The purpose of this study was to assess the prognostic value of early $^{18}$F-FDG PET using standardized uptake value (SUV) compared with visual analysis in patients with diffuse large B-cell lymphoma (DLBCL). Methods: Ninety-two patients with newly diagnosed DLBCL underwent $^{18}$F-FDG PET prospectively before and after 2 cycles of chemotherapy (at midtherapy). Maximum SUV (SUVmax) and mean SUV (SUVmean) normalized to body weight and body surface area, as well as tumor-to-normal ratios, were computed on the most intense uptake areas. The SUVs, tumor-to-normal ratios, and their changes over time were compared with visual analysis for predicting event-free survival (EFS) and overall survival, using receiver-operating-characteristic (ROC) analysis. Survival curves were estimated with Kaplan–Meier analysis and compared using the log-rank test. Results: With visual analysis, the accuracy of early PET to predict EFS was 65.2%. The 2-y estimate for EFS was 51% (95% confidence interval [CI], 34%–68%) in the PET-positive group compared with 79% (95% CI, 68%–90%) in the PET-negative group ($P = 0.009$). An optimal cutoff value of 65.7% SUVmax reduction from baseline to midtherapy obtained from ROC analysis yielded an accuracy of 76.1% to predict EFS. The 2-y estimate for EFS was 21% (95% CI, 0%–42%) in patients with SUVmax reduction $\leq 65.7\%$ compared with 79% (95% CI, 69%–88%) in those with reduction $> 65.7\%$ ($P < 0.0001$). Fourteen patients considered as positive on visual analysis could have been reclassified as good responders. Conclusion: SUV-based assessment of therapeutic response during first-line chemotherapy improves the prognostic value of early $^{18}$F-FDG PET compared with visual analysis in DLBCL.

Key Words: early PET; standardized uptake value; lymphoma; prognosis; response

DOI: 10.2967/jnumed.107.042093
Publique-Hôpitaux de Paris (AP-HP) was conducted prospectively on 110 patients with newly diagnosed and histologically proven aggressive non-Hodgkin’s lymphoma to assess the prognostic value of early 18F-FDG PET after 2 cycles of chemotherapy. The study was approved by the AP-HP review board, and all patients gave informed written consent. Early PET results did not influence the scheduled first-line therapeutic strategy. Results based on visual analysis involving the initial 90 patients have recently been published (7). Among the 110 patients, 104 had DLBCL (6 T-cell) but complete attenuation-corrected PET raw data were not available in 12 (scans done at other institutions). Therefore, 92 homogeneous DLBCL patients were included in the current study. Patient characteristics and chemotherapy regimens are summarized in Table 1. The database was closed in May 2006, with a median follow-up of 42 mo among survivors.

**18F-FDG PET**

Patients underwent PET before initiation (PET1) and after 2 cycles (PET2) of chemotherapy, with a median interval of 14 d after the second cycle (range, 8–37 d). Patients fasted for 6 h, and PET was performed after having controlled the blood glucose level, which was targeted ≤7 mM. Before February 2004, the first 81 patients were scanned on a dedicated C-PET camera (ADAC). They were injected with 2 MBq/kg 18F-FDG and sat at rest for 83 ± 22 min before imaging. The acquisition consisted of 5–7 overlapping bed shifts, to cover a volume from the upper thigh to the skull base (25-cm field of view). For each bed position, a 6-min emission scan was acquired in a 3-dimensional (3D) coincidence mode, followed by a 1-min transmission scan (137Cs source). Images (144 × 144 matrix; voxel size, 4 × 4 × 4 mm³) were reconstructed using an iterative ordered-subsets expectation maximization (OSEM) algorithm with attenuation correction. The last 11 patients were scanned on a Gemini PET/CT system (Philips). They were injected with 5 MBq/kg 18F-FDG and rested for 69 ± 9 min before imaging. The acquisition featured a low-dose transmission CT scan (100 kV; 40 mAs; slice thickness, 5 mm), followed by the emission scan in 9–11 overlapping bed shifts (18-cm field of view), each for 3-min duration. Images (144 × 144 matrix; voxel size, 4 × 4 × 4 mm³) were reconstructed with a 3D row-action maximum-likelihood algorithm (RAMLA). All patients also underwent a concurrent diagnostic CT scan of the chest, abdomen, and pelvis before, during midtherapy, and after treatment completion and then every 6 mo for follow-up based on the criteria of Cheson et al. (21).

