NATIONAL MARROW DONOR PROGRAM®

Trends in Allogeneic Transplants

Approximately 20,000 allogeneic hematopoietic cell transplants (bone marrow, PBSC, or cord blood transplants — BMT) are performed annually worldwide, and approximately 3,500 patients are transplanted annually using unrelated donors through the National Marrow Donor Program (NMDP).

This represents a steady growth trend in allogeneic transplantation, which is a result of advances in HLA typing, advances in patient care, and expanded cell sources. A major reason for this increase is more precise HLA matching, which has led to a decline in many post-transplant complications. As a result, unrelated donor and related donor transplants can have comparable outcomes in select patient populations. [1,2,3,4]

The proportion of allogeneic transplants from unrelated donors or cord blood has also increased, and the NMDP has now facilitated more than 30,000 marrow, peripheral blood stem cell (PBSC), and cord blood transplants. And while the number of NMDP-facilitated transplants has been increasing steadily for several years, recent growth has been more dramatic, with more than 3,600 transplants in 2007 alone, compared with 3,200 in 2006. In 2007, the NMDP averaged more than 300 unrelated donor transplants per month.

Several other trends in allogeneic transplantation have emerged during the last decade:

- An increase in transplants for AML, MDS, and lymphomas (Figure 1)
- A decline in transplants for CML (Figure 1)
- An increase in transplants for non-malignant diseases (Figure 2)
- Increased use of cord blood and PBSC grafts (Figures 3-5)
- Increased use of transplants for patients >50 years (Figure 6)

Trends in diseases treated

As shown in Figure 1, the most dramatic growth in allogeneic transplantation has been in patients with AML. Since AML is mainly a disease of older adults, a major reason for this growth is the use of non-myeloablative or reduced-intensity transplants that have expanded transplant therapy to older patients who would otherwise be excluded from this therapy.

Figure 1.
NMDP Transplants for Malignant Diseases by Diagnosis and by Year, 1988-2006. (NMDP data)

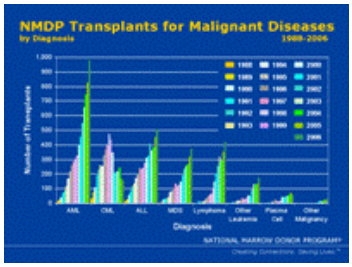

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Figure 1 shows that the number of transplants for ALL, MDS, and

lymphoma have also increased significantly. The advent of reduced-intensity or non-myeloablative transplants is also a prime reason for this increase. In addition, improved HLA matching, advances in conditioning regimens, advances in post-transplant supportive care -- including improved management of GVHD, CMV disease, and infections -- have also contributed to the growing number of allogeneic transplants in general.

Figure 1 also shows that the number of transplants for patients with CML began to decrease in 1999 as imatinib mesylate became more widely used to treat this disease through a targeted inhibition of the BCR-ABL kinase. The decline has slowed in recent years and may be leveling out as allogeneic transplantation is increasingly used as second-line therapy for many patients who fail imatinib therapy due to drug resistance or BCR-ABL mutations. [5]

Figure 2.
NMDP Transplants for Non-Malignant Diseases by Diagnosis and by Year, 1988-2006. (NMDP data)

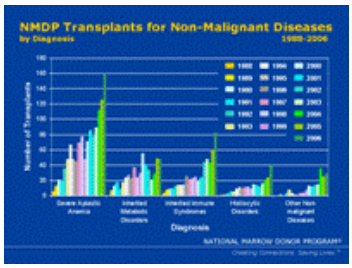

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Figure 2 shows that NMDP transplants for non-malignant diseases has grown for most diseases, with the most rapid growth being seen in severe aplastic anemia (SAA). This follows the trend seen in the related-donor setting, where allogeneic transplantation is the preferred first-line treatment for SAA patients <40 years old who have a matched related donor. [6]

