Regence Oregon and Utah | Regence Idaho and select counties of Washington

Medical Policy Manual Transplant, Policy No. 45.27

Hematopoietic Cell Transplantation for Miscellaneous Solid Tumors in Adults

Effective: August 1, 2019

Next Review: January 2020
Last Review: June 2019

IMPORTANT REMINDER

Medical Policies are developed to provide guidance for members and providers regarding coverage in accordance with contract terms. Benefit determinations are based in all cases on the applicable contract language. To the extent there may be any conflict between the Medical Policy and contract language, the contract language takes precedence.

PLEASE NOTE: Contracts exclude from coverage, among other things, services or procedures that are considered investigational or cosmetic. Providers may bill members for services or procedures that are considered investigational or cosmetic. Providers are encouraged to inform members before rendering such services that the members are likely to be financially responsible for the cost of these services.

DESCRIPTION

This policy addresses hematopoietic cell transplantation for miscellaneous solid tumors in adults. Transplantation of cells from both autologous and allogeneic donors for a variety of solid tumors is discussed.

MEDICAL POLICY CRITERIA

Note: This policy addresses only solid tumors in adults. See Cross References section below for tumors not specifically addressed in this policy. See Appendix I for glossary of terms.

Autologous or allogeneic hematopoietic cell transplant is considered **investigational** for all of the following malignancies in adults:

- Bile duct cancer
- Cervical cancer
- Colon cancer
- Esophageal cancer

- Fallopian tube cancer
- Gall bladder cancer
- Lung cancer, any histology
- Malignant melanoma
- Nasopharyngeal cancer
- Neuroendocrine tumors
- Osteosarcoma
- Pancreas cancer
- Paranasal sinus cancer
- Prostate cancer
- Rectal cancer
- Renal cell cancer
- Soft tissue sarcomas
- Stomach cancer
- Thymus tumors
- Thyroid tumors
- Tumors of unknown primary origin
- Uterine cancer

NOTE: A summary of the supporting rationale for the policy criteria is at the end of the policy.

CROSS REFERENCES

1. Donor Lymphocyte Infusion for Malignancies Treated with an Allogeneic Hematopoietic Cell Transplant, Transplant, Policy No. 45.03
2. Placental and Umbilical Cord Blood as a Source of Stem Cells, Transplant, Policy No. 45.16
3. Hematopoietic Cell Transplantation for Epithelial Ovarian Cancer, Transplant, Policy No. 45.26
4. Hematopoietic Cell Transplantation for Breast Cancer, Transplant, Policy No. 45.29
5. Hematopoietic Cell Transplantation for CNS Embryonal Tumors and Ependymoma, Transplant, Policy No. 45.33
6. Autologous Hematopoietic Cell Transplantation for Malignant Astrocytomas and Gliomas, Transplant, Policy No. 45.34
7. Hematopoietic Cell Transplantation for Solid Tumors of Childhood, Transplant, Policy No. 45.37
8. Hematopoietic Cell Transplantation in the Treatment of Germ-Cell Tumors, Transplant, Policy No. 45.38

BACKGROUND

HEMATOPOIETIC CELL TRANSPLANTATION

Broadly speaking, there are two types of hematopoietic cell transplants (HCT, previously referred to in this policy as a hematopoietic stem cell transplant [HSCT]), autologous and allogeneic. The purpose of an autologous HCT is to treat a disease (e.g. lymphoma) with

myeloablative doses of chemotherapy (with or without radiation) that are active against the disease. The recipient's own HCTs (collected previously) are infused after the chemotherapy in order to re-establish normal marrow function. In an allogeneic transplant, the recipient receives HCTs from a donor after myeloablative therapy or non-myeloablative therapy in order to re-establish normal marrow function as well as to use the new blood system as a platform for immunotherapy, a so called "graft versus tumor" effect. Hematopoietic cells can be harvested from bone marrow, peripheral blood, or umbilical cord blood shortly after delivery of neonates. Although cord blood is an allogeneic source, the cells in it are antigenically "naïve" and thus are associated with a lower incidence of rejection or graft-versus-host disease (GVHD).

Immunologic compatibility between infused hematopoietic cells and the recipient is not an issue in autologous HCT. However, immunologic compatibility between donor and patient is a critical factor for achieving a good outcome of allogeneic HCT. Compatibility is established by typing of human leukocyte antigens (HLA) using cellular, serologic, or molecular techniques. HLA refers to the tissue type expressed at the Class I and Class II gene loci on each arm of chromosome 6. Depending on the disease being treated, an acceptable donor will match the patient at all or most of the HLA loci (with the exception of umbilical cord blood).

