Technology Brief

Extracorporeal photopheresis for the treatment of graft versus host disease following bone marrow transplantation

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This brief was prepared by Ms Linda Mundy from the HealthPACT Secretariat.
TECHNOLOGY BRIEF

REGISTER ID: WP044

NAME OF TECHNOLOGY: EXTRACORPOREAL PHOTOPHERESIS

PURPOSE AND TARGET GROUP: FOR THE TREATMENT OF GRAFT-VERSUS-HOST-DISEASE FOLLOWING BONE MARROW TRANSPLANTATION

STAGE OF DEVELOPMENT (IN AUSTRALIA):

☐ Yet to emerge ☒ Established
☐ Experimental ☐ Established but changed indication or modification of technique
☐ Investigational ☐ Should be taken out of use
☐ Nearly established

AUSTRALIAN THERAPEUTIC GOODS ADMINISTRATION APPROVAL

☒ Yes ☐ No
☐ Not applicable

ARTG number

Therakos Photopheresis System 139761 Photopheresis system
30th May 2007 139762 Lamp assembly
139763 Blood set

INTERNATIONAL UTILISATION:

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IMPACT SUMMARY:

Medtel Pty Ltd (New South Wales) distributes the Therakos™ UVAR™ XTS™ Photopheresis System (Therakos Inc, New Jersey, USA) in Australia with the aim of providing extracorporeal photopheresis. This system has now been superseded by the Therakos™ CELLEX™ system. The technology would be made available through haematologists for the treatment of adult or paediatric patients suffering from refractory acute or chronic graft-versus-host-disease following bone marrow transplantation.
**BACKGROUND**

Graft-versus-host-disease (GVHD) is a major cause of morbidity and mortality following allogeneic stem cell transplantation\(^1\), and may be classified as either acute (aGVHD, occurring within 100 days of transplant) or chronic (cGVHD, occurring after 100 days of transplant). Reported incidence rates of either form vary depending on the source of donor cells (see Burden of Disease). cGVHD is categorised as progressive if it develops from aGVHD, quiescent if there is no disease-free interval between aGVHD and cGVHD or *de novo* if it develops without previous aGVHD (Penas & Zaman 2010).

The pathogenesis of GVHD is poorly understood, however it is essentially caused by effector cells, or T lymphocytes, present in the source of the donated graft, recognising the tissue of the transplant recipient as antigenically foreign and mounting an immune response (Salmasian et al 2010). The T-cells produce excess cytokines (TNF-α and interferon-gamma), especially in response to mismatched human leukocyte antigens\(^2\) (HLAs). GVHD can occur in HLA-identical sibling or HLA-identical unrelated recipient-donor pairings, and it is thought that this occurs due to differences in the minor histocompatibility proteins that are presented by the major histocompatibility complex to the T cells, initiating an immune response (Fraser & Scott Baker 2007). Symptoms of GVHD resemble those of autoimmune disorders. Acute GVHD targets most commonly the skin, exhibiting a rash and lesions, especially on the hair follicles. Approximately two per cent of aGVHD cases will develop severe symptoms including toxic epidermal necrosis. aGVHD usually affects the liver, gastrointestinal tract, lungs and lymphoid tissue, with pulmonary complications usually severe (Penas & Zaman 2010). Acute GVHD has been classified into four grades ranging from grade I which manifests itself with relatively mild symptoms including a rash to grade III with severe multi-organ involvement, to grade IV which is considered life-threatening (Salmasian et al 2010). Chronic GVHD symptoms include sclerodermatous skin changes from collagen deposition, pulmonary fibrosis, esophageal dysfunction, dry mouth or mucocutaneous ulcerations, cholestasis, and myositis or fasciitis (Foss et al 2002). Patients with *de novo* cGVHD have a better prognosis compared to those with progressive or quiescent cGVHD, and those cGVHD patients with liver dysfunction and thrombocytopenia have a poor prognosis (Salmasian et al 2010).

