

OBJECTIVES

Whether to perform routine bone-marrow biopsies (BMB) in the PET-CT era for Hodgkin lymphoma has lately come into question.

We performed a retrospective study of all HL patients treated at MDACC between April 1999 and March 2014. 187 eligible patients were identified.

Aims:

1. To determine degree of concordance between PET-CT and BMB in identifying bone marrow involvement.
2. To probe the prognostic significance of a positive BMB when PET scan is negative for bone involvement.

METHODS

Inclusion criteria:

- stage IV classical HL treated at MDACC between April 1999 and March 2014
 - Age \geq 15 years old
 - presence of pre-treatment PET/CT scan performed within 30-days of therapy initiation.
- Baseline PET-CT imaging and BMB pathology were reviewed.
 - Positive bone involvement on PET scan (PET+) was defined as increased uptake in the marrow with or without cortical erosion.
 - Cohen's kappa coefficient was used to measure agreement between PET and BMB in delineating BM involvement.
 - Relapse-free survival (RFS) and overall survival (OS) were assessed via Kaplan-Meier analysis. Comparisons were made by the log-rank test.

RESULTS

- Median age was 35 years (range: 15-86).
- 70 % of patients had nodular-sclerosing HL
- 57% had 2-3 extra-nodal sites of involvement
- 24.9% had a positive BMB while 46% were PET+.
- 95% received ABVD or an ABVD-like regimen (95%).

- The 5-year RFS and OS of the whole group was 75%, and 88%, respectively.
- Relapses occurred in 42 patients, eventually 21 died with disease.
- **Kappa coefficient** was computed to measure agreement between BMB and PET scan and was found to be **0.446**.
- This demonstrates intermediate concordance between the BMB and PET scan.

- Of the PET+ patients 31.35% had a negative BMB.
- 10.3% of patients with negative PET scan had a positive BMB.
- Among patients with negative PET scan for bone involvement, the 5-year relapse-free survival rate was significantly lower in the subgroup of patients with positive BMB (83.5% vs. 64%, $P=0.03$).

Table 1. Patient characteristics

Characteristics	Patient number/value
Median age, years (range)	35 (15-86)
Gender	
Female	109 (58%)
Male	78 (41.5%)
IPS	
1-2	66 (35.1%)
3	42 (22.3%)
>3	77 (41.0%)
Pathology	
NS	132 (70.2%)
Lymphocyte rich	30 (16%)
Other	25 (13.3%)
B symptoms +	115 (61.2%)
Chemotherapy	
ABVD/ABVD like	178 (94.7%)