CONVENTIONAL PREPARATIVE CONDITIONING FOR HCT

The conventional ("classical") practice of *allogeneic* HCT involves administration of cytotoxic agents (e.g., cyclophosphamide, busulfan) with or without total body irradiation at doses sufficient to destroy endogenous hematopoietic capability in the recipient. The beneficial treatment effect in this procedure is due to a combination of initial eradication of malignant cells and subsequent graft-versus-malignancy (GVM) effect that develops after engraftment of allogeneic cells within the patient's bone marrow space. While the slower GVM effect is considered to be the potentially curative component, it may be overwhelmed by extant disease without the use of pretransplant conditioning. However, intense conditioning regimens are limited to patients who are sufficiently fit medically to tolerate substantial adverse effects that include pre-engraftment opportunistic infections secondary to loss of endogenous bone marrow function and organ damage and failure caused by the cytotoxic drugs. Furthermore, in any allogeneic HCT, immunosuppressant drugs are required to minimize graft rejection and GVHD, which also increases susceptibility of the patient to opportunistic infections.

The success of *autologous* HCT is predicated on the ability of cytotoxic chemotherapy (with or without radiation) to be delivered at doses that could otherwise not be given without stem cells, which are infused to "rescue" hematopoiesis after high dose therapy. As a consequence, autologous HCT is typically performed as consolidation therapy when the patient's disease is in complete remission (CR). Patients who undergo autologous HCT are susceptible to chemotherapy-related toxicities and opportunistic infections prior to engraftment, but not GVHD.

REDUCED-INTENSITY CONDITIONING FOR ALLOGENEIC HCT

Reduced-intensity conditioning (RIC) refers to the conditioning with lower doses or less intense regimens of cytotoxic drugs or radiation than are used in conventional full-dose myeloablative conditioning treatments. The goal of RIC is to reduce disease burden, but also to minimize as much as possible associated treatment-related morbidity and non-relapse mortality (NRM) in the period during which the beneficial GVM effect of allogeneic transplantation develops. Although the definition of RIC remains arbitrary, with numerous versions employed, all seek to balance the competing effects of NRM and relapse due to residual disease. RIC regimens can

be viewed as a continuum in effects, from nearly totally myeloablative, to minimally myeloablative with lymphoablation, with intensity tailored to specific diseases and patient condition. Patients who undergo RIC with allogeneic HCT initially demonstrate donor cell engraftment and bone marrow mixed chimerism. Most will subsequently convert to full-donor chimerism, which may be supplemented with donor lymphocyte infusions to eradicate residual malignant cells.

For the purposes of this Policy, the term “reduced-intensity conditioning” (RIC) will refer to all conditioning regimens intended to be non-myeloablative, as opposed to fully myeloablative (conventional) regimens.

HCT IN SOLID TUMORS IN ADULTS

HCT is an established treatment for certain hematologic malignancies. Its use in solid tumors in adults is less well established, although it has been investigated for a variety of solid tumors. With the advent of nonmyeloablative allogeneic transplant, interest has shifted to exploring the generation of alloreactivity to metastatic solid tumors via a graft-versus-tumor effect of donor-derived T cells.[1]

MISCELLANEOUS SOLID TUMORS IN ADULTS

This policy collectively addresses other solid tumors of adults for which HCT has been investigated, including lung cancer; malignant melanoma; tumors of the gastrointestinal tract (including colon, rectum, pancreas, stomach, esophagus, gallbladder, and bile duct tumors); male and female genitourinary systems (e.g., renal cell carcinoma, cervical carcinoma, cancer of the uterus, fallopian tubes, and prostate gland); tumors of the head and neck; soft tissue sarcoma; thyroid tumors; tumors of the thymus; and tumors of unknown primary origin.

REGULATORY STATUS

The U.S. Food and Drug Administration regulates human cells and tissues intended for implantation, transplantation, or infusion through the Center for Biologics Evaluation and Research, under Code of Federal Regulation (CFR) title 21, parts 1270 and 1271.[2] Hematopoietic cells are included in these regulations.

EVIDENCE SUMMARY

The principal outcomes associated with treatment of solid organ malignancies are typically measured in units of survival past treatment: disease-free survival (DFS), a period of time following treatment where the disease is undetectable; progression-free survival (PFS), the duration of time after treatment before the advancement or progression of disease; and overall survival (OS), the period of time the patient remains alive following treatment. Patient quality of life may be another primary outcome, particularly among patients living with refractory disease. In order to understand the impact of hematopoietic cell transplantation for treatment of solid tumors in adults on these outcomes, well-designed randomized controlled trials (RCTs) that compare this therapy to standard medical treatment, such as conventional standard-dose chemotherapy are needed. Further, for treatment of malignant cancers, particularly those with a poor prognosis, an understanding of any adverse treatment effects must be carefully weighed against any benefits associated with treatment to understand the net treatment effect.

