fared well (4/7 with DLBCL and 2/3 other B-cell lymphomas and 2/2 other T-cell lymphomas are alive and disease free). Patients in CR or PR had a better OS (18/23) compared with those patients with persistent or progressive disease at time of transplant (0/5). 11/29 patients died (9 from relapse and 2 from treatment related mortality).

Conclusions: HSCT offers the possibility of cure for patients with NHL, especially for patients with ALCL and for those patients that have a good response to re-induction therapy prior to transplant. Relapsed disease post-transplant remains a major challenge for patients with LL and for patients transplanted with non-responsive disease. Post transplant therapies to target residual disease should be evaluated in these patients.

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The Clinical Significance of Non-Tuberculosis Mycobacterium (NTM) Infection in Pediatric Hematopoietic Cell Transplant (HCT) Recipients

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Introduction: Infections with NTM species are reported in immunocompromised patients (pts) post-HCT with little information on associated risk factors. In HIV+ pts, routine prophylaxis is indicated for those with CD4 counts of 100-200cells/uL. We hypothesize CD4 counts ≤200 as a possible risk factor for development of NTM infection in the pediatric alloHCT setting. We report our center's experience with NTM infections to help identify risk factors, clinical significance and need for prophylactic therapy.

Methods: Pts ≤21 years undergoing HCT from 2001 to 2014 were included. Definition of NTM infection: Positive culture for NTM species in blood, cerebrospinal fluid (CSF), lungs, BM or tissue. Only pts with *Mycobacterium Avium Complex* (MAC) infection were included. Controls (n=19) were identified by matching age, gender, and underlying disease. Descriptive statistics was calculated and comparison between 2 groups was carried with t-test for continuous variables and Fisher exact test for categorical variables.

Results: Of 272 pts undergoing HCT, NTM was diagnosed in 11 pts with 17 HCT (autologous=1; allogeneic=16) performed among these pts. Indications for HCT: malignant=6 (55%), non-malignant=5 (45%). Donor sources: sibling BM (n=3), sibling PB (n=2), unrelated PB (n=3) unrelated BM (n=3), or unrelated UCB (n=5). Conditioning regimens: myeloablative (n=7), non-myeloablative (n=6), no conditioning (n=3). Pts had MAC isolated from the following sites: lungs (n=5), CSF (n=1), BM (n=2), lymph node (n=1), and blood (n=3). Median date from HCT to NTM diagnosis was 233 days (range: 15 to 724 days). Mean absolute CD4 count at diagnosis was 137 +/- 143 cells/uL (1 unreported). All pts began therapy with azithromycin, ethambutol, and rifabutin/rifampin. Additive therapy included levofloxacin (n=3), imipenem (n=1), amikacin (n=3), and gatifloxacin (n=1). Treatment duration ranged from 53-459 days. Eight of 11 pts had graft-vs-host disease (GVHD) with 75% (n=6) diagnosed prior to the onset of NTM. Overall survival was 73%(n=8). Causes of death were: complications due to NTM, progressive underlying disease, and pulmonary failure secondary to chronic GVHD. Of the 8 surviving pts, 1 had recurrence, 5 cleared the infection, and 2 are in treatment.

No statistically significant risk factors for NTM were found, including presence of GVHD, CD4 count at diagnosis, CMV viremia, or donor source. Similar results were obtained when not controlling for these variables. No statistically significant difference was found between pts who developed MAC infections and those that did not.

Discussion: These results were unable to identify low CD4 counts as a potential risk factor for NTM necessitating the need for multicenter collaborations. NTM appears to be a treatable disease, with the role of prophylaxis unclear. With the extensive treatment duration, healthcare utilization costs should also be evaluated.

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Hematopoietic Stem Cell Transplantation for Children Acute Myeloid Leukemia, a Single Center Experience

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Hematopoietic Stem Cell Transplantation (HSCT) plays an important role in the treatment of children with Acute Myeloid Leukemia (AML). Match related donor (MRD) and Unrelated Cord Blood Transplantation (UCBT) for patients who lack a sibling donor are the options of HSCT in our unit. UCB offers the advantage of faster availability of banked cryopreserved UCB units compared with unrelated bone marrow grafts with similar results in survival. We report our results of HSCT for AML. We analyzed 28 children receiving allogeneic HSCT for AML, 17 UCBT and 11 HSCT from a MRD. Cord blood units were selected with 1 or 2 HLA mismatch; reduce intensity conditioning (RIC) in all except two UCBT consists of fludaradine and melphalan. Conditioning for MRD HSCT consists of BU16/Cy120. Graft vs host disease prophylaxis with cyclosporine/MTX for MRD HSCT and cyclosporine/MMF o cyclosporine/methylprednisolone for UCBT. Average for neutrophil recovery in UCBT and MRD HSCT was 21 and 19 days respectively, average for platelet recovery in UCBT and MRD HSCT was 34 and 23 days respectively. Transplant related mortality in UCBT and MRD HSCT 18% and 17% respectively, causes of death were relapse(5=29%) grade IV hepatic graft versus host disease(2) and bacterial sepsis(1) for UCBT, causes of death in MRD HSCT were relapse (1=9%) cerebral infarction(1) and chronic graft versus host disease(1). With a median follow up of 1 year, overall survival for entire cohort was 60.7%, overall survival for UCBT was 52.9% and 72.7% for MRD HSCT (p=0.25). Despite being few patients these results show no significant difference in overall survival between related donors and unrelated cord blood. RIC with fludarabine and melphalan is a promising alternative in children; it shows an acceptable relapse rate compared with other more toxic conditionings.