Figure1. percentages of PET and BMB positivity

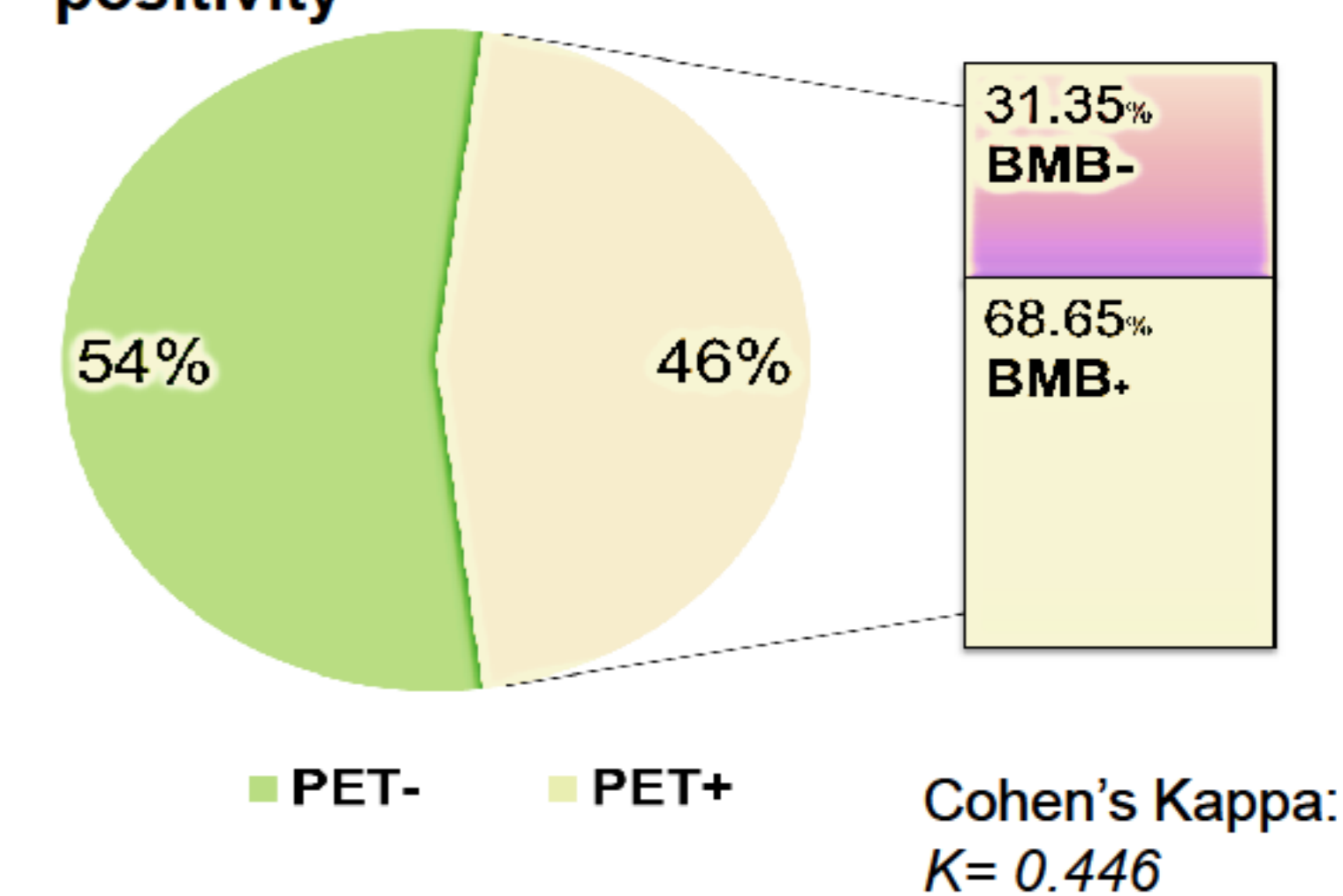


Figure2. Relapse Free survival for all patients

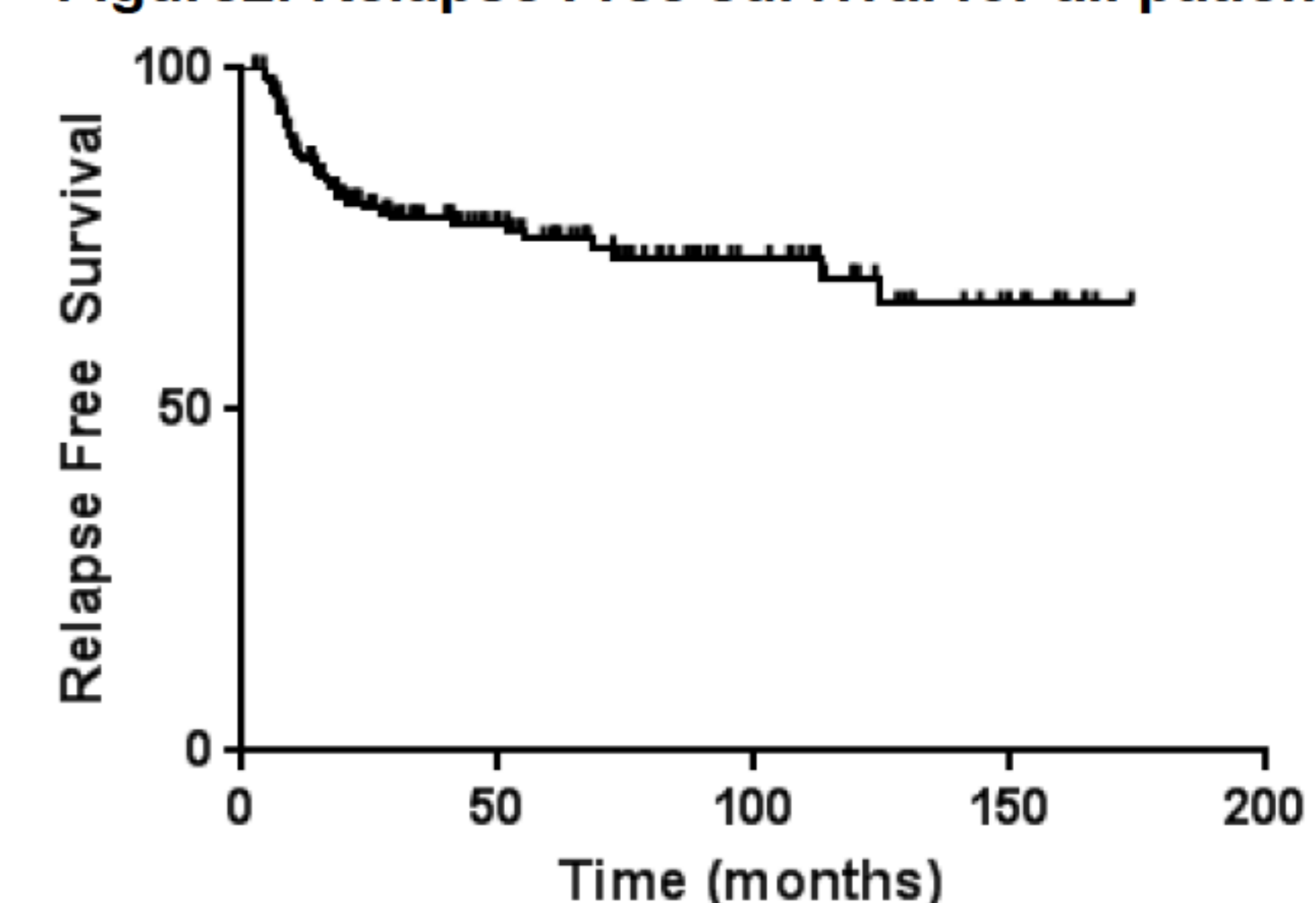


Figure3. Relapse free survival for patients with PET+ versus PET- Bone involvement at diagnosis

