Kansas City

An Independent Licensee of the Blue Cross and Blue Shield Association

Isolated Small Bowel Transplant

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Policy

Blue Cross and Blue Shield of Kansas City (Blue KC) will provide coverage for a small bowel transplant when it is determined to be medically necessary because the criteria shown below are met.

When Policy Topic is covered

A small bowel transplant using cadaveric intestine may be considered **medically necessary** in adult and pediatric patients with intestinal failure (characterized by loss of absorption and the inability to maintain protein-energy, fluid, electrolyte, or micronutrient balance), who have established long-term dependency on total parenteral nutrition (TPN) and are developing or have developed severe complications due to TPN.

A small bowel transplant using a living donor may be considered **medically necessary** only when a cadaveric intestine is not available for transplantation in a patient who meets the criteria noted above for a cadaveric intestinal transplant.

A small bowel retransplant may be considered **medically necessary** after a failed primary small bowel transplant.

When Policy Topic is not covered

A small bowel transplant is considered **investigational** for adults and pediatric patients with intestinal failure who are able to tolerate TPN.

A small bowel transplant using living donors is considered **not medically necessary** in all other situations.

Considerations

General

Potential contraindications subject to the judgment of the transplant center:

1. Known current malignancy, including metastatic cancer
2. Recent malignancy with high risk of recurrence
3. Untreated systemic infection making immunosuppression unsafe, including chronic infection
4. Other irreversible end-stage disease not attributed to intestinal failure

5. History of cancer with a moderate risk of recurrence
6. Systemic disease that could be exacerbated by immunosuppression
7. Psychosocial conditions or chemical dependency affecting ability to adhere to therapy

Small Bowel Specific
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). Short-bowel syndrome is one case of intestinal failure.

Patients who are developing or have developed severe complications due to TPN include, but are not limited to the following: multiple and prolonged hospitalizations to treat TPN-related complications (especially repeated episodes of catheter-related sepsis) or the development of progressive 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. In those receiving TPN, liver disease with jaundice (total bilirubin above 3 mg/dl) is often associated with development of irreversible progressive liver disease. The inability to maintain venous access is another reason to consider small bowel transplant in those who are dependent on TPN.

Small bowel transplants should be considered for coverage under the Transplant Benefit.

Transplant Benefit
Transplant requests should be reviewed by the Plan medical director or his or her designee. Only patients accepted for transplantation by an approved transplantation center and actively listed for transplant should be considered for precertification or prior approval. Guidelines should be followed for transplant network or consortiums, if applicable.

Small bowel transplants should be considered for coverage under the transplant benefit.

What is covered under the scope of the human organ transplant (HOT) benefit needs to be considered. Typically, the following are covered under the HOT benefit:

- hospitalization of the recipient for medically recognized transplants from a donor to a transplant recipient;
- evaluation tests requiring hospitalization to determine the suitability of both potential and actual donors, when such tests cannot be safely and effectively performed on an outpatient basis;
- hospital room, board, and general nursing in semiprivate rooms;
- special care units, such as coronary and intensive care;
- hospital ancillary services;

- physicians' services for surgery, technical assistance, administration of anesthetics, and medical care;
- acquisition, preparation, transportation, and storage of organ;
- diagnostic services;
- drugs that require a prescription by federal law.

Expenses incurred in the evaluation and procurement of organs and tissues are benefits when billed by the hospital. Included in these expenses may be specific charges for participation with registries for organ procurement, operating rooms, supplies, use of hospital equipment, and transportation of the tissue or organ to be evaluated.

Administration of products with a specific transplant benefit needs to be defined as to:

- when the benefit begins (at the time of admission for the transplant or once the patient is determined eligible for a transplant, which may include tests or office visits prior to transplant);
- when the benefit ends (at the time of discharge from the hospital or at the end of required follow-up, including the immunosuppressive drugs administered on an outpatient basis).

Coverage usually is not provided for:

- HOT services, for which the cost is covered/funded by governmental, foundational, or charitable grants;
- organs sold rather than donated to the recipient;
- an artificial organ.

