Extracorporeal Photopheresis and Infectious Complications in Patients with Chronic Graft Versus Host Disease

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Background

- Extracorporeal photopheresis (ECP), is a cell-based immune-modulatory therapy used in the treatment of steroid refractory chronic graft versus host disease (cGHVD).
- It is unclear whether ECP is associated with an increased risk of infections compared to alternative treatment.
- We aimed to study the infectious complications in patients on ECP post allogeneic hematopoietic stem cell transplant (alloHSCT).
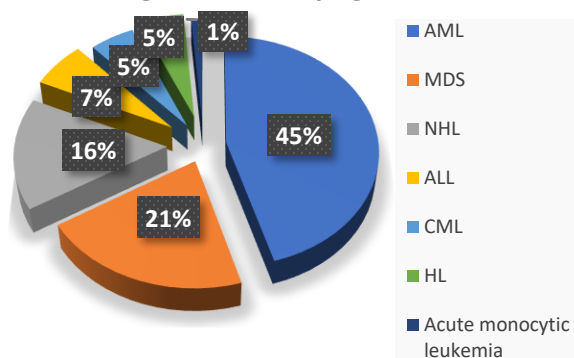
Methods

- Retrospective cohort study of adults with cGVHD post alloHSCT initiated on ECP or second line immunosuppressive agents (SLIS) using Heron database.
- March 1, 2014 to October 1, 2018; followed for 1-year post treatment.
- Each subject in the ECP arm matched up to 1:2 to the SLIS arm according to gender, age, underlying disease, and date of diagnosis of cGVHD.
- Main outcome: incidence of each type of infection (event rate/ person-years).
- Kaplan Meier analysis/log rank test used, evaluating time to infection.
- Spectrum of infectious complications described.

Funding

Table 1. Patient Characteristics

Characteristic	ECP arm (N =36)	SLIS arm (N=41)
Median Age (in yrs)	56.93 (18.07-68.68)	58.33 (25.58 – 73.43)
Sex, n (%)		
Male	21 (58.3)	25 (61)
Female	15 (41.7)	16 (39)
HLA mismatch, n (%)	4 (11.1)	4 (9.8)
Stem cell donors, n (%)		
Related	16 (44.4)	14 (34.1)
Unrelated	20 (55.6)	27 (65.9)
Prophylaxis for infections at baseline, n (%)		
Bacterial	27 (75)	21 (53.8)
HSV	36 (100)	36 (92.3)
CMV	1 (2.8)	3 (7.7)
Fungal	31 (86.1)	24 (61.5)
PJP	35 (97.2)	35 (89.7)
Type of Indwelling Catheter, n (%)		
Central Venous Catheter	30 (81.1)	12 (29.3)
Peripheral Venous Catheter	6 (18.9)	29 (70.7)

Figure 1. Underlying Diseases

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- AML 45%
- MDS 21%
- NHL 16%
- ALL 7%
- CML 5%
- HL 5%
- Acute monocytic leukemia 1%

Table 2. Subtypes of Infections

Infections	ECP arm (N=94)	SLIS arm (N=118)
Bacterial, n (%)	47 (50)	55 (46.6)
Acute sinusitis, n (%)	5 (10.6)	3 (5.5)
Pneumonia, n (%)	16 (34)	15 (27.3)
Endogenous bacteremia, n (%)	6 (12.8)	4 (7.3)
Catheter related bloodstream infection, n (%)	0 (0)	5 (9.1)
Others, n (%)	18 (38.3)	28 (50.9)
Cellulitis	11 (61.1)	4 (14.2)
Miscellaneous	7 (38.9)	24 (85.8)
Fungal, n (%)	3 (3.2)	5 (4.2)
Acute sinusitis, n (%)	-	1 (20)
Pneumonia, n (%)	1 (33.3)	2 (40)
Esophagitis, n (%)	-	1 (20)
Invasive fungal infections, n (%)	1 (33.3)	1 (20)
Others, n (%)	1 (33.3)	-
Viral, n (%)	44 (46.8)	58 (49.2)
Sinusitis, n (%)	4 (9.1)	9 (15.5)
Pneumonia, n (%)	17 (38.6)	14 (24.1)
Diarrhea, n (%)	1 (2.3)	1 (1.7)
Viremia, n (%)	4 (9.1)	16 (27.6)
Encephalitis/meningitis, n(%)	1 (2.3)	2 (3.4)
Others, n (%)	17 (38.6)	16 (27.6)
URI	14 (82.3)	8 (50)
Miscellaneous	3 (17.7)	8 (50)

N – The total no. of infections (i.e. bacterial, fungal and viral) combined i.e. 94 in the ECP arm and 118 in the non-ECP arm.

n – Denotes the number of infections within each type (e.g. 47 bacterial infections were observed in ECP arm)

(%) – Calculated using 'N' as denominator for each type of infection (e.g. bacteria (47/94 x100), fungus (3/94 x100) and viruses (44/94x100)); 'n' as denominator within each category (e.g. bacterial infections in ECP arm: acute bacterial sinusitis (5/47x100); bacterial pneumonia (16/47 x100); endogenous bacteremia (6/47x100); catheter-related blood stream infection (0/47 x100); and others (18/47 x100))

Results

- Seventy-seven patients were included (Table 1).
- Bacterial infections accounted for majority of the infections in ECP arm (50%) compared to SLIS arm in which viruses were most common (49.2%) (Table 2).
- Bacterial pneumonia was the most common clinical syndrome (Table 2).
- Bacteremia accounted for 12.8% of infections in the ECP arm compared to 16.4% in the SLIS arm.
- There was no difference in the event rates of infections among the two groups [2.58/ person-years in ECP group vs 3.60/person-years, p = 0.3766], or the probability of infection at any time (Figure 2).

Figure 2. Kaplan-Meier plot of time to the earliest infection diagnosis between ECP and SLIS group
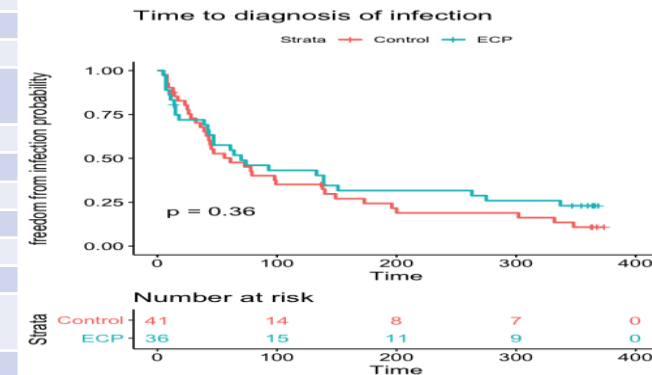
Conclusion

- Bacterial and viral pneumonia were the most common infections in patients undergoing ECP.
- Overall, ECP does not confer an increased risk of infectious complications compared to second line IS agents.