targeted surveillance and early intervention in survivors at highest risk for late-occurring hepatic disease.

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Vitamin D Status and its Correlation with Bone Mineral Density in Long Term Survivors After Childhood Hematopoietic Stem Cell Transplantation

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Introduction: Children undergoing hematopoietic stem cell transplantation (HSCT) are at risk of developing vitamin D deficiency (VDD). However, data on vitamin D status and its correlation with bone mineral density (BMD) in the long term survivors after childhood HSCT is limited. The aim of this study was to determine the prevalence of VDD among long term survivors after HSCT in childhood, and to evaluate the correlations between vitamin D and BMD.

Methods: A retrospective study was carried out in patients seen in Long Term follow-up Clinic (LTFC) at our institution from January 2011 to July 2012. VDD and insufficiency (VDI) were defined as serum 25-hydroxyvitamin D (25-OHD) <15 ng/mL and 15-30 ng/mL, respectively. BMD was measured using dual-energy radiograph absorptiometry (Hologic Delphi). Lumbar, total body, and hip BMD Z scores were determined using manufacturer's normative data based on age. Spearman's correlation was performed to assess correlation between serum 25-OHD levels and different BMD variables.

Results: Ninety eight patients underwent 103 HSCTs between 1990 and 2010. Fifty two (53%) patients were > 5 years out of transplant. A total of 114 vitamin D levels were recorded for the 98 patients, the median 25-OHD level was 26 (range 7 - 68 ng/mL). In 68/114 (60%) observations the 25-OHD levels were less than < 30ng/mL. Of these, 10 (9%) patients had VDD (levels < 15ng/mL, while 58 (51%) had VDI. There were no significant correlations between 25-OHD levels and age at HSCT, gender, underlying diagnosis, type of transplant, or development of acute or chronic GVHD (Table 2). There was a trend towards lower 25-OHD levels after non-TBI based conditioning regimen ($P = .047$). BMD was performed in 83 patients (85%). Low BMD was found in nearly one-third to half of patients tested: 29%, 54%, and 33% of the patients had BMDlumbar, BMDhip and BMDWB Z scores of < -1.0, respectively, while 5%, 9% and 5% of the patients had BMDlumbar, BMDhip and BMDWB Z scores < -2.5, respectively. The median Z scores of the BMDlumbar, BMDhip, and the BMDWB were -0.3 (range - 4.2 to 2.4), -1.1 (range -3.3 to 1.9), and -0.4 (range -5.4 to 2.7) respectively. In patients with BMD < -2.5 and < -1.0, the corresponding median 25-OHD was 26 (range 7 - 62 ng/mL) and there was no significant association. Spearman correlation between 25-OHD D level, BMDWB and BMDlumbar showed a correlation coefficient of -0.24 (P value: 0.0409) and -0.22 (P value: 0.0546) respectively. There was no correlation between normal vitamin D levels, VDI and VDD with BMD of the hip, lumbar spine and whole body.

Discussion: Low 25-OHD (<30 ng/mL) was common (60%) in long term survivors after HSCT during childhood. Similar to other reports, VDD and VDI was seen in 9%, and 51% of the patients respectively. There was only a weak correlation of the 25-OHD levels with BMD of whole body and the lumbar spine, suggesting that factors other than hypovitaminosis D might have contributed to low BMD. There was a small trend of lower 25-OHD levels after non-TBI based conditioning.

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Prevalence of Abdominal Pain Related Functional Gastrointestinal Disorders in Pediatric Recipients of Hematopoietic Stem Cell Transplant

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Background: Consultation for abdominal pain (AP) in pediatric patients following allogeneic hematopoietic stem cell transplant (HSCT) is common. Non HSCT related GI inflammation (infectious and non-infectious) has been associated with post-inflammatory abdominal pain and functional gastrointestinal disorders (FGID) in as high as 60% of cases. The presence of AP and FGIDs after HSCT has not been described. We hypothesized that AP is frequent after HSCT given the inflammation from conditioning, GVHD and infection.

Methods: Patients >2 years from HSCT were offered a Questionnaire of Pediatric Gastrointestinal Symptoms. Those with active gut GVHD were excluded. After completing the surveys, chart reviews were performed focusing on demographics, transplant characteristics, adverse events and long-term outcomes.

Results: 48 patients completed the survey;7 (15%) had abdominal complaints. 3 patients were diagnosed with AP related FGID (dyspepsia, IBS, functional abdominal pain); 4 had AP that did not fit criteria for diagnosis. The group with AP were transplanted for high risk malignancy (71%) – ALL(2), AML (1), Anaplastic Lymphoma (1) and Stage IV Neuroblastoma(1). There was an increased incidence of total body irradiation (TBI) containing regimens (57% vs 39%) in patients with AP, but conditioning regimen intensity ie. myeloablative versus reduced intensity (MA/RIC) was not associated with AP. There was an increased incidence of aGVHD (43.9% vs 29.3%), however surprisingly incidence of GI aGVHD was equal between groups. Those with AP had a higher incidence of second transplants (28.5% vs 4.9%), which were performed for relapse. The AP group also had more frequent abdominal infections (40% vs. 15%). The time interval from HSCT in the AP/FGID group is shorter (4 years), compared to the non-AP group (6 years), $P = .029$; however there were no other significant demographic differences between the two groups.

Conclusions: AP and FGIDs are common after HSCT in children. AP was more frequent in patients <5 yrs from HSCT. Data suggested that TBI, abdominal infections and relapse may be associated with later development of abdominal pain. Larger studies are needed for further evaluation and to confirm these finding. The investigation of post-HSCT AP and FGIDs may help understand the role of inflammation, stress, coping and families on the development of functional abdominal pain.

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Outcomes of Lung Transplantation After Allogeneic Hematopoietic Stem Cell Transplantation

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