AUTOLOGOUS HEMATOPOIETIC CELL TRANSPLANTATION (HCT) IN SOLID TUMORS OF ADULTS

Literature on the use of autologous HCT for the solid tumors of adults addressed in this policy consists of a several systematic reviews.

A review published by Pedrazzoli concluded broadly that “data available to date do not support the routine use of HDC [high-dose chemotherapy] with AHSCT [autologous HSCT] for solid tumors other than [breast cancer] in adults.”[3] Pedrazzoli also published results from a previous review of AHSCT for solid tumors in adults in 2006, concluding that insufficient evidence exists to support its use in small cell lung cancer and soft tissue sarcoma.[4] Finally, another review published in 1999 by Nieto concluded that evidence was inadequate to demonstrate a survival benefit from HDC and AHCT for melanoma or soft tissue sarcoma.[5] Overall, the literature is insufficient and does not permit conclusions about the use of this therapy in adults with solid tumors.

Urothelial Carcinoma

Limited data exist on the use of autologous HCT for urothelial carcinoma. To date, only a single uncontrolled pilot study on HDC with HCT for patients with refractory urothelial carcinoma has been published. This study was unable to provide evidence of improved outcomes.[6]

Nasopharyngeal Carcinoma

A single uncontrolled pilot study on HDC with autologous HCT for patients with recurrent or advanced nasopharyngeal carcinoma fails to provide evidence to support the use of this treatment for this indication.[7]

Adult Soft Tissue Sarcomas

The prognosis of patients with unresectable or metastatic soft tissue sarcomas is poor, with a median survival of about one-year, and less than 10% five-year survival.[4] A variety of single-agent and combination regimens are used for treatment, with targeted therapies available for some subtypes.

In general, dose-intensive doxorubicin- and ifosfamide-based regimens have yielded higher response rates and prolonged DFS, but not OS. The available evidence on the use of autologous HCT for this indication consists of systematic reviews and several case series.

In 2014, a Cochrane systematic review evaluated the use of autologous HCT following high-dose chemotherapy for non-rhabdomyosarcoma soft tissue sarcomas.[8] The authors included 62 studies reporting on 294 transplanted patients with a variety of soft tissue sarcomas. One randomized controlled trial (RCT) with 83 patients was identified; the remaining studies were single-arm studies. In the RCT, OS was not statistically significantly different between autologous HCT following high-dose chemotherapy compared with standard-dose chemotherapy (hazard ratio [HR], 1.26; 95% confidence interval [CI], 0.70 to 2.29; p=0.44), and the point estimate for survival at three years was 32.7% compared with 49.4%. The pooled treatment-related mortality rate across the single-arm studies was 15/294 (5.1%). Authors concluded that the available evidence from small phase II studies was insufficient to support the use of autologous HCT in adult patients with soft tissue sarcoma.

Another systematic review, published in 2008 by Verma, found three Phase III RCTs involving HSCT, none of which evaluated the therapy for first-line treatment of advanced or metastatic adult soft tissue sarcoma compared to conventional standard-dose chemotherapy.[9]

Schlemmer published a phase II study in 2006 on 55 patients with metastatic soft tissue sarcoma.[10] Although significantly more patients receiving autologous HCT responded to doxorubicin-based induction chemotherapy versus the control group (14% vs. 3%; p=0.003), the estimated OS was not statistically different between those that received autologous HCT and those that did not.

In 2007, Kasper published results of a cases series of 21 patients with soft-tissue sarcoma, which showed a PFS and an OS benefit only in patients with no evidence of disease before receiving HDC and autologous HCT.[11]

Another paper by Kasper published in 2010, reported the results of a prospective, single institution phase II trial that enrolled 34 patients with advanced and/or metastatic soft tissue sarcoma.[12] After four courses of chemotherapy, patients with at least a partial response underwent high-dose chemotherapy and autologous HCT (n=9). All other patients continued chemotherapy for two more cycles. Patients treated with HCT had statistically significant longer PFS and OS compared with patients treated with standard chemotherapy, although only nine of 34 patients were selected for treatment with HCT.

Hartmann published results of a phase II study of high-dose chemotherapy with ifosfamide, carboplatin, and etoposide (HD-ICE) followed by peripheral blood stem cell transplantation in patients with grade 2 or 3 histologically-proven soft tissue sarcoma that were considered unresectable or marginally resectable.[13] Thirty patients were enrolled, 14 of whom did not receive all allocated interventions due to progressive disease (n=5), ifosfamide-related neurotoxicity (n=6), withdrawal of consent (n=1), complete remission (n=1), and insufficient stem-cell harvest (n=1). Eighteen patients underwent radiation: five preoperatively, 12 postoperatively, and with palliative intent in one. Twenty-four of 30 (80%) patients underwent surgery with macroscopically complete tumor resection. In the subgroup of patients who underwent consolidation high-dose chemotherapy, surgery revealed R0-margins (microscopically margin-negative resection) in 12 patients (75%), while four patients had R1-margins (macroscopically margin-negative but microscopically margin-positive resection). In the subgroup of patients treated without HD-ICE consolidation, seven of the eight patients had R1-margins. Severe hematologic toxicity occurred in most patients, and eight patients developed febrile neutropenia. One patient developed myelodysplastic syndrome after 25 months of follow-up. After a median follow-up period of 50 months (range, 26–120 months) in surviving patients, the median PFS of all patients was 21 months (range, 1–94) and median OS was 37 months (range, 3–120 months), corresponding to five-year PFS and OS rates of 39 % and 48 %, respectively. The authors conclude that induction chemo-/ radiotherapy and the role of dose intensification should be further studied until potential alternatives of targeted therapies become available for further distinct subtypes of adult type sarcomas.

In general, small sample size and limitations inherent to observational study design restrict the interpretation of these findings. Further research is needed to determine whether there is an association between autologous HCT and OS, and if this association is uniform across all patient populations.

Small-Cell Lung Carcinoma

The interest in treating small-cell lung carcinoma (SCLC) with HCT originates from its extremely high chemosensitivity and poor prognosis. The available literature on this topic consists of two review articles, a single meta-analysis, and several small randomized controlled trials.

In 2009, Jiang published results from a systematic review and meta-analysis of the medical literature through October 2008, including English language studies using intensified chemotherapy with autologous hematopoietic progenitors to treat SCLC.[14] The meta-analysis consisted of five RCTs (three were phase III trials and two were phase II), for a total of 641 patients. They found no significant increase in the likelihood of an improved response rate with autologous transplant versus control chemotherapy. Neither did they find a statistically significant increase in OS among the autologous transplant patients compared to control regimens. The authors concluded that current evidence does not support the use of intensified chemotherapy and autologous HCT for treating SMLC.

One smaller randomized study and several single-arm studies of HDC and autologous HCT for SCLC are summarized in a 2007 systematic review article by Cricellari.[15] The authors begin the conclusion of their review with this statement, “The lesson we have learned is that the current literature indicates that there is no evidence that the treatment of SCLC can be improved by increasing the dose intensity, peak dose, or total dose of chemotherapy, and survival rates have reached a plateau, so intensification strategy should probably be abandoned.”

In 2005, Lorigan reported on a randomized phase III trial of 318 patients with SCLC.[16] No statistically significant difference in response rates was seen between the two groups (80% response rate in the standard arm vs. 88% in the HDC group), nor was there a statistically significant difference in OS between the two groups.

In 2002, a report from the European Group for Bone Marrow Transplantation's Solid Tumors Working Party concluded that evidence was still insufficient to establish a definite role for HDC and autologous transplantation in small-cell lung cancer.[17]

Overall, the majority of the data from these studies, including the randomized study, showed no increased OS with autologous HCT. At least one systematic review on this topic recommended that autologous HSCT, as a dose intensification strategy for SCLC, be abandoned in light of evidence demonstrating no clear treatment benefit.[15]

ALLOGENEIC HCT IN SOLID TUMORS OF ADULTS

The literature on allogenic HCT in solid tumors among adults consists of several small case series.

Multiple Indications

A review of data from the European Bone Marrow Transplantation Solid Tumors Working Party (EBMT STWP) on allogeneic HCT for renal cell cancer, pancreatic cancer, colorectal cancer and soft-tissue sarcoma found multiple small case series (n≤25) with different conditioning regimens, varying response rates and treatment mortality rates for each indication.[18] The EBMT STWP concluded that, “Allogeneic transplantation in renal cancer and other solid tumors should be considered a developmental therapy until definitive proof of a clinical benefit is achieved by current studies.”

Available reviews of allogeneic HCT have concluded that the scientific evidence is insufficient to support the use of this therapy in adults with solid tumors.

Mixed Tumor Types

In 2016, Omazic reported on a long-term follow-up on 61 patients with a variety of solid tumor types considered to be incurable with any conventional therapy who were treated with allogeneic HCT from 1999 to 2012.[19] Tumors included metastatic renal carcinoma (n=22), cholangiocarcinoma (n=17), colon cancer (n=15), prostate cancer (n=3), pancreatic adenocarcinoma (n=3), and breast cancer (n=1). Most patients (n=59) had undergone surgical debulking of the primary tumor, and 31 patients had previously undergone additional therapy with cytotoxic chemotherapy, radiotherapy, or immunotherapy. Conditioning was myeloablative in 23 patients, reduced in 36 patients, and nonmyeloablative in two patients. Over a median follow-up of eight years, the rate of OS at five and ten years were 15% and 9%, respectively.