**Visual Analysis of 18F-FDG Uptake**

PET images were analyzed by a consensus of 2 experienced observers who were unaware of clinical, radiologic, and follow-up data. All foci were scored for their extent and intensity using a 3-point scale (1 = low, 2 = moderate, 3 = high) (3,7). The extent was scored within each lymphatic area, organ, or skeletal region, depending on the number of nodes or volume involved; the intensity was scored compared with surrounding tissues after upper thresholding of the data to have the liver activity around 30% of the gray scale. Then, PET2 was scored as positive or negative in comparison with PET1. Negative was defined as having either no residual abnormal uptake or having a unique residual site (with an extent score of 1) associated with an intensity score of 1, whereas all other previously hypermetabolic sites had disappeared. Positive was defined as having at least 1 residual site (with an extent score of 1) associated with an intensity score of 2, or as having ≥2 residual sites with any extent and intensity scores.

**SUV-Based Assessment of 18F-FDG Uptake**

For each PET dataset, the tumor (T) with the most intense 18F-FDG uptake among all foci was carefully identified, relying on a graded color-scaled parametric analysis (Fig. 1). From the activity profile crossing the hottest point, an isocontour threshold was determined halfway between the background and the maximal pixel value (22) and was automatically propagated on adjacent slices to encompass the entire tumor volume. Maximal and mean counts-per-pixel were computed within the volumetric region of interest (ROI). If present, a central cold area was included. In addition, 2 large ROIs were manually drawn over gluteal muscle regions (Fig. 1), from which the counts-per-pixel were averaged to define the normal background (N).

To assess metabolic changes during chemotherapy, the hottest tumor in any region or organ on PET2 was used for comparison and as the indicator for disease status, even though its location differed from the initial hottest tumor on PET1. In cases in which all lesions had disappeared, ROIs were manually drawn in the same area on PET2 as that on PET1, with careful slice-to-slice comparison and by making sure that the ROI size was restricted to the baseline tumor. In addition, we also investigated 18F-FDG uptake changes on PET2 within the initial hottest tumor site on PET1, even though PET2 demonstrated hottest foci on other locations.

SUVs were calculated from the counts-per-pixel and normalized to body weight (BW) and body surface area, defined as BSA (m²) = 0.007184 × weight (kg)⁰.⁷²⁴ × height (cm)⁰.²³² (23,24), using the following formulas:

\[
SUV_{BW} = \frac{\text{tissue activity (kBq/mL)}}{\text{injected activity (MBq)/weight (kg)}}, \quad \text{Eq. 1}
\]

\[
SUV_{BSA} = \frac{\text{tissue activity (kBq/mL)}}{\text{injected activity (MBq)/BSA (m²)}}, \quad \text{Eq. 2}
\]

where *activity was decay-corrected from the delay between injection and image acquisition. In addition, the tumor-to-normal

**TABLE 1**

Patient Characteristics and Chemotherapy Regimens

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (n = 92)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age, y (range)</td>
<td>54 (19–78)</td>
</tr>
<tr>
<td>Sex: men/women</td>
<td>60/32</td>
</tr>
<tr>
<td>Ann Arbor stage, no. (%)</td>
<td>11 (12)</td>
</tr>
<tr>
<td>I–II</td>
<td>81 (88)</td>
</tr>
<tr>
<td>III–IV</td>
<td>20 (22)</td>
</tr>
<tr>
<td>Standard IPI score, no. (%)</td>
<td>18 (19)</td>
</tr>
<tr>
<td>Low risk (L)</td>
<td>30 (33)</td>
</tr>
<tr>
<td>Low-intermediate (LI)</td>
<td>24 (26)</td>
</tr>
<tr>
<td>High-intermediate (HI)</td>
<td>42 (46)</td>
</tr>
<tr>
<td>High (H)</td>
<td>27 (29)</td>
</tr>
<tr>
<td>Chemotherapy regimen, no. (%)</td>
<td>3 (3)</td>
</tr>
</tbody>
</table>
|   CHOP | 5 MBq/kg 18F-FDG and rested for 83 ± 22 min before imaging. The acquisition consisted of 5–7 overlapping bed shifts, to cover a volume from the upper thigh to the skull base (25-cm field of view). For each bed position, a 6-min emission scan was acquired in a 3-dimensional (3D) coincidence mode, followed by a 1-min transmission scan (137Cs source). Images (144 × 144 matrix; voxel size, 4 × 4 × 4 mm³) were reconstructed using an iterative ordered-subsets expectation maximization (OSEM) algorithm with attenuation correction. The last 11 patients were scanned on a Gemini PET/CT system (Philips). They were injected with 5 MBq/kg 18F-FDG and rested for 69 ± 9 min before imaging. The acquisition featured a low-dose transmission CT scan (100 kV; 40 mAs; slice thickness, 5 mm), followed by the emission scan in 9–11 overlapping bed shifts (18-cm field of view), each for 3-min duration. Images (144 × 144 matrix; voxel size, 4 × 4 × 4 mm³) were reconstructed with a 3D row-action maximum-likelihood algorithm (RAMLA). All patients also underwent a concurrent diagnostic CT scan of the chest, abdomen, and pelvis before, during midtherapy, and after treatment completion and then every 6 mo for follow-up based on the criteria of Cheson et al. (21).