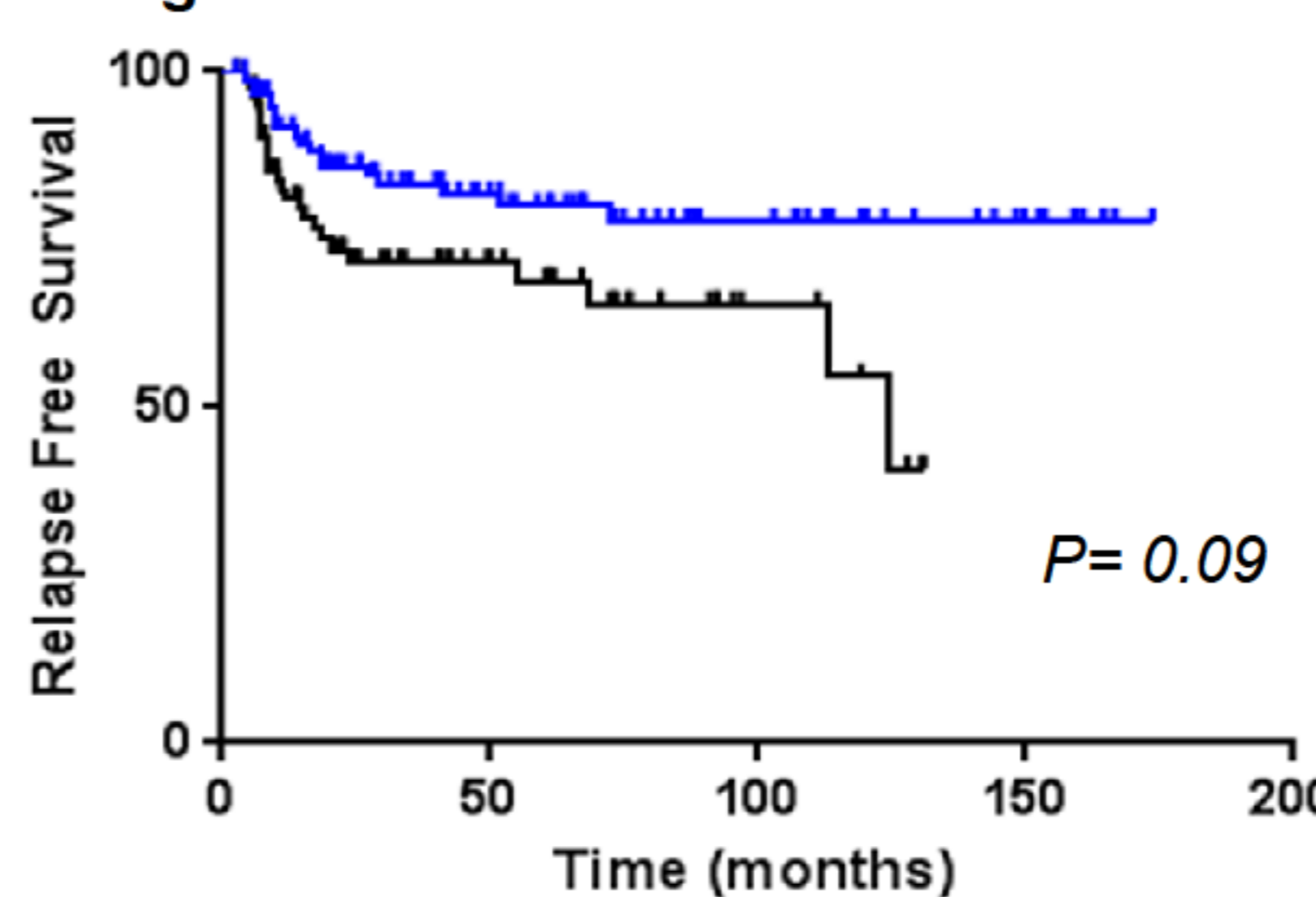
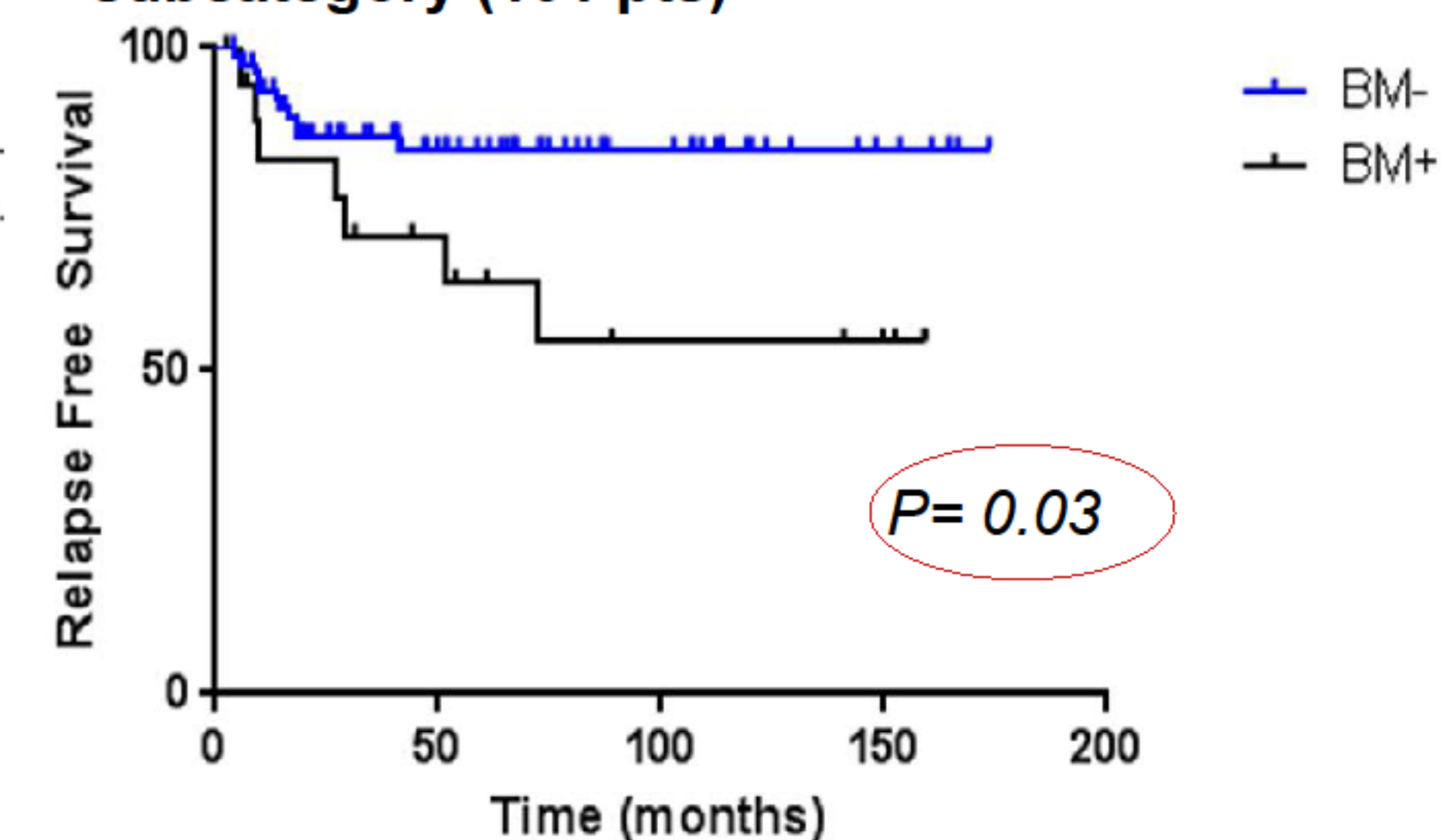


Figure4. Relapse free survival for patients with BMB+ (19 pts) versus BMB-(81 pts) in the PET-subcategory (101 pts)



CONCLUSIONS

- ❖ Our study validates prior reports in demonstrating higher sensitivity for PET scan than bone marrow biopsy in detecting bone marrow involvement in stage IV HL.
- ❖ There is a small subgroup with a negative PET for bone involvement but a positive BMB.
- ❖ Among patients with negative PET scans, those with a positive BMB had a significantly increased risk of relapse.
- ❖ Consequently, while BMB is unlikely to change management in stage IV disease, its continued may be of utility in predicting outcome.
- ❖ Future investigations may attempt to determine the target patient population that would most benefit from BMB in the setting of a negative PET scan.