Nasopharyngeal Carcinoma

A single report is available on the use of allogeneic HCT for treatment of nasopharyngeal carcinoma.

In 2011, Toh reported the outcomes of a phase II trial of 21 patients with pretreated metastatic nasopharyngeal carcinoma.[20] Previous treatment was not uniform; patients had received a median of two previous chemotherapy regimens (range 1-8). All patients had extensive metastases. Patients underwent nonmyeloablative allogeneic HCT with sibling allograft. Seven patients (33%) showed a partial response and three (14%) achieved stable disease. Four patients were alive at two years and three showed prolonged disease control past 344 days. One and two-year OS rates were 29 and 19%, respectively, comparable to the median 7-14 months OS reported in the literature for metastatic nasopharyngeal patients treated with salvage chemotherapy without HCT. However, valid and reliable conclusions based upon these results cannot be made due to limitations such as: small sample size, varied pre-HCT treatment regimens, and lack of control group. These limitations hinder the ability to account for the many types of bias that can affect study outcomes.

Renal Cell Carcinoma

Metastatic renal cell carcinoma (RCC) has an extremely poor prognosis, with a median survival of less than one year and a five-year survival of less than 5%.[21] RCC is relatively resistant to chemotherapy, but is susceptible to immune therapy. Interleukin-2 (IL-2) and/or interferon alpha have induced responses and long-term PFS in 4%–15% of patients.[18] In addition, seven targeted therapies have the U.S. Food and Drug (FDA) approval for treatment of advanced RCC: sunitinib, sorafenib, pazopanib, axitinib, temsirolimus, everolimus, and bevacizuman.[22] Based on the susceptibility of RCC to immune therapies, the immune-based strategy of a graft-versus-tumor effect possible with an allogeneic transplant has led to an interest in its use in RCC. Several small case series and pilot studies exist on the use of allogeneic HCT in RCC.

In 2009, Bregni assessed the long-term benefit of allografting in 25 patients with cytokine-refractory metastatic RCC who received a reduced intensity conditioning (RIC) allograft from a sibling who was human leukocyte antigen (HLA) identical.[23] All patients received the same conditioning regimens. Response to allograft was available in 24 patients, with a complete response in one patient and partial response in four patients. Twelve patients had minor response or stable disease, and seven reported progressive disease. Overall response rate (complete plus partial) was 20%. Six patients died because of transplant-related complications. Median survival was 336 days (12–2,332+). One-year OS was 48% (95% CI: 28–68), and five-year OS was 20% (95% CI: 4–36). The authors concluded that allografting may be associated with long-term disease control in only a small fraction of cytokine-resistant patients with RCC.

In 2000, Childs published a study on the first series of patients with RCC treated with nonmyeloablative allogeneic HCT.[21] The investigators showed regression of the tumor in ten of 19 (53%) patients with cytokine-refractory, metastatic RCC who received an HLA-identical sibling allogeneic HCT. Three patients had a complete response, and remained in remission 16, 25, and 27 months after transplant. Four of seven patients with a partial response were alive without disease progression nine to19 months after transplantation.

Other pilot trials have demonstrated the graft-versus-tumor effect of allogeneic transplant in metastatic RCC, but most have not shown as high a response rate as the Childs' study.[24] Overall response rates in these pilot trials have been about 25%, with complete response rates of about 8%.

Results from small, nonrandomized clinical trials should be interpreted with caution as it is not possible to account for the many types of bias that can affect study outcomes. Prospective, randomized trials are needed to assess the net impact of this technique on the survival of patients with RCC.

Colorectal Cancer

A single case series is available on the use of allogeneic HCT in patients with colorectal carcinoma.

In 2009, Aglietta reported their experience with 39 patients with metastatic colorectal cancer who underwent RIC allogeneic HCT between 1999 and 2004 at nine European Group for Blood and Marrow Transplantation (EBMT) centers.[25] Patients were treated with one of five different RIC regimens. Patient population characteristics were heterogeneous; pretransplant disease status was partial response in two patients, stable disease in six patients, and progressive disease in 31. After transplant, tumor responses were complete in 2% of patients, partial in 18%, and 26% of patients had stable disease, for overall disease control in 46% of patients. Transplant-related mortality was 10%. Median overall follow-up was 202 days (range, 6–1,020), after which time 33 patients had died. Tumor progression was the cause of death in 74% of patients. Achievement of response after transplantation was associated with a difference in OS, with the 18 patients who had a response having a median OS of approximately 400 days versus approximately 120 days for those who had no response (p=.00018). The authors concluded that the HCT approach should probably be reserved for patients with a partial response or stable disease after second-line therapy for metastatic colorectal cancer, and that second-generation clinical trials in these patients are warranted.

Pancreatic Cancer

Two small case series (n≤22) have been published on the use of this technology among patients with pancreatic cancer.

