposed surface
hidden surface
Antibody target

Sensitivity Comparison

Sensitivity	κ , mg/L	λ , mg/L
SPE ¹	2,000	500
Serum IFE ¹	150	100
UPEP ²	30	30
Urine IFE ²	20	20
sFLC assay ³	1.2	1.7

¹ Katzmann et al. *Clin Chem*. 2002;1437-1444.
² Beetham et al. *Ann Clin Biochem* 2000;37:581-587.
³ Bradwell et al. *Serum Free Light Chain Analysis*. 3rd ed.

International Staging System for MM

Beta 2 microglobulin and Albumin - Please search for these values!!!

Stage	Criteria	Median Survival
◆ I	Serum β2M <3.5 mg/L Serum albumin ≥3.5 g/dl	62 mo
◆ II	Serum β2M <3.5 mg/l Serum albumin <3.5 g/dl OR Serum β2M 3.5 to <5.5 mg/L Irrespective of serum albumin	44 mo
◆ III	Serum β2M ≥5.5 mg/L	29 mo

Grapp PR et al. J Clin Oncol. 2005;23:3412

19. Serum albumin:

1 known → [] . [] 1 g/dl

2 not known

20. Serum β2 microglobulin:

1 known → [] . [] [] []

2 not known

Pretransplant Therapy:
Newer FDA approved drugs included:
Bortezomib
Lenalidomide
Thalidomide

Supportive Care:
Epoetin Alfa
Vertebroplasty

Radiation Therapy

Response to initial therapy

Progression after response?

Chromosomal Abnormalities

Were they studied?

Method Used:
Karyotype
(cytogenetics)
FISH
Flow cytometry (ploidy)
PCR

Abnormalities found

Attach report please!!

Were chromosomal analyses performed at any time prior to the preparative regimen?

1 yes, with normal results (46,XX or 46,XY)

2 yes, with abnormal results

3 yes, but no available metaphases

4 no

5 unknown

144. Specify test method used:

1 FISH

2 flow cytometry for ploidy

3 karyotyping (conventional)

4 PCR

5 other → 145. Specify other method used:

146. Specify karyotype findings:

1 normal

2 hyperdiploid

3 hypodiploid

Specify abnormalities:

yes no unknown

147. Trisomy 3(+3)

148. Trisomy 5(+5)

149. Trisomy 7(+7)

150. Trisomy 9(+9)

151. Trisomy 11(+11)

152. Trisomy 15(+15)

153. Trisomy 19(+19)

154. Monosomy 13(-13)

155. Abnormal 8q24

156. Abnormal 11q13

157. Abnormal 13q14

158. Abnormal 14q32

159. 8(4;14)

160. t(11;14)

Chromosomal Abnormalities in Myeloma

- 237.² Were cytogenetics done on bone marrow anytime prior to high-dose therapy (conditioning)?
- 1 Yes, normal (46,XX or 46,XY)
- 2 Yes, but no evaluable metaphases _____

- ◆ Specific chromosome changes in MM
- ◆ Ig translocations
 - 11q13: most common (Cyclin D1,15-20%)
 - 4p16.3 (FGFR3, MMSET, 12%)
 - 8q24 (c-myc, <10%)
 - 16q23 (c-maf, 5-10%)
 - 6p25 (IRF4, 5%)
- ◆ 13 deletion (Rb, ~50%)

• Kuehl WM, Bergsagel PL. *Nat Rev Cancer*. 2002;2:175



Initial Therapy for MM – prior to transplant

56. Was patient treated for multiple myeloma or plasma cell leukemia prior to high-dose therapy (conditioning)?
- 1 Yes No Go to Q.189?

