any similar units in the public sector. And of course, the key to success of any HSCT Centre is good team work. We hope more such units are developed with a similar public private partnership, so that no child in need of HSCT is turned away for want of funds.

**SCT-1_V1.6**

**A SINGLE CENTRE STUDY ON THE VARIABLES AFFECTING OUTCOME OF PICU ADMISSIONS IN CHILDREN UNDERGOING HAEMATOPOIETIC STEM CELL TRANSPLANTATION (HSCT)**

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**Background:** Regimen related toxicities form the major causes of transplant related morbidity and mortality and have a major impact on the outcome in children undergoing haematopoietic stem cell transplantation (HSCT). Severe toxicity involving one organ or involvement of multiple organs predicts a poor response. There is limited data from our country on treatment outcomes of children undergoing HSCT requiring intensive care support. In view of the high cost of supportive care, we aimed to analyse the impact of aggressive paediatric intensive care unit (PICU) support in these children.

**Patients and methods:** Data on all the PICU admissions among children <18 years of age who underwent HSCT over 3 years from August 2013 to August 2016 at Apollo Speciality hospital, Chennai was collected by retrospective analysis of the hospital records including case files and discharge or death summaries of patients. The risk factors analysed were

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<th>TYPE OF DISEASE</th>
<th>BENIGN VERSUS MALIGNANT</th>
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<td>SOURCE OF GRAFT</td>
<td>RELATED VERSUS UNRELATED</td>
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<td>GRAFT VERSUS HOST</td>
<td>PRESENT OR ABSENT</td>
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<tr>
<td>REASON FOR ADMISSION</td>
<td>SEPSIS, CNS, GASTROINTESTINAL, LIVER, RENAL, COAGULOPATHY</td>
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**Results:** Of the total 238 paediatric transplants during the study duration, 72 children (30%) required PICU admission at a mean post infusion day of D+5. About 30% of the children had been transplanted for malignancies and 70% were benign with primary immune deficiency disorders requiring maximum PICU care. Sibling graft was used in 59% and unrelated graft in 41% of children. One-third of children had acute GVHD at the time of admission. The most common indication for PICU care was septic shock with 48% of children. Seizures contributed to 22% and respiratory distress in 23.3%. Of the children who had sepsis, the gastrointestinal tract was the focus in 29.7% and lungs in 43%. The incidence of various organ dysfunctions in our cohort of patients included 73% hepatic involvement, 67% renal dysfunction, 56% gut involvement, 44% with coagulopathy and 43% CNS involvement. When the mortality data was analysed, there was a trend towards higher mortality in the PID group as these children had previously been treated in intensive care units for various infections with multiple antibiotics. The mortality was higher in unrelated at 50% as compared to sibling at 27%. The presence of graft versus host disease did not have an effect on outcome. Sepsis with liver or renal dysfunction carried a high mortality.

**Conclusions:** The overall mortality was 40% with bacterial sepsis with septic shock and multi-organ dysfunction syndrome being the most common cause of early transplant related mortality. The presence of one or more organ dysfunction, especially hepatic or renal, was a predictor of poor outcome. The mortality rates were higher in unrelated or mismatched grafts. However, about 60% of the children could be salvaged with PICU support and all children undergoing HSCT must be cared for in harmony with the PICU team.

**SCT-1_V1.7**

**TURNING WEAKNESS TO STRENGTH – LESSONS LEARNT IN DELIVERING CURE FOR PRIMARY IMMUNE DEFICIENCY DISORDERS**

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**Aim:** Haematopoietic stem cell transplantation (HSCT) is the only form of cure in children with primary immune deficiency disorders (PIDs). There is very little data to find predictors of morbidity and mortality from our country. We aimed to analyse information could translate into early
intervention in order to improve outcome and survival for this rare group of disorders.

**Patients and methods:** All children less than 18 years of age with PIDs who were transplanted at Apollo Specialty Cancer Hospital, Chennai from 2008 to 2016 were included in the study. Each of the PIDs were analyzed in terms of the type of graft used, conditioning regimen, their rates of engraftment, presence of co-morbidities at the time of HSCT, propensity for GVHD and causes of mortality.