Risk factors for the development for aGVHD include HLA-mismatch, diagnosis of chronic myeloid leukaemia, an increased number of allogeneic stem cell transplantation procedures, the use of total body radiotherapy or the use of

\(^1\) Allogeneic stem cell transplantation is a procedure where stem cells are taken from a genetically non-identical member of the same species as the recipient.

\(^2\) Human leukocyte antigens (HLAs) are proteins expressed on the surface of cells which are used by the immune system to differentiate self from non-self.
Extracorporeal photopheresis (ECP) was initially developed to treat patients with cutaneous T-cell lymphoma, and has been proposed for use in a variety of T-cell mediated diseases including systemic lupus erythematosus and rheumatoid arthritis. The original treatment protocol involved patients taking a high oral dose of the psoralen, 8-methoxy-psoralen (8-MOP), before undergoing white blood cell (WBC) apheresis, with the collected WBCs treated with ultraviolet A (UVA) light then returned to the patient. The current ECP technique draws whole blood from the patient, separates the WBCs and treats only these cells with 8-MOP. This results in the patient receiving a greatly reduced dose of 8-MOP, approximately 0.25% of the oral dose, and decreases the risk of post-treatment photosensitisation (Ward 2011).

The current technique utilises a specialised device, the Therakos™ UVAR™ or CELLEX™ system, which incorporates single or double venous access, respectively. Whole blood is withdrawn from the patient and enters a discontinuous centrifugal system where the red blood cells (RBCs) are separated from the WBCs and returned to the patient. It is important that as many RBCs as possible are removed from the buffy coat as contaminating RBCs interfere with the access of the UVA light to the WBCs (Ward 2011). During one ECP treatment, sufficient whole blood is removed to produce approximately 240 cc of buffy coat (containing leucocytes and platelets) and 300 ml of plasma (Foss et al 2002). Adequate WBC collection usually requires 3-6 cycles of apheresis. The purified WBCs (approximately 10% of the total body volume of leucocytes) are held in a sterile photoactivation chamber and the 8-MOP is added to the cells at a concentration of 0.017 mL per mL of WBC. After mixing, the treated cells are circulated through the chamber between two banks of UVA light bulbs for 25-45 minutes, depending on the density of the WBCs and the luminosity of the light source which declines with age. After photoactivation, the treated WBCs are returned to the patient (Figure 1) (Ward 2011). Total treatment time with the Therakos™ UVAR™ is approximately three hours, however this time is halved when the CELLEX™ system is used due to the use of double venous access (Therakos Inc 2011). The number of treatments required per patient may vary, however standard therapy may consist of initial treatment three times per week for 2-3 months, with follow-up weekly treatments which may continue for up to 12 months (personal communication Queensland Health). A short video describing the ECP process may be accessed here. It should be stressed that the Therakos device is not transportable.
Extracorporeal photopheresis (ECP) is a treatment for graft versus host disease (GVHD) following bone marrow transplantation. The treatment involves the removal of blood from the patient, separation of red blood cells (RBCs) and white blood cells (WBCs), treatment of WBCs with 8-methoxypsoralen (MOP) and exposure to ultraviolet A (UVA) light, and then re-infusion of treated cells back into the patient. The mechanism of ECP action is complex and poorly understood. Alternative therapies for the treatment of GVHD aim to suppress the function of the effector cells, avoiding an active immune response. ECP aims to strengthen the response of the suppressor cells responsible for recognition of self, or tolerance, “tipping” the immune response away from an active response towards tolerance. During ECP, 8-MOP forms crosslinks within the strands of DNA in the WBCs, resulting in apoptosis of these cells. When the treated, apoptotic cells are reinfused into the patient they encounter antigen-presenting cells. The apoptotic markers expressed on the surface of the WBCs are presented to cytotoxic T cells, which in turn produce regulatory T cells which recognise cells of the same clonal lineage as the treated WBCs. As the ECP treated WBCs originate from expanded clones that dominate during an active immune response, ECP is only effective at suppressing cellular immune responses that are active at the time that ECP is performed. Hence the need for repeated treatments.