In 2009, Abe reported the outcomes for five patients with chemotherapy-resistant, unresectable pancreatic adenocarcinoma who received a nonmyeloablative allogeneic peripheral blood HCT.[26] The median patient age was 54 years (range: 44–62 years). All patients had advanced disease, either with metastases or peritonitis, and had received at least one course of chemotherapy including gemcitabine. After HSCT, tumor response was only observed in two patients; one patient had complete disappearance of the primary tumor and one had a 20% reduction in tumor size. Four patients died of progressive disease on post-transplant day ranging from 28 to day 209 (median: 96 days).

In 2008, Kanda reported on the efficacy of RIC allogeneic HCT against advanced pancreatic cancer in 22 patients from three transplantation centers in Japan.[27] The RIC regimens differed among the centers, and the patient population was fairly heterogeneous, with 15 patients having metastatic disease and seven having locally advanced disease. All but one patient received chemotherapy of various combinations before transplant, and ten patients received local radiation. After HSCT, one patient achieved complete response, two patients had partial response, two had minor response, and eight had stable disease, with an overall response rate of 23%. Median survival was 139 days, and the major cause of death was tumor progression (median duration of survival in advanced pancreatic cancer in the nontransplant setting is less than six months, even in patients treated with gemcitabine). Only one patient survived longer than one-year after transplantation. The authors concluded that a tumor response was observed in one-fourth of patients with advanced pancreatic cancer who underwent HCT and that the response was not durable.

Results from the above studies should be interpreted with caution due to the heterogeneity of patient populations (including previous treatment regimens), small sample size, and short follow-up times, all of which prevent control for biases which can affect study outcomes.

PRACTICE GUIDELINE SUMMARY

NATIONAL COMPREHENSIVE CANCER NETWORK (NCCN)

The NCCN guidelines on the tumors addressed in this policy do not discuss hematopoietic cell transplantation as a treatment option.[22,28]

AMERICAN SOCIETY FOR BLOOD AND MARROW TRANSPLANTATION

In 2015, the American Society for Blood and Marrow Transplantation (ASBMT) issued guidelines related to indications for autologous and allogeneic hematopoietic cell transplantation.[29] The tumors addressed in this review for which ASBMT provides recommendations are as follows:

- Ewing's sarcoma, high risk: allogeneic HCT – N ("not generally recommended"); autologous HCT – C ("standard of care, clinical evidence available")
- Renal cancer, metastatic: allogeneic HCT – D ("developmental"); autologous HCT – N ("not generally recommended").

SUMMARY

There is not enough research to show that hematopoietic cell transplantation (HCT) improves health outcomes for adult patients with the tumors addressed in this policy; therefore, HCT is considered investigational for these indications.

REFERENCES

1. Carnevale-Schianca, F, Ricchiardi, A, Capaldi, A, et al. Allogeneic hemopoietic stem cell transplantation in solid tumors. *Transplant Proc*. 2005 Jul-Aug;37(6):2664-6. PMID: 16182778