Description of Procedure or Service

Populations	Interventions	Comparators	Outcomes
Individuals: ▪ With intestinal failure	Interventions of interest are: ▪ Small bowel transplant	Comparators of interest are: ▪ Medical management ▪ Parenteral nutrition	Relevant outcomes include: ▪ Overall survival ▪ Morbid events ▪ Treatment-related mortality ▪ Treatment-related morbidity
Individuals: ▪ With failed small bowel transplant without contraindication(s) for retransplant	Interventions of interest are: ▪ Small bowel retransplant.	Comparators of interest are: ▪ Medical management ▪ Parenteral nutrition	Relevant outcomes include: ▪ Overall survival ▪ Morbid events ▪ Treatment-related mortality ▪ Treatment-related morbidity

A small bowel transplant may be performed as an isolated procedure or in conjunction with other visceral organs, including the liver, duodenum, jejunum, ileum, pancreas, or colon. Isolated small bowel transplant is commonly performed in patients with short bowel syndrome. Small bowel/liver transplants and multivisceral transplants are considered in separate policy.

For individuals who have intestinal failure who receive a small bowel transplant, the evidence includes case series. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. Small bowel transplant is

infrequently performed, and only relatively small case series, generally single-center, are available. Risks after small bowel transplant are high, particularly related to infection, but may be balanced against the need to avoid the long-term complications of total parenteral nutrition dependence. In addition, early small bowel transplant may obviate the need for a later combined liver/small bowel transplant. Transplantation is contraindicated in patients in whom the procedure is expected to be futile due to comorbid disease or in whom posttransplantation care is expected to worsen comorbid conditions significantly. Guidelines and U.S. federal policy no longer view HIV infection as an absolute contraindication for solid organ transplantation. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have failed small bowel transplant without contraindication(s) for retransplant who receive a small bowel retransplant, the evidence includes case series. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. Data from a small number of patients undergoing retransplantation are available. Although limited in quantity, the available data have suggested a reasonably high survival rate after small bowel retransplantation in patients who continue to meet criteria for transplantation. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

Based on clinical input, small bowel transplantation using a living donor may be considered medically necessary only when a cadaveric intestinal transplant is not available. Routine use of living donor intestinal transplants is considered not medically necessary because the net health outcome associated with this procedure is reduced (compared with cadaveric transplant) due to donor-related morbidity.

Background

Small Bowel Syndrome

Short bowel syndrome is a condition in which the absorbing surface of the small intestine is inadequate due to extensive disease or surgical removal of a large portion of small intestine. In adults, etiologies of short bowel syndrome include ischemia, trauma, volvulus, and tumors. In children, gastroschisis, volvulus, necrotizing enterocolitis, and congenital atresia are predominant causes.

Treatment

The small intestine, particularly the ileum, can adapt to some functions of the diseased or removed portion over a period of 1 to 2 years. Prognosis for recovery depends on the degree and location of small intestine damage. Therapy focuses on achieving adequate macro- and micronutrient uptake in the remaining small bowel. Pharmacologic agents have been studied to increase villous proliferation and slow transit times, and surgical techniques have been advocated to optimize remaining small bowel.

However, some patients with short bowel syndrome are unable to obtain adequate nutrition from enteral feeding and become chronically dependent on total

parenteral nutrition. Patients with complications from total parenteral nutrition may be considered candidates for a small bowel transplant. Complications include catheter-related mechanical problems, infections, hepatobiliary disease, and metabolic bone disease. While cadaveric intestinal transplant is the most commonly performed transplant, there has been a recent interest in using living donors.

Intestinal transplants (including multivisceral and bowel/liver) represent a small minority of all solid organ transplants. In 2016, 147 intestinal transplants were performed in the United States; all were from cadaver donors.[1]

Regulatory Status

Small bowel transplantation is a surgical procedure and, as such, is not subject to regulation by the U.S. Food and Drug Administration.

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 title 21, parts 1270 and 1271. Small bowel transplants are included in these regulations.

Rationale

Literature Review

The evidence review was created in December 1995 and has been updated regularly with searches of the MEDLINE database. The most recent literature update was performed through June 7, 2018.

Evidence reviews assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function—including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. Randomized controlled trials are rarely large enough or long enough to capture less common adverse events and long-

term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

Small bowel transplantation

Clinical Context and Test Purpose

The purpose of a small bowel transplant in patients who have an intestinal failure is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does a small bowel transplant improve the net health outcome in individuals with intestinal failure?

