TITLE: Drug Therapies for Immunosuppression in Adult Patients Following Islet Cell Transplantation for the Treatment of Diabetes: Clinical and Cost-Effectiveness

DATE: 14 March 2013

RESEARCH QUESTIONS

1. What is the clinical effectiveness of common drug therapies for immunosuppression in adult patients following islet cell transplantation for the treatment of diabetes?

2. What is the cost-effectiveness of common drug therapies for immunosuppression in adult patients following islet cell transplantation for the treatment of diabetes?

KEY MESSAGE

Seven non-randomized studies were identified regarding the clinical effectiveness of common drug therapies for immunosuppression in adult patients following islet cell transplantation for the treatment of diabetes. No relevant cost studies were identified.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2013, Issue 3), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2008 and March 8, 2013. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.
RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

Seven non-randomized studies \(^1-^7\) were identified regarding the clinical effectiveness of common drug therapies for immunosuppression in adult patients following islet cell transplantation for the treatment of diabetes. No relevant health technology assessment reports, systematic reviews, meta-analyses, randomized controlled trials, or economic evaluations were identified. Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

Seven non-randomized studies, \(^1-^7\) examining a variety of different drug protocols, were identified regarding the clinical effectiveness of common drug therapies for immunosuppression in adult patients following islet cell transplantation for the treatment of diabetes. Results of the relevant studies are summarized in Table 1. Islet cell transplantation resulted in insulin independence in many of the identified studies. \(^2-^7\) No major adverse events were reported in any of the included studies. No studies were identified regarding the cost-effectiveness of drugs for immunosuppression after islet cell transplantation.

<table>
<thead>
<tr>
<th>First Author and Year</th>
<th>Drug Regimen(s) Studied</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takita, 2012 (^1)</td>
<td>Group 1: Induction: ATG plus anakinra and eternacept, Maintenance: TCD-AI protocol (tacrolimus and mycophenolate mofetil); Group 2 and 3: Induction: ATG plus anakinra and eternacept, Maintenance: Edmonton protocol (daclizumab, sirolimus, tacrolimus);</td>
<td>Fewer symptomatic AEs were observed in the TCD-AI group within the first three months after transplant. All patients receiving the Edmonton protocol eventually switched to the TCD-AI protocol because of AEs. The authors suggested that the TCD-AI protocol is a tolerable immunosuppressive option and larger trials should be undertaken.</td>
</tr>
<tr>
<td>Matsumoto, 2011 (^2)</td>
<td>Group 1: Induction: Daclizumab, Maintenance: sirolimus and tacrolimus; Group 2: Induction: ATG, Maintenance: tacrolimus and mycophenolate mofetil;</td>
<td>Patients in group 1 achieved insulin independence after two islet infusions while patients in group 2 only required one infusion. The authors concluded that the infusion techniques used in their study, combined with the immunosuppressive regimen used for group 2, resulted in successful islet transplants from a single donor.</td>
</tr>
<tr>
<td>Posselt, 2010 (^3)</td>
<td>Induction: ATG, Maintenance: sirolimus or mycophenolate mofetil;</td>
<td>All patients who received belatacept achieved insulin independence after one transplant which was maintained for the length of the study. Patient who received efalizumab achieved independence after</td>
</tr>
<tr>
<td>First Author and Year</td>
<td>Drug Regimen(s) Studied</td>
<td>Conclusions</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>belacept or efalizumab</td>
<td>one or two transplants and remained so until the drug was removed from the market. No significant AEs were observed in either group.</td>
<td></td>
</tr>
<tr>
<td>Roelen, 2009*</td>
<td>Induction: ATG</td>
<td>In the tacrolimus/sirolimus and sirolimus groups, lack of insulin independence was associated with CRL alloreactivity.</td>
</tr>
<tr>
<td>Bellin, 2008*</td>
<td>Induction: ATG plus etanercept Maintenance: year 1: cyclosporine and everolimus year 2+: mycophenolic acid or mycophenolate mofetil</td>
<td>Five of the six patients were insulin independent at one year and four patients remained so after three years. The authors suggest that this regimen may be suitable for long-term immunosuppressive therapy after islet cell transplantation.</td>
</tr>
<tr>
<td>Gangemi, 2008*</td>
<td>Group 1 Edmonton protocol (daclizumab, sirolimus, tacrolimus) Group 2 University of Illinois Protocol (etanercept, exenatide, plus Edmonton)</td>
<td>All patients in both groups achieved insulin independence. Patients in the Edmonton group required two or three infusions while patients in the Illinois group required only one infusion to achieve insulin independence. All patients in the Edmonton group maintained independence through the follow-up period.</td>
</tr>
<tr>
<td>Tan, 2008*</td>
<td>Induction: alemtuzumab Maintenance: tacrolimus and sirolimus</td>
<td>Four patients were insulin independent at one year. For the other three patients, post-transplant insulin doses were reduced by more than 75%. No major AEs were observed in the study.</td>
</tr>
</tbody>
</table>

AE = adverse event; ATG = antithymocyte globulin; CTL = cytotoxic T lymphocytes; TCD-Al = T-cell depletion with anti-inflammatory
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials
No literature identified.

Non-Randomized Studies


Economic Evaluations
No literature identified.

PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca
APPENDIX – FURTHER INFORMATION:

Review Articles


Additional References