2. U.S Food and Drug Administration (FDA). Tissues and Tissue Products. . [cited 01/20/2017]; Available from: http://www.fda.gov/BiologicsBloodVaccines/TissueTissueProducts/default.htm
3. Pedrazzoli, P, Rosti, G, Secondino, S, Carminati, O, Demirer, T. High-dose chemotherapy with autologous hematopoietic stem cell support for solid tumors in adults. *Semin Hematol*. 2007 Oct;44(4):286-95. PMID: 17961729
4. Pedrazzoli, P, Ledermann, JA, Lotz, JP, et al. High dose chemotherapy with autologous hematopoietic stem cell support for solid tumors other than breast cancer in adults. *Ann Oncol*. 2006 Oct;17(10):1479-88. PMID: 16547069
5. Nieto, Y, Shpall, EJ. Autologous stem-cell transplantation for solid tumors in adults. *Hematol Oncol Clin North Am*. 1999 Oct;13(5):939-68, vi. PMID: 10553256
6. Nishimura, M, Nasu, K, Ohta, H, Shintaku, M, Takahashi, Y. High dose chemotherapy for refractory urothelial carcinoma supported by peripheral blood stem cell transplantation. *Cancer*. 1999 Nov 1;86(9):1827-31. PMID: 10547557
7. Airoldi, M, De Crescenzo, A, Pedani, F, et al. Feasibility and long-term results of autologous PBSC transplantation in recurrent undifferentiated nasopharyngeal carcinoma. *Head Neck*. 2001 Sep;23(9):799-803. PMID: 11505492
8. Peinemann, F, Labeit, AM. Autologous haematopoietic stem cell transplantation following high-dose chemotherapy for non-rhabdomyosarcoma soft tissue sarcomas: a Cochrane systematic review*. *BMJ Open*. 2014;4:e005033. PMID: 25079925
9. Verma, S, Younus, J, Stys-Norman, D, Haynes, AE, Blackstein, M. Dose-intensive chemotherapy with growth factor or autologous bone marrow/stem cell transplant support in first-line treatment of advanced or metastatic adult soft tissue sarcoma: a systematic review. *Cancer*. 2008 Mar 15;112(6):1197-205. PMID: 18224666
10. Schlemmer, M, Wendtner, CM, Falk, M, et al. Efficacy of consolidation high-dose chemotherapy with ifosfamide, carboplatin and etoposide (HD-ICE) followed by autologous peripheral blood stem cell rescue in chemosensitive patients with metastatic soft tissue sarcomas. *Oncology*. 2006;71(1-2):32-9. PMID: 17344669
11. Kasper, B, Dietrich, S, Mechtersheimer, G, Ho, AD, Egerer, G. Large institutional experience with dose-intensive chemotherapy and stem cell support in the management of sarcoma patients. *Oncology*. 2007;73(1-2):58-64. PMID: 18334832
12. Kasper, B, Scharrenbroich, I, Schmitt, T, et al. Consolidation with high-dose chemotherapy and stem cell support for responding patients with metastatic soft tissue sarcomas: prospective, single-institutional phase II study. *Bone Marrow Transplant*. 2010 Jul;45(7):1234-8. PMID: 19935728
13. Hartmann, JT, Horger, M, Kluba, T, et al. A non-comparative phase II study of dose intensive chemotherapy with doxorubicin and ifosfamide followed by high dose ICE consolidation with PBSCT in non-resectable, high grade, adult type soft tissue sarcomas. *Investigational new drugs*. 2013 Dec;31(6):1592-601. PMID: 24091981
14. Jiang, J, Shi, HZ, Deng, JM, Liang, QL, Qin, SM, Wu, C. Efficacy of intensified chemotherapy with hematopoietic progenitors in small-cell lung cancer: A meta-analysis of the published literature. *Lung Cancer*. 2009 Aug;65(2):214-8. PMID: 19118919
15. Crivellari, G, Monfardini, S, Stragliotto, S, Marino, D, Aversa, SM. Increasing chemotherapy in small-cell lung cancer: from dose intensity and density to megadoses. *Oncologist*. 2007 Jan;12(1):79-89. PMID: 17227903
16. Lorigan, P, Woll, PJ, O'Brien, ME, Ashcroft, LF, Sampson, MR, Thatcher, N. Randomized phase III trial of dose-dense chemotherapy supported by whole-blood hematopoietic progenitors in better-prognosis small-cell lung cancer. *J Natl Cancer Inst*. 2005 May 4;97(9):666-74. PMID: 15870437

17. Rosti, G, Ferrante, P, Ledermann, J, et al. High-dose chemotherapy for solid tumors: results of the EBMT. *Crit Rev Oncol Hematol*. 2002 Feb;41(2):129-40. PMID: 11856589
18. Demirer, T, Barkholt, L, Blaise, D, et al. Transplantation of allogeneic hematopoietic stem cells: an emerging treatment modality for solid tumors. *Nat Clin Pract Oncol*. 2008 May;5(5):256-67. PMID: 18398414
19. Omazic, B, Remberger, M, Barkholt, L, et al. Long-Term Follow-Up of Allogeneic Hematopoietic Stem Cell Transplantation for Solid Cancer. *Biol Blood Marrow Transplant*. 2016 Apr;22(4):676-81. PMID: 26740375
20. Toh, HC, Chia, WK, Sun, L, et al. Graft-vs-tumor effect in patients with advanced nasopharyngeal cancer treated with nonmyeloablative allogeneic PBSC transplantation. *Bone Marrow Transplant*. 2011 Apr;46(4):573-9. PMID: 20661236
21. Childs, R, Chernoff, A, Contentin, N, et al. Regression of metastatic renal-cell carcinoma after nonmyeloablative allogeneic peripheral-blood stem-cell transplantation. *N Engl J Med*. 2000 Sep 14;343(11):750-8. PMID: 10984562
22. National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines Kidney Cancer v2.2017. [cited 01/22/2018]; Available from: http://www.nccn.org/professionals/physician_gls/PDF/kidney.pdf
23. Bregni, M, Bernardi, M, Servida, P, et al. Long-term follow-up of metastatic renal cancer patients undergoing reduced-intensity allografting. *Bone Marrow Transplant*. 2009 Aug;44(4):237-42. PMID: 19234510
24. Imanguli, MM, Childs, RW. Hematopoietic stem cell transplantation for solid tumors. *Update Cancer Ther*. 2006;1(3):343-52. PMID: No PMID Entry
25. Aglietta, M, Barkholt, L, Schianca, FC, et al. Reduced-intensity allogeneic hematopoietic stem cell transplantation in metastatic colorectal cancer as a novel adoptive cell therapy approach. The European group for blood and marrow transplantation experience. *Biol Blood Marrow Transplant*. 2009 Mar;15(3):326-35. PMID: 19203723
26. Abe, Y, Ito, T, Baba, E, et al. Nonmyeloablative allogeneic hematopoietic stem cell transplantation as immunotherapy for pancreatic cancer. *Pancreas*. 2009 Oct;38(7):815-9. PMID: 19696692
27. Kanda, Y, Omuro, Y, Baba, E, et al. Allo-SCT using reduced-intensity conditioning against advanced pancreatic cancer: a Japanese survey. *Bone Marrow Transplant*. 2008 Jul;42(2):99-103. PMID: 18391987
28. National Comprehensive Cancer Network (NCCN) Guidelines. Version 1.2017 Soft Tissue Sarcoma. . [cited 01/22/2018]; Available from: http://www.nccn.org/professionals/physician_gls/PDF/sarcoma.pdf
29. Majhail, NS, Farnia, SH, Carpenter, PA, et al. Indications for Autologous and Allogeneic Hematopoietic Cell Transplantation: Guidelines from the American Society for Blood and Marrow Transplantation. *Biol Blood Marrow Transplant*. 2015 Nov;21(11):1863-9. PMID: 26256941
30. BlueCross BlueShield Association Medical Policy Reference Manual "Hematopoietic Stem-Cell Transplant for Miscellaneous Solid Tumors in Adults." Policy No. 8.01.24

