6th International Workshop on PET in Lymphoma
Menton, September 21, 2016
Poster Session

Poster discussion
PET in lymphoma - clinical

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Poster discussion – PET in lymphoma

Clinically versus technically oriented studies

38 abstracts on ‚PET in lymphoma‘

21 clinically oriented studies

A1, A3, A7-A9, A11-A16, B1-2, D1-6, E1, F3

17 technically oriented studies

A2, A4-A6, A10, C1, C2, E2, F1, F2, F4, G1-G6

11 brief presentations

5 clinically oriented studies

A7, A14, A15, E1, F3

6 technically oriented studies

A5, A10, G1, G2, G3, G6

Poster discussion – PET in lymphoma

21 clinically oriented studies

	HL	DLBCL	MCL	FL	PTCL	LBL	MM
Pre-treatment	A13, D1, D2, D3	A13, A16, D5, E1	A15	D6		A14	
Interim	A7, B1, D4	A1, A3, B2					
Post-treatment		A8, A9, A11			A12		
Relapse							F3

Poster discussion – PET in lymphoma

21 clinically oriented studies

Baseline PET/CT

Pediatric lymphomas - diagnostic value

D2

Descriptive results of FDG PET/CT in nodular lymphocyte predominant Hodgkin lymphoma (NLPHL) in children: 5 years' experience

F. Montravers[1], H. Ducou le Pointe[2], V. Huynh[2], N. Jehanno[3], S. Abbou[4], T. Leblanc[5], H. Pacquement[6], Y. Reguerre[7], S. Helfre[8], TJ Molina[9], S Boudjemaa[10], J. Landman-Parker[11]

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- The role of FDG PET/CT is not as well established in NLPHL, a very rare disease accounting for about 10 new cases a year in France in children, as in classical Hodgkin lymphoma.

- We describe the FDG PET characteristics of all the 23 NLPHL children (18 boys and 5 girls, median age = 12 years, range: 5-18) presented during our regional lymphoma multidisciplinary team meetings from February 2011 to June 2016

Baseline PET/CT – Pediatric NLPHL

D2: Montravers et al, Paris, France

Entity / study goal:	Pediatric NLPHL / role of PET/CT
No. of patients:	23, retrospective
Evaluation:	PET/CT at various time-points
Treatment:	CVP

Results:

PET positive	65 %	(15/23, 7 completely resected, 1 low SUV = 2,5)
SUVmax at baseline staging		10,6 (5,5 - 20)
SUVmax at non-response		8 (5 - 14)
SUVmax at relapse		10 (10 - 11)

Conclusions: PET/ CT is suitable for staging and response assessment in pediatric NLPHL

Performance similar to classical HL

D5

VALUE OF FDG PET/CT IN THE INITIAL STAGING OF PEDIATRIC NON HODGKIN LYMPHOMA. A REPORT FROM THE FRENCH PET LYMPHOMA STUDY

F Montravers[1], V Edeline[2], M Texier[3], J Lumbroso[4], I Borget[3], H Brisse[5], S Canale[4], H. Ducou Le Pointe[6], A Lambilliotte[7], H. Pacquement[8], N Garnier[9], J Landman-Parker[10], G. Plat[11], T Leblanc[12], L Brugières[13], V. Minard-Colin[13]

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- Among 218 French children (3-21y) included in this prospective multicentric study, FDG PET/CT was feasible at diagnosis despite the emergency of management in 153 children (70%).
- PET was positive for at least one site in all children except those with primary complete resection.

Baseline PET/CT – Pediatric NHL

D5: Montravers et al, Paris, France

Entity / study goal:	Pediatric NHL / value of baseline PET/CT
No. of patients:	153, retrospective
Evaluation:	Comparison with conventional staging procedures
Treatment:	Pediatric NHL protocols

Results:

PET positive	95 %	(146/153, 7 completely resected)
Identification of extra manifestations		39 % (60/153)
Identification of BM manifestations		34 % (11/32)
Change of stage assignment		1,4 %

Conclusions: Baseline PET/CT is suitable for staging in pediatric NHL (Burkitt, DLBCL, PMBCL, ALCL, LBL)

Poster discussion – PET in lymphoma

21 clinically oriented studies

Baseline PET/CT

Bone marrow involvement

Baseline PET/CT – Follicular lymphoma

D6: Emsen et al, Paris, France

Entity / study goal:	Follicular lymphoma / bone marrow involvement
No. of patients:	168 from 3 trials, retrospective
Gold standard:	Bone marrow biopsy (BMB, 159)
Treatment:	Immunochemotherapy

Results:

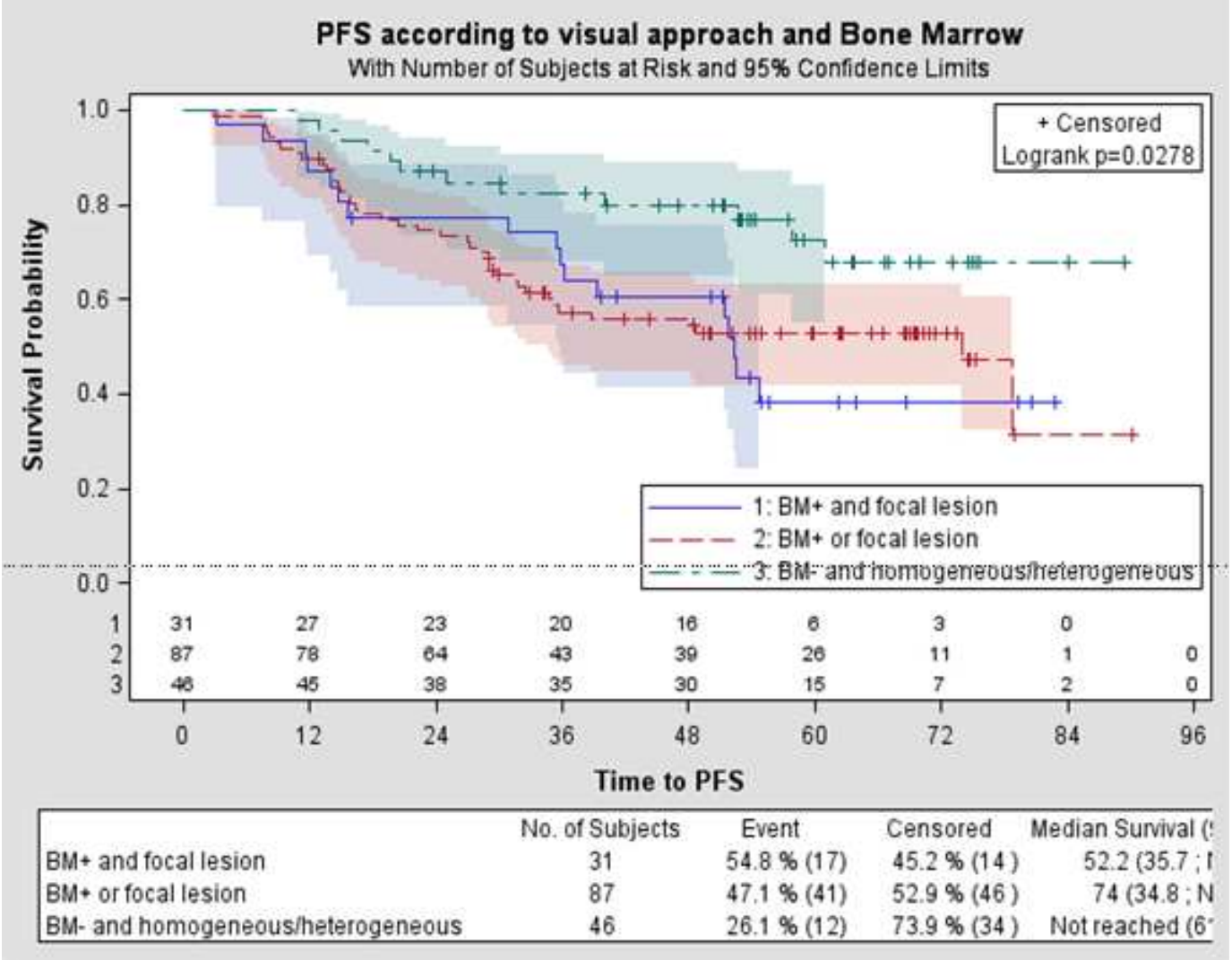
Focal lesions	62 pts. (1 lesion: 17; 2-6 lesions: 11; > 6 lesions: 34)
Positive BMB	87 pts. (only 31 with focal lesions)

	BMB –	BMB +	Focal lesions –	Focal lesions +
5-yr PFS	69 %	47 %	No impact !	

Conclusions: In follicular lymphoma, FDG-PET/CT cannot replace BMB

Baseline PET/CT – Follicular lymphoma

D6: Emsen et al, Paris, France



Poster discussion – PET in lymphoma

21 clinically oriented studies

Baseline PET/CT

Prognostic impact

Baseline PET/CT – DLBCL

D3: Kanoun et al, Dijon, France

Entity / study goal:	Advanced HL / pre-treatment TMTV and interim PET
No. of patients:	392, prospective
Evaluation:	Baseline PET: $TMTV_{41\%}$; interim PET2: DS
Treatment:	$BEACOPP_{esc}$ ± ABVD

Results:

$TMTV_{41\%}$: Best cut-off: 350 cm³ (23 - 2149)

Prognostic value:	2-yr PFS		2-yr-PFS
TMTV low	93 %	TMTV low and iPET –	94 %
TMTV high	81 %	TMTV high or iPET +	88 %
Interim PET –	92 %		
Interim PET +	76 %	TMTV high and iPET +	61 %

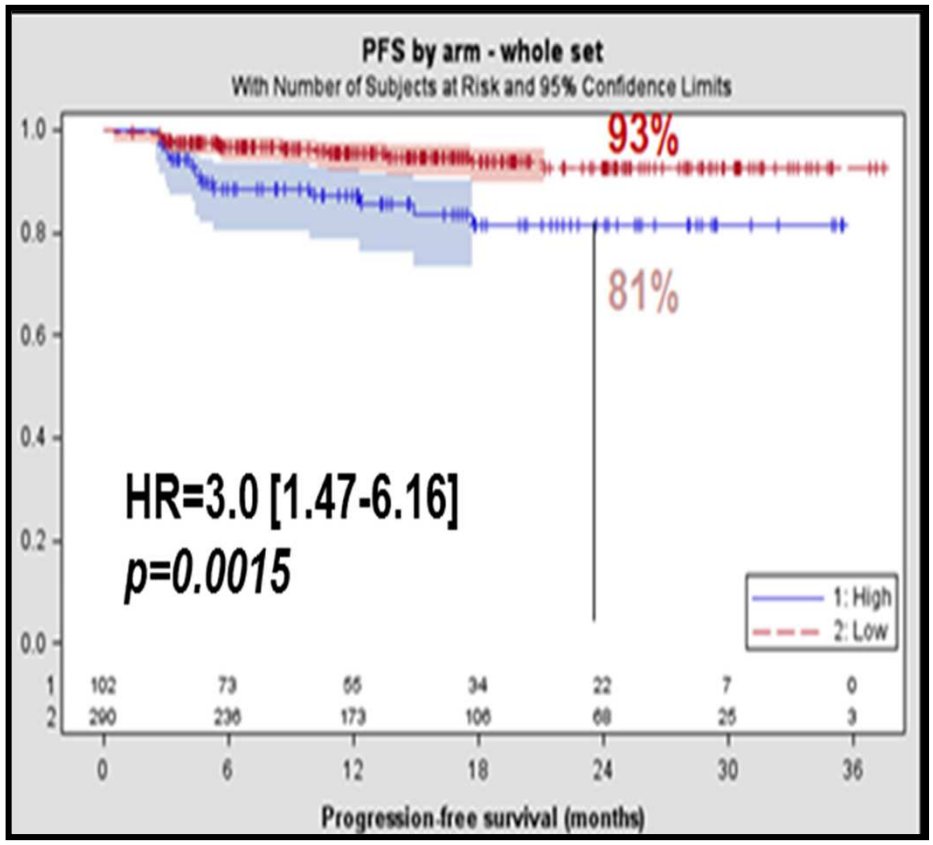
Conclusions: TMTV and interim PET predict outcome in advanced HL