The following PICOTS were used to select literature to inform this review.

Patients

The relevant population of interest is individuals with intestinal failure.

Interventions

The therapy being considered is small bowel transplant.

Comparators

The following practices are currently being used to make decisions about intestinal failure: medical management and parenteral nutrition.

Outcomes

The general outcomes of interest are overall survival and treatment-related adverse events (eg, immunosuppression, graft failure, surgical complications, infections). See the Adverse Events section for a detailed discussion.

Timing

Short-term follow-up ranges from immediately postsurgery to 30 days posttransplantation; lifelong follow-up (out to at 10 years or more given current survival data) is necessary due to ongoing immunosuppression drugs and risk of graft failure.

Setting

Small bowel transplantation is provided in a hospital setting by specialized staff who are equipped to perform the surgical procedure and manage postsurgical intensive care.

Systematic Reviews

This evidence review has been informed by 2 TEC Assessments conducted in the 1990s. The first TEC Assessment (1995) concluded that, in children, small bowel transplant was associated with improved survival rates compared with total parenteral nutrition (TPN) because the associated adverse events for small bowel transplant were offset by severe TPN-related complications.[2] The second TEC Assessment (1999) reevaluated the data on adults and concluded that, because it

is not possible to predict which patients would survive longer on TPN vs small bowel transplant, transplantation may be considered a reasonable option in select adults.[3]

Case Series

Most of the published literature consists of case series, mainly reported by single centers in the United States, Japan, and Europe. Tables 1 and 2 summarize the characteristics and results of these case series, respectively. Many case series have included small bowel/liver transplantations and multivisceral transplantations (which are the focus of a separate policy).

Reasons for transplantations were mainly short bowel syndrome. Other reasons included congenital enteropathies and motility disorders. The most common outcomes reported were survival rates and weaning off TPN. Several studies have presented survival rates by type of transplantation, while others have combined all types of transplants when reporting survival rates. When rates were reported by type of transplant, isolated transplantations had higher survival rates than multivisceral transplants (see Table 2).

Several investigators have reported higher survival rates in transplantations conducted more recently than those conducted earlier.[4,5] Reasons for improved survival rates in more recent years have been attributed to the development of more effective immunosuppressive drugs and the learning curve for the complex procedure.

Sudan (2010) published a review of current literature on long-term outcomes after intestinal transplantation.[6] Sudan noted that intestinal transplantation had become standard therapy for patients with life-threatening complications from parenteral nutrition therapy. Data from current single-center series have indicated 1-year patient survival rates between 78% and 85% and 5-year or more survival rates between 56% and 61%. Concerning pediatric intestinal transplant patients, most achieve normal growth velocity at 2 years posttransplant. However, oral aversion is common; tube feedings are necessary for 45% of children. Sudan also reported on parental surveys of quality of life for pediatric transplant patients in which intestinal transplant patients appear to have modestly improved quality of life compared with those remaining on TPN and slightly worse than matched school-age controls without intestinal disease.

Authors of these series, as well as related reviews, have observed that while outcomes have improved over time, recurrent and chronic rejection and complications of immunosuppression continue to be obstacles to long-term survival. A separate discussion of adverse events follows the evidence tables.

Table 1. Summary of Key Case Series Characteristics for Transplantations

Study	Location	N	Median Age (Range), y	Interventions		Follow-Up (Range), mo
				Treatment	**n**	
Lacaille et al	France	110	5.3 (0.4-19)	▪ Isolated IT	60	Of 55 alive:

(2017)[7]				▪ Combined liver IT ▪ Multivisceral graft	45 5	▪ 17 at <5 y ▪ 17 at 5-10 y ▪ 21 at ≥10 y	
Garcia Aroz et al (2017)[8],[a]	U.S.	10	1.5 (0.7-13)	▪ Isolated IT ▪ Combined liver IT	7 3	6/7 alive at follow-up ≥10 y	
Dore et al (2016)[9]	U.S.	30	0.2 (0.1-18)	▪ Isolated IT ▪ Combined liver IT ▪ Multivisceral graft	6 6 18	28 (4-175)	
Rutter et al (2016)[10]	U.K.	60	1.8 (0-8)	▪ Isolated IT ▪ Multivisceral graft ▪ Modified multivisceral	16 35 9	21.3 (0-95)	
Lauro et al (2014)[11]	Italy	46	34 (NR)	▪ Isolated IT ▪ Combined liver IT ▪ Multivisceral graft	34 6 6	51.3	
Ueno et al (2014)[4],[b]	Japan	24	0-2 y: 6[c] 3-6 y: 6 7-18 y: 8 ≥19 y: 4	▪ Isolated IT ▪ Combined liver IT	23 1	NR	
Benedetti et al (2006)[5],[a]	U.S.	11	27 (1.5-50)	▪ Isolated IT	11	NR	

