



## Patients' quality of life after stopping plasma exchange: A pilot study



Randah Dahlan <sup>a</sup>, Brendan B. McCormick <sup>a</sup>, Maan Alkhattabi <sup>b</sup>, Kerri Gallo <sup>c</sup>,  
William F. Clark <sup>d,\*</sup>, Gail Rock <sup>e</sup>

<sup>a</sup> Division of Nephrology, Department of Medicine, University of Ottawa and the Ottawa Hospital, Canada

<sup>b</sup> Department of Internal Medicine, Western University and London Health Sciences Hospital, Canada

<sup>c</sup> Division of Nephrology, Department of Medicine, Western University and London Health Sciences Center, Canada

<sup>d</sup> Division of Nephrology, Department of Medicine, Western University and London Health Sciences Center, Canada

<sup>e</sup> Ottawa Hospital, #101-270 Sandridge Road, Ottawa K1L 5A2, Canada

### ARTICLE INFO

#### Article history:

Received 29 October 2013

Received in revised form 23 April 2014

Accepted 26 April 2014

Available online

#### Keywords:

Plasma exchange

Plasma exchange

Quality of life

### ABSTRACT

**Background:** Plasma exchange is being widely used to treat various serious medical conditions. There has been very little follow-up data to describe the quality of life (QOL) of plasma exchange-recipients after active plasma exchange has stopped.

**Objective:** To assess the QOL of plasma exchange recipients after stopping plasma exchange.

**Methods:** A pilot study, based on responses to a postal questionnaire and clinical data obtained from the patients' charts, was carried out. The scores were computed from questionnaire responses and analyzed.

**Results:** The response rate was 59% with 58 patients completing a questionnaire three months after their final plasma exchange therapy. We identified significant heterogeneity in the quality of life of plasma exchange recipients after stopping plasma exchange therapy. This could be driven by different patient co-morbidities. We recommend that during follow up visits, a multi-disciplinary approach including consultation with a social worker might be considered for patients who may continue to have some limitations in their psychosocial activities post-discontinuation of plasma exchange. The high response rate to the questionnaire indicates that PLEX patients are interested in being involved in QOL studies, which suggests potential support for a prospective study of QOL with pre and post questionnaires and more detailed tracking of baseline co-morbidities.

© 2014 Elsevier Ltd. All rights reserved.

## 1. Introduction

Plasma exchange is an extracorporeal treatment that involves the removal of circulating proteins from plasma and infusion of donor albumin or plasma. It is used to treat a growing number of acute and chronic conditions [1]. The

response to plasma exchange is usually determined by certain disease-specific objective measures, for example, improvement in the platelets count and lactate dehydrogenase level in patients with thrombotic thrombocytopenic purpura (TTP), or improvement in the renal function in transplant recipients with acute humoral rejection. To date, there has not been any attempt to measure quality of life changes that are associated with PLEX therapy in either acute or chronic treatment. The quality of life literature is well developed in other extracorporeal treatments such as hemodialysis [2], and it is generally accepted that patients' perspectives should, be considered as important as an objective measure in hemodialysis efficacy [3].

\* Corresponding author. Address: London Health Science Centre, 800 Commissioner's Road East, London, Ontario N6A 5W9, Canada. Tel.: +1 519 685 8361; fax: +1 519 685 8047.

E-mail address: [william.clark@lhsc.on.ca](mailto:william.clark@lhsc.on.ca) (W.F. Clark).

There are a number of challenges in assessing quality of life effects of a relatively rare intervention such as PLEX. Patients are often acutely ill due to complex and multisystem illness when starting therapy and thus baseline quality of life measurements are a challenge. Quality of life data for PLEX is, however, important to ascertain as it is highly relevant to health care professionals because it may identify potential aspects for optimization of care and improvement in the support we provide to patients. This pilot study was carried out to assess the feasibility of collecting meaningful data on the out of hospital quality of life of patients after stopping plasma exchange.