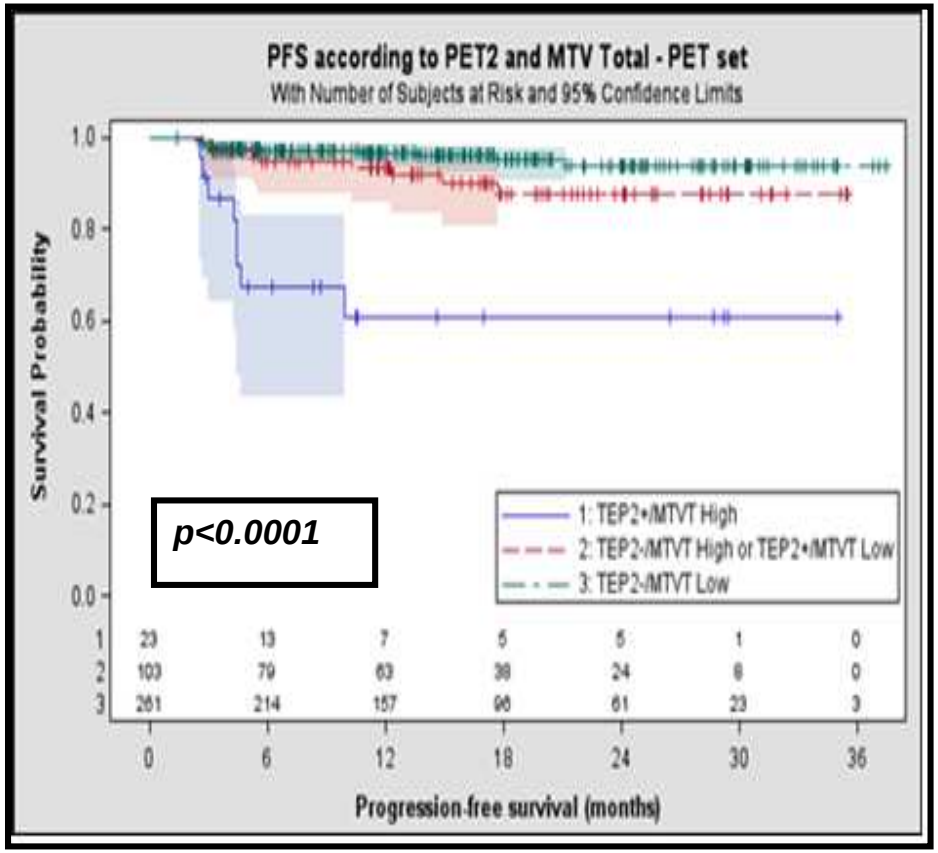
Results

D3

TMTV>350ml was predictive of a lower PFS in the whole cohort (n=393, HR=3.0 [1.47-6.16], *p=0.0015*)

In combination with PET2 response, TMTV identify 3 subsets of patients with different outcomes (*p<0.0001*)





Baseline PET/CT – Hodgkin lymphoma

D1: Weiler-Sagie et al, Haifa, Israel

Entity / study goal: Hodgkin lymphoma / pre-treatment PET parameters
No. of patients: 107, stage I - IV, retrospective
PET parameters: Bone marrow uptake, TMTV, SUV_{max}, SUV_{mean}
Treatment: 2 x ABVD, then according to iPET result

Results:

SUV_{mean}: Best cut-off: 3.8; higher is better !

Multivariate analysis: SUV_{mean} and BMU predict PFS

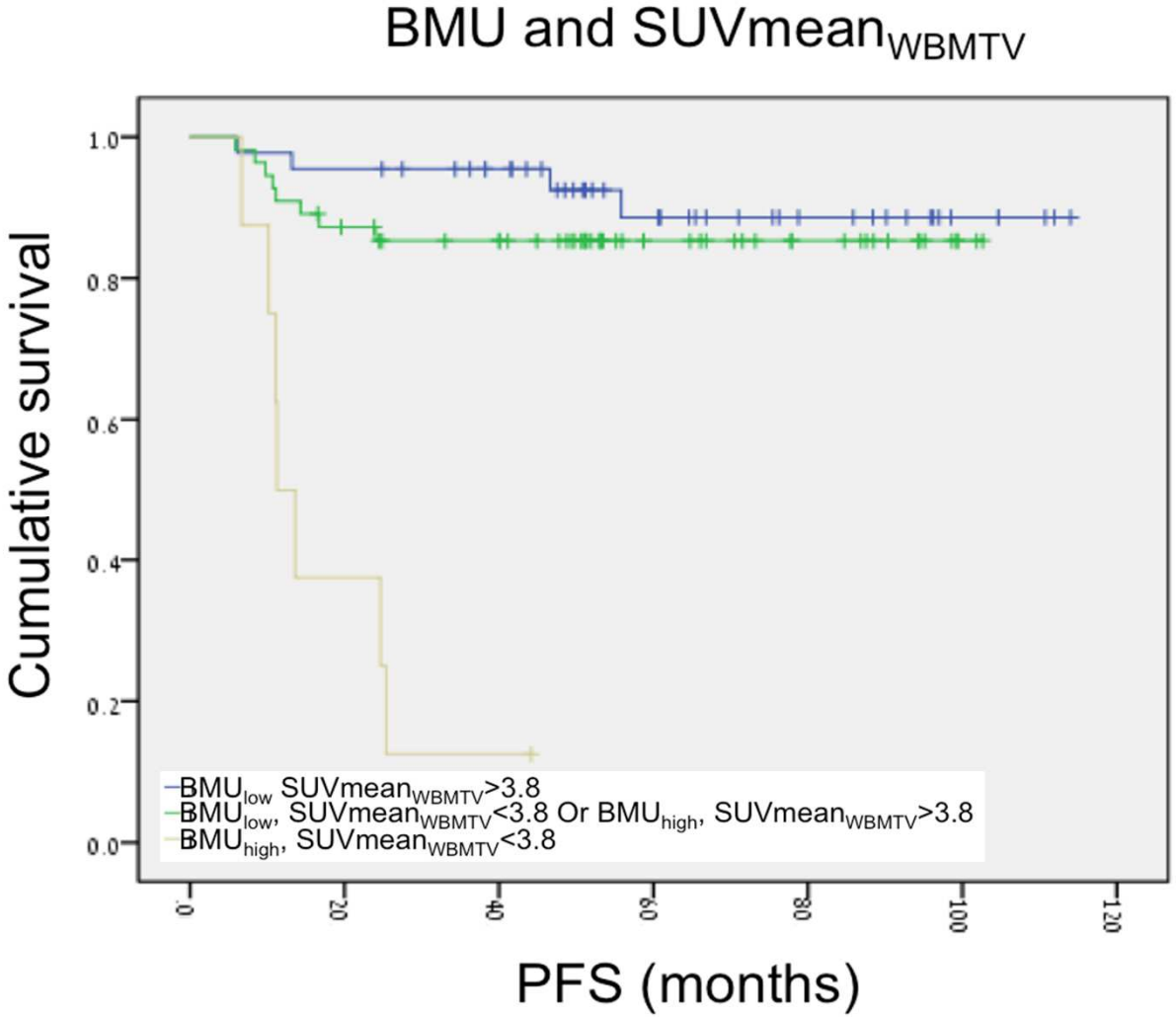
Three risk groups:

Parameter	No. pts.	2-y-PFS
SUV↑, BMU↓	44	96 %
SUV↓or BMU↑	55	85 %
SUV↓, BMU↑	8	13 %

Conclusions: Low baseline SUV_{mean} + diffusely increased BMU define patient goup with very high relapse risk

Baseline PET/CT – Hodgkin lymphoma

D1: Weiler-Sagie et al, Haifa, Israel



Baseline PET/CT – DLBCL

A16: Al Tabaa et al, Montpellier, France

Entity / study goal:	DLBCL / pre-treatment TMTV and EBV status
No. of patients:	47, retrospective
Evaluation:	$TMTV_{41\%}$; circulating cell-free EBV
Treatment:	?

Results:

EBV+ DLBCL:	7 of 47 pts.		
$TMTV_{41\%}$:	Best cut-off: 206 cm^3 (8 - 830)		
Prognostic score:	Pts.	5-y-EFS	5-y-OS
Low TMTV and EBV-	31	87 %	93 %
High TMTV or EBV+	9	50 %	60 %
High TMTV and EBV+	1	0 %	0 %

Conclusions: TMTV and EBV status predict outcome in DLBCL

Baseline PET/CT – HL and DLBCL

A13: Diaz et al, Salamanca, Spain

Entity / study goal:	HL and DLBCL / FDG-PET/CT before transplantation
No. of patients:	12 HL, 12 NHL, retrospective
Evaluation:	PET before, 100 days after and 1 year after tx
Treatment:	Autologous (15) or allogeneic (9) transplantation

Results:

	PET0		PET100		PET365	
	pos.	neg.	pos.	neg.	pos.	neg.
Autologous tx (15)	5	10	5	10	5	5
Allogeneic tx (9)	3	6	1	8	1	8

Conclusions: Pre-transplantation FDG-PET/CT predicts outcome in autologous, but not in allogeneic transplantation

A15

C. Bailly[1],
T. Carlier[1],
M. Meignan[2],
C. Gallazzini-Crepin[3],
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S. Le Gouill[6],
C. Bodet-Milin[1],

Prognostic value of FDG-PET Parameters at Diagnosis and after Induction in Patients with Mantle Cell Lymphoma

Interim Results from the LyMa-PET Project.

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4.Nuclear Medicine department, Cancer Center, Dijon, France
5.Nuclear Medicine department, Cancer Center, Rennes, France
6.Hematology department, University Hospital, Nantes, France

Baseline PET/CT – MCL

A15: Bailly et al, Nantes, France

Entity / study goal: MCL / role of FDG-PET/CT in outcome prediction
No. of patients: 94, prospective
Evaluation: bPET: $SUV_{max/mean/peak}$, TLG_{HU}, TF, MTV_{WB}, TLG_{WB}
iPET: $\Delta SUV_{max/mean/peak}$, DS
Treatment: R-DHAP + R-BEAM + ASCT

Results:

Parameters predictive of PFS:

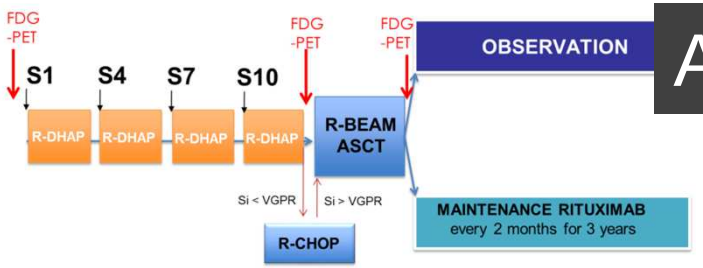
Baseline PET $SUV_{max/mean/peak}$, TLG_{HU} (+ MIPI)
not: TF, MTV_{WB}, TLG_{WB}

Interim PET $SUV_{max/mean/peak}$, $\Delta SUV_{max/mean/peak}$
not: DS

Conclusions: In MCL, SUV-based parameters are most suitable to predict PFS

A15

- 94 untreated mantle cell lymphoma (MCL) patients of the phase III Lyma trial population (n=299)



