Small Bowel/Liver and Multivisceral Transplant

**I. Description**
Small bowel/liver transplantation is transplantation of an intestinal allograft in combination with a liver allograft, either alone or in combination with one or more of the following organs: stomach, duodenum, jejunum, ileum, pancreas, or colon.

**Background**
Small bowel transplants are typically performed in patients with short bowel syndrome, defined as an inadequate absorbing surface of the small intestine due to extensive disease or surgical removal of a large portion of small intestine. In some instances, short bowel syndrome is associated with liver failure, often due to the long-term complications of total parenteral nutrition (TPN). These patients may be candidates for a small bowel/liver transplant or a multivisceral transplant, which includes the small bowel and liver with 1 or more of the following organs: stomach, duodenum, jejunum, ileum, pancreas, and/or colon. A multivisceral transplant is indicated when anatomic or other medical problems preclude a small bowel/liver transplant.

**II. Policy**
A. A small bowel/liver transplant or multivisceral transplant is covered (subject to Administrative Guidelines) for pediatric and adult patients with intestinal failure (characterized by loss of absorption and the inability to maintain protein-energy, fluid, electrolyte, or micronutrient balance) who have been managed with long-term total parenteral nutrition (TPN) and who have developed evidence of impending end-stage liver failure.
III. Policy Guidelines

General

A. Potential contraindications to solid organ transplant (subject to the judgment of the transplant center):
   1. Known current malignancy, including metastatic cancer
   2. Recent malignancy with high risk of recurrence
   3. History of cancer with a moderate risk of recurrence
   4. Systemic disease that could be exacerbated by immunosuppression
   5. Untreated systemic infection making immunosuppression unsafe, including chronic infection
   6. Other irreversible end-stage disease not attributed to intestinal failure
   7. Psychosocial conditions or chemical dependency affecting ability to adhere to therapy

B. Intestinal failure results from surgical resection, congenital defect, or disease-associated loss of absorption and is characterized by the inability to maintain protein-energy, fluid, electrolyte, or micronutrient balance (adapted from reference 1). (1) Short bowel syndrome is one case of intestinal failure.

C. Candidates should meet the following criteria:
   - Adequate cardiopulmonary status
   - Documentation of patient compliance with medical management

D. HIV [human immunodeficiency virus]-positive patients who meet the following criteria, as stated in the 2001 guidelines of the American Society of Transplantation, could be considered candidates for small bowel/live or multivisceral transplantation:
   - CD4 count greater than 200 cells per cubic millimeter for greater than 6 months
   - HIV-1 RNA undetectable
   - On stable anti-retroviral therapy >3 months
   - No other complications from AIDS [acquired immune deficiency syndrome] (e.g., opportunistic infection, including aspergillus, tuberculosis, coccidiosis mycosis, resistant fungal infections, Kaposi’s sarcoma, or other neoplasm), and meeting all other criteria for transplantation

Small Bowel/Liver Specific

Evidence of intolerance of total parenteral nutrition (TPN) includes, but is not limited to, multiple and prolonged hospitalizations to treat TPN-related complications, or the development of progressive but reversible liver failure. In the setting of progressive liver failure, small bowel transplant may be considered a technique to avoid end-stage liver failure related to chronic TPN, thus avoiding the necessity of a multivisceral transplant.