## 2. Method

The study was performed in accordance with the guidelines set out by the Ethics Board at Western University, London, Ontario, Canada (#17049E). We surveyed adult patients who had received plasma exchange at London health sciences hospitals from May 2010 to April 2012 and survived to discharge. They were approached to participate in the study by mailing a questionnaire three months after they had completed their last cycle of plasma exchange. Patients on chronic PLEX were not included. Instructions were written on the form to encourage the patients to answer all questions, choose the best answer that describes their condition, and return the questionnaire by using a prepaid return envelope. The first section of the questionnaire was answered by the plasma exchange nurse (patients did not see the nurse's answers), and it included the following information: patient study ID number, diagnosis requiring plasma exchange, date of diagnosis, date of first plasma exchange session, date of last plasma exchange session, how many previous cycle of plasma exchange the patient had (if applicable), total number of PLEX sessions, the replacement fluid used, other medications used to treat the active disease (e.g. IVIG, rituximab, etc.), and the outcome of all sessions in aggregate as graded subjectively by the nurse at the end of cycle as one of the following:

- *Excellent*: if the patient had a quick remission with no major adverse reactions to PLEX.
- *Good*: if there was a delay in responding to the therapy but no adverse reactions to PLEX.
- *Fair*: if the patient had a serious adverse reaction to PLEX (e.g. hypotension or shortness of breath).
- *Poor*: if the patient did not respond to therapy or had multiple adverse reactions.

The patient questionnaire was designed based on a simplified version of SF-36 Health Survey score [2]. It included tools to assess the patients' perception of the following: their general health status, the effect of their current physical health on their job, school or their ability to perform household work, and their current social and psychological health.

## 3. Statistics

Data were collected with the aid of a standardized questionnaire. Statistical analysis was performed using the

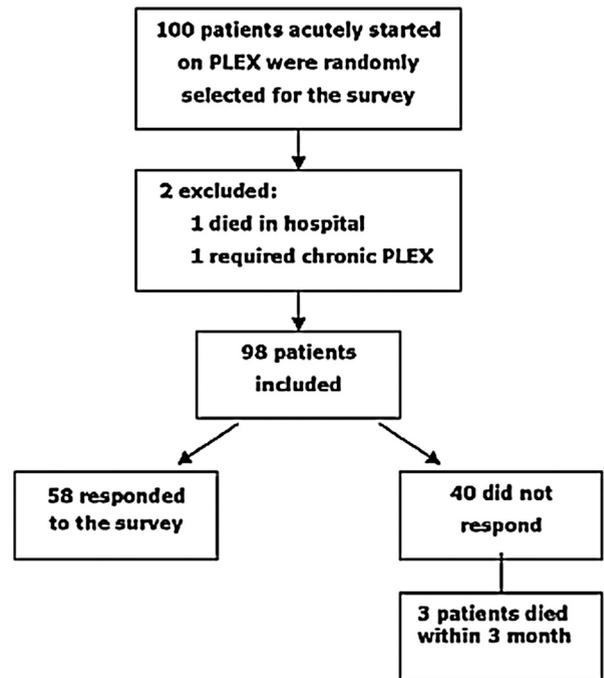


Fig. 1. Flow chart of the surveyed patients.

software *Epi Info* version 3.5.1 of August 13 2008 (CDC Atlanta).

## 4. Results

Between May 2010 to April 2012, 98 questionnaires were mailed to plasma exchange recipients who had completed their PLEX cycle (Fig. 1). We received fifty eight (59%) questionnaires back while forty patients (40%) did not respond, and three of them died within three months of completion of therapy. Therefore, for those who were able to respond, the response rate was 61%. Data of the 58 responders were analyzed. The average age of the included patients was  $52.0 \pm 17.8$  years and most of them were females. The underlying diseases requiring PLEX were: TTP, acute humeral rejection in a renal transplant recipient, pulmonary hemorrhage associated with ANCA vasculitis or Goodpasture syndrome, chronic inflammatory demyelinating polyneuropathy (CIPD), myasthenia gravis, and other less common causes (e.g. IgM nephropathy, intrahepatic cholestasis with refractory pruritus or cryoglobulinemia). The demographics of the study patients, as well as those who did not mail the questionnaire back, are summarized in Table 1. Non-responders tended to be older and their response to therapy was generally poorer than responders.