Preliminary studies conducted in patients who have undergone solid organ transplants have shown promise, however these studies have been small, with too much variability in the protocols to make any definitive conclusions as to the effectiveness of ECP in these patients (Marques & Schwartz 2011), therefore this summary will only assess the evidence pertaining to the use of ECP for patients with GVHD following bone marrow transplantation. However, it is believed that ECP may be a good treatment option for these patients, delivering improved outcomes, if treatment is given early as first-line, rather than as a treatment of last resort (personal communication Peter MacCallum Cancer Centre, Victoria).
CLINICAL NEED AND BURDEN OF DISEASE

The Australian Bone Marrow Donor Registry (ABMDR) has hosted the donor information for the New Zealand Bone Marrow Donor Registry (NZBMDR) since 1997. New Zealand only holds a repository for donations received from Maori, Polynesian and ethnic minority donors. In the period from July 2009 to June 2010, 70 Australian patients and 39 international patients from 11 countries received a bone marrow transplant from Australian donors. Of these international patients, seven were from New Zealand. Not all patients requiring or requesting a bone marrow transplant are successful in attaining a match. During 2008-2009, a total of 470 Australian patients requested a search of the ABMDR in addition to 15,243 international patients, which may more accurately indicate the need for bone marrow transplantation (ABMDR 2010). Approximately 2/3 of Australian patients requiring a bone marrow transplant use a donor sourced from overseas. In Queensland, approximately 20 paediatric and 80-90 adult patients require a bone marrow transplant (personal communication BMT Program, Royal Children's Hospital, Brisbane).

Data from the Australian Bone Marrow Transplant Recipient Registry may reflect a more accurate burden of disease. The ABMTRR reports that a total of 1,307 and 200 transplants were performed in Australia and New Zealand, respectively, during 2009. This figure represents a slight increase from 2008, when 1,209 and 171 transplants were performed in Australia and New Zealand. Of the transplants performed during 2009, the majority were first transplants, with 135 subsequent transplants performed in Australia and 10 in New Zealand, respectively. In Australia, the majority were single autologous transplants (n=826). There was a similar number of allogeneic transplants from related and unrelated donors (n=220 and 195, respectively), with a small proportion of autologous transplants (n=66) requiring two or more infusions but counted as one transfusion. Of the 892 autologous transplants performed in Australia, the source of stem cells was peripheral blood in the majority of cases, with six transplants using cells sourced from bone marrow(n=882). Of the 415 allogeneic transplants, 314 and 55 used cells sourced from peripheral blood and bone marrow, respectively. Similar patterns of transplantation were reported in New Zealand (BMTSANZ 2011).

The most frequent diagnosis of the 470 patients seeking a transplant was acute myelogenous leukaemia (n=139) followed by acute lymphoblastic leukaemia (n=88) and non-Hodgkin’s lymphoma (n=28) (ABMDR 2010). In the period from July 2009 to June 2010, 29 unrelated donor bone marrow transplants were performed in New Zealand (personal communication NZBMDR).

Rates of GVHD vary depending on the source of donor cells. The incidence of aGVHD ranges from 20-50 per cent in patients who receive stem cells from sibling matched donors and from 42-80 per cent using stem cells from an unrelated or HLA-mismatched donor. Mortality from aGVHD is high with rates of up to 50 per cent.
reported in patients with a moderate to severe form of the disease. The incidence of cGVHD ranges from 30 per cent in sibling matched donors to over 70 per cent in HLA-matched unrelated donor transplants (Foss 2003; Penas & Zaman 2010). Approximately 20-30 per cent of patients with aGVHD do not go on to develop cGVHD, and roughly 25-35 per cent of patients with cGVHD did not experience aGVHD (Penas & Zaman 2010).