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\]

where *activity was decay-corrected from the delay between injection and image acquisition. In addition, the tumor-to-normal
uptake ratio (T/N ratio) for each PET image was computed as follows (Eq. 3):

\[
\frac{\text{T/N ratio}}{\text{maximal counts-per-pixel within T}} = \frac{\text{mean counts-per-pixel within N}}{\text{Eq. 3}}
\]

Statistical Analysis
To evaluate the prognostic value of early PET, event-free survival (EFS) and overall survival (OS) were chosen as endpoints. EFS was defined as the date of enrollment to first evidence of progression, relapse, or death from any cause. Data were censored if the patients were alive and free of progression or relapse at last follow-up. OS was defined as the date of enrollment to death from any cause. Data were censored if the patients were alive at last follow-up. Receiver-operating-characteristic (ROC) analysis was performed to determine an optimal cutoff value of uptake on PET2 or an optimal cutoff value of uptake reduction from PET1 to PET2 in predicting EFS—event versus no event—and OS—dead versus alive. Differences in SUVs between groups were analyzed with an unpaired Student t test, and significance was obtained when the 2-sided \(P\) value was < 0.05. Survival according to visual analysis and SUV-based assessment of early PET was depicted using the Kaplan–Meier plots and compared using the log-rank test.

RESULTS
Patient Outcome
During a median follow-up period of 42 mo after inclusion, 60 patients had no event (EFS = 65.2%), whereas the remaining 32 patients progressed or died, with a median delay of 6.7 mo; in addition, 71 patients survived (OS = 77.2%), whereas the remaining 21 patients died, with a median delay of 9.1 mo.

Visual Analysis of Survival
All patients demonstrated intense foci of uptake on PET1, as expected from DLBCL. At midtherapy, PET2 was interpreted as positive in 34 patients and negative in 58 patients. The 2-y estimate for EFS was 51% (95% confidence interval [CI], 34%–68%) in PET2-positive patients compared with 79% (95% CI, 68%–90%) in PET2-negative patients (\(P = 0.009\); Fig. 2A). Positive and negative predictive values (PPVs and NPVs, respectively), as well as accuracies in predicting EFS and OS (65.2% and 68.5%, respectively) are listed in Table 2. Of the 34 PET2-positive patients, 17 remained free of an event at last follow-up.

SUV-Based Assessment of Survival
There was no statistical difference between the SUVs computed from the C-PET system and those obtained from the Gemini PET/CT, on both PET1 and PET2 (\(P = 0.6\) and 0.3, respectively). At baseline, SUV\(_{\text{BWmax}}\) averaged 13.2 ± 4.8, whereas at midtherapy SUV\(_{\text{BWmax}}\) decreased to 3.4 ± 2.7, corresponding to a mean reduction of 71.7%. Among the 34 PET2-positive patients, the hottest tumor remained in the same site as PET1 in 50%, whereas the location changed in 50%, either because the tumor responded...
better to therapy than other locations (n = 15) or, in the case of progression, because another location demonstrated higher uptake (n = 2). SUV_BWmax reduction averaged 55.4% in PET2-positive patients versus 81.2% in PET2-negative patients (P < 0.0001). All SUV_BW, SUV_BSA values and T/N ratios are displayed in Table 3.

