# The importance of measurable residual disease in acute myeloid leukemia during outpatient hematopoietic cell transplantation with reduced-intensity conditioning: data from a single center

MRD in AML during HSCT

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## ABSTRACT

**Background**. There is limited information on the association of measurable residual disease (MRD) in acute myeloid leukemia (AML) with relapse and survival after hematopoietic stem cell transplantation (HSCT) with reduced-intensity conditioning (RIC).

**Methods**: Retrospective study including 85 AML patients who received an HSCT from peripheral blood after RIC as outpatients. MRD was assessed by multiparametric flow cytometry (MFC) before and within 100 days after transplant.

## RESULTS

Pretransplant MRD was positive in 14 (16.47%) patients and in 12 (14.11%) afterwards. Following HSCT, 3 of 85 patients remained MRD-positive, 62 remained MRD-negative, 9 converted to MRD-positive, 11 to MRD-negative (p=0.001). After transplantation, 20 (23.5%) patients relapsed at 3 (2-46) months; before relapse, 8 were MRD-positive, 12 MRD-negative. Twenty-one (24.7%) patients died at 6 (1-28) months, 5 MRD-positive, 16 MRD-negative; 10 died from relapse, 8 of infection. Five-year OS (59.02%), relapse-free survival (RFS) (53.21%), cumulative incidence of relapse (CIR) (40.63%), and non-relapse mortality (NRM) (18.41%), were documented. Post-HSCT MRD-positive status (p=0.002), HSCT-specific comorbidity index ≥1 (p=0.028), mixed chimerism (p=0.029), were associated with lower RFS and higher CIR.

**Table 1. Measurable residual disease status before and after outpatient transplantation in 85 patients with acute myeloblastic leukemia after reduced-intensity conditioning.**

| MRD status | Relapse, (%) | p-value | Death, (%) | p-value | Relapse and death, (%) | p-value |
|---|---|---|---|---|---|---|
| **Pre-HSCT** | | 0.062 | | 0.016 | | 0.329 |
| **MRD (+), n=14** | 6 (42.85) | | 7 (50) | | 4 (66.66) | |
| **MRD (-), n=71** | 14 (19.71) | | 14 (19.71) | | 6 (42.85) | |
| **Post-HSCT** | | 0.001 | | 0.142 | | 0.999 |
| **MRD (+), n=12** | 8 (66.66) | | 5 (41.66) | | 4 (50) | |
| **MRD (-), n=73** | 12 (16.43) | | 16 (21.91) | | 6 (50) | |
| **MRD HSCT kinetics** | | 0.001 | | 0.061 | | 0.446 |
| **MRD (+/+), n=3** | 2 (66.66) | | 2 (66.66) | | 2 (100) | |
| **MRD (-/-), n=62** | 8 (12.90) | | 11 (17.74) | | 4 (50) | |
| **MRD (+/-), n=11** | 4 (36.36) | | 5 (45.45) | | 2 (50) | |
| **MRD (-/+), n=9** | 6 (66.66) | | 3 (33.33) | | 2 (33.33) | |

## CONCLUSION

Measurable residual disease monitoring by MFC before and after outpatient allografting using RIC in AML patients had significant associations with survival outcomes; a positive MRD status was associated with lower RFS and OS and higher CIR. The limitations of MFC MRD to predict relapse suggest the need to improve the assay, or adopting MRD testing by molecular methods.

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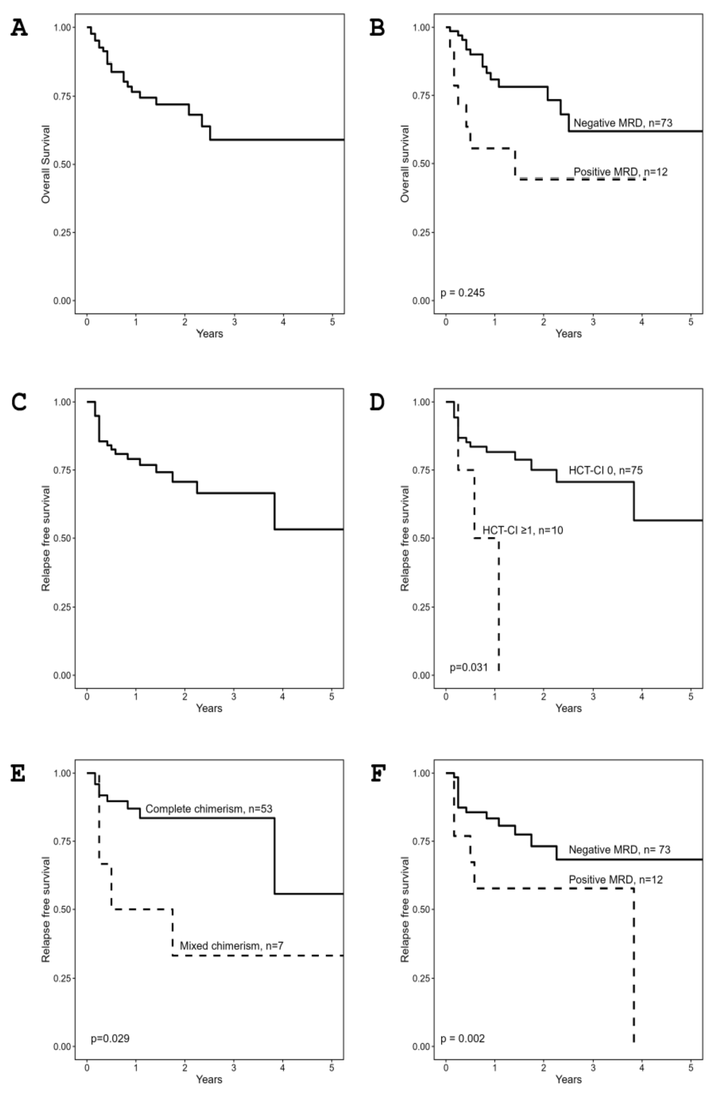


**Figure 1:** Five-year survival outcomes in 85 patients with acute myeloid leukemia after hematopoietic stem cell transplantation with reduced-intensity conditioning. A. Overall survival in the whole cohort, B. Overall survival according to measurable residual disease status after transplantation, C. Relapse-free survival in the whole cohort, D. Relapse-free survival according to HCT-CI score. E. Relapse-free survival according to chimerism status, F. Relapse-free survival according to measurable residual disease status after transplantation