	Regimen	1st	2nd												
PROTON THERAPY:	57.	<input type="checkbox"/> Yes <input type="checkbox"/> No	90. <input type="checkbox"/> Yes <input type="checkbox"/> No												
Specify sites:	58. ¹	_____	91. ¹												
		_____	_____												
Date started:	62.	<table border="1" style="display: inline-table; text-align: center; width: 60px;"><tr><td>Month</td><td>Day</td><td>Year</td></tr><tr><td> </td><td> </td><td> </td></tr></table>	Month	Day	Year				95. <table border="1" style="display: inline-table; text-align: center; width: 60px;"><tr><td>Month</td><td>Day</td><td>Year</td></tr><tr><td> </td><td> </td><td> </td></tr></table>	Month	Day	Year			
Month	Day	Year													
Month	Day	Year													
Chemotherapy:	64.	<input type="checkbox"/> Yes <input type="checkbox"/> No	97. <input type="checkbox"/> Yes <input type="checkbox"/> No												

Steps in assessment of Transplant response:
 What is the baseline to assess response?
 Case #1: Chemo given ≤ 6m prior to transplant? Transplant could then be a consolidation of chemo response.
 Baseline – pre chemotherapy levels
 Case #2: Chemo non-response (e.g. progressed on chemo) OR no chemo within 6 months of transplant.
 Baseline here is immediate pretransplant levels.



206. Indicate patient's sensitivity of myeloma to chemotherapy prior to conditioning
 (Q.206 only: treatment must have been completed ≤6 months prior to transplant):
- 1 Sensitive (≥50% reduction in Ig level, or ≥90% reduction in urinary light chains in light chain only disease, or ≥50% reduction of plasma cells in bone marrow for nonsecretory myeloma)
- 2 Resistant (<50% reduction of Ig level, or <90% reduction in urinary light chains in light chain only disease, or <50% reduction of plasma cells in bone marrow for nonsecretory myeloma)
- 3 Not applicable (no chemotherapy, or ended more than 6 months prior to conditioning)
- 4 Unknown

Last disease status: cross check with qn 88 & 89

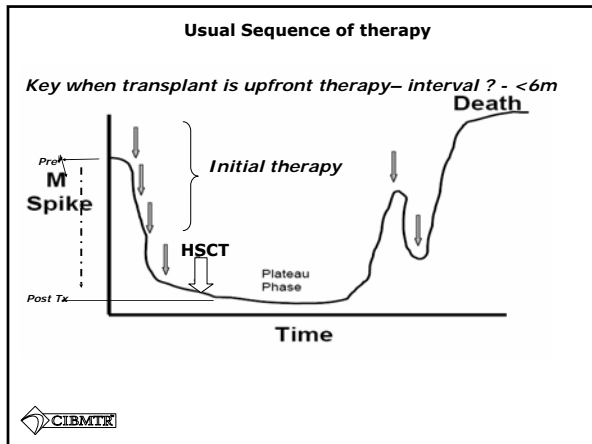
207. Indicate patient's disease status of multiple myeloma or plasma cell leukemia immediately prior to conditioning for transplant (refer to page 7 for definitions):

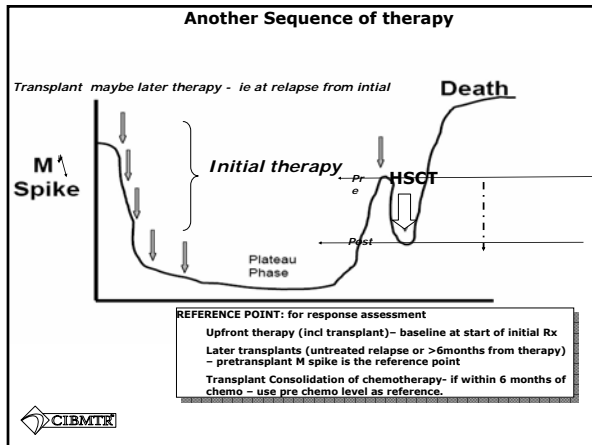
- 1 CR
- 2 CCR
- 3 PR
- 4 MR (multiple myeloma only)
- 5 NR
- 6 SD (multiple myeloma only)
- 7 REL from CR (untreated)
- 8 PROG
- 9 NE, specify reason: _____
- 10 Unknown
- 11 Other, specify: _____

