have persistent disease after induction chemotherapy or who have subsequently relapsed. Transplantation in first remission results in cure rates about 55%. Transplantation appears to offer a clear advantage over chemotherapy for patients with high-risk disease, such as those with Philadelphia chromosome–positive disease. Debate continues about whether adults with standard-risk disease should be transplanted in first remission or whether transplantation should be reserved until relapse. Autologous transplantation is associated with a higher relapse rate but a somewhat lower risk of nonrelapse mortality when compared to allogeneic transplantation. There is no obvious role of autologous transplantation for acute lymphocytic leukemia in first remission, and for second-remission patients, most experts recommend use of allogeneic stem cells if an appropriate donor is available.

CHRONIC LEUKEMIA

Allogeneic hematopoietic cell transplantation is the only therapy shown to cure a substantial portion of patients with chronic myeloid leukemia (CML). Five-year disease-free survival rates are 15–20% for patients transplanted for blast crisis, 25–50% for accelerated-phase patients, and 60–70% for chronic-phase patients, with cure rates as high as 80% at selected centers. However, with the availability of imatinib mesylate and other highly active tyrosine kinase inhibitors (TKIs), transplantation is generally reserved for those who fail to achieve a complete cytogenetic response with a TKI, relapse after an initial response, or are intolerant of the drugs (Chap. 133).

Allogeneic transplantation using a high-dose preparative regimen has rarely been used for chronic lymphocytic leukemia (CLL), in large part because of the chronic nature of the disease and because of the age profile of patients. In those cases where it was studied, complete remissions were achieved in the majority of patients, with disease-free survival rates of ~50% at 3 years, despite the advanced stage of the disease at the time of transplant. The marked antitumor effects have resulted in the increased use and study of allogeneic transplantation using reduced-intensity conditioning for the treatment of CLL.

MYELODYSPLASIA

Between 20 and 65% of patients with myelodysplasia appear to be cured with allogeneic transplantation. Results are better among younger patients and those with less advanced disease. However, patients with early-stage myelodysplasia can live for extended periods without intervention, and so transplantation is generally reserved for patients with an International Prognostic Scoring System (IPSS) score of Int-2 or for selected patients with an IPSS score of Int-1 who have other poor prognostic features (Chap. 130).

LYMPHOMA

Patients with disseminated intermediate- or high-grade non-Hodgkin's lymphoma who have not been cured by first-line chemotherapy and are transplanted in first relapse or second remission can still be cured in 40–50% of cases. This represents a clear advantage over results obtained with conventional-dose salvage chemotherapy. It is unsettled whether patients with high-risk disease benefit from transplantation in first remission. Most experts favor the use of autologous rather than allogeneic transplantation for patients with intermediate- or high-grade non-Hodgkin's lymphoma, because fewer complications occur with this approach and survival appears equivalent. For patients with recurrent disseminated indolent non-Hodgkin's lymphoma, autologous transplantation results in high response rates and improved progression-free survival compared to salvage chemotherapy. However, late relapses are seen after transplantation. The role of autologous transplantation in the initial treatment of patients is debated. It may be indicated in the small subset of patients presenting with high-risk prognostic factors but is not clearly more effective in those in lower risk groups. Reduced-intensity conditioning regimens followed by allogeneic transplantation result in high response rates in patients with indolent lymphomas, but the exact role of this approach remains to be defined.

The role of transplantation in Hodgkin's disease is similar to that in intermediate- and high-grade non-Hodgkin's lymphoma. With transplantation, 5-year disease-free survival is 20–30% in patients who never achieve a first remission with standard chemotherapy and up to 70% for those transplanted in second remission. Transplantation has no defined role in first remission in Hodgkin's disease.

MYELOMA

Patients with myeloma who have progressed on first-line therapy can sometimes benefit from allogeneic or autologous transplantation. Prospective randomized studies demonstrate that the inclusion of autologous transplantation as part of the initial therapy of patients results in improved disease-free survival and overall survival. Further benefit is seen with the use of lenalidomide maintenance therapy following transplantation. The use of autologous transplantation followed by nonmyeloablative allogeneic transplantation has yielded mixed results.

SOLID TUMORS

Randomized trials evaluating autologous transplantation as treatment for primary or metastatic breast cancer have failed to show a consistent survival advantage with this approach, and therefore, there is no established role for transplantation in this disease.

Patients with testicular cancer in whom first-line platinum-containing chemotherapy has failed can still be cured in ~50% of cases if treated with high-dose chemotherapy with autologous stem cell support, an outcome better than that seen with low-dose salvage chemotherapy.

The use of high-dose chemotherapy with autologous stem cell support is being studied for several other solid tumors, including neuroblastoma and pediatric sarcomas. As in most other settings, the best results have been obtained in patients with limited amounts of disease and where the remaining tumor remains sensitive to conventional-dose chemotherapy. Few randomized trials of transplantation in these diseases have been completed.

Partial and complete responses have been reported following nonmyeloablative allogeneic transplantation for some solid tumors, most notably renal cell cancers. The GVT effect, well documented in the treatment of hematologic malignancies, may apply to selected solid tumors under certain circumstances.

POSTTRANSPLANT RELAPSE

Patients who relapse following autologous transplantation sometimes respond to further chemotherapy and may be candidates for possible allogeneic transplantation, particularly if the remission following the initial autologous transplant was long. Several options are available for patients who relapse following allogeneic transplantation. Of particular interest are the response rates seen with infusion of unirradiated donor lymphocytes. Complete responses in as many as 75% of patients with chronic myeloid leukemia, 40% in myelodysplasia, 25% in AML, and 15% in myeloma have been reported. Major complications of donor lymphocyte infusions include transient myelosuppression and the development of GVHD. These complications depend on the number of donor lymphocytes given and the schedule of infusions, with less GVHD seen with lower dose, fractionated schedules.