

Endocrine Evaluation in Children and Adolescents Submitted to Allogeneic Bone Marrow Transplantation

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BACKGROUND

Pediatric bone marrow transplantation (BMT) can lead to endocrine dysfunctions due to common pre-transplantation regimens involving chemo and radiotherapy.

OBJECTIVE

To evaluate the prevalence and time-of-onset of endocrine dysfunctions after allogeneic BMT (aBMT) in children and adolescents.

PATIENTS AND METHODS

- Retrospective cohort-study design.
- Beginning of BMT program: 2010
- Inclusion criteria:
 - Age: < 18 years at aBMT
 - Follow up:
 - ✓ First endocrine evaluation:
 - 100 days after BMT (time zero)[‡]
 - Interval between endocrine evaluation: every six months[‡]
- ‡ when possible
- Clinical evaluation:
 - Height (cm) and z-score*
 - Weight (kg) and z-score*
 - Pubertal stage (Tanner)
 - BMI (kg/m²) and z-score* *NCHS 2000
- Laboratory evaluation:
 - Growth:
 - IGF-1, IGFBP-3, Bone Age (Greulich-Pyle), stim test**
 - Puberty – precocious or delayed:
 - LH, FSH, Estradiol, Testosterone, Pelvic US
 - Thyroid:
 - T3, FT4, TSH, Thyroid Antibodies, Thyroid US**
 - Adrenal:
 - Basal cortisol, ACTH
 - Diabetes insipidus:
 - Na⁺, Osmolality (serum and urinary)
 - Bone disease:
 - Calcium, Phosphorus, Alkaline Phosphatase, PTH, Vitamin D, Bone Density**
 - Metabolic syndrome:
 - Glucose, Insulin, Cholesterol (Total, HDL, LDL, VLDL) Triglycerides, oGTT**

**when needed

RESULTS

- Patients:
 - 75 submitted to aBMT
 - 40 pts (21 F) referred to for endocrine evaluation
- Primary diseases:

Disease	n
Acute lymphoblastic leukemia	14
Acute myeloid leukemia	8
Blackfan Diamond anemia	2
Fanconi anemia	2
Krabb disease (d)	2
Chronic Granulomatous d	2
Chediaki-Higashi d	1
Combined Immune Deficiency	1
Others (Korchman d, Osteopetrosis, Muccop)	1 each

- Clinical Data
 - Age at diagnosis: 5.5 ± 4.2 years old (0.0 – 15.0)
 - Age of aBMT: 8.5 ± 4.5 ys (0.8 – 17.8)
 - Bone marrow donors:

Donors	N
Siblings	21
Bone marrow bank	6
Umbilicous cord	5
Parents	5

- Endocrine Evaluation
 - Age: 9.9 ± 4.0 ys (2.0 – 18.0)
 - Interval between BMT and endocrine evaluation: 1.5 ± 1.3 ys (0.0 – 5.0)
 - Endocrine complications:

Endocrine findings	N
Follow up	15*
Growth disorders	8 (5 with GH deficiency)
Dyslipidemia	5
Hypothyroidism	5
Obesity	3
Pubertal disorders	3 amenorrhea 1 precocious puberty 2 delayed puberty
Failure to thrive	1
Adrenal insufficiency	1

* three died during follow up

CONCLUSION

These findings emphasize the importance of screening for endocrine complications, particularly growth disorders, thyroid and metabolic syndrome, in children who have undergone aBMT. Children require an early and long follow up so that endocrine complications can be diagnosed and promptly treated.

References

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