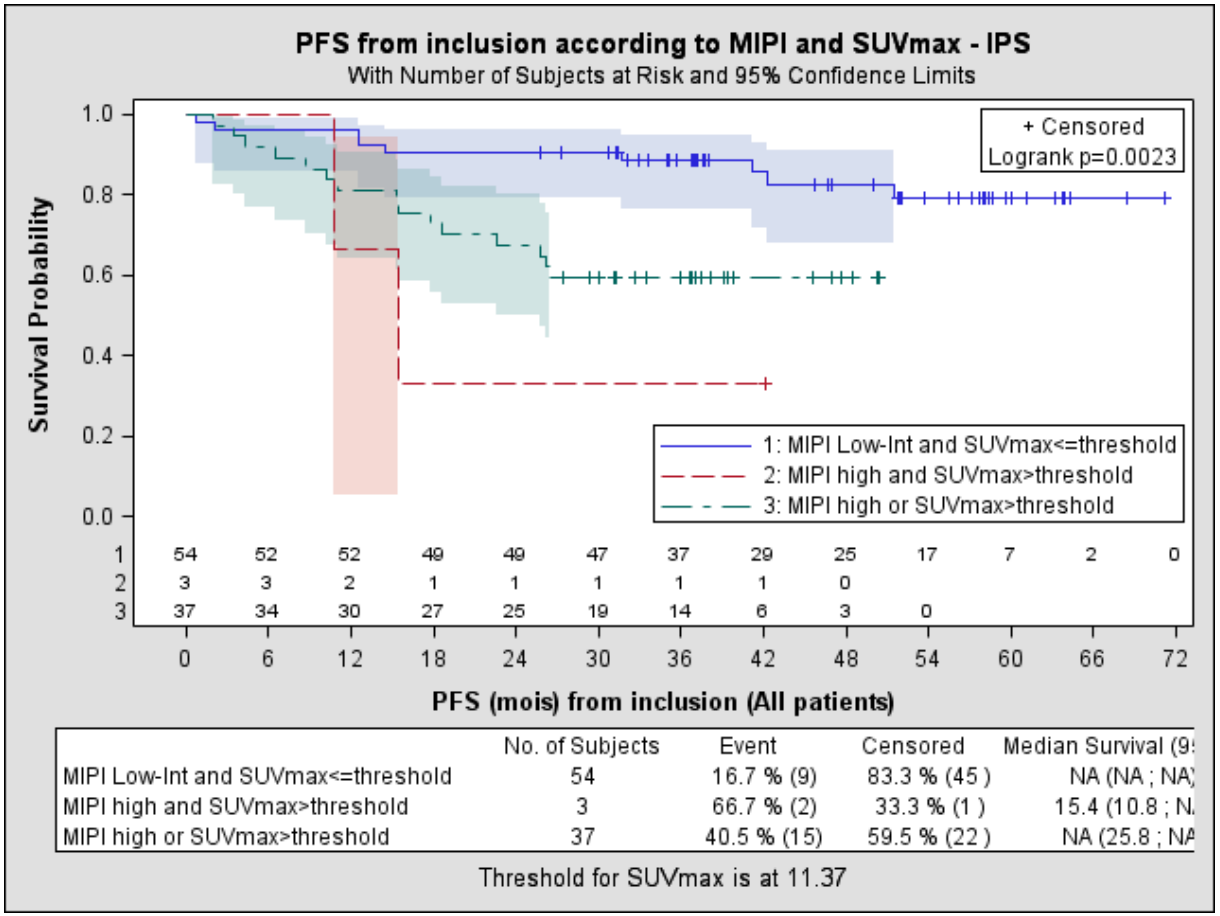
Prognostic value of FDG-PET parameters at diagnosis

Parameters		PFS	
		Threshold	p-value
SUVmax		11.4	<0.001
SUVpeak		8.7	<0.001
TLG (*Extracted from the area with the highest uptake*)		65	0.0298
Textural Features	Entropy	4,99	0.0107
	HGZE	692,32	<0.001

Prognostic value of FDG-PET parameters at the end of induction

Parameters	PFS	
	Threshold	p-value
SUVmax	5.75	0,0003
SUVpeak	4.17	<0,0001
ΔSUVmax	-30%	0.005
ΔSUVpeak	-41%	0.003
Deauville (1/2/3 vs 4/5)		0.137

Prognostic value of SUVmax combined with MIPI at diagnosis



Prognostic value of SUVmax reinforced when associated with MIPI

- Three groups with different PFS duration

Baseline PET/CT – T-LBL

A14: Becker et al, Rouen, France

Predictive value of FDG-PET/CT

in adults

with T-lymphoblastic lymphoma

Baseline PET/CT – Dose adjustment ?

E1: Tout et al, Tour, France

Rituximab exposure is influenced by

baseline metabolic tumor volume

and affects outcome of

DLBCL patients

Poster discussion – PET in lymphoma

21 clinically oriented studies

Interim PET/CT

Feasibility in HL undergoing PD-L1 blockade

Interim PET/CT – Hodgkin lymphoma

B1: Dann et al, Haifa, Israel

Entity / study goal:	HL / FDG-PET/CT during PD-L1 blockade
No. of patients:	7, retrospective
Evaluation:	PET after 1 - 4 cycles, DS, MTV, CT mass
Treatment:	Pembrolizumab, nivolumab

Results:

Response	Pts.	Deauville	% remaining MTV	% remain. CT mass
CR	2	1, 3	0 %, 68 %	38 %, 34 %
PR	3	4	1 %, 14 %, 54 %	38 %, 53 %, 100 %
PD	2	5	38 %, 260 %	n.d., 180 %

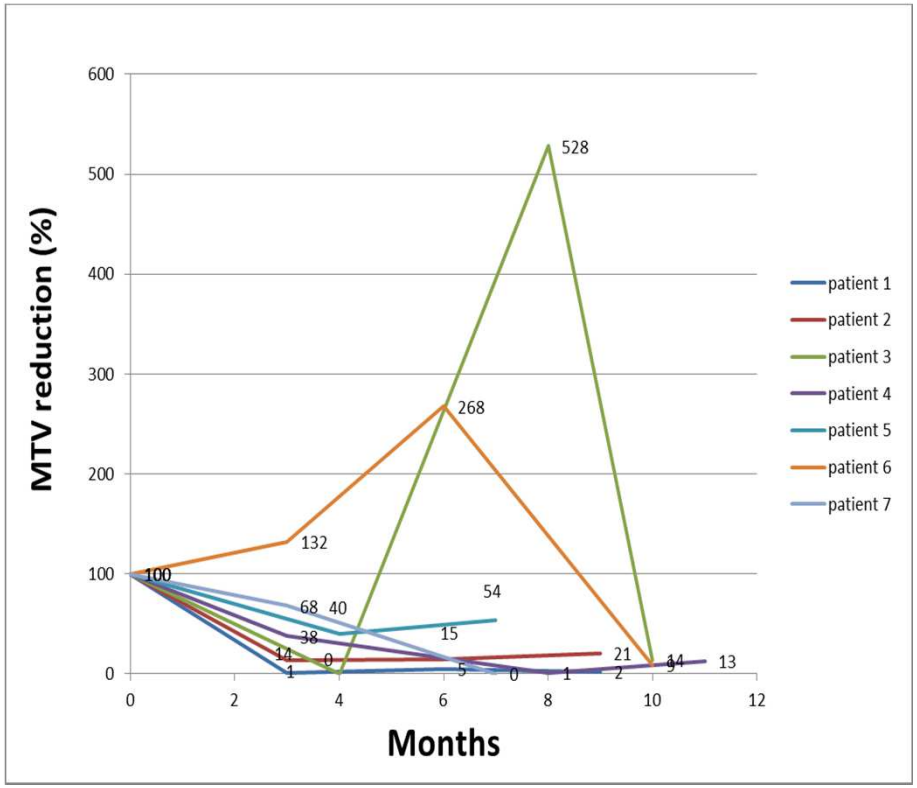
Conclusions: FDG-PET/CT may be used for response assessment in HL patients undergoing PD-L1 blockade

