The developments of bone marrow transplantation - what the future brings.

Allogeneic transplantation

Gösta Gahrton
Allogeneic transplantation

Brief early History

- 1957 Donall Thomas shows that allogeneic bone marrow infused in terminal cancer patients give rise to mature blood cells

- 1959 George Mathé shows that infused allogeneic bone marrow in accidentally irradiated workers gave rise to mature blood cells

- 1965 Jean Dausset characterizes the HLA system

- 1968 Richard Gatti and Robert Good show that bone marrow transplantation can cure a patient with immunodeficiency syndrome
EBMT Activity Survey on HSCT 1990-2009: allogeneic

Leukemias
Lymphoproliferative disorders
Non malignant
Solid tumors
EBMT Activity survey on HSCT in 2009: proportion of main disease category - allogeneic

- AML, 3655, 33%
- ALL, 1861, 17%
- CML, 380, 3%
- MDS/MPS, 1571, 14%
- NHL, 991, 9%
- HD, 322, 3%
- BMF, 608, 5%
- PCD, 546, 5%
- CLL, 386, 3%
- Solid tumors, 84, 1%
- PID, 331, 3%
- IDM, 107, 1%
- Others, 65, 1%
- AID, 11, 0%
- Hemo/thal, 273, 2%
- BM, 608, 5%
- HD, 322, 3%
- PCD, 546, 5%
- CML, 380, 3%
- MDS/MPS, 1571, 14%
Some patient related risk factors

1. Age – younger do better than older

2. Sex – females do often better than males

3. Chromosomal aberrations – good and bad ones

4. Genetic profile – complicated

5. Type of disease – genetic disorders good; malignancies varies – acute leukemia better than myeloma

6. Stage of disease – advanced poor
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Some transplant related risk factors

1. HLA-type – sibling best; high resolution HLA- typing good

2. Donor type: Female to male transplant bad- more GVHD, however less relapse rate

3. Stem cell source – PBSC more cGVHD, Cord blood less GVHD

4. Conditioning treatment – myeloablative higher treatment related deaths, but less relapses; reduced intensity conditioning the opposite

5. T-cell depletion – less GVHD but more relapses
EBMT risk score

Cancer 2010;115: 4715-4726

EHA book Chapter...

The European Group for Blood and Marrow Transplantation

Baldomero, Gratwohl et al 2011
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Changing indication

1. Competing new developments
2. New competing drugs
EBMT Activity Survey on HSCT 1990-2009: changes in CML

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Future

1. Individualized treatment considering risk factors

2. Development of drugs that preserve graft versus tumor but not GVHD – bortezomib?

3. High resolution HLA typing for better donor selection

4. Expanding cord blood cells – may improve engraftment at less GVHD

5. Modify conditioning – intermediate intensity conditioning?

6. Peri- and/or Post transplant cell therapy – T-cells, NK cells?