**DIFFUSION**

There are currently two Therakos ECP devices operating in Australia: one in the Peter MacCallum Cancer Centre, Melbourne, Victoria and the other in the Royal Prince Alfred Hospital in Sydney, New South Wales. Both devices are currently used to primarily treat adult patients; however the Peter MacCallum has recently begun to treat paediatric patients. The device operated by the RPA is funded by the NSW Blood and Marrow Transplant Network to treat steroid refractory disease and has been operational for approximately 12 months (personal communication Medtel Pty Ltd). The Peter MacCallum Centre currently treats approximately 30 adult patients per month, the majority of whom have cutaneous T cell lymphoma, however the numbers of patients with GVHD are increasing. The majority of these patients are Victorian, however approximately four patients are from other states and one patient is from New Zealand (personal communication Peter MacCallum Cancer Centre).

**COMPARATORS**

The best treatment for aGVHD is avoiding its development by minimising the risk factors outlined above and with the use of immune suppressant prophylaxis. Standard treatment for aGVHD is aggressive immunosuppressive therapies, including high-dose corticosteroids, cyclosporine A, antithymocyte globulin, tacrolimus, and mycophenolate mofetil (Foss 2003; Penas & Zaman 2010). First-line treatment of cGVHD is based on steroids of 1mg/kg/day of prednisone. The use of calcineurin inhibitors is controversial, especially in patients with normal platelets counts and therefore a lower risk for mortality. Patients with low platelets at diagnosis and/or a high risk for steroid toxicity may be treated initially with a combination of prednisone and a calcineurin inhibitor. There is no standard therapy for patients who fail to respond to corticosteroids. Additional systemic immunosuppressive agents including thalidomide, mycophenolic acid, and azathioprine do not improve treatment results in the primary treatment of cGVHD and are associated with higher morbidity, and, in the case of azathioprine, with higher mortality (Wolff et al 2010). Long-term use of steroids in paediatric patients is associated with serious adverse events, including toxicity (personal communication Royal Children’s Hospital, Melbourne).

**SAFETY AND EFFECTIVENESS ISSUES**

A retrospective case series reported on the clinical and survival outcomes of 27 paediatric patients (mean age 10, range 1-17 years) who developed GVHD and were
treated with ECP following treatment failure with standard steroid regimes (level IV Intervention evidence). Six patients developed cGVHD with the remaining 21 patients diagnosed with aGVHD, 11 of whom were grade IV. The majority of patients (48%) underwent allogeneic haematopoietic stem cell transplantation for acute lymphoblastic leukaemia. Donors were HLA matched in 17 cases and 14 donors were related to the recipient. ECP was performed twice a week on consecutive days for aGVHD patients, and bi-weekly on consecutive days for cGVHD using the Cobe Spectra cell separator and UVA-MATIC UVA irradiator (Gonzalez Vicent et al 2010).

A total of 225 ECP procedures were performed, with a median of six per patient (range 2-25), with the median time spent on ECP being 30 days (range 2-442 days). Median follow-up was 167 days (range 4-1,816 days). Of the 21 aGVHD patients, 11 (52.4%) reached complete and eight reached partial remission, with only those patients with complete remission being considered a responder. Three of the cGVHD patients (50%) achieved complete remission, with two in partial remission. One cGVHD and two aGVHD patients were considered non-responders. Median time to response was two and four cycles in aGVHD and cGVHD patients, respectively, and no patients relapsed having achieved a response. Adverse events related to the procedure were observed in 5/27 (18.5%) patients. Three patients developed mild hypotension and three had a catheter–related infection, all of which were resolved. One patient developed a severe cytomegalovirus infection and five patients developed a fungal infection, which was likely to have been caused by their treatment with high-dose steroids. During the follow-up period, a total of 16 patients died, with cause of death cited as microangiopathy (n=5), fungal infection (n=5), disease relapse (n=2), GVHD (n=2), cytomegalovirus (n=1) and alveolar haemorrhage (n=1). As a whole group, the probability of disease-free survival was 43 ± 9 per cent. Although thrombocytopenia and thrombotic microangiopathy were variables that impacted on disease-free survival, in a multivariate analysis, only complete remission had an effect on disease-free survival (p<0.0001). The probability of disease-free survival was significantly higher in responders who experienced complete remission (69 ±12%, n=14) compared to non-responders (16 ±10%, n=13, p=0.02). There was a significant increase in the number of CD4+ post-ECP compared to pre-treatment levels (p= 0.02), specifically effector memory (p=0.01) and regulatory cells (p=0.04).