CODES

Codes	Number	Description
CPT	38204	Management of recipient hematopoietic cell donor search and cell acquisition
	38205	Blood-derived hematopoietic progenitor cell harvesting for transplantation, per collection, allogeneic

Codes	Number	Description
	38206	;autologous
	38207	Transplant preparation of hematopoietic progenitor cells; cryopreservation and storage
	38208	;thawing of previously frozen harvest, without washing, per donor
	38209	;thawing of previously frozen harvest with washing, per donor
	38210	;specific cell depletion with harvest, T cell depletion
	38211	;tumor cell depletion
	38212	;red blood cell removal
	38213	;platelet depletion
	38214	;plasma (volume) depletion
	38215	;cell concentration in plasma, mononuclear, or buffy coat layer
	38220	Diagnostic bone marrow; aspiration(s)
	38221	Diagnostic bone marrow; biopsy(ies)
	38222	Diagnostic bone marrow; biopsy(ies) and aspiration(s)
	38230	Bone marrow harvesting for transplantation; allogeneic
	38232	Bone marrow harvesting for transplantation; autologous
	38240	Bone marrow or blood-derived peripheral stem-cell transplantation; allogeneic
	38241	;autologous
	38242	Allogeneic donor lymphocyte infusions
	38243	Hematopoietic progenitor cell (HPC); allogeneic transplantation per donor, HPC boost
HCPCS	J9000–J9999	Chemotherapy drugs code range
	Q0083–Q0085	Chemotherapy administration code range
	S2140	Cord blood harvesting for transplantation; allogeneic
	S2142	Cord blood derived stem-cell transplantation, allogeneic
	S2150	Bone marrow or blood-derived peripheral stem-cell harvesting and transplantation, allogeneic or autologous, including pheresis, high-dose chemotherapy, and the number of days of post-transplant care in the global definition (including drugs; hospitalization; medical surgical, diagnostic and emergency services)

APPENDIX I: GLOSSARY OF TERMS

consolidation therapy[1] - Treatment that is given after cancer has disappeared following the initial therapy. Consolidation therapy is used to kill any cancer cells that may be left in the body. It may include radiation therapy, a stem cell transplant, or treatment with drugs that kill cancer cells. Also called intensification therapy and postremission therapy.

relapse[2] - The return of a disease or the signs and symptoms of a disease after a period of improvement.

salvage therapy[3] - Treatment that is given after the cancer has not responded to other treatments.

tandem transplant[4] – Refers to a planned second course of high-dose therapy and HCT within six months of the first course.

1. NCI Dictionary of Cancer Terms | https://www.cancer.gov/publications/dictionaries/cancer-terms?cdrid=45654 | Accessed Sep 26 2016
2. NCI Dictionary of Cancer Terms | https://www.cancer.gov/publications/dictionaries/cancer-terms?CdrID=45866 | Accessed Sep 26 2016
3. NCI Dictionary of Cancer Terms | https://www.cancer.gov/publications/dictionaries/cancer-terms?cdrid=44176 | Accessed Sep 26 2016

4. NCCN Guidelines Version 2.2016 Multiple Myeloma | https://www.nccn.org/professionals/physician_gls/pdf/myeloma.pdf | Accessed Sep 26 2016

Date of Origin: *May 2010*