With ROC analysis, an optimal cutoff value of SUV_BWmax of 5.0 at PET2 could predict EFS with higher PPV, NPV, and accuracy (75.0%) than visual analysis (Table 2). SUV_BSAmax performed even better for predicting outcome, with an accuracy reaching 88.0% for OS. At midtherapy, most patients showed SUV_BWmax ≤ 5.0, and these patients (n = 79) tended to have lower baseline SUV_BWmax (12.8 ± 4.7) than those (n = 13) with SUV_BWmax > 5.0 (15.4 ± 5.0; P = 0.073). Furthermore, SUV_BWmax at PET1 failed to demonstrate a significant predictive value for EFS (area under ROC curve = 0.525, P = 0.7).

The percentage of SUV_BWmax reduction from PET1 to PET2 averaged 60.7% ± 32.6% in the 32 patients whose disease progressed or who died versus 77.5% ± 12.4% in the 60 patients who remained free of disease (P < 0.0006). ROC analysis yielded an optimal cutoff value of 65.7% SUV_BWmax reduction at midtherapy for predicting EFS. The overall accuracy increased to 76.1% (Table 2). In patients with SUV_BWmax reduction ≤ 65.7% (n = 16), the 2-y estimate for EFS was only 21% (95% CI, 0%–42%) compared with 79% (95% CI, 69%–88%) in those with SUV_BWmax reduction > 65.7% (n = 76) (P < 0.0001; Fig. 2B). Results obtained from both the reduction of SUV_BWmean and T/N ratio showed slightly poorer accuracies and PPVs—that is, more false-positive scans. SUVmax reduction, whether normalized to BW or BSA, also gave slightly better PPVs and accuracies for OS (Table 2).

When considering the 18F-FDG uptake change with regard to the most active focus on the baseline scan only, ROC analysis led to an 83.3% PPV, 72.5% NPV, and 73.9% accuracy for EFS. The optimal cutoff value was 65.7%.

**DISCUSSION**

In the present study, we emphasize, in a homogeneous series of 92 patients with DLBCL, that SUV-based assessment of glucose metabolic changes after 2 treatment cycles improves the prognostic value of early 18F-FDG PET, compared with visual analysis, with a median follow-up of 42 mo.

A negative interim scan based on visual analysis during first-line chemotherapy has proven to be an independent indicator of favorable outcome among patients with low-risk or high-risk disease based on the International Prognostic Index (7). Moreover, a more recent study showed that a significant survival difference exists between patient groups on the basis of early PET results but not on the gene-expression profiles (25). However, visual analysis of PET may be improved because some PET-positive patients still have a good outcome (7,26,27). If response on interim 18F-FDG PET is to be used to guide second-line risk-adapted therapeutic strategies in the future, efforts should be made to decrease the false-positive scans so that patients are not overtreated—that is, to improve the PPV of PET (27). In the present series, 17 of 34 patients with residual 18F-FDG uptake, considered visually positive on PET2, remained free of an event. The same issue was also raised in a recent study with advanced-stage Hodgkin’s disease (28). Such patients could have already shown significant reduction of 18F-FDG uptake after first-line chemotherapy but still presented with an increased activity compared with the surrounding normal tissue by visual analysis.
To be able to quantify the \(^{18}\)F-FDG metabolic rate instead of interpreting images only as positive or negative, Römer et al. demonstrated in 11 lymphoma patients that Patlak analysis of \(^{18}\)F-FDG kinetics may provide superior information in therapy monitoring (1). However, quantification of glucose metabolic rate, which requires dynamic imaging on a restricted field of view and measurement of the arterial input function, is generally regarded as too complex in routine practice (23,24). Moreover, it may not be suitable in DLBCL when the most active lesion indicating tumor viability can be outside the field of view (18–25 cm). In Hodgkin’s lymphoma, Hutchings et al. demonstrated that SUV analysis of interim PET may help in patient stratification (29). Our study also shows that an easy-to-calculate semiquantitative index, such as the SUV\(_{\text{max}}\), is adapted to assess early response and predict long-term outcome. The PPV of early PET for EFS can be improved from 50% with visual analysis to 81.3% when using SUV\(_{\text{BWmax}}\) reduction of 65.7% from PET1 to PET2 as a cutoff value. Fourteen patients could have been considered good responders in this case without altering NPV (at the expense of 4 more false-negative scans), among whom 11 were in complete remission at the end of first-line therapy and remain free of an event at the last follow-up (Fig. 3). The overall accuracy for EFS prediction based on SUV\(_{\text{BWmax}}\) reduction compared with visual analysis is 76.1% versus 65.2%, with even higher performance in predicting OS, as shown in Table 2. More importantly, Kaplan–Meier analysis demonstrates much higher statistical significance between EFS curves using the SUV approach.