IT: intestinal transplantation; NR: not reported.
[a] All living donors.
[b] Twelve living donors and 12 cadaveric donors.
[c] Reported as age range and n.

Table 2. Summary of Key Case Series Results for Transplantations

Study	Interventions		Survival		Off Total Parenteral Nutrition	
	Treatment	**n**	**Years**	**%**	**Measure**	**%**
Lacaille et al (2017)[7]	▪ Isolated IT ▪ Combined liver ▪ Multivisceral graft	60 45 5	10 18 10 NR	59 54 48 NR	All combined at last FU	73
Garcia Aroz et al (2017)[8],[a]	▪ Isolated IT ▪ Combined liver IT	7 3	All combined:	70	All combined at last FU	100
Dore et al (2016)[9]	▪ Isolated IT ▪ Combined liver IT ▪ Multivisceral graft	6 6 18	9 10 2.5	83 33 67	All combined: ▪ in 31 days ▪ at last FU	 71 62
Rutter et al (2016)[10]	▪ Isolated IT ▪ Multivisceral graft ▪ Modified multivisceral	16 35 9	1 5 1 5 1 5	92 37 71 33 85 65		NR
Lauro et al (2014)[11]	▪ Isolated IT ▪ Combined liver IT ▪ Multivisceral graft	34 6 6	All combined: 1 3 5 10	77 58 53 37		NR
Ueno et al (2014)[4],[b]	▪ Isolated IT	23	All combined:	86		80

	▪ Combined liver IT	1	15	68		
Benedetti et al (2006)[5,a]	▪ Isolated IT	11	13	82 82		100

FU: follow-up; IT: intestinal transplantation; NR: not reported.
[a] All living donors.
[b] Twelve living donors and 12 cadaveric donors.

Adverse Events

Systematic Reviews

One issue discussed in intestinal transplantation literature is an earlier referral to avoid combined liver and intestine transplantation.[12] It has been suggested that removing the restriction on intestinal transplantation to patients who have severe complications from TPN and recommending earlier transplantation may improve survival. However, in a review of the status of intestinal transplantation, Vianna et al (2008) identified no randomized trials that compared intestinal transplantation with long-term TPN; therefore, optimal timing for earlier transplantation has not been established.[13]

Case Series

Wu et al (2016) investigated the incidence and risk factors of acute antibody-mediated rejection (ABMR) among patients undergoing intestinal transplantation (N=175).[14] Patients were 25 years of age. Acute ABMR was diagnosed by clinical evidence; histologic evidence of tissue damage; focal or diffuse linear C4d deposition; and circulating anti-human leukocyte antigen antibodies. Of the 175 intestinal transplants, 58% were liver-free small intestine grafts, 36% included a liver graft, and 6.3% were retransplantations. Eighteen cases of acute ABMR were identified, 14 (14%) among the patients undergoing first liver-free transplantation, 2 (3%) among patients undergoing liver/small bowel transplantations, and 2 (18%) among the patients undergoing retransplantation. Graft failure occurred in 67% of patients with acute ABMR. The presence of a donor-specific antibody and a liver-free graft were associated with the development of acute ABMR.

Florescu et al (2012) have published several retrospective reviews of complications in a cohort of 98 pediatric patients. Twenty-one (21.4%) of these children had an isolated small bowel transplant; the remainder had combined transplants. Their 2012 study reported that 68 (69%) of the 98 patients developed at least 1 episode of bloodstream infection.[15] Among patients with an isolated small bowel transplant, the median time to infection for those who developed one was 4.5 months (95% confidence interval, 2.4 to 6.7 months). Also in 2012, these researchers reported that 7 (7%) of 98 patients developed cytomegalovirus disease; only 1 had an isolated small bowel transplant.[16] Florescu et al (2010) previously reported that, in 25 (25.5%) of 98 cases reviewed who developed at least 1 episode of fungal infection, Candida infection was most common.[17] Mortality rates did not differ significantly between patients who did (32.3%) and did not develop a fungal infection (29.8%; p=0.46).