**Results:** A total of 62 PID transplants have been performed at our centre of which 37 were T cell defects, 3 B cell defects, 11 Phagocytic defects, 10 primary Haemophagocytic Lymphohistiocytosis (HLH), 2 Mendelian susceptibility to Mycobacterial Disease (MSMD). Haplodidentical HSCT was offered in 13 children. The conditioning regimen was myeloablative in children with Wiskott Aldrich Syndrome (WAS), Hyper IgM, and Chronic Granulomatous Disease (CGD) with fludarabine and busulphan. All children with Severe Combined Immune Deficiency (SCID), Haemophagocytic Lymphohistiocytosis (HLH), Common Variable Immune Deficiency (CVID), Leucocyte Adhesion Defect (LAD) were treated with a reduced intensity conditioning using fludarabine and treosulphan. All haplodidentical transplantation were done based on the same reduced intensity protocol with post transplant cyclophosphamide.

Co-morbidities at the time of HSCT namely infections, disseminated BCG infection and failure to thrive was noted in 62.5% of the SCID babies. All children with WAS and Hyper IgM syndrome had eczema, bloody diarrhea or pneumonia and refractory immune cytopenias. Children with CGD had previous fungal granulomas or tuberculosis, children with CVID had bronchiectasis and children with LAD had non-healing ulcers. Among children with SCID, most common cause of death was bacterial sepsis whilst children with WAS died due to pulmonary haemorrhage associated with immune cytopenias. Among those with HLH, 1 died of immune haemolysis and the other 2 who were less than 6 months of age died of pulmonary haemorrhage. Graft versus host disease (GVHD) was the cause of death in 2 children and late cytomegaloviral (CMV) infection resulted in death in 3 children. Primary graft failure was seen in 2 children resulting in an overall survival rate among all children with PIDs of 62%.

**Conclusion:** This is the first series in India with survival rates of 62% in children with Primary Immune Deficiency Disorders. Conditioning regimens need to be chosen based on the genotype of an individual child. The pre-engraftment phase is critical in babies with SCID due to maximum mortality risk due to bacterial sepsis during this phase. Wiskott-Aldrich syndrome poses unique challenges due to immune dysregulation and these children need to be monitored for late immune cytopenias affecting mortality in over 50%. GVHD is a predominant problem in children with CGD with a risk of 80%. In children with primary HLH and less than 6 months of age, acute pulmonary haemorrhage is a risk factor affecting mortality. In all these children, CMV viral load needs to be monitored and treated early. Haploidentical HSCT is a feasible option in children with no matched family donors with success rates on par with unrelated donor HSCT.

**SCT-1_V1.8 ALLOGENIC HEMATOPOEITIC STEM CELL TRANSPLANT FOR HIGH RISK ACUTE PEDIATRIC LEUKEMIA: SINGLE CENTER EXPERIENCE**

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**Objectives:** Aim of the study is to analyze retrospectively the outcome of allogeneic hematopoietic stem cell transplant (HSCT) for High Risk Acute Pediatric Leukemia.

**Methods:** Retrospective data was analyzed for patient who underwent allogeneic HSCT at our center from January 2008 to June 2016. After a signed informed consent a total of 42 transplants were done for 41 patients; Median age was 16 years (range 3-21). The diagnosis was: acute lymphoblastic leukemia in 26(63%) patients, acute myeloid leukemia 14(34%), and Acute Promyelocytic Leukemia in one. 33% were in first remission (CR1), 40% in second (CR2), and 27 % in third or with refractory disease (CR3). Transplant type: MSD-30; Haploidentical HSCT-10& MUD-2. Conditioning regimen: Cy/TBI-13; BU/Cy-13; Flu/Mel-4; Flu/Cy/TBI-6; Bu/flu/Cy-3; In vitro T cell depletion and Flu/Mel/ATG-Thiotepa - 2 patients; Flu/AraC/Ida/Mel-1. Graft versus host disease (GVHD) prophylaxis was Cyclosporine and Methotrexate in 31; PTCy with Tacrolimus/MMF in 9, and Tacrolimus/MMF in 2 patients.