Perotti et al (2010) reported on the factors that may influence clinical outcomes and survival in a longitudinal study of 73 paediatric patients with aGVHD (n=50, mean age 9.9 ± 4.5 years) and cGVHD (n=23, mean age 11.8 ± 4.4 years) (level IV Intervention evidence). All patients were refractory to one week of steroid treatment,

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3 Complete remission defined as a complete resolution of GVHD symptoms and partial remission defined as at least a 50% reduction in organ involvement. No change was defined as stable organ involvement. No response was defined as a progressive worsening of GVHD and an inability to taper other medications.
with patients in the aGVHD and cGVHD group being symptomatic for a median of nine (IQR^4 6-20 days) and 42 (IQR 17-220 days) days, respectively, prior to commencement of ECP with the COBE Spectra cell separator and UVA-MATIC UVA irradiator. Patients in the aGVHD and cGVHD group received a median of 18 ECP treatments (IQR 12-24) and 34 (IQR 16-43) ECP treatments, respectively, with an overall follow-up time of 2,862 patient-months (median 23.7, range 2-145).

The results of ECP treatment in both the aGVHD and cGVHD patients are summarised in Table 1. A higher proportion of aGVHD patients achieved a complete response compared to those with cGVHD (32% vs 21.7%). No association between any clinical or laboratory variable, including white blood cell, monocyte or platelet counts, and complete response was identified. There was, however, a trend to increased natural killer cell numbers only in responders with aGVHD (p=0.05). In addition, the grade of aGVHD was not associated with response to treatment. Steroid use decreased substantially or completely in 52 and 43.5 per cent of patients in the aGVHD and cGVHD groups, respectively; however a high proportion of patients in the aGVHD group experienced no change or an increase in steroid use (34%). The decrease in steroid use at 30 days was associated with survival in the aGVHD patients with a hazard ratio of 2.2 (95% CI [1.5, 3.2], p<0.001) for each mg/kg reduction. Overall survival was 44 and 78 per cent in the aGVHD and cGVHD groups, respectively. In the aGVHD group, mortality was significantly associated with response to ECP treatment with 13 out of 34 responders (38.2%) dying compared to 15/16 (93.8%) of patients in the non-responder group (p<0.001). There was no significant difference between mortality rates in responders compared to non-responders in the cGVHD group (12.5% vs 42.9%, respectively, p=0.10) (Perotti et al 2010).

In total, 2,360 ECP procedures were performed with minimal procedure-related adverse events. A double lumen central venous catheter was used in 17 of the aGVHD patients, three of whom (17.6%) experienced a catheter related infection. Similarly, two of the nine (22.2%) patients in the cGVHD group experienced a CVC-related infection. Other adverse events included chills (12 episodes) abdominal pain (7 episodes) and fever (11 episodes) and headache (22 episodes) following monocyte re-infusion (Perotti et al 2010).

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^4 IQR = interquartile range
A smaller, retrospective case series by Aktari et al (2010), reported on the outcomes of 28 consecutive adult patients with cGVHD which developed after HLA-matched haematopoietic progenitor cell transplantation given for the treatment of a variety of haematological malignancies (level IV intervention evidence). All patients were steroid-dependent, steroid-refractory or steroid-intolerant and received ECP therapy with the Therakos UVAR™ system. ECP was administered weekly on two consecutive days for the first two months, then two times a week every fortnight for two months, followed by two times a week every month. Three patients were lost to follow-up, with the remaining 25 patients followed-up for 50.2 months (range 13.1 to 101.3 months) from time of transplant.

