



TITLE: Extracorporeal Photopheresis for Organ Rejection: Clinical and Cost-Effectiveness

DATE: 28 September 2015

RESEARCH QUESTIONS

1. What is the clinical effectiveness of extracorporeal photopheresis (ECP) for the management of organ rejection following solid organ transplant?
2. What is the cost-effectiveness of ECP for the management of organ rejection following solid organ transplant?

KEY FINDINGS

Four non-randomized studies were identified regarding extracorporeal photopheresis for the management of organ rejection following solid organ transplant.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library, 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. The search was limited to English language documents published between Jan 1, 2010 and Sep 17, 2015. 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.

SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

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Table 1: Selection Criteria

Population	Patients experiencing organ rejection following solid organ transplant
Intervention	Extracorporeal photopheresis
Comparator	Standard of care; None
Outcomes	Q1: Clinical effectiveness, change in clinical outcomes Q2: Cost-effectiveness
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations

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.

Four non-randomized studies were identified regarding extracorporeal photopheresis for the management of organ rejection following solid organ transplant. No relevant health technology assessments, 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

Four non-randomized studies were identified regarding extracorporeal photopheresis (ECP) for the management of organ rejection following solid organ transplant.¹⁻⁴ Three studies examined ECP following lung transplantation^{1-2,4} and one following kidney transplantation.³ Post-lung transplant, ECP was used to treat restrictive allograft syndrome¹ and bronchiolitis obliterans syndrome.^{1-2,4} No ECP-related side effects were reported.¹⁻² Patients with bronchiolitis obliterans syndrome who responded to ECP had better survival and less re-transplantation than ECP non-responders in the same study.² Forced expiratory volume in one second decline was reduced in the ECP group.^{1,4} The authors of one study concluded that ECP was a safe option for the management of chronic lung allograft dysfunction.¹

In one study,³ ECP was provided prophylactically (in addition to immunosuppressive agents) to patients who had undergone kidney transplantation. Glomerular filtration rate was significantly higher at six months in the ECP group compared to the control group.

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

1. Del Fante C, Scudeller L, Oggioni T, Viarengo G, Cemmi F, Morosini M, et al. Long-Term Off-Line Extracorporeal Photochemotherapy in Patients with Chronic Lung Allograft Rejection Not Responsive to Conventional Treatment: A 10-Year Single-Centre Analysis. *Respiration*. 2015;90(2):118-28.
[PubMed: PM26112178](#)
2. Jaksch P, Scheed A, Keplinger M, Ernst MB, Dani T, Just U, et al. A prospective interventional study on the use of extracorporeal photopheresis in patients with bronchiolitis obliterans syndrome after lung transplantation. *J Heart Lung Transplant*. 2012 Sep;31(9):950-7.
[PubMed: PM22884382](#)
3. Kuzstal M, Koscielska-Kasprzak K, Gdowska W, Zabinska M, Myszk M, Klak R, et al. Extracorporeal photopheresis as an antirejection prophylaxis in kidney transplant recipients: preliminary results. *Transplant Proc*. 2011 Oct;43(8):2938-40.
[PubMed: PM21996194](#)
4. Morrell MR, Despotis GJ, Lublin DM, Patterson GA, Trulock EP, Hachem RR. The efficacy of photopheresis for bronchiolitis obliterans syndrome after lung transplantation. *J Heart Lung Transplant*. 2010 Apr;29(4):424-31.
[PubMed: PM19853479](#)

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:

Case Series

5. Carlo WF, Pearce FB, George JF, Tallaj JA, McGiffin DC, Marques MB, et al. Single-center experience with extracorporeal photopheresis in pediatric heart transplantation. *J Heart Lung Transplant.* 2014 Jun;33(6):624-8.
[PubMed: PM24661684](#)

Coverage Protocol

6. Extracorporeal photopheresis after solid-organ transplant and for graft-versus-host disease, autoimmune disease, and cutaneous T-cell lymphoma [Internet]. Buffalo (NY): BlueCross BlueShield of Western New York; 2011 [cited 2015 Sep 25]. Available from: https://securews.bcbswny.com/web/content/dam/BSNENY/Provider/Protocols/E/prov_prot_80136.pdf

Review Articles

7. Capuano M, Sommese L, Pignalosa O, Parente D, Fabbricini R, Nicoletti GF, et al. Current clinical applications of extracorporeal photochemotherapy. *Ther Apher Dial.* 2015 Apr;19(2):103-10.
[PubMed: PM25363837](#)
8. Perotti C, Sniecinski I. A concise review on extracorporeal photochemotherapy: Where we began and where we are now and where are we going! *Transfus Apher Sci.* 2015 Jun;52(3):360-8.
[PubMed: PM25910538](#)
9. Barten MJ, Dieterlen MT. Extracorporeal photopheresis after heart transplantation. *Immunotherapy.* 2014;6(8):927-44.
[PubMed: PM25313571](#)
10. Jaksch P, Knobler R. ECP and solid organ transplantation. *Transfus Apher Sci.* 2014 Jun;50(3):358-62.
[PubMed: PM24768429](#)
11. Marques MB, Adamski J. Extracorporeal photopheresis: technique, established and novel indications. *J Clin Apher.* 2014 Aug;29(4):228-34.
[PubMed: PM24828404](#)
12. Worel N, Leitner G. Clinical Results of Extracorporeal Photopheresis. *Transfus Med Hemother* [Internet]. 2012 Aug [cited 2015 Sep 25];39(4):254-62. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3434329>
[PubMed: PM22969695](#)
13. Marques MB, Schwartz J. Update on extracorporeal photopheresis in heart and lung transplantation. *J Clin Apher.* 2011;26(3):146-51.
[PubMed: PM21647952](#)

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[PubMed: PM21261172](#)

Additional References

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[PubMed: PM25748232](#)
16. Yung GL, Craig V. Lung transplantation and extracorporeal photopheresis: The answer to bronchiolitis obliterans? Transfus Apher Sci. 2015 Apr;52(2):162-6.
[PubMed: PM25881738](#)