One of the reasons why the usefulness of SUV in clinical application remained controversial is that being a simplified semiquantitative method, SUV is prone to many sources of variability from one institution to another. In our series, SUV\(_{\text{BWmax}}\) in the most intense lesion at baseline averaged 13.2 ± 4.8, which compares well with the value of

### TABLE 3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PET1</th>
<th>PET2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (n = 92)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUV(_{\text{BWmax}})</td>
<td>13.2 ± 4.8 (4.8–24.8)</td>
<td>3.4 ± 2.7 (0.9–20.8)</td>
</tr>
<tr>
<td>SUV(_{\text{Bmax}})</td>
<td>9.5 ± 3.6 (3.4–18.0)</td>
<td>2.4 ± 2.1 (0.6–16.2)</td>
</tr>
<tr>
<td>SUV(_{\text{BSAmax}})</td>
<td>0.35 ± 0.13 (0.11–0.67)</td>
<td>0.09 ± 0.07 (0.03–0.53)</td>
</tr>
<tr>
<td>SUV(_{\text{Bmean}})</td>
<td>0.25 ± 0.10 (0.06–0.49)</td>
<td>0.07 ± 0.06 (0.02–0.42)</td>
</tr>
<tr>
<td>T/N ratio</td>
<td>19.5 ± 8.0 (6.6–45.7)</td>
<td>4.7 ± 3.3 (1.2–21.5)</td>
</tr>
</tbody>
</table>

**BW =** body weight; **BSA =** body surface area; **T/N ratio =** tumor-to-normal ratio.

Values are mean ± SD (range).
underestimation of 18F-FDG uptake in small lesions. Pre-
delay after 18F-FDG injection, the partial-volume effect,
ment can stem from many factors, including the imaging
with regard to the lower SD. Variability in SUV measure-
SUVs are relatively lower but appear more homogeneous
32
limited spatial resolution of PET (31). Although the time interval varied
60 min after injection, which is
1 for left hilar
5
1 for left hilar
16,31
). Moreover, we have investigated the differ-
corrective method or reconstruction algorithms, univariate
analysis has proven that SUVs obtained from these 2
systems showed no statistical difference. Most important,
each patient had his or her 2 PET scans on the same
machine; therefore, the potential systemic bias could have
been eliminated by computing the SUVBWmax differences.
Another limitation of our study is the use of a post hoc
response criterion for SUV-based analysis (obtained from
the same patient population), instead of a predefined re-
response criterion, as we did for visual analysis.

As to the correction scheme, SUV normalized to BW for
many tissues was found to have a strong positive correla-
tion with weight (34,35) because 18F-FDG uptake is lower
in fat than in other tissues and, consequently, SUVs tend to
be overestimated in heavier patients (24). Because body
weight often changes during treatment, BSA normalization
was proposed. In our study, SUVBSAmax values on PET2
alone showed a better PPV than SUVBWmax for EFS and
OS prediction; however, when considering the percentage
of SUV reduction, SUVBSAmax and SUVBWmax gave ident-
ical values and accuracies for EFS and OS prediction.

For all of the reasons discussed, it seems difficult to rely
on one single SUV at a given time point to appreciate the
therapeutic response and to predict outcome. Indeed, be-
cause a cutoff value for an absolute SUV can vary greatly
between different institutions (here, SUVBWmax of 5.0 on
PET2), the measurement of an interscan SUV reduction
within the same institution is probably a better and more
reproducible approach (here, a 65.7% SUVBWmax reduc-
tion). This is confirmed by the higher accuracy obtained
for EFS from ROC analysis with the second analysis, for
18F-FDG uptake change, over the first one.

One could regret that most patients were scanned on the
C-PET and few on the Gemini, which could introduce quantification bias. This limitation is due to the prospective
nature of our study, with subsequent evolution of the
technology. Even though the calibration factors could vary
slightly between scanners related to different attenuation
correction methods or reconstruction algorithms, univariate
analysis has proven that SUVs obtained from these 2
systems showed no statistical difference. Most important,
each patient had his or her 2 PET scans on the same
machine; therefore, the potential systemic bias could have
been eliminated by computing the SUVBWmax differences.

