

Implementation of an integral health program for diabetic foot ulcer patients by using Heberprot-P at the primary health attention level in the municipality of Playa, in Havana, Cuba

✉ Julio E Baldomero¹, Ricardo Silva¹, Luís Herrera¹, Pedro López¹, Amaurys del Río¹, José E Saurí¹, Ernesto López¹, Miriela Gil¹, Marianela García¹, José A Llanes², Jesús Bejar², Migdalia M Romero³, Tania Benavides⁴, Ana M González⁵, Víctor Hernández⁶, Isis Yera⁷

¹Centro de Ingeniería Genética y Biotecnología, CIGB
Ave. 31 entre 156 y 190, Cubanacán, Playa, AP 6162, Ciudad de La Habana, Cuba

²Instituto Nacional de Angiología y Cirugía Vascular

³Policlínico Docente 26 de Julio

⁴Policlínico Docente Jorge Ruiz Ramírez

⁵Policlínico Docente 5 de Septiembre

⁶Policlínico Docente 1ro de Enero

⁷Centro para el Desarrollo de la Farmacoepidemiología
Ciudad de La Habana, Cuba

E-mail: julio.baldomero@cigb.edu.cu

ABSTRACT

A model was introduced within the Program of Integral Attention to the Diabetic Patient (PIADP), in each policlinic of the Playa municipality in Havana, Cuba, and implemented under the integral treatment of patients with less complicated diabetic foot ulcers (DFU) and by using Heberprot-P to accelerate wound granulation and healing in an ambulatory manner. Since January of 2010, a strategy was developed in the primary health attention (PHA) of that municipality, constituted by three stages and including organizational elements such as: the elaboration of a Situational Room of the municipality, the qualification theoretical-practice of the human resources, the logistic securing, the redispensarization of diabetic patients, the programmed investigation in consultations and domiciliary visits; as well as elements of implementation: action of communitary promotion and mass media use. The application of the Heberprot-P started with the characterization of patient with DFU in the municipality and the selection of the human resources that would execute the treatment. All the 33 health professionals were prepared at each area, in the PIADP room, a system of filter for a suitable classification of the DFU was implemented. To date, 233 patients were treated, 28 of them (12.1%) requiring treatment with Heberprot-P, and their data being registered in pharmacovigilance models; 65 (27.8%) were sent to the secondary level of health, with complicated DFU and other vascular affections (60.1%). All except two of those patients, who completed treatment at the hospital, completed treatment at the PHA. The feasibility of the model by using Heberprot-P was demonstrated and an integral approach was established under intensive pharmacovigilance.

Keywords: diabetic food ulcers, Heberprot-P, Program of integral attention to the diabetic patient, primary health attention

Biotechnologia Aplicada 2010;27:155-158

RESUMEN

Implementación de un modelo de atención integral a pacientes con úlceras en pie diabético con el uso del Heberprot-P en la atención primaria de salud del municipio de Playa, Cuba. Dentro del Programa de atención integral al paciente diabético (PAID) de cada policlínico del municipio Playa de Ciudad de La Habana, Cuba, se estableció un modelo para el tratamiento integral a pacientes con úlceras de pie diabético (UPD) menos complicadas, que incorpora el uso del Heberprot-P para favorecer la granulación y curación de las lesiones en menor tiempo y de forma ambulatoria. Desde enero de 2010 se desarrolla una estrategia en la atención primaria de salud (APS) del municipio de Playa, en tres etapas que incluyen elementos organizativos, como la elaboración de una Sala situacional del municipio la capacitación teórico-práctica de los recursos humanos, el aseguramiento logístico, la redispensarización de pacientes diabéticos, la pesquisa en consultas y las visitas domiciliarias programadas; así como elementos de implementación: acciones de promoción comunitaria y uso de medios de comunicación. La aplicación del Heberprot-P partió de la caracterización de las úlceras de los pacientes diabéticos del municipio y la selección de los recursos humanos que ejecutarían el tratamiento. Se prepararon los 33 (100%) profesionales de la salud. En la consulta del PAID de cada área de salud se implementó un sistema de filtro para una adecuada clasificación de las UPD hasta la fecha. Se han atendido 233 pacientes, 28 (12.1%) que requieren tratamiento con Heberprot-P, cuyos datos se registraron en modelos de farmacovigilancia, 65 (27.8%) se remitieron al nivel secundario de salud, con UPD complicadas y otras afecciones angiológicas (60.1%). Salvo dos de estos pacientes que completaron el tratamiento en el hospital, los demás se atendieron en la APS. Se demostró la factibilidad del modelo con el uso del Heberprot-P, con un enfoque integral bajo farmacovigilancia intensiva.