Most patients (65%) rated their perception of health status at the time of filling out the questionnaire as "Fair" to "Good" (Fig. 2). This may imply that the effect achieved by PLEX therapy on patients' general health as perceived by patients is sustainable for at least 2–3 months post discontinuation of PLEX. 40% of patients felt that their health status after stopping PLEX had no impact on their performance at work or school or on their ability to carry out their

**Table 1**  
Patients' demographics.

Characteristic	Value responders n = 58	Value non-responders n = 40
Age (y, mean)	52.0 ± 17.8	56.3 ± 16.2
Sex (Males:Females)	15:43	23: 17
Reason for PLEX:		
TTP	15 (25.9%)	11 (27.5%)
Acute humeral rejection	14 (24.1%)	8 (20.0%)
Pulmonary hemorrhage	10 (17.2%)	12 (30.0%)
Myasthenia gravis	7 (12.1%)	2 (5.0%)
Demyelinating polyneuropathy	4 (6.9%)	1 (2.5%)
Others	8 (13.8%)	6 (15.0%)
Replacement fluid		
5% albumin	40 (69.0%)	30 (75%)
CPP	18 (31.0%)	10 (25%)
Number of PLEX sessions		
<15 session	39 (67.2%)	29 (72.5%)
≥15 session	19 (32.8%)	11 (27.5%)
Outcome of PLEX cycle		
Excellent	3 (5.2%)	1 (2.5%)
Good	40 (69.0%)	18 (45.0%)
Fair	14 (24.1%)	17 (42.5%)
Poor	1 (1.7%)	4 (10.0%)
No. of previous PLEX cycles		
None	55 (94.8%)	39 (97.5%)
1–10 sessions	3 (5.2%)	1 (2.5%)

CPP: cryoprecipitate-poor plasma, CIDP: chronic inflammatory demyelinating polyneuropathy, PLEX: plasmapheresis.

usual household work, while 35% reported limitations in these activities for most of the time during the first three months post discontinuation of plasma exchange (Fig. 3).

Psychosocially, one third of patients reported feeling calm and peaceful for most of the time during the three months preceding completing the questionnaire, while others reported episodes of feeling downhearted and blue. Moreover, variable percentages of patients had some limitations in their social life and were unable to resume their previous social activities with friends and close relatives (Fig. 4).

## 5. Discussion

The impact of various diseases on physical health may be associated with a negative impact on other aspects of life. Tools used to assess the severity of diseases and their response to a specific therapy may not detect their impact on a patients' quality of life. For example, disease severity in patients with myasthenia gravis (MG) has been shown to negatively affect various psychological, social and functional aspects of patients' daily living [3]. These effects are not captured directly by the Quantitative Myasthenia Gravis Score used in these patients, but are reflected in MG-QOL scales [4,5].

Plasma exchange has been shown to be comparable to intravenous immunoglobulin (IVIG) in achieving an improvement in the quality of life of MG patients, and the improvement with either treatment was not correlated with disease severity at study entry [4,6].

This study has identified significant heterogeneity in the quality of life of plasma exchange recipients after stopping PLEX therapy. This raises the question of how much of the current quality of life is driven by the response to therapy, and how much by co-morbidities. This pilot cross sectional study does provide evidence that PLEX patients are willing to fill in questionnaires, and this indicates their interest in being involved in QOL studies. Formal prospective QOL studies in PLEX recipients are needed with pre and post questionnaires and more detailed tracking of baseline co-morbidities. This would allow a better understanding of which populations of patients has a QOL benefit from PLEX, whether the duration or success of the PLEX therapy has any bearing on QOL outcomes, and what the QOL is like for patients on chronic PLEX (with reference to chronic HD).

