Supplementary methods:

1. MRD-directed DLI after haplo-HSCT

Post-transplantation immunesuppression was immediately tapered and then discontinued in subjects who were MRD positive ≤100 d after transplantation. Subjects who were MRD positive >100 d after transplantation had immunesuppression immediately discontinued. G-CSF-mobilized leukocyte cells were administered instead of the more common unstimulated donor blood lymphocytes. The initial dose of mononucleated cells (MNCs) for DLI and the dose of cells for repetitive infusion were 1.0-2.0×10^8 MNCs/kg. Patients received antileukemic chemotherapy 48–72 h before DLI. For patients who were MRD positive 1 month after DLI, second DLI was administered 3 or 6 months after the first DLI for those without or with GVHD, respectively. Patients received cyclosporine A (CsA) to prevent GVHD after DLI for 6–8 weeks. The starting dosage of CsA was 2.5 mg/kg/d, which was adjusted to maintain a plasma concentration >100 ng/mL.

2. Immunosuppressive thearpies after haplo-HSCT

All patients received CsA, mycophenolate mofetil (MMF) and short-term methotrexate (MTX) for graft-versus-host disease (GVHD) prophylaxis. CsA (2.5 mg/kg, q12h, intravenous [i.v.]) was used from day –9, of which the trough concentration was adjusted to 150–250 ng/mL. It was switched to oral administration when the patient's bowel function returned to normal. For the patients without GVHD after haplo-HSCT, CsA was tapered since 6 months after haplo-HSCT and discontinued 9–12 months after haplo-HSCT. From day –9, 0.25–0.5 g of MMF was administered orally every 12 h, then it was tapered to half until day +60 and was discontinued thereafter. Following graft infusion, a dose of 15 mg/m^2 of MTX was administered i.v. on day +1, as well as a dose of 10 mg/m^2 on days +3, +6 and +11.