Role of combination of quantitative 18FDG PET-CT parameters in prognostic stratification

The effectiveness of baseline Total Lesion Glycolysis (TLG) to risk stratify patients led to study whether the positive predictive value (PPV) of TLG could be improved by combining TLG with other clinical and imaging parameters.
In 100 of 125 patients enrolled in the IELSG26 study, Maximum Standardized Update value (SUVmax), Metabolic Tumour Volume (MTV) and TLG were measured both at baseline and after chemoimmunotherapy (R-CHOP or R-CHOP like in 15 patients and R-VACOP-B or R-MACOP-B in the remaining 85); nearly all (90%) had a residual morphological lesion at the end of chemoimmunotherapy and 88 patients underwent consolidation radiotherapy, according to the local policy of the enrolling centre.
With a median follow-up of 62 months, Overall Survival (OS) and Progression Free Survival (PFS) rates at 5 years were 96% (95%CI,90-98%) and 90% (95%CI, 82-95%), respectively.
At univariate analysis of the main clinical characteristics in this patient cohort (including age, gender, performance status, B symptoms, Ann Arbor stage, bulky disease, lactate dehydrogenase plasma level, IPI and age-adjusted IPI), only advanced stage at diagnosis was associated with a significantly poorer PFS (Log-rank test, p=0.049).
The univariate analysis (log-rank test) of the impact of quantitative and visual PET parameters on PFS is reported in Table1

Table 1. Univariate analysis of the impact on PFS of quantitative and visual PET parameters

Parameter	Cut-off	Sensitivity (%)	Specificity (%)	NPV (%)	PPV (%)	Log-rank test (p-value)
Interim DS	>3	60	66	96	11	0.239
End-of-therapy DS	>3	90	77	99	30	<0.0001
Baseline SUV max	22.23	60	76.6	94	21	0.007
Baseline MTV	607 ml	80	80	97	31	<0.0001
Baseline TLG	5814	90	77	99	30	<0.0001
End-of-therapy SUVmax	2.6	90	71	98	28	<0.0001
End-of-therapy MTV	35 ml	100	78.9	100	34	<0.0001
End-of-therapy TLG	84.4	100	86.7	100	45	<0.0001
Δ SUV max	78%	60	89	94	33	0.004
Δ MTV	96%	100	49	100	18	0.0034
Δ TLG	98%	60	83	95	29	0.0012
Baseline SUV max + Δ SUV max		30	99	76	73	<0.0001
Baseline MTV + Δ MTV		80	90	98	47	<0.0001
Baseline TLG+ Δ TLG		60	97	67	96	<0.0001
Baseline TLG+ end-of-therapy DS		80	92	98	53	<0.0001
End-of-therapy TLG+ end-of-therapy DS		90	89	99	47	<0.0001
Baseline TLG+ interim DS		60	88	97	27	0.0027

DS, Deauville score, MTV, metabolic tumor volume; NPV, negative predictive value; PPV, positive predictive value; SUV max, maximum standardized uptake value; TLG, total lesion glycolysis; Δ (delta), change from baseline to end of therapy.

Of note, all the individual quantitative parameters had very high Negative Predictive value (NPV) (0.94-1.0) but low PPV (0.18–0.45). SUV max, MTV and TLG at the end of therapy performed better in predicting PFS than the same values estimated at baseline and their changes (Δ, delta) after immunochemotherapy.

The end-of-therapy TLG was the best individual PFS predictor, with a NPV of 100%, but the combination of baseline TLG and end-of-therapy Deauville Score (DS) resulted in a better PPV (53% vs 45%) without a detrimental effect on the NPV (98%).
Therefore, both visual analysis using the DS and PET-derived quantitative parameters can predict PFS in patients with PMBCL
The combination of baseline TLG and post-treatment DS could be used to build a prognostic model that helps identify patients at risk of poor PFS.