Several other series have reported on renal failure after intestinal transplantation. For example, Calvo Pulido et al (2014) reported on 21 adults who underwent intestinal transplantation; 17 were isolated small bowel transplants.[18] Thirteen (62%) patients experienced renal failure; the etiology included high ileostomy output, immunosuppression, and medical treatment. Boyer et al (2013) reported that 7 of 12 children who had an isolated small bowel transplant developed renal function complications at some point after surgery.[19] Before treatment, all patients had normal renal functioning.

Living Donor Transplants

Cadaveric intestines are most commonly used, but recently there has been an interest in using a portion of intestine harvested from a living, related donor. Potential advantages of a living donor include the ability to plan the transplantation electively and better antigen matching, leading to improved management of rejection. Case reports from the 1990s have reported on 1 or 2 patients with different lengths of the ileum or jejunum.[20-23] While there appear to be few complications to the donors, of the 6 cases reported, 5 recipients remain on TPN for at least part of their caloric intake. One patient was weaned off TPN.

Tables 1 and 2 provide details on case series that used living donors (Garcia Aroz et al [2017],[8] Ueno et al [2014],[4] Benedetti et al [2006][5]). In general, survival rates of recipients with living donors are comparable to rates for recipients of cadaveric donations. Living related donors were reported to have an uneventful recovery. Weight loss and diarrhea were reported among donors, but recovery was without complications.

HIV-Positive Transplant Recipients

The 2013 HIV Organ Policy Equity Act in the United States permitted scientists to research organ donations from a person with HIV to another HIV-infected person.[24] In 2015, the Organ Procurement and Transplant Network updated its policies to be consistent with the HIV Organ Policy Equity Act.[25] The Organ Procurement and Transplant Network and United Network for Organ Sharing policies specify that organs from HIV-positive patients be used only for HIV-positive transplant recipients.

Current Organ Procurement and Transplantation policy permits HIV-positive transplant candidates.[26]

The British HIV Association and the British Transplantation Society (2017) updated their guidelines on kidney transplantation in patients with HIV disease.[27] These criteria may be extrapolated to other organs:

- Adherent with treatment, particularly antiretroviral therapy
- Cluster of differentiation 4 count greater than 100 cells/mL (ideally >200 cells/mL) for at least 3 months
- Undetectable HIV viremia (<50 HIV-1 RNA copies/mL) for at least 6 months
- No opportunistic infections for at least 6 months

- No history of progressive multifocal leukoencephalopathy, chronic intestinal cryptosporidiosis, or lymphoma.

Section Summary: Small Bowel Transplantation
Small bowel transplant is infrequently performed, and only relatively small case series, generally single-center, are available. Risks after small bowel transplant are high, particularly related to infection, but may be balanced against the need to avoid the long-term complications of TPN dependence. In addition, early small bowel transplant may obviate the need for a later combined liver/small bowel transplant. Guidelines and U.S. federal policy no longer view HIV infection as an absolute contraindication for solid organ transplantation.

Small Bowel Retransplantation

Clinical Context and Test Purpose
The purpose of small bowel retransplant in patients who have failed small bowel transplant and do not have contraindication(s) for retransplant is to provide a treatment option that is an alternative to or an improvement on existing therapies.

The question addressed in this evidence review is: Does small bowel retransplant improve the net health outcome in individuals whose small bowel transplant has failed?

The following PICOTS were used to select literature to inform this review.

Patients
The relevant population of interest is individuals who have failed small bowel transplant and do not have contraindication(s) for retransplant.

Interventions
The therapy being considered is a small bowel retransplant.

Comparators
The following practices are currently being used to make decisions about the intestinal failure of an initial small bowel transplant: medical management and parenteral nutrition.

The general outcomes of interest are overall survival and treatment-related adverse events (eg, immunosuppression, graft failure, surgical complications, infections). See the Adverse Events section for initial transplants for detailed discussion.