Another limitation of our study is the use of a post hoc
response criterion for SUV-based analysis (obtained from
the same patient population), instead of a predefined re-
response criterion, as we did for visual analysis.

It must be pointed out that in our study, when a lesion
different from the baseline tumor showed the most intense
activity on PET2, which happened in 17 patients (18% of
92), we used its SUV as the index of 18F-FDG uptake at
midtherapy. When only the change of SUVBWmax within
the initial tumor was considered in the analysis, more false-
negative scans were noted in predicting EFS. Indeed, in this
case the overall accuracy was slightly inferior (73.9% in-
stead of 76.1%).

FIGURE 3. A 25-y-old woman with bulky mediastinal uptake
on PET1 (A, anterior view), who was interpreted as positive
visually on PET2 (B, left anterior oblique view). Two residual foci
were diagnosed (arrows), scored as extent = 1, intensity = 1
for retrosternal site and extent = 2, intensity = 1 for left hilar
site. However, SUVBWmax reduction was measured at 80.7%—
that is, above the cutoff value of 65.7%, indicating good early
response. Patient remained in complete remission after 36 mo
of follow-up.

17.2 ± 9.7 reported by Schöder et al. in 63 patients with
aggressive lymphoma (43 new cases of disease) (30). Our
SUVs are relatively lower but appear more homogeneous
with regard to the lower SD. Variability in SUV measure-
ment can stem from many factors, including the imaging
delay after 18F-FDG injection, the partial-volume effect,
and the applied normalization scheme (17,22,31).

With regard to the imaging delay, we generally per-
formed image acquisition >60 min after injection, which is
considered the time required for the 18F-FDG uptake to
reach a plateau (16). Although the time interval varied
slightly between the C-PET and Gemini acquisitions for
logistics reasons inherent to a multicenter study, no scan
was performed earlier than 48 min.

The partial-volume effect is related primarily to the
limited spatial resolution of PET (32) and results in an
underestimation of 18F-FDG uptake in small lesions. Pre-
vious studies have shown that SUV measurement is more
reliable for an object with a diameter at least 2.5-fold
the PET intrinsic spatial resolution (31,32). For the same
reason, SUVmax is regarded as better than SUVmean as
a metabolic index, especially in small lesions (31). In our
study, SUVmax, normalized either to BW or to BSA,
demonstrated PPVs and accuracies for outcome prediction
that were superior to those of SUVmean and T/N ratio, and
we recommend the use of SUVmax. The method of ROI
definition may also have an impact on the partial-volume
effect: ROIs obtained from the PET activity profiles, as it
was done in our study, correspond most closely to the actual
tumor size (22). Moreover, we have investigated the differ-
ences in SUVs between PET-based and CT-based ROI
definitions on coregistered PET/CT images of a simple
phantom (a series of syringes of increasing diameters ranging
from 0.4 to 2.5 cm, filled with a homogenated 18F-FDG
solution) and showed that CT-based ROIs would not improve
SUV measurements (33).

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CONCLUSION

Our findings indicate the potential of improving the prognostic value of early 18F-FDG PET by using SUV-based rather than visual analysis in DLBCL. The optimal cutoff value for SUV\textsubscript{max} reduction from baseline to midtherapy is 65.7% for predicting EFS. This cutoff value, however, may require refinement under circumstances of different treatment regimens and in other histologic types of lymphomas (27), and we look forward for its application in other study groups. Potential implications for patient care will be to provide a more reproducible assessment of early PET studies and, eventually, to guide risk-adapted therapies.

ACKNOWLEDGMENTS

We are indebted to the entire team of the AP-HP PET Center at Tenon Hospital, Paris, for their help with C-PET imaging. Particular thanks go to Marie-Joséphine Waryn and Sébastien Mrozowicz for their collaborations in the phantom study, Julien-Aymeric Simonnet for his review of statistical analysis, and Marie-Claude Bassene and Antoine Allain for their help with database management. This study was supported by the Délégation à la Recherche Clinique de l’Assistance Publique-Hôpitaux de Paris (PHRC-AOM00152) and the Société Française de Radiologie.

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