**Results:** Out of 42 transplants, 5 patients received bone marrow, 37 patients received G- CSF mobilized peripheral blood stem cells. A median 7 million of CD34+ cells/kg was infused. A total of 39 transplants (93%) engrafted. Median time for Neutrophil and platelet engraftment was 11 days and 17 days respectively. Seven patient developed hemorrhagic cystitis. Acute graft GVHD (GR II – IV) was seen in 12(29%) and chronic GVHD in 3 patients. CMV reactivation was seen in 5 patients and was treated with Gancyclovir. Chimeracy at day + 100 was available in 25(60%) cases; all of them had full donor hematopoiesis. Primary rejection was seen in 2 patients and secondary rejection in 1 patient. Fourteen patients (34%) have died, the causes were; relapse of leukemia (n: 7), Infection (n: 4), GVHD (n: 3).Median follow up period was 250 days with overall survival (OS) for the whole group 66%. Discriminated OS according to remission status was 71% in CR1, 70% in CR2 and 54% in CR3.

**Conclusion:** Allogenic HSCT is a suitable option in pediatric high risk leukemia and shows encouraging results

**SCT-1_V1.9 LOW RELAPSE RATES IN TCR α/β AND CD 19 DEPLETED GRAFT IN HAPLO-IDENTICAL STEM CELL TRANSPLANTATION FOR PEDIATRIC ACUTE LEUKEMIA**


**Introduction:** The major barriers to successful haplo-identical stem cell transplantation (haplo-HSCT) in leukemia are disease relapse, graft rejection and delayed immune recovery in settings of T-cell depletion and acute GVHD in case of T-cell replete transplant. Leukemia relapse remains one of the major causes of treatment failure. Graft manipulation with selective removal of TCR α/β and CD 19 positive lymphocytes have been developed to address these conundrums of haplo-HSCT.

**Methods:** We retrospectively reviewed clinical outcomes of haplo-HSCT with TCR α/β and CD 19 depleted graft in pediatric patients with leukemia.

**Results:** Eight patients (male n=5; female n=3) with a median age of 45 months (11 to 68) underwent 9 haplo-HSCT with TCR α/β and CD 19 depletion including a salvage transplantation (father donor in 7 and mother in 1). Seven patients had relapsed acute lymphoid leukemia, while one patient had relapsed acute myeloid leukemia. Myeloablative conditioning regimens were used including Fludarabine-TBI-Etoposide, Fludarabine-Busulphan-Melphalan and Fludarabine-ATG-TBI. Pre-transplant rituximab was administered in 5 patients on day-1 to decrease the risk of EBV associated PTLD. Stem cell source in all the transplants was PBSC manipulated by TCR α/β and CD 19 depletion. Only three received post-transplant GVHD prophylaxis. The graft contained a median of 17.7 x 10^6/kg range 12.5 - 25.3) CD 34 cells, 0.04 x 10^6/kg range 0.02 - 0.93 TCR α/β and 8.1 x 10^6/kg range 2.8 - 68.8 TCR γ/δ cells. Primary neutrophil engraftment was achieved in all eight transplantations and the median day of neutrophil engraftment was 12 days (range 9 - 20). Cumulative incidence of acute GVHD grade II-IV was 37.5% and of none of the patient developed grade III-IV acute GVHD. Three patients developed CMV reactivation. One patient had secondary graft failure on day +33 post transplantation and subsequently succumbed to infectious complications following a salvage transplant. One patient with ALL had disease relapse, on day +236. Immune reconstitution was robust with NK cells recovering the fastest (median of 213/μl at day +21). With a median follow up of 472 days (range 153 - 635); event free survival (EFS) was 75%.

**Conclusion:** Our data suggest that TCR α/β and CD 19 depletion for graft manipulation in haplo-HSCT for acute leukemia results in good engraftment, low rejection rates, low incidence of acute GVHD and, most strikingly, low relapse rates.