

Multidisciplinary Team Work to succeed: A Primary Immunodeficiency Unit experience

Barrios Y¹, Franco A¹, Alonso-Larruga A², Sánchez-Machín I³, Poza-Guedes P³, Gonzalez R³, Matheu V^{3,*}

¹Inmunología, Hospital Universitario de Canarias, San Cristóbal de La Laguna, Spain

²Bioquímica, Hospital Universitario de Canarias, San Cristóbal de La Laguna, Spain

³Alergología, Hospital Universitario de Canarias, San Cristóbal de La Laguna, Spain

*in behalf of **Grupo de Estudio de Inmunodeficiencias Primarias** (GEDIP), Hospital Universitario de Canarias, San Cristóbal de La Laguna, Spain

Corresponding:

Victor Matheu; MD

Modulo de Inmunodeficiencias Primarias

Servicio de Alergología, Hospital Universitario de Canarias

Ctra Cuesta-Taco s/n, 38320. La Cuesta. Tenerife

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi:

10.18176/jiaci.0485

Key words: Multidisciplinary team, Functional studies of immune response, Response to Vaccines, Common Variable Immunodeficiency, Specific antibody deficiency.

Palabras clave: Equipo multidisciplinar, Estudio funcional de respuesta inmunitaria, Respuesta a vacunas, Inmunodeficiencia Común Variable, Déficit específico de anticuerpos.

Primary Immunodeficiencies (PID) are a heterogeneous group of diseases that, today, consist of more than 340 genetic defects with broad-spectrum clinical manifestations [1], which are currently grouped into broad categories based on the underlying genetic defect [2]. PIDs could comprise alterations of the B cell response and their lineage, alterations of the complement system, deficits in the responses of the T cell or the commitment of the phagocyte system cells [3]

The well-known concept of multidisciplinary team is usually focused on complex [4] and chronic diseases [5]. These teams involve professionals from various disciplines in which they hold meetings to provide a more effective and generally efficient way of handling these patients. There is not much literature about this kind of team for the management of PIDs, maybe because the small number of cases and the specialized diagnostic approach.

Methods

In 2017, a new Allergy Service was added to the Assistance Services Portfolio of the *Hospital Universitario de Canarias* (HUC) complex located in Tenerife Island and with an area for ambulatory assistance of 490,000 inhabitants. Previously, there was a Clinical Immunology Unit with competences in the field of autoimmunity and histocompatibility, being the provincial reference center for kidney transplantation [6] in the island (990,000 inhabitants) and, up to that time a mere advisory work in matters concerning PIDs within its area of influence.

Taking advantage of the synergies and that these PID patients were managed by a wide spectrum of physicians with different approaches, it was decided to create an PID Study Group(*GEDIP*) coordinated and directed by the Immunology Section. The Medical Services members of the GEDIP were Immunology, Allergy, Pneumology, Pediatrics, Microbiology, Internal Medicine and the Adult Vaccination Module.

The group set various objectives such as

- 1) Design communication protocols and rapid vehiculization of patients to a specific care module;
- 2) Set up specific dedicated diagnostic procedures to implement new diagnostic algorithms in the field of PIDs
- 3) Dissemination of the group and its objectives.
- 4) Incorporation of new groups with synergies to improve coordination and increase efficiency;
- 5) Planning of training activities in the field of PIDs;
- 6) Communication with patient associations

Results

An exclusive PID Unit was created consisting in two modules: outpatient consultation PID and Angioedema and complement disease. These modules run in the Hospital Allergy Service but received patients from other Hospital and Primary services.

During the first year there was an initial meeting of the total GEDIP group and subsequent meetings every quarter where the progress of the consultation was evaluated. The diagnostic protocols were implemented including the incorporation to the Immunology portfolio of the hospital of functional studies of immune response to Conjugated Protein and Polysaccharide Vaccines(Table 1).

The dissemination of the objectives of the GEDIP was carried out through two strategies: one at the Hospital level and another at the Primary Care level as shown in table1. In all cases, special emphasis was placed on the promotion of the immunodeficiency warning signs and the new referral channel to address those suspect patients.

In the PID Module, sixty-eight new patients were evaluated during the first year. Forty-two of them were women (mean age: 49.51 years -median 55-). There were

monthly specific sessions of GEDIP Coordinator (Immunology) with the responsible of the PID Module (Allergy) before and after the consultation day to guide the specific cases.

The medical service that most contributed patients was Pneumology with 22 patients. Next was Allergy with 18 patients, Haematology 13, Primary Care 5, Rheumatology 3, Pediatrics 3, Internal Medicine 2 and ENT 2. The main causes of consultation were recurrent bronchitis; bronchiectasis; hypogammaglobulinemia; rhinosinusitis and pneumonia [7].

Of the sixty-eight patients studied, twenty had allergy as principal diagnosis (ten with asthma). Eight patients had diagnosis of transient hypogammaglobulinemia, two had Alpha-1 antitrypsin deficiency and other ten have no conclusive diagnosis.

Twenty-eight of these patients were evaluated in the second diagnostic step of humoral deficits [8] including the production of specific antibodies (diphtheria and tetanus), quantitative immunoglobulin levels and IgG subclasses, post-vaccine response assessment, monoclonal proteins, complement CH50 and lymphocytes subpopulation including T, B and NK cells.

During this first year three patients were diagnosed with Common Variable Immunodeficiency (CVID) [9]: a 32-year-old male with recurrent pneumonia; a 29-year-old woman with recurrent bronchitis; and a 38-year-old woman with an episode of severe pneumonia with intensive care unit admission and who had had previous episodes of recurrent respiratory infections. A fourth patient, a 68-year-old woman with recurrent bronchitis, CVID and thymectomy for a thymoma two years earlier, was diagnosed with Good's syndrome. Finally, two other patients were diagnosed with specific antibody deficiency [10]: a 64-year-old woman with episodes of recurrent respiratory infections and a lymphoma 5 year before; and a 59-year-old woman with recurrent rhinosinusitis.

Discussion

Most of the initial objectives after the creation of the GEDIP group could be fulfilled within the first year since its introduction. The work of the group members has provided a new clinical perspective for this group of patients in our location, demonstrating that the interdisciplinary approach has been a fruitful approach and that in the future, and with the support of the appropriate structures will be revalued to give

adequate care for patients that can be evaluated in this area. The inclusion of a Clinical Immunologist should be a key step.

In this case, before the creation of the GEDIP group, there was a lack in the coordination to manage these patients compared to other health services less fragmented than the Canary Islands. In addition, one of the problems found previously was the impossibility of adequate directing from the Primary Care centers as well as a standard approach in these patients. With the creation of this PID Unit, these problems have drastically been solved.

The implementation of the studies of immune function materialized in the response to vaccines has only been one of the palpable events of the progress in the diagnosis achieved for our patients. The following steps of adaptation of the referral protocols and the implementation of the advanced diagnosis will make the improvement in the quality of life of these patients a reality.

Conflict of Interest

Nothing to declare.

Financial Sources

Hospital Universitario de Canarias, Servicio Canario de Salud.

Acknowledgement

Grupo de Estudio de Inmunodeficiencias Primarias (GEDIP) from *Hospital Universitario de Canarias* from Services: Pneumology (I. Suarez-Toste); Microbiology (T. Delgado-Melián), Preventive Medicine (J. Duque-Arimany), Pediatric (C. Martínez-Faci, V. Velasco; Internal Medicine (M.C. Durán, A. Martínez-Riera) Ear-Nose-Throat (G. de Lucas, A. Perez-Orribo); Hematology (P. Machado, T. Martín-Santos), Immunology (Y Barrios; A Franco); Allergy (V Matheu, I Sanchez-Machin, P Poza-Guedes, R Gonzalez, C Alava, E Mederos)

References

1. Parvaneh N, Casanova JL, Notarangelo LD, Conley ME. Primary immunodeficiencies: a rapidly evolving story. *J Allergy Clin Immunol*. 2013;131:314-23.
2. Bousfiha A, Jeddane L, Picard C, Ailal F, Bobby Gaspar H, et al. The 2017 IUIS Phenotypic Classification for Primary Immunodeficiencies. *J Clin Immunol*. 2018;38:129-43.
3. Modell V, Orange JS, Quinn J, Modell F. Global report on primary immunodeficiencies: 2018 update from the Jeffrey Modell Centers Network on disease classification, regional trends, treatment modalities, and physician reported outcomes. *Immunol Res*. 2018;66:367-80.
4. Pillay B, Wooten AC, Crowe H, Corcoran N, Tran B, Bowden P, et al. The impact of multidisciplinary team meetings on patient assessment, management and outcomes in oncology settings: A systematic review of the literature. *Cancer Treat Rev*. 2016;42:56-72.
5. Ferman M, Lim AH, Hossain M, Siow GW, Andrews JM. Multidisciplinary team meetings appear to be effective in inflammatory bowel disease management: an audit of process and outcomes. *Intern Med J*. 2018;48:1102-08.
6. <https://www3.gobiernodecanarias.org/sanidad/scs/organica.jsp?idCarpeta=3da5f513-541b-11de-9665-998e1388f7ed>
7. Yazdani R, Abolhassani H, Asgardoost MH, Shaghghi M, Modaresi M, Azizi G, et al. Infectious and Noninfectious Pulmonary Complications in Patients With Primary Immunodeficiency Disorders. *J Investig Allergol Clin Immunol*. 2017;27:213-24.
8. Bonilla FA, Khan DA, Ballas ZK, Chinen J, Frank MM, Hsu JT, et al. Joint Task Force on Practice Parameters, representing the American Academy of Allergy, Asthma & Immunology; the American College of Allergy, Asthma & Immunology; and the Joint Council of Allergy, Asthma & Immunology. Practice parameter for the diagnosis and management of primary immunodeficiency. *J Allergy Clin Immunol*. 2015;136:1186-205.
9. Yazdani R, Habibi S, Sharifi L, Azizi G, Abolhassani H, Olbrich P, et al. Common Variable Immunodeficiency: Epidemiology, Pathogenesis, Clinical manifestations, Diagnosis, Classification and Management. *J Investig Allergol Clin Immunol*. 2020;30: in press.
10. Vigano S, TrabANELLI S, Indulsi F, Salomé B, Harari A, Romero P. et al. Dysregulated Innate Lymphocytes in Patients With Primary Antibody Deficiency Treated With Intravenous Immunoglobulin. *J Investig Allergol Clin Immunol*. 2017;27:394-6

Table. List of the actions carried out during the first year after the establishment of the new PID Unit.

Design communication and quick referral protocols.
An exclusive outpatient consultation PIDs Module
A shared use folder in the hospital intranet program was created by Immunology
Setting up a multidisciplinary group on Primary Immunodeficiencies (GEDIP)
Immunology, Allergy, Pneumology, Pediatrics, Microbiology, Internal Medicine and the Adult Vaccination Module
Quarterly meetings of the total GEDIP group
Monthly specific sessions of GEDIP Coordinator (Immunology) with the PID Unit (Allergy)
A patient circuit for replacement therapy at the Day Hospital
Set up specific dedicated diagnostic procedures to implement new diagnostic algorithms in the field of PIDs
Functional studies of immune response to T cell-dependent and T-cell independent vaccines
Implementation of advanced lymphocytes subpopulation study including T, B and NK cells.
Dissemination of the group and its objectives.
General presentation in the Univ. General Hospital & individualized presentations in specific services
Presentations at a Primary Care Allergy Forum (>100 registered G.P.) and Regional Pediatrics Meeting
Incorporation of new groups with synergies to improve coordination and increase efficiency;
ENT and Hematology Services were incorporated to <i>GEDIP</i> .
Planning of specific training activities in the field of PIDs;
Clinical Immunology Society and American Academy of Allergy, Asthma and Immunology
Specific training on the preparation of diagnostic reports of the Spanish Society of Immunology
Communication with patient associations
Explicit support from the National Patient Association (AEDIP) for the Multidisciplinary Unit
Maintaining a direct information channel with the National Patient Association (AEDIP)