Continuing CR from before

Patients may not have had immediate pre Tx staging: Chemo within 6 months and consolidative transplant use the last status post chemo >6 months ago and unknown status thereafter did the patient PROG or REL?
If no progression and later transplant – Very Unusual
 Unknown / NE / Other, specify







**Current –
Bladé Criteria for Complete and Partial Response**

COMPLETE RESPONSE (CR) requires all of the following

- No serum/urine M protein by IFE for ≥6 wk
- <5% plasma cells in bone marrow aspirate
- No increase in size of number of lytic bone lesions
- Disappearance of soft tissue plasmacytomas

PARTIAL RESPONSE (PR) requires all of the following

- ≥50% reduction in serum M protein ≥ 6 wk
- ≥90% reduction in 24-hr urinary light chain excretion ≥6wk
- ≥50% reduction in soft tissue plasmacytomas
- No increase in size or number of lytic bone lesions

♦ Categories of Minimal response , Stable Disease for others

- EBMT, IMBTR, and ABMTR criteria
- Bladé J et al. *Br J Haematol.* 1998;102:1115

Establishing a baseline for assessing response to transplant

125. Specify the total number of chemotherapy regimens given prior to the preparative regimen:

126. At what point in the disease course was the HSCT performed?

- 1 as part of initial therapy for a recipient with no disease progression at any time prior to HSCT
- 2 later in the disease course for a recipient with disease progression at any time prior to HSCT



EBMT/IBMTR Response Criteria: Problems

- ◆ **Stability of Response - maintained for minimum 6 weeks – FIXED!**
- ◆ **Immunofixation – needed for CR – Still Needed but a new category of VGPR (very good PR)**
- ◆ **Nonsecretory disease and plasma cell leukemia – need marrow aspirate – Can follow with Free Light**
- ◆ **At any response level: if some but not all criteria met – downgrade to next lower level of response. e.g. CR criteria met except for immunofixation – response is PR – Changed to VGPR**



The New Response Criteria - 2006

Leukemia (2006) 20, 1467-1473
© 2006 Nature Publishing Group All rights reserved 0887-6924/06 \$30.00
www.nature.com/leu

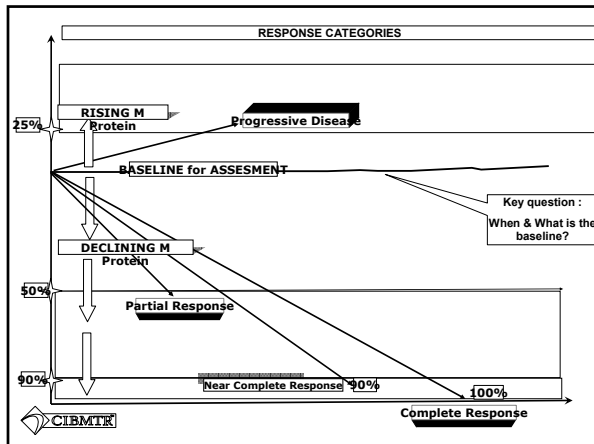
LEADING ARTICLE

International uniform response criteria for multiple myeloma

BCM Durie¹, J-H Hanonnet², JS Abigan³, J Blade⁴, B Barlogie⁵, K Anderson⁶, M Gertz⁷, M Dimopoulos⁸, J Westin⁹, P Sonneveld¹⁰, H Luchini¹¹, G Gahrton¹², M Beksaç¹³, J Crowley¹⁴, A Belch¹⁵, M Rocca¹⁶, J Turesson¹⁷, D Joshua¹⁸, D Vesole¹⁹, R Kyle²⁰, R Alexanian²¹, G Tricot²², M Attal²³, G Merlini²⁴, R Powles²⁵, P Richardson²⁶, K Shimizu²⁷, P Tosi²⁸, C Morgan²⁹ and SW Rajkumar³⁰ on behalf of the International Myeloma Working Group³¹

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Major Changes in the new schema

Table 2 Summary of similarities and specific changes introduced in the New Uniform Response Criteria compared to the EBMT/IBMT Criteria

- For patients with measurable levels of serum and urine monoclonal protein levels, the criteria for CR, PR and progressive disease remain unchanged (Tables 5 and 6)
- Clarification and revision of important practical details of response evaluation (Table 4)
 - Elimination of mandatory 6 weeks wait time to confirm achievement of response
 - Introduction of a similar non-time-dependent confirmation for relapse and/or disease progression
 - Clarification of the start time for duration of response evaluation
 - Requirement of >PR as response requirement for new drug trials
 - Allow use of quantitative immunoglobulin levels in patients in whom the M-protein measurements are unavailable or unreliable
- Introduction of new response categories (Table 6) sCR and VGPR
- Elimination of the minor response category
- Incorporation of response criteria for the serum FLC assay to enable assessment of response in patients with non- or oligo-secretory disease (Tables 5 and 6)
- Clarification that criteria for progressive disease (rather than criteria for relapse from CR) are to be used for calculation of time to progression and progression-free survival in patients who are in CR. Criteria for relapse from CR are to be used only if DFS is calculated and reported
- Introduction of new category of clinical relapse or progressive disease (Table 6)
 - Introduces clinical relapse as a new optional end point

➤ No change in CR, PR, PD for patients with secretory MM

➤ >6 wk wait for confirmation is out!

➤ Serum free light chains accepted for response

➤ New categories of response –sCR and VGPR

➤ New Category of relapse - Clinical Relapse

CIBMTR

Comparison of Uniform Response Criteria with the EBMT Criteria

- ◆ Unchanged: CR/PR/PD
- ◆ Clarified: Response Evaluation
 - Eliminated 6-week *mandatory* wait time to confirm response
 - Non-time dependant confirmation of relapse or disease progression
 - DOR "start time" based on first observation of PR – TIME more important – Please report dates
 - Quantitative immunoglobulin assessment when M-protein unreliable
 - Serum FLC assay in non- or oligo-secretory disease acceptable

CIBMTR

Hematologic and Clinical Parameters at the Time of Best Response, ≤Day 100 Posttransplant

289.* Best response posttransplant (see Response Codes on page 7):

1 CR 286.* Date CR first documented: _____

2 CCR 289.* Date of best response determination: _____

3 PR 289.* Date of best response determination: _____

4 MR (multiple myeloma only) 289.* Date of best response determination: _____

5 NR 289.* Date of best response determination: _____

6 SD (multiple myeloma only) 289.* Date of best response determination: _____

7 REL from CR (untreated) 291. Date of relapse: _____

8 PROG 290. Date of progression: _____

9 NE 292. Specify reason: _____

297.* Serum immunofixation: Negative Positive—Specify (check all that apply):

297.* Original monoclonal band

297.* New monoclonal band(s)

298.* Urinary monoclonal light chains: _____ @24h


298.* Urinary immunofixation: Negative Positive—Specify (check all that apply):

298.* Original monoclonal band

298.* New monoclonal band(s)


Month Day Year

*First negative IFE date
i.e. Retrospective after
Second neg IFE ≥ 6wks*



New vs. Old Criteria


- ◆ **Expanded:**
 - Stringent CR – CR with normal free light chains and no marrow disease by flow or immunohistochemistry
 - VGPR – PR with 90% decline in M spike or detectable only by IFE
 - Clinical Relapse (optional end point) – Two consecutive assessments required
- ◆ SD (TTP Estimates better)
- ◆ **Eliminated:**
 - MR
 - nCR



Uniform Response Criteria for Disease Progression and Relapse from CR

- ◆ Progressive Disease:
 1. Increases ≥25% in serum or urine M-protein
 2. Increase in BM plasma cells ≥10%
 3. New or increasing bone lesions or plasmacytomas
 4. Hypercalcemia (Corrected serum calcium >11.5mg/dL)
- ◆ Clinical Relapse:
 - Direct indicators of increasing disease and/or end organ dysfunction (CRAB)
- ◆ Relapse from CR* requires at least one of the following:
 1. Reappearance of serum or urine M-protein by immunofixation or electrophoresis.
 2. ≥5% plasma cells in a bone marrow aspirate or on trephine bone biopsy.
 3. Any other sign of progression: (new lytic bone lesions, new plasmacytomas, hypercalcemia)