This study has several limitations, including: the limited sample size, the lack of baseline QOL data before initiation of PLEX, use of a non-validated questionnaire, the lack of gold-standard score for the assessment of quality of life in PLEX-recipients, and the possibility that the assessed

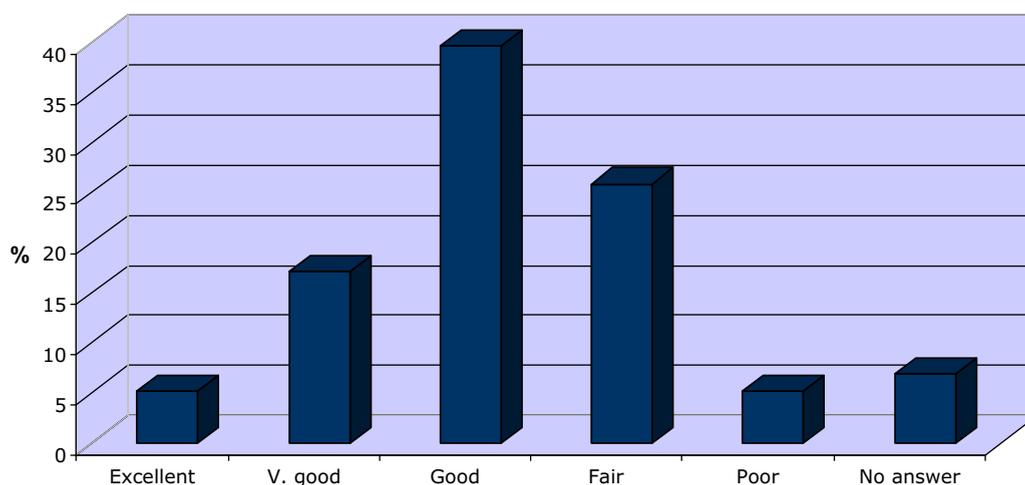


Fig. 2. Patients' perception of their general health status.

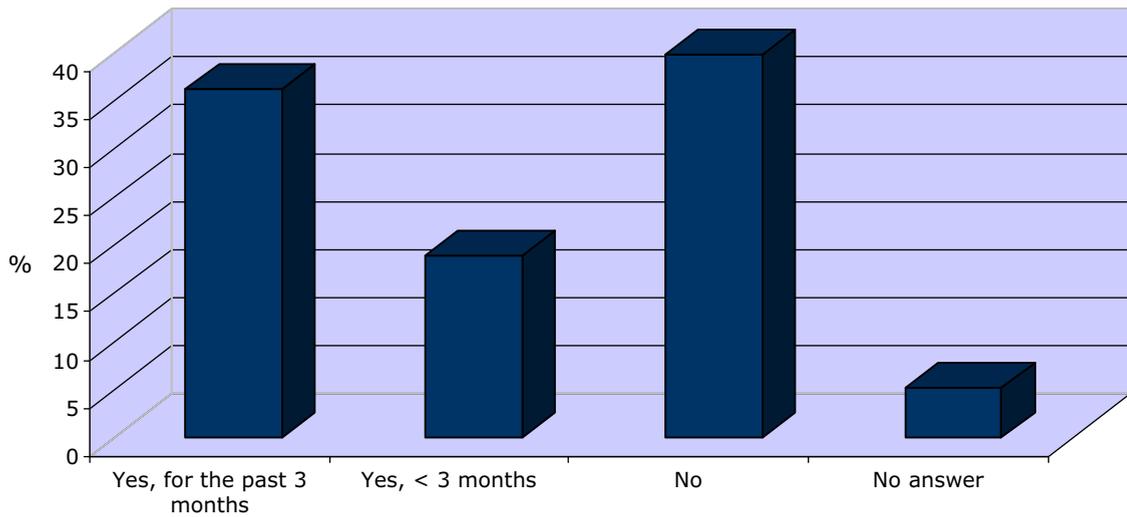


Fig. 3. Does your health keep you from working at a job, doing work around the house or going to school?