The median number of ECP treatments was 26 (range 2-68). Fourteen patients (56%) were considered as clinical responders, with at least a 50 per cent reduction in steroid use over four months and an improvement in skin lesions. Although all donors were HLA-matched, some donors were unrelated to the recipient, however this did not influence whether or not the patient responded to ECP ($p=0.656$). Interestingly, the median time from transplantation to onset of GVHD was significantly different between responders (6.9 months, range 3.3 to 15.1 months) and non-responders (4.0 months, range 3.4-8.6 months, $p=0.018$). A total of nine patients died during the follow-up period: two in the responder group and seven in the non-responder group; however cause of death was not related to the ECP treatment. Survival was significantly improved for responders compared to non-responders, with responders
having a 2-year estimated survival of 88 per cent versus 18 per cent for non-responders \((p=0.004)\). Correlation of survival with baseline \(CD4^+\) T cell counts tended towards significance \((\text{hazard ratio } 0.996, p=0.052)\), however \(CD4^+\) levels were significantly correlated with response to ECP \((p=0.042)\). A univariate analysis determined that the best baseline cut-off values to predict a response to ECP were \(CD4^+\) counts of 104 cells/µL \((71\% \text{ sensitivity}, 82\% \text{ specificity})\) and myeloid dendritic cell counts of 3.7 cells/µL \((79\% \text{ sensitivity}, 82\% \text{ specificity})\), indicating that higher baseline values of these cell populations may predict a clinical response to ECP \((\text{Akhtari et al 2010})\).

A case report described the long-term use of ECP in a 14 year old patient with sclerodermatous cGVHD, which had developed three years post-bone marrow transplantation. During the intervening 3-year period following transplantation, the patient required an additional stem cell transplantation from the same donor. During this time, the patient developed grade III cutaneous aGVHD, which was treated successfully with steroid therapy. Despite this, cGVHD subsequently developed, which was also treated successfully. However, steroid refractory sclerodermatous cGVHD developed two years after the second transplantation. ECP was initiated using the Therakos UVAR™ XTS™ system and administered twice weekly for one month, then three times a week for the second month whilst continuing baseline immunosuppressive therapy, which gradually decreased over the treatment period until ceasing completely at 16 months. ECP decreased to twice weekly at 19 months and at 21 months alternated between once-to-twice weekly. ECP treatment continued for 53 months with the number of ECP treatments exceeding 540 sessions. Treatment was suspended on three occasions due to the patient developing transient tachycardia, transient asymptomatic hypotension and venous port clotting. In addition, the patient experienced multiple steroid-related complications, one of which required a hip replacement. The symptoms of sclerodermatous improved with treatment, with the skin score falling from approximately 45 (maximum score 66) to six, demonstrating a reduction in skin thickening. Improved range of motion and movement was noted, in addition to hair growth on extremities. In addition, red blood cell counts, platelet counts and haemoglobin levels normalised. The patient continued to receive ECP treatment alternating once-to-twice weekly without any ECP related, whilst not using any immunosuppressive therapy \((\text{Bisaccia et al 2011})\).

**Cost Impact**

The cost of the Therakos Photopheresis system is approximately A$100,000. The consumables associated with each treatment session costs approximately A$1,700, excluding the cost of the psoralen, methoxsalen. Methoxsalen is currently an unapproved medicine supplied by the TGA only through the Special Access Scheme on a case by case basis. One vial per treatment is required and each vial costs approximately A$125 (personal communication Medtel Pty Ltd). The number of
treatments required per patient may vary, however standard therapy may consist of initial treatment three times per week for 2-3 months, with follow-up weekly treatments which may continue for up to 12 months. Total treatment costs may be in the vicinity of $100-150,000 per patient, excluding other costs associated with treatment such as accommodation of the patient and travel (personal communication Queensland Health).

Currently ECP treatment for Australian patients at the Peter MacCallum Cancer Centre is funded via a shortfall grant provided by the Victorian government to cover the difference between funding provided by the apheresis DRG\(^5\) (approximately $5-600) and the real cost of ECP (approximately $2,700-3,000) (personal communication Peter MacCallum Cancer Centre).