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Serotherapy with Alemtuzumab but Not ATG Is Associated with Increased Adenovirus Infection in Pediatric Recipients of Cord Blood Grafts

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Table 1

	No serotherapy	ATG	Alemtuzumab	p value
ADV	5.8 (0-16.9)%	0 %	29.3 (5.1-53.5)%	0.056
CMV	5.8 (0-16.9)%	20 (0-44.8)%	34 (9.7-58.3)%	0.08
EBV	5.8 (0-16.9)%	18.2 (0-40.5)%	0%	.25

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Unrelated cord blood transplant (UCBT) is an established graft source for HSCT especially for minorities. Use of serotherapy such as anti-thymocyte globulin (ATG) and alemtuzumab is associated with delayed immune reconstitution, leading to increased viral reactivation especially when the donors are virus naïve. Therefore, we studied the impact of serotherapy along with other factors on viral reactivation (EBV, CMV, adenovirus (ADV)), GVHD, and transplant-related mortality (TRM) at 100 days in pediatric patients after UCBT. Statistics used were chi-squared test, and Kaplan-Meier cumulative incidence (CI) with log-rank. For CI of viral reactivation, patients were censored if they died or reached day 100 before viral reactivation. All patients had weekly GVHD grading using Glucksberg criteria and weekly PCR for the 3 viruses. Reactivation was defined as blood viral PCR>1000 copies/ml. This retrospective study evaluated 47 consecutive UCBTs performed from 2006-2014. Median age was 3 years (range 0-17). Diagnoses: leukemia (19), immunodeficiency (10), hemoglobinopathy (7), bone marrow failure (6), metabolic disorder (3), andhistiocytic disorder (2). 21 patients received myeloablative conditioning (MAC) and 26 reduced-intensity conditioning (RIC). Median degree of HLA matching was 5/6 (4-6/6). Pre-transplant serotherapy was used in 30 patients (15alemtuzumab, 15 ATG) irrespective of HLA matching. Median cell dose was $6.15x10^7$($0.9–18.9x10^7$) TNC/kg. Among all variables evaluated, underlying diagnosis was the only one associated with development of $\geq$ grade 2 acute GVHD, occurring predominantly in leukemia patients ($p=0.048$). For viral reactivation, the conditioning regimen influenced CMV reactivation, with significantly more CMV reactivations in MAC recipients ($p = 0.044$), and more EBV reactivations in RIC recipients ($p = 0.046$). Conditioning regimen did not influence ADV reactivation. For ADV, only the type of serotherapy had a strong association with reactivation, with more ADV infections in patients who received alemtuzumab ($p = 0.044$). No variable had a relationship with TRM. We then explored the day 100 CI of viral reactivation, by type of serotherapy (Table 1). There was a trend towards higher CI of ADV reactivation in patients who received alemtuzumab. We conclude that in pediatric UCBT patients, while the impact of serotherapy on acute GVHD is unclear, it does have a major impact on viral reactivation. Specifically, alemtuzumab appears to have more impact on ADV reactivation than ATG. While further data will be collected on the morbidity and mortality associated with these infections, novel therapies to treat viruses in the context of serotherapy-treated UCBT recipients are needed.

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Targeted Next-Generation Sequencing Panel for Clinical Diagnostic in Inherited Bone Marrow Failure Syndromes Benefit for Pediatric HSCT

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Objective: Inherited bone marrow failure syndromes (IBMFS) are a heterogeneous group of genetic disorders characterized by bone marrow failure, congenital anomalies, and an increased risk of malignant disease. Because of phenotypic variability, diagnosis can be challenging for clinicians. This study is aimed to develop a targeted panel-based Next Generation Sequencing (NGS) pipeline to clinical diagnosis in IBMFS patients.
Method: Agilent Haloplex method was used for target capture the IBMFS Library of known genes and related genes, Illumina platform was used for high-throughput sequencing, sequencing data was aligned by NextGENe® software, the variants were filtered and interpretation by the online tool Ingenuity Variant Analysis, and Sanger sequencing was used to confirm the variations. 21 patients with suspected IBMFS were studied and DNA from members of each pedigree were collected for this study.
Results: More than 95% of the sequencing reads aligned to human genome reference sequence and more than 85% of the reads are in the target sequence. The 20× coverage area is >95% and the uniformity is >85%. Of the 21 patients with suspected IBMFS, pathogenic mutations have been identified in 12 patients, including 6 cases with Fanconi anemia (FA), 2 cases of Dyskeratosis congenital (DC), 2 cases of Severe congenital neutropenia (SCN), 1 case of Diamond-Blackfan anemia (DBA), and 1 case of Shwachman-Diamond syndrome (SDS). After hematopoietic stem cell transplantation, 5 patients were successfully cured. Prenatal diagnosis has been successfully performed in 3 families.
Conclusion: This study successfully established the target panel sequencing method to molecular diagnosis of IBMFS. The clinical results showed that our method can effectively detect and identify pathogenic genes in monogenic disorders and to provide a strong basis for completely cure and prenatal diagnosis, because the efficiency of captured target region is excellent, the quality of sequencing data is reliable, and the analysis by the bioinformatics software is very comprehensive.

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Upfront Alternate Donor HSCT for Children with Severe Aplastic Anemia: A Single Center Prospective Clinical Trail Outcome

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