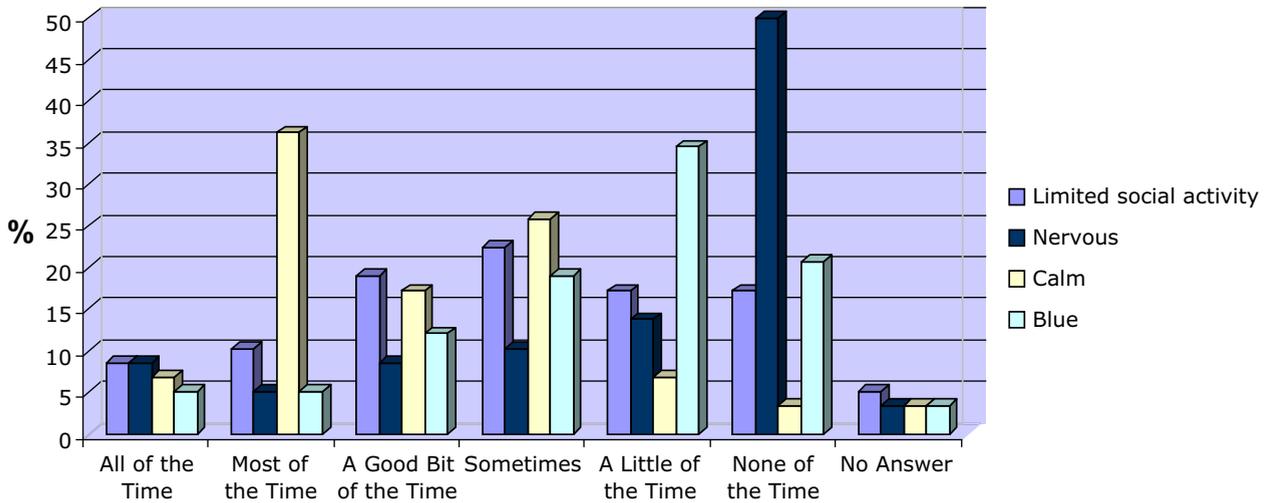


Fig. 4. Psychosocial status of patients 3 months after stopping PLEX.

outcomes do not necessarily reflect the direct impact of treatment. We do feel, however, that QOL in PLEX patients merits further investigation.

**References**

[1] Szczepiorkowski Zbigniew M, Winters Jeffrey L, Bandarenko Nicholas, Kim Haewon C, Linenberger Michael L, Marques Marisa B, et al. Guidelines on the use of therapeutic apheresis in clinical practice—evidence-based approach from the apheresis applications committee of the American Society for Apheresis. *J Clin Apheresis* 2010;25:83–177.

[2] Brennan MR, Gill M, Robbins S, Esrailian E. Biomarkers and health-related quality of life in end stage renal disease: a systematic review. *Clin Am J Soc Nephrol* 2008;3:1759–68.

[3] Simic-Ogrizovic S, Jemcov T, Pejanovic S, Stosovic M, Radovic M, Djukanovic L. Health-related quality of life, treatment efficacy and haemodialysis patient outcome. *Renal Fail* 2009;31:201–6.

[4] Ware JE, Sherbourne CD. The MOS 36-item short form health survey (SF-36). Conceptual framework and item selection. *Med Care* 1992;30(6):473–83.

[5] Mullins L, Carpentier M, Paul R, et al. Disease-specific measure of quality of life for myasthenia gravis. *Muscle Nerve* 2008;38:947–56.

[6] Barnett Carolina, Wilson Graham, Barth David, Katzberg Hans D, Brill Vera. Changes in quality of life scores with intravenous immunoglobulin or plasma exchange in patients with myasthenia gravis. *J Neurol Neurosurg Psychiatry* 2013;84:94–7.