Reduction of MTV faster than CT mass faster than DS

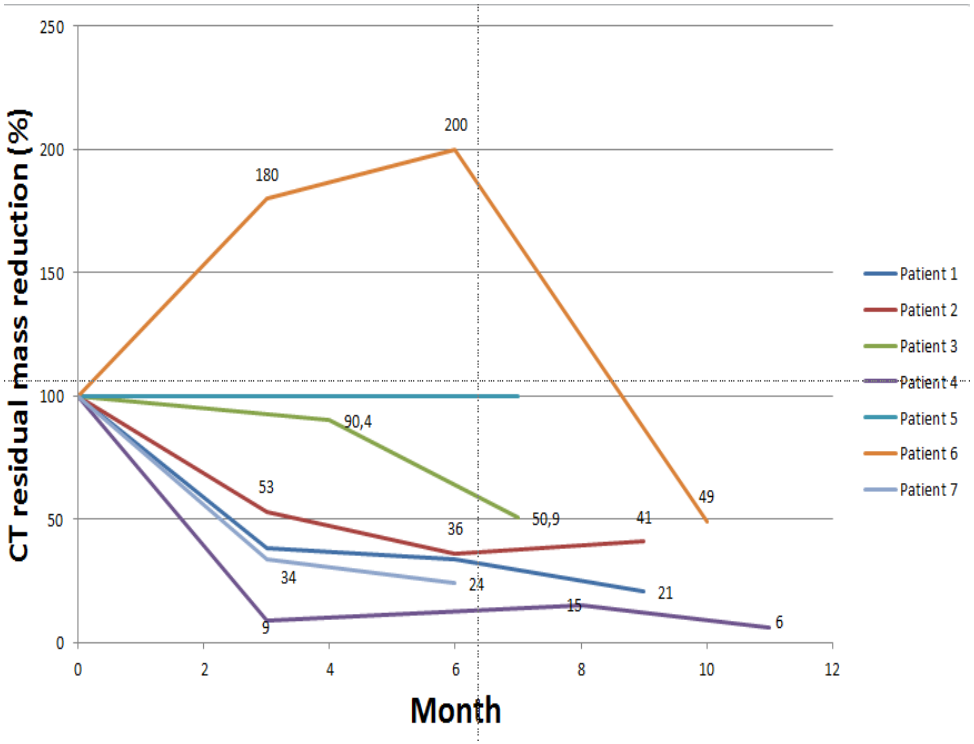
Interim PET/CT – Hodgkin lymphoma

B1: Dann et al, Haifa, Israel

MTV reduction



CT mass reduction



Poster discussion – PET in lymphoma

21 clinically oriented studies

Interim PET/CT

Prognostic impact in HL

Interim PET/CT – Hodgkin lymphoma

A7: Annunziata et al, Rome, Italy

Interim FDG-PET/CT in Hodgkin lymphoma: the prognostic role of the ratio between target lesion and liver SUV_{max} (rPET)

Poster discussion – PET in lymphoma

21 clinically oriented studies

Interim PET/CT

Prognostic impact in DLBCL

Interim PET/CT – DLBCL

A1: Coronado et al, Barcelona, Spain

Entity / study goal:	DLBCL / prediction of PET4 by PET2 ?
No. of patients:	99, prospective
Evaluation:	PET0, 2, 4 and 6; ΔSUV_{max} (PET2: ≤ 66%, 4: ≤ 70%)
Treatment:	R-CHOP

Results:

Concordance PET2 / PET4 90/99 = 91 %

Discordant cases 8 x PET2+/PET4- → 7/8 PET6- (88 %)

1 x PET2-/PET4+ → not further evaluated

Concordance onsite / central review: PET2 63 %

PET4: 93 %

Conclusions: PET2 is predictive of PET4

PET4 predicts final outcome better than PET2

Concordance for PET4 is better than for PET2

Interim PET/CT – DLBCL

A1: Schoder et al, New York, USA

Entity / study goal:	DLBCL / standardization of iPET criteria
No. of patients:	161 (152 with PET6), prospective
Evaluation:	PET0, 2 and 6; DS, IWG+PET, ΔSUV_{max}
Treatment:	R-CHOP vs. DA-EPOCH-R

Results:

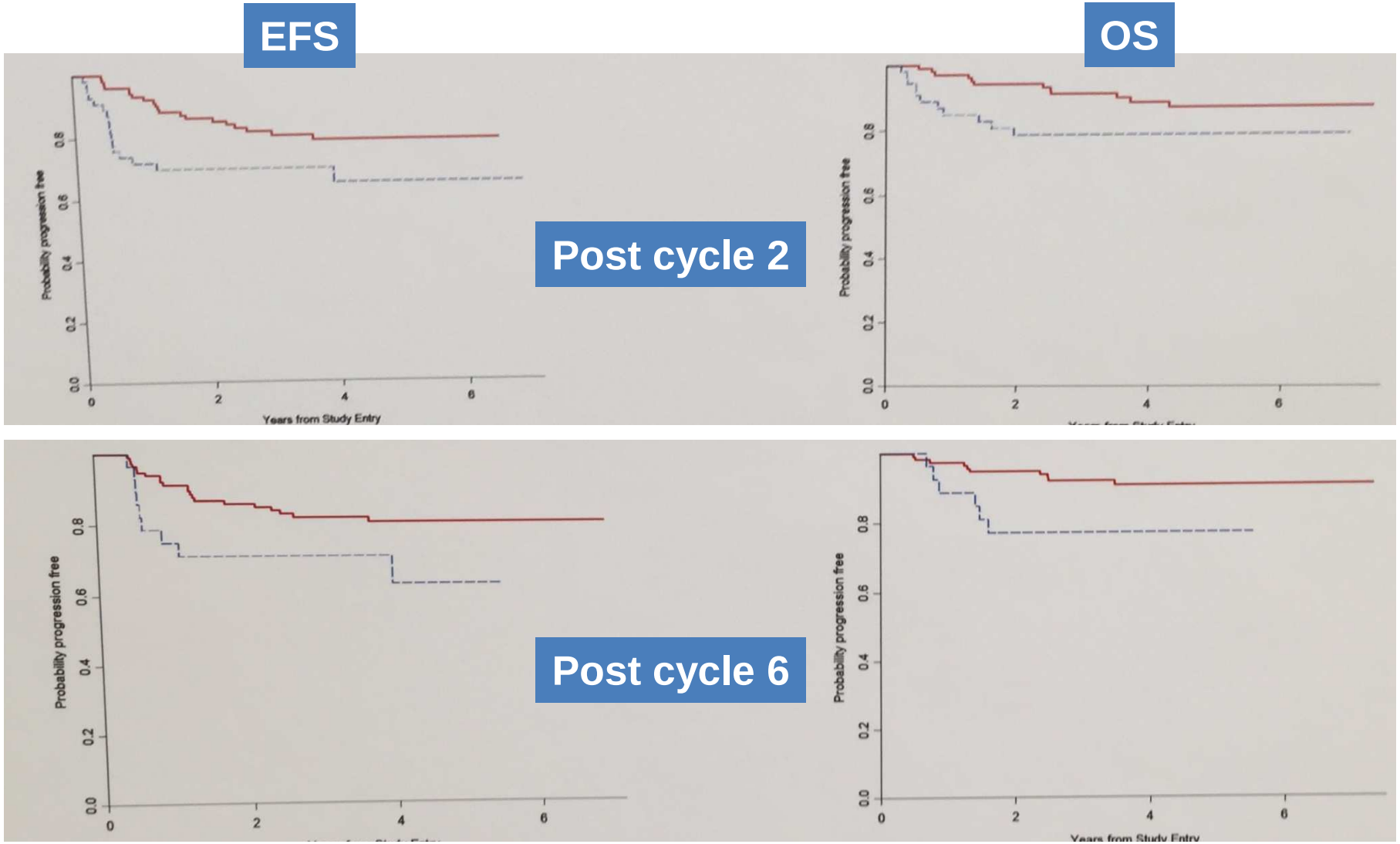
Data on trial performance, quality assurance

DS 1-3 vs. 4+5	PET2	PET6
EFS	p = 0,0322	p = 0,0544
OS	p = 0,0689	p = 0,0316

Conclusions: DS at PET2 and PET6 predict EFS and OS

Interim PET/CT – DLBCL

A1: Schoder et al, New York, USA



Poster discussion – PET in lymphoma

21 clinically oriented studies

Interim PET/CT

Prognostic impact in pediatric lymphomas

Interim PET/CT – Pediatric HL

D4: Serry et al, Cairo, Egypt

Entity / study goal: Pediatric HL / different PET0 and iPET parameters
No. of patients: 60, retrospective
Evaluation: PET0 and iPET; DS, SUV_{max}, SUV_{mean}, TMTV, TLG
Treatment: ABVD

Results:

	DS	% Pts.	CR	DSS
iPET negative	1+2	83%	90%	90%
iPET MRU	3	8 %	20%	
iPET positive	4+5	8 %	40%	30%

Conclusions: Outcome prediction at iPET:

Visual: DS
Semiquantitative: SUV_{max}, $\Delta SUV_{mean}2.5$, $\Delta TMTV2.5$, $\%\Delta SUV_{max}$

EARLY FDG PET/CT RESPONSE ASSESSMENT IN PEDIATRIC NON HODGKIN LYMPHOMA: A REPORT FROM THE FRENCH PET LYMPHOMA STUDY

B2

V. Edeline et al, on Behalf of SFCE **(société Française de lutte contre les cancers et les leucémies de l'enfant et de l'adolescent)**

-French SFCE study. 230 patients included (age range: 3-21y) and treated with French SFCE protocols.

-The main objective of the study was to investigate the value of PET/CT at the time of remission assessment.

-Sub-study: interim PET/CT during chemotherapy recommended but not mandatory for primary objective. No therapeutic decision was based on PET/CT only.

-Early PET/CT response was assessed using the Deauville 5 points scale. Exploratory analyses were performed using ΔSUVmax.

-Median follow-up of 29.2 months, 3-year EFS and OS of this cohort are 85.3% and 95.4% respectively.

Interim PET/CT – Pediatric NHL

B2: Edeline et al, Paris, France

Entity / study goal:	Pediatric NHL / value of iPET
No. of patients:	89, prospective
Evaluation:	PET0, PET2; DS, ΔSUV_{max}
Treatment:	Pediatric NHL protocols

Results:

Evaluable cases	69/89 = 78 % (brown fatty tissue!)	
Favorable iPET response:	DS1-3	45 %
	ΔSUV_{max} > 66 %	72 %

Conclusions: 22 % of patients not evaluable by iPET
(Burkitt, DLBCL, PMBCL, ALCL, LBL)

Low proportion of CMR (DS1-3)

Poster discussion – PET in lymphoma

21 clinically oriented studies

Post-treatment PET/CT

Prognostic impact in NHL

A2

SC Hematology - Azienda Ospedaliero Universitaria Careggi – Firenze - Italy

THE PROGNOSTIC VALUE OF RESIDUAL ANATOMICAL DISEASE IN DE-NOVO DIFFUSE LARGE B-CELL LYMPHOMA (DLBCL) PATIENTS WITH FDG-PET–BASED COMPLETE RESPONSE AFTER FIRST-LINE RITUXIMAB-CHOP THERAPY

Novo Mattia, Kovalchuk Sofia, Puccini Benedetta, Mannelli Lara, Benelli Gemma, Berti Valentina, Bosi Alberto and Rigacci Luigi

Objective

- Determinate the efficacy of FDG-PET to assess end-of-treatment response in de-novo DLBCL patients
- Evaluate the prognostic value of residual anatomical disease detected by CT imaging in those who had FDG-PET complete response.

