actual incidence is not clear. In addition, lymphocyte subsets at presentation have not been investigated so far in HLH. Hence, we decided to retrospectively analyze lymphocyte subsets and quantitative immunoglobulin levels in additional to traditional diagnostic markers at presentation in patients with HLH.

Methods: We retrospectively analyzed the medical records of patients who received a diagnosis of HLH at our institution, believed to be familial or secondary HLH. Patients with SAP deficiency were excluded as hypogammaglobulinemia is a known association. Patients who had received HLH therapy prior to evaluation of lymphocyte subsets and immunoglobulin levels were also excluded from the analysis. Data at presentation was evaluable in 35 patients.

Results: Of the 35 patients, 26 had familial HLH and 9 had secondary HLH. 25 patients underwent allogeneic HSCT. Seven died secondary to complications post HSCT and 1 patient died prior to HSCT from refractory HLH. Identifiable genetic mutations associated with HLH were found in 20 patients. Analysis of their immune phenotype in additional to the diagnostic criteria revealed the following: 19(54%) had B-cell lymphopenia, including 7(20%) who had both T-cell and B-lymphopenia. 3(8%) patients had T-cell lymphopenia. Even in patients with B and T cell lymphopenia, the B-cell lymphopenia was proportionately lower. Hypogammaglobulinemia (low IgG levels) was seen in 4 patients.

Discussion: Although we noted hypogammoglobulinemia in a few patients, the predominant finding was the high incidence of B-cell lymphopenia. Interestingly, B-cell lymphopenia and hypogammaglobulinemia have also been noted perforin deficient mice with HLH at our institution (unpublished data). In conclusion, this study suggests that B-cell lymphopenia can serve as a surrogate marker for the diagnosis of HLH.

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Reduced-Intensity Conditioning and Umbilical Cord Blood Transplantation in Children. Experience of a Pediatric Hospital in Colombia

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Umbilical cord blood (UCB) has been shown to contain sufficient progenitor cells to provide durable engraftment in children, and it provides an alternative stem cell source for patients without matched related or unrelated donors.

We describe the preliminary results of a cohort of 16 pediatric patients with a median age of 9 years (range 3 -18) with haematological malignancies undergoing to a unrelated umbilical cord blood transplant with a reduced-intensity conditioning regimen of fludarabine, melphalan, and antithymocyte globulin.

All patients achieved hematologic recovery, the median time to an absolute neutrophil count $> 0.5 \times 10^9$/L was 20 days, and the median time to an unsupported platelet count $> 20 \times 10^9$/L was 32 days. Acute graft-versus-host disease (GVHD) grade III-IV occurred in 37,5% of patients. The 100-day TRM was 25%, and the 1 -year disease-free survival was 58%.

Our findings support the use of reduced-intensity regimen in pediatric patients with hematologic malignancies, however the incidence of acute GVHD is a little higher than that reported in other series so a better strategy for prophylaxis against acute GVHD should be implemented.

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T-Cell-Replete Haploidentical Stem Cell Transplantation with Post-Transplant Cyclophosphamide for Patients with X-Linked Adrenoleukodystrophy: An Immediate Choice for an Urgent Situation

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X-linked adrenoleukodystrophy (X-ALD) is a demyelinating disease caused by the deficiency of the ABCD1 gene that encodes for a peroxisomal protein membrane. The most severe form of X-ALD is the cerebral variant, which leads to severe disability and death during the first two decades. To date, allogeneic hematopoietic stem cell transplantation (HSCT) is the only treatment that has shown to significantly change the natural history of the disease, enhancing survival and stabilizing neurological lesions and symptoms. In the absence of a matched sibling or unrelated donor, haploidentical family members might be an option in these rapidly progressing diseases. Haploidentical HSCT has been performed using a T cell depleted graft, but is often associated with higher rates of graft failure and delayed immune reconstitution. Haploidentical HSCT using post-transplant cyclophosphamide has been performed in series of malignant and non-malignant diseases and has shown similar outcomes compared to other alternative donor sources. Here we show our experience with 8 patients with X-ALD treated with haploidentical HSCT with post-transplant cyclophosphamide. Between november 2012 and august 2013, 8 patients with X-ALD (ages 6 to 18 years) underwent haploidentical related HSCT in two different institutions, two patients received two transplants with different related donors. One patient received a second transplant after failure of a double cord blood transplant. Pre-transplant MRI showed Loes score of 2,5 to 18, all patients had neuropsychological evaluation with performance IQ above 90. Donor was the father (n=7), the uncle (n=2) or brother (n=1). All patients received reduced toxicity conditioning regimen consisted of: fludarabine 150 mg/m^2, cyclophosphamide 29 mg/kg and total body irradiation 2 Gy. Six patients received also rabbit antithymocyte globulin 4,5 mg/kg. GVHD prophylaxis consisted of cyclophosphamide 50 mg/kg/d on days +3 and +4, tacrolimus and mycophenolate mofetil starting on day +5. Seven patients engrafted, 13 to 19 days after transplant. One patient had a primary graft failure and was not eligible for a second transplant due to severe progression of neurological symptoms. Two patients had secondary graft failure with progressive loss of donor chimerism and were successfully rescued with second haploidentical transplants using different related donors. Four patients had grade II-IV acute graft-versus-host disease and four patients had CMV reactivations. One patient with grade III GVHD showed progression of neurologic symptoms of primary disease. Seven patients are alive and engrafted from 3 to 11 months after

transplant, with chimerism from 80 to 100% donor cells. In conclusion, haploidentical HSCT with post-transplant cyclophosphamide is a feasible alternative for X-ALD lacking a suitable matched donor. Graft failure is still an obstacle that has to be better prevented.