Timing
Short-term follow-up ranges from immediately postsurgery to 30 days posttransplantation; lifelong follow-up (out to at 10 years or more given current survival data) is necessary due to ongoing immunosuppression drugs and risk of graft failure.

Setting

Small bowel transplantation is provided in a hospital setting by specialized staff who are equipped to perform the surgical procedure and manage postsurgical intensive care.

Case Series

A few case series from single institutions and a single analysis of data from the United Network for Organ Sharing database have provided evidence on the use of retransplantation in patients who failed primary small bowel transplant. Case series characteristics and results are detailed in Tables 3 and 4, respectively.

Desai et al (2012) have published the most comprehensive reporting of outcomes after repeat small bowel transplant in the United States.[28] They evaluated data for patients in the United Network for Organ Sharing database who underwent small bowel transplants in the United States between 1987 and 2009.

Table 3. Summary of Key Case Series Characteristics for Retransplantations

Study	Location	N	Median Age (Range), y	Interventions		Follow-Up (Range), mo
				Treatment	**n**	
Lacaille et al (2017)[7]	France	10	13 (5-16)	▪ Isolated IT ▪ Combined liver IT	3 7	4
Desai et al (2012)[28]	U.S.	72 adults 77 children	NR	Adults: ▪ Isolated IT ▪ Combined liver IT Children: ▪ Isolated IT ▪ Combined liver IT	 41 31 28 49	NR
Abu-Elmagd et al 2009)[29]	U.S.	47	NR	▪ Isolated IT ▪ Combined liver IT ▪ Multivisceral graft	31 7 9	NR

IT: intestinal transplantation; NR: not reported.

Table 4. Summary of Key Case Series Results for Retransplantations

Study	Interventions		Survival		Off TPN
	Treatment	**n**	**Years**	**%**	
Lacaille et al (2017)[7]	▪ Isolated IT ▪ Combined liver IT	3 7	All combined at last follow-up:	30	NR
Desai et al (2012)[28]	Adults: ▪ Isolated IT ▪ Combined liver IT Children: ▪ Isolated IT ▪ Combined liver IT	 41 31 28 49	Adults: 1/3/5 1/3/5 Children: 1/3/5 1/3/5	 80/47/29 63/56/47 81/74/57 42/42/42	NR
Abu-Elmagd et al (2009)[29]	▪ Isolated IT ▪ Combined liver IT ▪ Multivisceral graft	31 7 9	All combined: 1 5	 69 47	NR

IT: intestinal transplantation; NR: not reported; TPN: total parenteral nutrition.

Section Summary: Small Bowel Retransplantation

Data from a small number of patients undergoing retransplantation are available. Although limited in quantity, the available data have suggested reasonably high survival rates after small bowel retransplantation in patients who continue to meet criteria for transplantation.

Summary of Evidence

For individuals who have intestinal failure who receive a small bowel transplant, the evidence includes case series. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. Small bowel transplant is infrequently performed, and only relatively small case series, generally single-center, are available. Risks after small bowel transplant are high, particularly related to infection, but may be balanced against the need to avoid the long-term complications of total parenteral nutrition dependence. In addition, early small bowel transplant may obviate the need for a later combined liver/small bowel transplant. Transplantation is contraindicated in patients in whom the procedure is expected to be futile due to comorbid disease or in whom posttransplantation care is expected to worsen comorbid conditions significantly. Guidelines and U.S. federal policy no longer view HIV infection as an absolute contraindication for solid organ transplantation. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have failed small bowel transplant without contraindication(s) for retransplant who receive a small bowel retransplant, the evidence includes case series. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. Data from a small number of patients undergoing retransplantation are available. Although limited in quantity, the available data have suggested a reasonably high survival rate after small bowel retransplantation in patients who continue to meet criteria for transplantation. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

Supplemental Information

Clinical Input From Physician Specialty Societies and Academic Medical Centers

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

In response to requests, input was received from 2 physician specialty societies and 2 academic medical centers while this policy was under review in 2009. The consensus of those providing input was that small bowel transplant should be performed in patients who are developing severe total parenteral nutrition–related complications and that small bowel transplant from living donors may be considered when cadaveric intestinal transplants are not available.