* To be used only if primary end point is DFS



Post Transplant Response

7. Serum monoclonal Ig: (only from electrophoresis) 3 nmol/L
 1 known 1 mg/dL
 2 not known 2 g/dL
3 g/L

8. Serum immunofixation:
 1 known
 2 not known

9. Specify monoclonal immunoglobulin result:
 1 present / positive
 2 absent / negative

Specify bands currently present:
 10. 1 yes 2 no Original monoclonal bands
 11. 1 yes 2 no New monoclonal bands



Post-Transplant Data
Multiple Myeloma / Plasma Cell Leukemia

Registry Use Only

Sequence Number:

Date Received:

Form ID:

Log: PC:

1. What was the best response to HSCT?
 1 complete remission
 2 stringent complete remission
 3 very good partial response
 4 partial response
 5 stable disease
 6 progression
 7 relapse from complete remission

2. Date the response was established: / /

3. Specify the incidence number of this status:
 1 first
 2 second
 3 third or higher

QUERIES:
Immunofixation not done → VGPR
Oligoclonal reconstitution is still CR
Look at original paraprotein !!!!
"Too low to quantitate" - VGPR



Oligoclonal Reconstitution

- ◆ Classic confounder.
- ◆ His IgA became IgG?
- ◆ Can lambda change to kappa after transplant?



Maintenance therapy

20. Was planned treatment per protocol (not for progressive disease) given post-HSCT?

1 yes
2 no
3 unknown

Line of Therapy

1st Line of Therapy

Systemic Therapy 21: 1 yes 2 no → cont. with q. 48

Number of cycles: 22: unknown / not applicable


Date started therapy: 23:
Month Day Year

Date stopped therapy: 24:
Month Day Year

- ◆ **Not for relapse or progression!**
- ◆ **Planned pre transplant**
- ◆ Interferon
- ◆ Prednisone
- ◆ Thalidomide
- ◆ Dexamethasone
- ◆ Revlimid (Lenalidomide)
- ◆ Velcade

Issues:

- ◆ Any survival benefit?
- ◆ Quality of Life affected?
- ◆ Delaying of Relapse versus QOL



Post Transplant Form

Current Disease Status

99. What is the current status of the disease?


1 complete remission
2 stringent complete remission
3 very good partial response
4 partial response
5 stable disease
6 progression
7 relapse from complete remission

100. Date the response was established:
Month Day

101. Specify the incidence number of this status:
1 first
2 second
3 third or higher

102. Plasma cells in bone marrow:
1 known %
2 not known

103. Plasma cell source:
1 aspirate
2 biopsy



Tandem Autologous Stem Cell Transplantation


- ◆ Patient has two planned autologous SCT within six months of each other
 - Peripheral Blood Stem Cells -- Collected once before the initial transplant
 - Half of the stem cells are used for each procedure

This is considered one treatment – pre transplant baseline for calculating response is prior to Transplant #1.

e.g.
M spike – 5gm/dl at diagnosis → initial therapy & 4 months later
M spike – 1 g/dl i.e 80% decline PR, chemosensitive disease
After Tx #1 → done 5 m from diagnosis
M spike – 0.6 g/dl (response is still 5-0.6 NQT 1-0.6)
After Tx #2 → done 8 m from diagnosis
M spike – 0.1 g/dl (response is still 5 – 0.1 ie 98%)

Should we calculate Response to Tx#1 ?

So unless the second transplant is a late Tx for relapse – use initial pre Tx#1 baseline for response assessment



Common Queries

◆ **Some Scenarios**

- **Discordant Responses or Relapses in different organs**
 - Hyposecretory Relapse
 - Renal Escape
- **Timeline of response for upfront transplanted patients**
- **Pre transplant Response → post transplant response**
 - CR → CCR continuing CR
 - PR → CR or continuing PR
 - MR/SD → PR or CR or MR or SD



Thank You

- ◆ **All of you who sent in questions**
- ◆ **Please keep the questions coming**