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Busulfan, Melphalan, and Thiotepa Conditioning for Allogeneic Hematopoietic Stem Cell Transplantation (HSCT) of Pediatric Patients with Acute Leukemia and Central Nervous System (CNS) Disease

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The standard of care for the transplantation of pediatric patients with acute leukemia and prior CNS disease is the use of total body irradiation (TBI), plus a CNS radiation therapy (RT) boost. However, the late effects of radiation can be prohibitive, especially in younger children or those who have previously received radiation therapy. We developed a chemotherapy-only cytoreductive regimen with the intent of targeting the CNS with agents that can readily cross the blood brain barrier and achieve high concentrations. We used the combination of Busulfan (1mg/kg every 6 hours x 3 days), melphalan (50mg/m^2/day x 2 days), and thiotepa IV (8.3mg/kg/day or 250mg/m^2/day x 2 days).

We treated six patients with acute myelogenous leukemia (AML (N=5) or acute lymphoblastic leukemia (ALL) with this regimen from July 1999 and February 2013. The median age at the time of HSCT was 2.8 years (range 1.7 to 13.4 years). Patients were in complete CNS remission (CR) CR1 (N=1), CR2 (N=3), CR3 (N=1), and CR8 (N=1). All six patients were treated with multiple intrathecal chemotherapy agents prior to transplant. Four of six patients received cranio-spinal radiation therapy (RT) prior to HSCT; RT was required to achieve a CNS CR in 3 of 4 of these patients. One patient received CNS RT post HSCT, while one patient was completely spared CNS RT.

Donors and grafts included unrelated mismatched umbilical double cord transplants (N=4) and matched related T-cell depleted bone marrow transplants (N=2). All six patients engrafted. One patient succumbed to infectious complications nearly 2 months post HSCT. The five other patients are still alive without marrow or CNS relapse at a median follow-up of 19.4 months post HSCT (range: 11.1 to 149.5 months) . While this represents a small patient series, this data provides evidence for a promising transplant chemotherapy-only regimen for the transplantation of pediatric patients with acute leukemia and CNS disease who are unable to receive TBI, and will be the focus of a larger prospective study.

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Acute Graft Versus Host Disease Following Sibling Donor Transplantation for Thalassemia Major

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Acute GVHD (aGVHD) remains a major challenge in allogeneic stem cell transplantation and is associated with significant morbidity. Though it is associated with a graft versus leukemia effect in SCT for malignant disorders, it has no benefit in SCT for non-malignant disorders such as thalassemia major.

This is a retrospective analysis of 321 patients who underwent allogeneic SCT for Thalassemia Major at our centre between Jan 1991 and Dec 2011. This included 205 males and 116 females with a median age of 7 years (range: 2 - 24). Patients who expired prior to 2 weeks or had primary graft rejection were excluded from this analysis. 6.9% of patients were in Lucarelli Class I, 36.4% in Class II, and 56.7% in Class III. Donors included matched sibling (n = 299) or other family donors (n = 22). Conditioning regimen was predominantly Busulfan based (n = 274) while 47 patients received treosulfan based conditioning. Graft source was mainly bone marrow (n = 286) while GVHD prophylaxis mainly was Cyclosporine with short course methotrexate (n = 301).

Acute GVHD (Grade I – IV) occurred in 125 patients (38.9%), grade II-IV in 28% and grade IV in 5.3%. Donor age ($p = 0.062$), type of conditioning regimen ($p = 0.07$), number of doses of methotrexate administered ($p = 0.05$), presence of veno-occlusive disease (VOD) [$p = 0.016$] and time to neutrophil engraftment ($p = 0.027$) were found to be significant risk factors for acute GVHD on a univariate analysis but only VOD ($p = 0.017$) and donor age ($p = 0.044$) remained significant on multivariate analysis. Resolution of GVHD was seen in 90.4% while 9.6% died either due to GVHD or infection. The 3 year overall survival was 80% ± 2.3% in patients with GVHD compared to 81.1% ± 2.9% in patients without GVHD ($p = 0.422$).

Acute GVHD is seen in 39% of patients undergoing SCT for thalassemia major but it does not have a significant impact on overall survival.

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Hemorrhagic Cystitis Following Hematopoietic Stem Cell Transplants in Children: Single Center Experience

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Background: Hemorrhagic cystitis (HC) is a fairly common and potentially severe complication observed after hematopoietic Stem cell transplantation (HSCT) which may result in morbidity and extended hospitalization. Its incidence in pediatric patients is unknown.

Methods: We performed a retrospective study on 900 pediatric patients who received HSCT after myeloablative or reduced intensity conditioning during 1992 – 2011 in our center. In all, sixty patients (43 male &17 female) developed HC: early in 35 patients and late in 25 patients. Median age of patients was 9.19years (range: 2-15). Major thaassemia (45%) and ALL (18.30%) were most common cause of transplantation. Patients received transplant from matched donor (n=45), 2 locus mismatched (n=8) and HLA-haploidentical (n=7). The source of stem cell were peripheral blood (n=40), bone marrow (n=15) and cord blood (n=5). Majority of patient (83.3%) received BU/CY conditioning regiment.

Results: The prevalence of HC was 6.7% in our patients who all of them had received allogenic HSCT. 4 patients had pervious history of HC. Acute graft versus host disease (GvHD) occurred in 46(76.7%) patients. There was no significant correlation between the grade of acute GvHD and