

Is Bone Marrow Biopsy Needed for Diagnosis of Acute Leukemia?



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INTRODUCTION

- Bone marrow examination is an important procedure for diagnosing acute leukemia (AL).
- At Siriraj hospital, both bone marrow aspiration (for smear interpretation and flow cytometry) and biopsy remain routine diagnostic procedures. The benefit of bone marrow biopsy (BMBx) in addition to bone marrow aspiration (BMA) for diagnosis of AL is unclear.
- This study aimed to determine the diagnostic concordance between BMA and BMBx and the added diagnostic benefit from bone marrow biopsy in cases of acute leukemia.

METHODS

- This study is a retrospective analysis that included patients diagnosed with acute leukemia who underwent both bone marrow aspiration and bone marrow biopsy.
- Data were collected from electronic medical records between 2013 and 2023.
- The types of acute leukemia were classified as acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL).

RESULTS

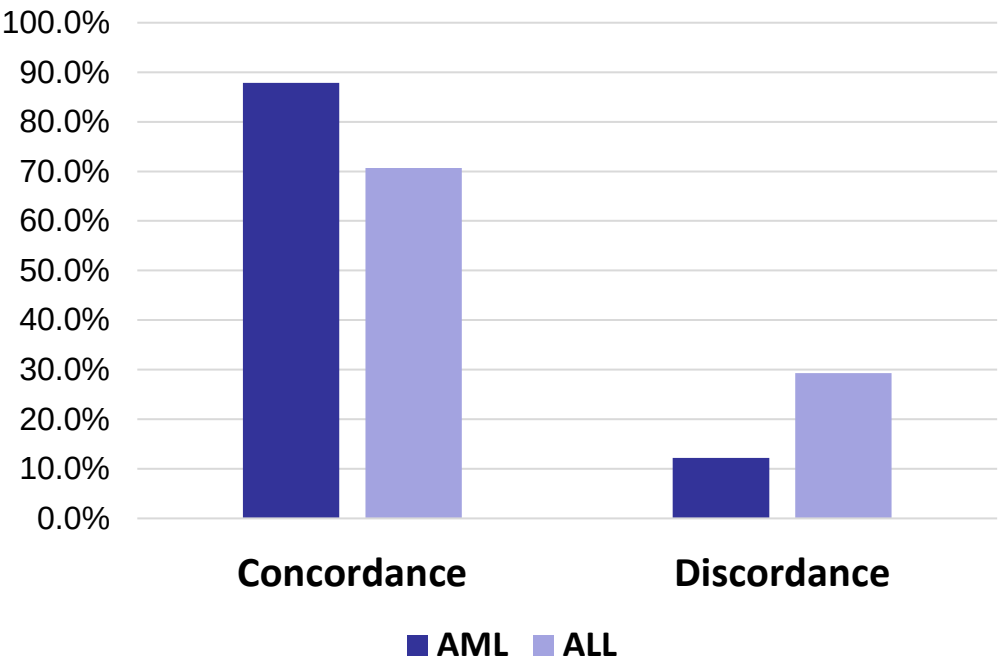
- The study included 281 cases of AL (148 cases of AML and 133 cases of ALL), with slightly higher proportion of males (51.6%). The median age was 50.1 years.
- Specimen quality of bone marrow aspiration specimens was evaluated. While most specimens showed good particle quality (77.2%), less common findings included clotted or fluid marrow (10.7%) and dry taps (12.1%).
- Diagnostic concordance between BMA and BMBx was observed in 79.9% of cases. AML has a high concordance rate with the final BMA diagnosis (87.8%). ALL has a lower concordance rate (70.7%), with a significant portion (21.8%) resulting in "inadequate specimen" results.
- BMBx added more data including the definite diagnosis, presence of myelofibrosis, and dysplastic feature in 23.1% of cases, especially in cases with dry tap from BMA (97%) or fluid/clotted marrow (43.3%) while additional benefit from BMBx was lowest in “good particle” group (8.8%).

Table1. Agreement between bone marrow aspiration and bone marrow biopsy

		Bone marrow biopsy				Total
		Acute leukemia	Acute leukemia + MDS/MF/other	Nondiagnostic	Not Acute leukemia	
Bone marrow aspiration	Acute leukemia	209	16	6	6	237
	Acute leukemia + MDS/other	3	0	0	0	3
	Nondiagnostic	25	12	0	0	27
	Not Acute leukemia	4	0	0	0	4
Total		241	28	6	6	281

MDS, Myelodysplastic; MF, myelofibrosis

Interpretation of BMA vs BMBx



CONCLUSIONS

- Bone marrow aspiration plays a highly sensitive role in the diagnosis of acute leukemia especially in AML.
- It showed 79.9% diagnostic concordance with bone marrow biopsy.
- Bone marrow biopsy is obviously beneficial in cases with dry tap or fluid marrow from bone marrow aspiration.