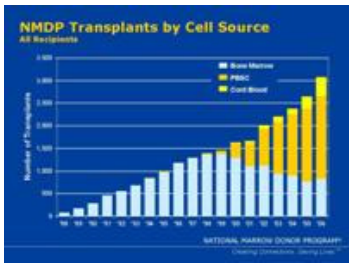
Survival of unrelated donor transplantation in patients with SAA is now approaching 60%. [7] Use of unrelated donor transplantation in SAA may continue to grow following the recent publication of a study showing that allogeneic transplantation is better than immunosuppressive therapy as second-line treatment in pediatric SAA. [8]

The increase in allogeneic transplantation for many other non-malignant diseases can also be attributed to improved HLA matching, advances in conditioning regimens and advances in post-transplant supportive care.

Increased use of cord blood and PBSC grafts

Figure 3 shows the growing use of PBSC and cord blood as graft sources in allogeneic transplantation. In 2007, 71% of adult donors – more than 2,100 – donated PBSC to patients through the NMDP. In 2007, 648 cord blood transplants were facilitated by the NMDP, which represented 18% of the total number of NMDP transplants in 2007. This is a 58% increase from 2006, when the NMDP facilitated 410 cord blood transplants.

Figure 3.
NMDP Transplants by Cell Source (bone marrow, peripheral blood stem cells or cord blood), 1988-2006. (NMDP data)



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Figures 4 and 5 show that cord blood is used more often in pediatric patients than in adult patients. However, recent studies have demonstrated that this stem cell source can be successfully used in adults and so its use is growing in this patient population. [9,10,11]

Figure 4.
NMDP Transplants in Adults by Cell Source (bone marrow, peripheral blood stem cells or cord blood), 1988-2006. (NMDP data)

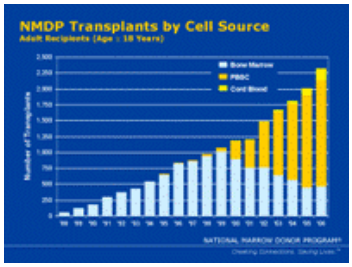

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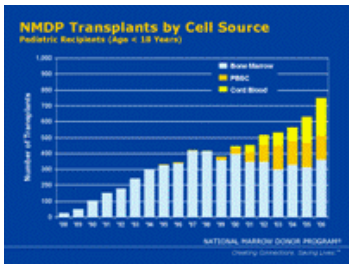
Figure 5.
NMDP Transplants in Pediatric Patients by Cell Source (bone marrow, peripheral blood stem cells or cord blood), 1988-2006. (NMDP data)



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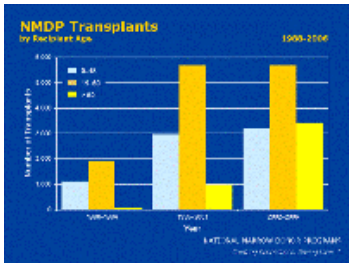
A comparison of Figures 4 and 5 shows that PBSC is used less frequently in pediatric patients undergoing allogeneic transplantation than in adult patients, which is due to poorer outcomes in children receiving PBSC transplants. [12]

Increased use of transplants for patients >50 years

Figure 6 shows the increased number of older patients (>50 years) who have received unrelated donor transplants from the NMDP. In 2007, more than 35% of NMDP transplants, representing more than 1,300 transplants, were for patients aged 50 and older. This increase is due in large part to the increased use of non-myeloablative or reduced-intensity transplants that have expanded transplant therapy to older patients who would otherwise be excluded from this therapy.

Figure 6.

NMDP Transplants by Recipient Age, 1988-2006. (NMDP data)



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To read about other trends in the use of hematopoietic cell transplantation, see Changing Trends in Diseases and Patients Treated.

Additional NMDP data may be requested. See the NMDP Research Web site for more information. (http://www.nmdpresearch.org/DATA/How_to_Request_Data/index.html)

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