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Better and safer allogeneic stem cell transplantation

EDITORIAL

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Allogeneic stem cell transplantation is a highly specialised treatment for patients for whom there are few or no curative treatments available. The results keep getting better.

In this edition of the Journal of the Norwegian Medical Association, Vo et al. present an overview of the results from allogeneic stem cell transplantation at Oslo University Hospital in the period 2015–2021 (1). The study shows that the number of transplants is increasing, while the risk of serious complications and death has been reduced. These results are gratifying, not least for patients with serious malignant haematological diseases with a poor prognosis. More patients can now receive treatment that is becoming safer and more effective.

The history of allogeneic stem cell transplantation is a fascinating journey from early uncertain experimental treatment to high-tech modern precision medicine (2, 3). Early experiments with transplantation in patients with severe radiation damage and acute leukaemia were conducted as far back as the 1950s, but with fatal outcomes (2). Until the 1960s, there was more or less a consensus in the immunology research community that transplantation across immunological barriers was impossible for practical reasons (3). However, increased knowledge of the HLA system, modern chemotherapy, access to immunomodulating agents, better and safer transfusion therapy and more and better antimicrobial agents led to a new impetus in the treatment in the 1980s. In Norway, allogeneic stem cell transplantation was established at Oslo University Hospital, Rikshospitalet at the start of the 1980s (3).

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In allogeneic stem cell transplantation, patients are effectively given a whole new haematopoietic and immunological organ system. The principle of the treatment is based on patients receiving immunocompetent cells, mainly T cells, which perform an immune-mediated eradication of remaining malignant cells, the so-called graft-versus-leukaemia reaction, in addition to chemotherapy or radiation therapy that destroys bone marrow.

One of the biggest challenges of this treatment has been that the same immune cells can cause serious immune-mediated organ damage: graft-versus-host disease (GVHD). However, it has long been known that patients with GVHD are less likely to experience a relapse of the malignant disease; in other words, they have a stronger graft-versus-leukaemia reaction (4). One of the challenges has therefore been to balance these two reactions with each other.

GVHD can be either acute or chronic, with symptoms occurring less than and more than 100 days post-transplantation, respectively. Although this distinction is not exact, the two conditions behave differently and have somewhat different pathophysiological backgrounds.

Acute GVHD mainly affects the skin, gastrointestinal tract and liver (5). In contrast, chronic GVHD has more organ involvement and can affect the vast majority of organ systems, as set out by Rørvik et al. in an article in this edition of the Journal (6). These complications can manifest after several years, and long after the patient has left the transplant centre. As the number of allogeneic stem cell transplant recipients is increasing, and patients are living longer, more doctors in both the primary care and the specialist health service will see these patients. The condition can cause significant health problems and reduced quality of life, but there are currently more and better treatment options available for GVHD. Despite progress, allogeneic stem cell transplantation is still a high-risk treatment with high morbidity and mortality. We need better treatment options for the primary diseases so that transplantation can be avoided. Specific tyrosine kinase inhibitors have been found to be highly effective for patients with chronic myelogenous leukaemia and chronic lymphocytic leukaemia. The number of transplant patients with these conditions has decreased significantly in recent years (1, 2).

In the last 30 years, the number of transplant centres has been increasing globally. To collect and analyse data on outcomes, international data registers have been set up, such as the European Society for Blood and Bone Marrow Transplantation (EBMT). Benchmarking is based on the principle of comparing one's own practice to a given standard (7). It is now possible for a researcher to compare their results with those from other centres, and potentially identify trends or deviations in results (8). Vo et al. show that the results from Oslo University Hospital are largely in accord with international data (1). The work deserves praise and offers reassurance for patients with blood cancer diseases

in Norway. Competence and experience, together with quality assurance and international accreditation, will act as a safety net in the further work to optimise allogeneic stem cell transplantation (9).

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