IV. Administrative Guidelines

A. Precertification is required for this service as well as any transplant evaluations. To precertify, please complete HMSA’s Precertification Request and mail or fax the form as indicated along with the required documentation.
<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>44120</td>
<td>Enterectomy, resection of small intestine; single resection and anastomosis</td>
</tr>
<tr>
<td>44121</td>
<td>;each additional resection and anastomosis</td>
</tr>
<tr>
<td>44132</td>
<td>Donor enterectomy (including cold preservation), open; from cadaveric donor</td>
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<tr>
<td>44133</td>
<td>;partial, from living donor</td>
</tr>
<tr>
<td>44715</td>
<td>Backbench standard preparation of cadaver or living donor intestine allograft prior to transplantation, including mobilization and fashioning of the superior mesenteric artery and vein</td>
</tr>
<tr>
<td>44720</td>
<td>Backbench reconstruction of cadaver or living donor intestine allograft prior to transplantation, venous anastomosis, each</td>
</tr>
<tr>
<td>44721</td>
<td>;arterial anastomosis, each</td>
</tr>
<tr>
<td>44799</td>
<td>Unlisted procedure, intestine</td>
</tr>
<tr>
<td>47133</td>
<td>Donor hepatectomy (including cold preservation), from cadaver donor</td>
</tr>
<tr>
<td>47135</td>
<td>Liver allotransplantation, orthotopic, partial or whole, cadaver or living donor, any age</td>
</tr>
<tr>
<td>47136</td>
<td>heterotopic, partial or whole, cadaver or living donor any age</td>
</tr>
<tr>
<td>47140</td>
<td>Donor hepatectomy (including cold preservation), from living donor; left lateral segment only (segments II and III)</td>
</tr>
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<td>47141</td>
<td>total left lobectomy (segments II, III, or IV)</td>
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<tr>
<td>47142</td>
<td>total right lobectomy (segments V, VI, VII, and VIII)</td>
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<tr>
<td>47143</td>
<td>Backbench standard preparation of cadaver donor whole liver graft prior to allotransplantation, including cholecystectomy, if necessary, and dissection and removal of surrounding tissues to prepare the vena cava, portal vein, hepatic artery, and common bile duct for implantation; without trisegment or lobe split</td>
</tr>
<tr>
<td>47144</td>
<td>with trisegment split of whole liver graft into two partial liver grafts (i.e., left lateral segment (segments II and III) and right trisegment (segments I and IV through VIII))</td>
</tr>
<tr>
<td>47145</td>
<td>with lobe split of whole liver graft into two partial liver grafts (i.e., left lobe (segments II, III and IV) and right lobe (segments I and V through VIII))</td>
</tr>
<tr>
<td>47146</td>
<td>Backbench reconstruction of cadaver or living donor liver graft prior to allotransplantation; venous anastomosis</td>
</tr>
<tr>
<td>47147</td>
<td>arterial anastomosis, each</td>
</tr>
<tr>
<td><strong>HCPCS Code</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>S2053</td>
<td>Transplantation of small intestine, and liver allografts</td>
</tr>
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</table>
V. Rationale

This policy was originally created in 1995 and was updated regularly with searches of the MEDLINE database. The most recent literature search was performed for the period April 2011 through April 2012.

A 1999 TEC Assessment focused on multivisceral transplantation and offered the following conclusions:

Multivisceral transplantation in patients with small bowel syndrome, liver failure, and/or other gastrointestinal problems such as pancreatic failure, thromboses of the celiac axis and the superior mesenteric artery, or pseudo-obstruction affecting the entire gastrointestinal tract associated with poor patient and graft survival. Pediatric and adult patients have a similar 2- and 5-year survival of 33–50%. However, without this procedure, it is expected that these patients would face 100% mortality. (2)

The published literature consists of case series, mainly reported by single centers. Authors of these reports, as well as reviews, observe that while outcomes continue to improve, recurrent and chronic rejection and complications of immunosuppression continue to be obstacles to long-term survival.

In 2010, Nayyar and colleagues reported that there had been improvements in 5-year actuarial patient and graft survival after liver/small bowel transplant since the use of rabbit antithymocyte globulin (rATG) induction began to be used in their pediatric center in 2002 (81% vs. 58% and 76% vs. 52%, respectively). (3) In addition to innovations in immunosuppressive therapy, the authors cited new approaches to management of short gut syndrome including hypoallergenic formulas and modification of enteral nutrition to prevent total parenteral nutrition (TPN)-induced cholestasis. The authors noted that better understanding of the protective role of the liver in preventing chronic rejection of the small bowel allograft could improve long-term survival after isolated small bowel transplantation.

Abu-Elmgagd et al., reporting on experience with 500 intestinal and multivisceral transplantations, also found that the best outcomes in their series were in the intestine-liver allografts. (4) The study found 1- and 5-year patient survival of 92% and 70%, respectively.

Several recent series have focused on complications after small bowel and multivisceral transplantation. For example, in 2011 Wu and colleagues reported on 241 patients who underwent intestinal transplantation. (5) Of these, 147 (61%) had multivisceral transplants, 65 (27%) had small bowel transplants, and 12% had small bowel/liver transplants. There were 151 children (63%) and 90 adults. A total of 22 patients (9%) developed graft-versus-host disease (GVHD). Children younger
than 5 years-old were more likely to develop GVHD; the incidence in this age group was 16 of 121 (13.2%) compared to 2 of 30 (6.7%) in children between 5 and 18 years and 9 of 90 (4.4%) in adults older than 18 years. In addition, a 2012 article retrospectively reported on bloodstream infections among 98 children younger than age 18 years with small bowel/combined organ transplants. (6) Seventy-seven (79%) patients underwent small bowel transplant in combination with a liver, kidney or kidney-pancreas, and 21 had an isolated small bowel transplant. After a median follow-up of 52 months, 58 (59%) patients remained alive. The 1-year survival rate was similar in patients with combined small bowel transplant (75%) and those with isolated small bowel transplant (81%). In the first year after transplantation, 68 patients (69.4%) experienced at least one episode of bloodstream infection. The 1-year survival rate for patients with bloodstream infections was 72% compared to 87% in patients without bloodstream infections (p-value= 0.056 for difference in survival in patients with and without bloodstream infections).

