
DATE: 03 September 2008

CONTEXT AND POLICY ISSUES:

Intestinal transplantation is referred to as small bowel transplantation which is a complex surgical procedure of transplanting the small intestine from a cadaveric donor for the purpose of restoring intestinal function in patients with irreversible intestinal failure. Intestinal transplantation can include the small intestine alone, the small intestine and the liver, or multiple organs (multivisceral) including the small bowel. In Canada, Ontario and Alberta are the two provinces that have performed intestinal transplantation. From 1988 to 2003, 21 transplants (zero to three per year) have been performed in Ontario, with one bowel transplantation being done in Ontario in 2008 to date.

Despite being evolved as a standard therapeutic option for patients with intestinal failure who are not tolerating parenteral nutrition, complications such as infection and rejection together with limited resources made the long-term clinical and cost-effectiveness of the procedure uncertain. Therefore, it is necessary to examine the evidence regarding the clinical and cost-effectiveness of intestinal transplantation.

RESEARCH QUESTIONS:

1. What is the clinical effectiveness and safety of intestinal transplantation?
2. Is there evidence demonstrating the effectiveness of intestinal transplantation in specific subgroups of patients?
3. What is the cost-effectiveness of intestinal transplantation?
4. What are the Canadian guidelines for use of intestinal transplantation?
METHODS:

A limited literature search was conducted on key health technology assessment resources, including PubMed, The Cochrane Library (Issue 3, 2008), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan, international HTA agencies, and a focused Internet search. Results include articles published between 2003 and July 2008, and are limited to English language publications only. Filters were applied to limit the retrieval to systematic reviews, health technology assessments, meta analyses, guidelines, economic studies and randomized controlled trials.

SUMMARY OF FINDINGS:

Clinical effectiveness and safety of intestinal transplantation

Our literature search identified one systematic review on intestinal transplantation. The Ontario Health Technology Advisory Committee (OHTAC) published a technology review in 2003. There were 35 studies from 1999 to 2003 on isolated small bowel transplant, small bowel-liver transplant, and multivisceral transplant patients included.

Survival rates and graft function reported in this review are summarized in Table 1.

Table 1: Results from the OHTAC Technology Review on Intestinal Transplantation

<table>
<thead>
<tr>
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<th>Isolated small bowel transplant</th>
<th>Small bowel-liver transplant</th>
<th>Multivisceral transplant</th>
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<tbody>
<tr>
<td>Mean 1-year patient survival rate</td>
<td>69%</td>
<td>66%</td>
<td>63%</td>
</tr>
<tr>
<td>Mean 1-year graft survival rate</td>
<td>55%</td>
<td>63%</td>
<td>63%</td>
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</table>

The review also showed the majority (70% or higher) of surviving small bowel transplant recipients were able to wean from parenteral nutrition and meet all caloric needs enterally. The quality of life after small bowel transplant was reported to be comparable to that of patients on home enteral nutrition. Despite improvement in patient and graft survival rate, small bowel transplant is still associated with significant mortality and morbidity including:

- Infection with subsequent sepsis is the leading cause of death (51.3 %). Bacterial, fungal and viral infections have all been reported, with the most common viral infections being cytomegalovirus and Epstein-Barr virus
- Graft rejection, the second leading cause of death after small bowel transplant, occurred in 10.4% of patients.
- Surgical complications occurred in 85% of small bowel-liver transplant patients and 25% of isolated small bowel transplant patients.

Effectiveness of intestinal transplantation in specific subgroups

Our literature search did not identify evidence on clinical effectiveness of intestinal transplantation for a specific subgroup of patients. The OHTAC report did state that patients with systemic malignancy, metastatic disease, AIDS, cardiopulmonary insufficiency and overwhelming sepsis are contraindicated for intestinal transplantation. This report also stated that intestinal transplantation is used for patients with total parenteral nutrition associated cholestasis, impending loss of central venous access, and intestinal pseudo-obstruction and
obstruction. The development of suitable criteria for candidate selection and early referral for transplantation are key factors in a positive outcome. A Markov analytic model on a cohort of 4-year-old subjects with short bowel syndrome found that early referral for intestinal transplantation was associated with 0.27 additional life years (13.16 versus 12.89) and 0.76 additional quality-adjusted life years (10.51 versus 9.75) as compared with current standard care.

Cost-effectiveness of intestinal transplantation

The Ontario systematic review reported the median cost of intestinal transplant in the US to be approximately US$275,000 per case. Small bowel transplant could be cost-effective by the second year after the transplant. A recent study comparing the cost of parenteral nutrition to intestinal transplantation also agreed that transplantation is cost-effective in patients that maintain graft function at least one year after surgery.

Canadian guidelines on intestinal transplantation

Our literature search did not identify Canadian guidelines on intestinal transplantation.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING:

The experience in small bowel transplant is limited both worldwide and in Canada. Limited evidence suggest short-term patient and graft survival has been improving over the years, but long-term data remain disappointing. Firm conclusions on cost-effectiveness of intestinal transplantation are not possible, although the procedure could be cost-effective if graft function can be maintained for at least one year after surgery. No information about the effectiveness of intestinal transplantation in specific patient subgroups was identified. In order to optimize the criteria for candidate selection and transplantation process, Canadian guidelines on intestinal transplantation are needed.
REFERENCES:


