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Review

Therapeutic aphaeresis: Experience in Puerto Rico

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ABSTRACT

The Puerto Rico (PR) Region of the American Red Cross (ARC) evaluated the therapeutic aphaeresis program and we conducted 1609 procedures in 30 months between 2011 and 2013. The primary objective of the present review was to demonstrate our data and compare it to the reviewed medical evidence regarding the adequacy of applying therapeutic aphaeresis (TA) for chosen indications based on data in the literature. It was concluded that our service is very active and appropriate, and the number of TA's done varies and it's not steady year-by-year. The indications are the same as most common indicators across the World and the adverse reactions are too. We are the only ones doing apheresis in the pediatric population of PR. No deaths have been reported from our procedures. We understand that clinicians do not have enough knowledge about TA and tend to apply TA's in many cases as a last resort treatment for many diseases. Education at medical faculties and of hospital staff (nurses and medical technologists) about TA is very important. There is a need for symposia about this topic to the medical and general community.

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1. Introduction

The Red Cross had a presence in Puerto Rico (PR) was there long before the American Red Cross first chartered it in 1917. The Spanish Red Cross founded the movement in PR on July 7, 1893 when PR was still under the dominance of the Spainish government. Manuel Fernandez Juncos was the person charged with the task of founding "Las Comisiones de la Cruz Roja Española" (Spanish Red Cross Branches) throughout PR. The Spanish Red Cross Branches in PR remained active until 1898 when the American Red Cross started to make a presence on the island through its Nursing Corps [1]. The Blood Services was founded in PR in 1951. The therapeutic aphaeresis service has been

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in PR since 1996. There has been no published data about TA in Puerto Rico, except for one review article in Spanish [2] using plasmapheresis in the polyneuropathies, describing one case report about nitrofurantoin-induced microangiopathic hemolytic anemia and thrombocytopenia in a patient with systemic lupus erythematosus [3], and two cases of Guillain–Barre syndrome like acute axonal neuropathies in systemic lupus erythematosus [4].

We performed an average of 439 procedures per year, 764 in calendar year 2011, and 556 in fiscal year 2013 around the Island. The most common procedures are plasmapheresis, followed by leukocyte reduction and red cell exchanges. The most common diagnosis is thrombotic thrombocytopenic purpura (TTP), but neurologic disorders in children, vasculitis syndromes in adults and post transplant focal segmental glomerulosclerosis (FSGS) are frequent indicators. Cytapheresis is performed in hyperleukocytosis of leukemia, severe thrombocytosis in myeloproliferative disorders, and acute chest syndrome and intrahepatic cholestasis in sickle cell disease. We have 7 Cobe Spectra machines and 7 people as human resources (one manager, four nurses, one supervisor, and one compliance officer coordinator).

We are presenting our experience in Puerto Rico in comparison with the American Society for Apheresis (ASFA) guidelines [5–7] as well as the published data from USA [8,9], Canada [10], Caribbean Islands [11], Central & South America [12–17], and European-Asiatic Continents [18–23].

2. Methods

We reviewed the records of therapeutic aphaeresis of the Department of Clinical Services of the Puerto Rico Region of American Red Cross performed from January of 2011 to July 2013 and made tables as well as a graph with the data obtained. The authors critically reviewed the evidence, and the information was augmented by a computerized PUBMED search of the English and Spanish language literature published across the years to the present. The information was correlated with our data from 2011 to 2013.

3. Results

We performed an average of 54 TA's per month with 439 procedures per year, 764 in calendar year 2011, and 556 in fiscal year 2013 around the Island. The minimum of procedures was 24 per month and the maximum 96 per month (Table 1 and Fig. 1). The majority of the population was adults and females with an average age of 37.75 years old (Table 2). The youngest was 4 months old and the oldest was 83 years old (y/o). As per Table 3, the majority of the case and procedures were performed in the metropolitan area of Puerto Rico including San Juan and Bayamon followed by Caguas, Cayey, and Aibonito.

Therapeutic Plasma Exchange (TPE) followed by leukocyte reduction was the most common procedures. The majority of the procedures were category I with grading recommendations of 1A and 1B (Table 4). The most common replacement fluids were fresh frozen plasma (FFP) and human albumin at 5%. Two-thirds of the procedures used pre-medication such as benadryl, decadron or solumedrol, and calcium gluconate. The main venous access was a femoral vein Quinton catheter.

Table 1
Therapeutic aphaeresis procedures in PR.

Month-year	Therapeutic aphaeresis (number)
January-11	46
February-11	57
March-11	71
April-11	79
May-11	62
June-11	70
July-11	44
August-11	70
September-11	58
October-11	50
November-11	68
December-11	90
January-12	35
February-12	33
March-12	37
April-12	47
May-12	33
June-12	52
July-12	24
August-12	24
September-12	77
October-12	96
November-12	38
December-12	33
January-13	53
February-13	82
March-13	61
April-13	45
May-13	25
June-13	49
Total	1609
Average	54
Max	96
Min	24

As per Table 5, the most common diagnosis are thrombotic thrombocytopenic purpura (TTP) and acute leukemia followed by Myasthenia Gravis and Sickle Cell Disease with acute chest syndrome and intrahepatic cholestasis. In the pediatric population, the most common were Sickle Cell Disease, Myasthenia, TTP, Autoimmune Encephalitis, Acute Leukemia, and Humoral Renal Graft Rejection. In adults we found that TTP, Leukemia, and Myasthenia Gravis (MG) are the most common indicators for TA. Other indications are rare but if we wrap them into one bracket they are autoimmune processes such as vasculitis, glomerulonephritis, neuromyelitis optica, polyangeitis and polyarteritis within others.

There was no death reported during TA and the adverse reactions were mild, non-significant, and manageable.

4. Discussion

Accordingly to the guidelines on the use of TA in clinical practice from the American Society for Apheresis published in 2010 and 2013 [5–7], we performed the procedures in diseases where the evidence base demonstrated an accepted benefit with proper categories and grading

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