**HIV-Positive Transplant Recipients**

This subgroup of recipients has long been controversial, due to the long-term prognosis for HIV positivity and the impact of immunosuppression on HIV disease. Although HIV-positive transplant recipients may be a research interest of some transplant centers, the minimal data regarding long-term outcome in these patients primarily consist of case reports and abstract presentations of liver and kidney recipients. Nevertheless, some transplant surgeons would argue that HIV positivity is no longer an absolute contraindication to transplant due to the advent of highly active antiretroviral therapy (HAART), which has markedly changed the natural history of the disease. In 2001, the Clinical Practice Committee of the American Society of Transplantation proposed that the presence of AIDS could be considered a contraindication to kidney transplant unless the following criteria were present. (7) These criteria may be extrapolated to other organs:

- CD4 count greater than 200 cells/mm-3 for more than 6 months
- HIV-1 RNA undetectable
- On stable antiretroviral therapy for more than 3 months
- No other complications from AIDS (e.g., opportunistic infection, including aspergillus, tuberculosis, coccidioses mycosis, resistant fungal infections, Kaposi’s sarcoma, or other neoplasm).
- Meeting all other criteria for transplantation.

In 2006, the British HIV Association and the British Transplantation Society Standards Committee published guidelines for kidney transplantation in patients with HIV disease. (8) As described above, these criteria may be extrapolated to other organs.

The guidelines, which are similar to those cited here, recommend that any patient with end-stage organ disease with a life expectancy of at least 5 years is considered appropriate for transplantation under the following conditions:

- CD4 greater than 200 cells/mL for at least 6 months
- Undetectable HIV viremia (<50 HIV-1 RNA copies/mL) for at least 6 months
Demonstrable adherence and a stable HAART regimen for at least 6 months
Absence of AIDS-defining illness following successful immune reconstitution after HAART.

Furthermore, as of November 2010, the United Network for Organ Sharing (UNOS) policy on identification of transmissible diseases in organ recipients states, “A potential candidate for organ transplantation whose test for HIV is positive should not be excluded from candidacy for organ transplantation unless there is a documented contraindication to transplantation based on local policy.” (9)

No studies that reported on outcomes in HIV-positive patients who received small bowel/liver or multivisceral transplants have been identified in literature searches.

Summary
Evidence for small bowel/liver and multivisceral transplant consists of case series. Though infrequently performed, the procedures are demonstrated to provide a survival benefit, and the procedure is considered medically necessary for patients who have been managed with long-term total parenteral nutrition and who have developed evidence of impending end-stage liver failure.

Medicare National Coverage
Medicare will cover intestinal transplantation for the purposes of restoring intestinal function in patients with irreversible intestinal failure only when performed for patients who have failed TPN and only when performed in centers that meet approved criteria. (10) The criteria for approval of centers will be based on an annual volume of 10 intestinal transplants per year with a 1-year actuarial survival of 65% (these criteria were reviewed again in 2006 and upheld).

VI. Important Reminder
The purpose of this Medical Policy is to provide a guide to coverage. This Medical Policy is not intended to dictate to providers how to practice medicine. Nothing in this Medical Policy is intended to discourage or prohibit providing other medical advice or treatment deemed appropriate by the treating physician.

Benefit determinations are subject to applicable member contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control.

This Medical Policy has been developed through consideration of the medical necessity criteria under Hawaii’s Patients’ Bill of Rights and Responsibilities Act (Hawaii Revised Statutes §432E-1.4), generally accepted standards of medical practice and review of medical literature and government approval status. HMSA has determined that services not covered under this Medical Policy will not be medically necessary under Hawaii law in most cases. If a treating physician disagrees with HMSA’s determination as to medical necessity in a given case, the physician may request that HMSA reconsider the application of the medical necessity criteria to the case at issue in light of any supporting documentation.
References

2. Blue Cross and Blue Shield Technology Evaluation Center (TEC). TEC Assessment. 1999; Volume 14(Tab 9).