Practice Guidelines and Position Statements

American Gastroenterological Association

The American Gastroenterological Association (2003) produced a medical position statement on short bowel syndrome and intestinal transplantation.[30] It recommended dietary, medical, and surgical solutions. Indications for intestinal transplantation mirrored those of the Centers for Medicare & Medicaid Services. The guidelines acknowledged the limitations of transplant for these patients. The statement recommended the following Medicare-approved indications, pending availability of additional data:

1. "Impending or overt liver failure.…
2. Thrombosis of major central venous channels….
3. Frequent central line-related sepsis….
4. Frequent severe dehydration."

American Society of Transplantation

The American Society of Transplantation (2001) issued a position paper on indications for pediatric intestinal transplantation.[31] The Society listed the following disorders in children as potentially treatable by intestinal transplantation: short bowel syndrome, defective intestinal motility, and impaired enterocyte absorptive capacity. Contraindications for intestinal transplant to treat pediatric patients with intestinal failure are similar to those of other solid organ transplants: profound neurologic disabilities, life-threatening comorbidities, severe immunologic deficiencies, nonresectable malignancies, autoimmune diseases, and insufficient vascular patency.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

The Centers for Medicare & Medicaid have a national coverage determination on intestinal and multivisceral transplantation. The determination covers these types of transplants only when performed for patients who have failed total parenteral nutrition (TPN) and only when performed in centers that meet approval criteria.

> "1. Failed TPN
>
> The TPN delivers nutrients intravenously, avoiding the need for absorption through the small bowel. TPN failure includes the following:
>
> Impending or overt liver failure due to TPN induced liver injury....
> Thrombosis of the major central venous channels; jugular, subclavian, and femoral veins.
> Frequent line infection and sepsis.
> Frequent episodes of severe dehydration despite intravenous fluid supplement in addition to TPN.

2. Approved Transplant Facilities

The criteria for approval of centers will be based on a volume of 10 intestinal transplants per year with a 1-year actuarial survival of 65 percent using the Kaplan-Meier technique."[32]

Ongoing and Unpublished Clinical Trials

A search of ClinicalTrials.gov in July 2018 did not identify any ongoing or unpublished trials that would likely influence this review.

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Billing Coding/Physician Documentation Information

44132 Donor enterectomy (including cold preservation), open; from cadaver donor

44133 Donor enterectomy (including cold preservation), open; partial, from living donor

44135 Intestinal allotransplantation; from cadaver donor

44136 Intestinal allotransplantation; from living donor

44715 Backbench standard preparation of cadaver or living donor intestine allograft prior to transplantation, including mobilization and fashioning of the superior mesenteric artery and vein

44720 Backbench reconstruction of cadaver or living donor intestine allograft

prior to transplantation; venous anastomosis, each

44721 Backbench reconstruction of cadaver or living donor intestine allograft prior to transplantation; arterial anastomosis, each

ICD-10 Codes

K90.0-K90.9 Intestinal malabsorption code range

K91.2 Postsurgical malabsorption, not elsewhere classified

T86.851 Intestine transplant failure

Additional Policy Key Words

N/A

Policy Implementation/Update Information

11/1/01 New policy added to the Surgery section.
11/1/02 No policy statement changes. Added to the transplant section.
11/1/03 No policy statement changes.
11/1/04 Policy statement revised to include HIV+ status as investigational.
11/1/05 Policy statement revised to remove HIV+ status as investigational.
4/1/06 No policy statement changes. Added general criteria to the considerations section
11/1/06 No policy statement changes.
11/1/07 No policy statement changes.
11/1/08 No policy statement changes.
11/1/09 Policy statements changed to indicate the small bowel transplant may be considered medically necessary in those developing severe TPN-related complications, and that small bowel transplants from living donors may be considered medically necessary only when cadaveric transplants are not available. The word "isolated" was added to the title.
11/1/10 No policy statement changes.
11/1/11 No policy statement changes.
11/1/12 Potential contraindications added to Policy Guidelines. Wording of potential contraindications consistent with other solid organ transplant policies
2/1/14 Added A small bowel retransplant may be considered medically necessary after a failed primary small bowel transplant.
2/1/15 No policy statement changes
3/1/15 No policy statement changes.
2/1/16 No policy statement changes.
2/1/17 No policy statement changes.
2/1/18 No policy statement changes.
2/1/19 No policy statement changes.