**ETHICAL, CULTURAL OR RELIGIOUS CONSIDERATIONS**

Several ethical and access issues are associated with the use of extracorporeal photopheresis for the treatment of GVHD. Due to the small numbers of patients that require ECP treatment, it is likely that this technology will be offered in only a small number of treatment centres in major tertiary hospitals, or in one national centre. The ongoing nature of ECP treatment may require rural and remote patients to relocate to a major population centre, and if a paediatric patient, this may require the long-term relocation of other family members. Although travelling to treatment centres when ECP is required may be an option for some patients, the majority are seriously ill and unable to travel. Both options may result in a financial burden to the family and/or health service.

Although GVHD is a rare event in paediatric patients compared to adult patients, it is associated with long-term morbidity in younger patients. Other treatment options exist for GVHD, such as long-term steroid use; however these options are associated with serious adverse events including toxicity, whereas ECP is considered a safe alternative treatment option in children (personal communication Royal Children’s Hospital, Melbourne).

Currently only two ECP devices are operating in Australia, with both primarily treating adult patients. Consideration must be given to whether or not a standalone ECP device for paediatric and adult patients is required in each ECP treatment centre to avoid the ethical complications of treating paediatric patients in an adult environment, and vice versa. Experts in the ECP field advocate 2-3 national adult treatment centres in Australia, based on population numbers, and one national paediatric centre of excellence, based on the low numbers of paediatric patients who require treatment (personal communication Royal Children’s Hospital and Peter MacCallum Centre, Melbourne, Victoria).

\(^5\) DRG = Diagnosis related group, which is based on the patient having a diagnosis. Interestingly, the DRG for donor apheresis (without diagnosis) is $1,000.
OTHER ISSUES

ECP is technically difficult in very small children, requiring a network of specialised clinical staff that are capable of operating in a specialised environment designed for paediatric patients. ECP specialists from the Peter MacCallum Cancer Centre and the Royal Children’s Hospital, Melbourne have begun discussions towards completing an application for funding under the umbrella of the Nationally Funded Centres grants for new technologies. Both centres would welcome the opportunity to present to HealthPACT.

SUMMARY OF FINDINGS

ECP is an established technique that has been used with success in adult Australian patients with cutaneous T cell lymphoma for approximately 10 years, with increasing numbers of patients with GVHD being treated. Recently paediatric patients with GVHD in Australia have been treated with ECP. Although GVHD is rare in paediatric patients, there is a real need to treat these patients in a specialised environment to avoid the morbidity associated with long-term steroid use. ECP is a safe and effective treatment for patients who have no alternative treatment options. Low level case series evidence indicates that long-term ECP is tolerated in most patients and that steroid use is reduced or ceased in those patients who respond to ECP. In addition, survival tends to favour those patients who respond to ECP.

Conventional treatment options for GVHD have a <50 per cent chance of eliciting a response and are associated with a significant risk of fatal infection. Preliminary evidence suggests that ECP may be as effective at eliciting a response without being associated with such a high risk of fatal infection (personal communication BMT Program, Royal Children's Hospital, Brisbane).

HEALTHPACT ASSESSMENT:

Based on low level case series evidence ECP appears to be a well tolerated and safe procedure in seriously ill adult and paediatric patients who have limited treatment options available to them. This technology is already being implemented to some degree in Australia, therefore HealthPACT have recommended that information on this technology be noted and that no further research is warranted by HealthPACT at this time.

NUMBER OF INCLUDED STUDIES

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References:

ABMDR (2010). *Australian Bone Marrow Donor Registry Annual Report 2009*, Australian Bone Marrow Donor Registry.


BMTSANZ (2011). *Australasian Bone Marrow Transplant Recipient Registry Annual Data Summary 2009*, Bone Marrow Transplant Society of Australia and New Zealand, Sydney, NSW.


**SEARCH CRITERIA:**

Chronic Disease  
Acute Disease  
Drug Therapy/methods/trends  
Graft vs Host Disease  
Salvage Therapy  
Autoimmune Diseases  
Photopheresis  
Methoxsalen/ administration & dosage  
Photosensitizing Agents/ administration & dosage  
Stem Cell Transplantation  
Transplantation, Homologous