**Retrospective cohort between January 2009 and December 2012*

Post-treatment PET/CT – DLBCL

A2: Novo et al, Florence, Italy

Entity / study goal:	DLBCL / prognostic value of residual CT mass
No. of patients:	62, retrospective
Evaluation:	Post-treatment PET/CT
Treatment:	R-CHOP

Results:

	Patients		Relapses	PV
fPET +	16/62 (26 %)		16/16	100 %
fPET -	46/62 (74 %)		5/46	89 %
	No res. mass	40/46	3/40	93 %
	Residual mass	6/46	2/ 6	66 %

Conclusions: Most pts. with an fPET- residual mass do not relapse

but: relapses more frequent than in pts. w/o residual mass !

Post-treatment PET/CT – Plasmablastic L.

A11: Al Tabaa et al, Montpellier, France

Entity / study goal:	Plasmablastic lymphoma / role of PET/CT
No. of patients:	35 (14 HIV+, 6 post-tx), retrospective
Evaluation:	Pre- and post-treatment PET/CT; DS
Treatment:	?

Results:

PET0 positive 100 %, SUV_{max} 10 (4 - 40)

fPET		% pts.	EFS	OS	
	CMR	80 %	47	87	months
	No CMR	20 %	7	22	months

Conclusions: PET/CT is useful for staging and response assessment in plasmablastic lymphoma

Post-treatment PET/CT – Bone DLBCL

A9: Rigacci et al, Florence, Italy

Entity / study goal:	Primary bone DLBCL / response evaluation
No. of patients:	23, retrospective
Evaluation:	Pre- and post-treatment PET/CT
Treatment:	Immunochemotherapy ± radiotherapy

Results:

Single lesions	10 pts.	
Multiple lesions	13 pts.	Relapses (f/u 64 mo.)
fPET negative	11 pts. (48 %)	0/11
fPET positive	12 pts. (52 %)	0/12

Conclusions: Post-treatment PET/CT is not useful

for response assessment in primary bone lymphomas

Bone regeneration? Osteoblastic activity?

Post-treatment PET/CT – PTCL

A12: Cordoba et al, Madrid, Spain

Entity / study goal: PTCL / response evaluation
No. of patients: 50, retrospective
Evaluation: Post-treatment PET/CT
Treatment: CHOP, CHOEP

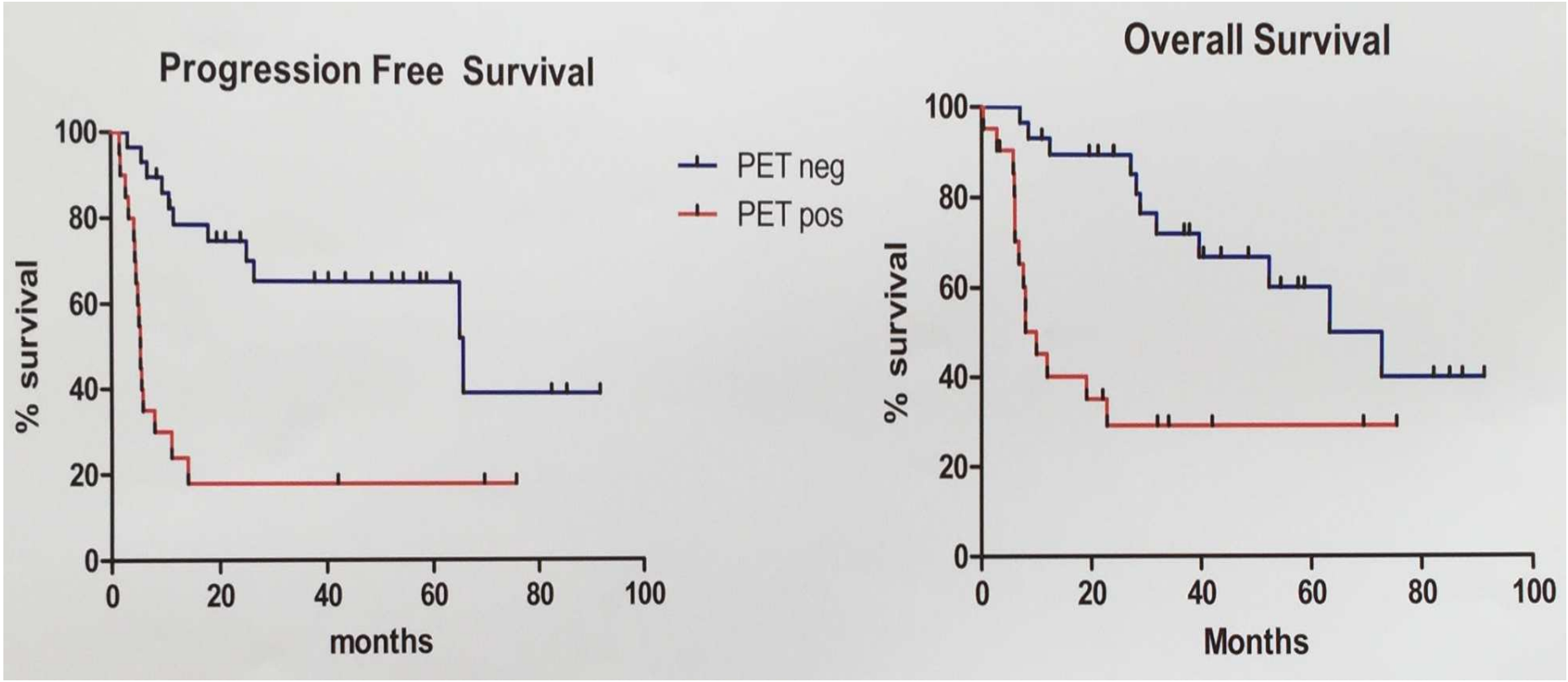
Results:

	CMR	No CMR	Predictors of CMR
% pts.	58 %	42 %	No B symptoms
Progression	41 %	81 %	Normal β_2-MG
PFS	66 mo.	5 mo.	Normal LDH
OS	73 mo.	10 mo.	

Conclusions: CMR at post-treatment PET/CT predicts fairly good outcome in PTCL

Post-treatment PET/CT – PTCL

A12: Cordoba et al, Madrid, Spain



Poster discussion – PET in lymphoma

21 clinically oriented studies

PET/CT at relapse

Prognostic impact at relapse of multiple myeloma

Follow-up PET/CT – Multiple Myeloma

F3: Jamet et al, Nantes, France

FDG-PET/CT at relapse

predicts survival

in multiple myeloma