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LETTER TO THE EDITOR

Brown adipose tissue activity on PET/CT and the course of Hodgkin lymphoma

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We read with great interest the article by Park et al. investigating the role of brown adipose tissue (BAT) activation in breast cancer patients and its association with survival outcomes (Park et al. 2023). This important study highlights the emerging role of BAT in oncological research. Their observations inspired us to investigate a similar association in the context of hematological malignancies, specifically Hodgkin lymphoma.

Unlike breast cancer, where the link between BAT activation and clinical outcomes has been explored, there remains a paucity of data regarding BAT's role in hematological cancers. To address this gap, we conducted a retrospective analysis of 157 Hodgkin lymphoma patients at our center, using [18 F]-FDG PET/CT imaging to assess BAT activation and its potential association with disease stage and metabolic response, as measured by Deauville scores. A nuclear medicine physician used an in-house software tool to reconstruct the PET images in three planes, both with and without attenuation correction. BAT was identified with densities ranging between −250 to -50 Hounsfield units on CT. Regions of interest were drawn around areas with higher FDG uptake than the surrounding soft tissue. The maximum standardized uptake value (SUVmax) and total metabolic activity (TMA) were recorded for all patients.

BAT activation was identified in 11 of 157 patients, a relatively low prevalence similar to the 2.0% BAT activation rate seen in the breast cancer cohort observed by Park et al. Although statistical analysis revealed no significant differences in SUVmax or TMA based on disease stage or Deauville scores (Table 1), we observed trends suggesting lower BAT metabolic activity in patients with a poor metabolic response (Deauville score≥4). Moreover, comparisons between disease stages 2 and 3–4 showed higher TMA in the more advanced stages, although these differences were not statistically significant. These findings raise intriguing questions about the role of BAT in lymphoma metabolism and immune response.

Several studies have explored the link between brown adipose tissue (BAT) activation and cancer. Higher BAT activity has been observed in patients with active cancer, particularly breast cancer, and it has been linked to a lower risk of metastasis and longer progression-free survival (Park et al. 2023; Bos et al. 2019; Huang et al. 2011; Cao et al. 2014; Steinberg et al. 2017). However, findings have been inconsistent, with some studies showing no significant correlation between cancer status and BAT activity or its impact on mortality (Eljalby et al. 2023).

We commend the efforts of Park et al. in elucidating the relationship between BAT activation and cancer progression, and we believe that further research into the role of BAT in hematological malignancies is warranted. Larger, multicenter studies with longer follow-up times and control for confounding variables such as BMI, medications, and seasonal temperature changes could provide more definitive insights (Santhanam et al. 2015). We hope our findings encourage further research into the potential role of BAT in lymphoma and other hematological malignancies.

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Table 1 Mann-Whitney U test for SUVmax and total metabolic activity significance between Deauville and disease stage groups

	n	Mean SUVmax	Mean TMA
Deauville Score	11	$p=0.497$	$p=0.776$
< 4	8	6.60 ± 4.96	25.55 ± 17.00
≥ 4	3	3.53 ± 0.50	21.19 ± 9.65
Cancer Stage	**15**	$p=0.391$	$p=0.270$
2	**10**	5.71 ± 4.47	27.11 ± 17.50
3 or 4	**5**	5.78 ± 2.27	49.40 ± 40.68

Abbreviation: SUVmax: Standardized Uptake Value Maximum, TMA: total metabolic activity

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Author contributions TT and HS conceptualized the study, SCB and OMA acquired the data, and TT and AUT analyzed and interpreted the data. HS, TT, and AUT drafted the initial manuscript, and SCB and OMA critically revised the draft. All authors approved the final version of the article and agreed to be held accountable for the work.

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Data availability Clinical data analyzed for our study can be requested upon contacting the corresponding author.

Declarations

Ethical approval Formal consent is not required for this retrospective study.

Competing interests The authors declare no competing interests.

Conflict of interest The authors have no conflicts of interest to declare.

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