Palabras clave: úlceras de pie diabético, Heberprot-P, Programa de atención integral al paciente diabético, atención primaria de salud

Introduction

Heberprot-P is a novel drug developed at the Center for Genetic Engineering and Biotechnology (CIGB) Havana, Cuba in conjunction with the National Center for Angiology and Vascular Surgery (NCAVS) and other Cuban institutions [1]. The drug is based in the infiltration of recombinant human epidermal growth factor in Diabetic Foot Ulcers (DFU). It is designed to promote healing in wounds and complex chronic ulcers presented in diabetic patients carrying legs in terminal states. Taking into account the therapeutic properties of Heberprot-P, it is considered as a unique drug targeting so far now a non solved medical need worldwide as it is amputation for DFU. Many studies carried out during the last 15 years, validated the use of Heberprot-P to promote healing in Diabetic Foot Ulcer (DFU) [2-7]. This statement has been validated by scientific evidences and medical experience recorded and tracked in more than 14 000 treated patients considered as the best avail of the safety and efficacy of Heberprot-P [1]. Diabetic Foot Ulcers are among the worst complications of Diabetes mellitus (DM). The disease has been considered as a serious non solved social and medical problem worldwide. It has been estimated that there are about 300 millions DM patients in the planet. This amount might duplicate in the next years and it is expected that rather soon diabetes might kill even more people than AIDS. DM is considered as the only non contagious pandemic in the world generating about 84% of the amputations generated in the globe. This data is so high that allow to say that every 30 seconds a DFU amputation is happening somewhere in the world. About 50 % of the patients who suffer an amputation face a second amputation in the contra lateral leg in a period of time not longer than 2 and 5 years from the previous one, provoking a tremendous harm in the DM patient quality of life plus generating a huge amount of expenses to familiar and health services economies. After suffering a major amputation, about less than 50% of the amputated patients survive more than 5 extras years. According international reports it is said that between 15 and 20% of DM patients face in any moment of their life a DFU event and among them, about 10 to 25% ends in an amputation event [8].

In Cuba, it has been estimated that the DM population is about half a million patients. From this number about 12 000 patients are holding a UPD episode with a record of about 1000 amputations per year [9].

Once Heberprot-P was developed and registered for being used at the Cuban medical facilities from the secondary health attention system (SHAS) in complex DFU treatments, we asked our selves the following questions: Could Heberprot-P being used at the Primary Health Attention system (PHAS) for treating DFU? Why almost all DFU patients attended at the PHAS were submitted to the Secondary Health Attention (SHA) system? How to improve this situation?

Materials and methods

Since January 2010 it has been developed an action plant designed in three steps at the PHAS level at Playa Municipality in Havana. The action plant includes several organizing elements as: Design of a DM si-

tuational map at the municipality. Facilitating human resources technical qualification at each Polyclinic by offering technical and practical courses to the staff about DM and its care. Training in determine accurate DFU calculation in patients, promoting at the communities to set up a census searching for DFU either by interviewing them when visiting the polyclinic or the family doctor or by searching them at the community. Assuring needs for active DFU patients screening to verify the detection of silent DM patients *in situ*. Determining the real DFU prevalence at the community either by tracking DM patients among the local population or by detecting them at each polyclinic. Other alternatives as searching them by visiting their houses were accepted as well, through active DM patient screening according the established program indicated by the Public Health Minister.

Those patients who qualify for this therapy normally were treated at the PAHS level if they carry out not complicated DFU (complicated means deep and clinical manifestation of infection and osteomyelitis) coming from the municipal population.

The appointments to administrate Heberprot-P patients are those established by the Program for the Integral Attention to DFU patients using Heberprot-p. The program involved medical specialists in Medical and Integral Medicine (MIM); specialists in DM, nurses, podiatric, nutritionists, Health Promoters and others able to coordinate common efforts to establish a link with the secondary health attention level formed by ophthalmologists, endocrinologists, dentists and others.

Results

The Playa municipality is located at northwest of Havana city province with an extension of 36.2 km and 17 km of costs. Playa holds a population of 192 438 habitants (52.9% women and 47.1% men). Population density is 5160.3 habitants per square km. The municipality is distributed in 9 health zones or areas totally covering the whole population. Playa was the first municipality in introducing Heberprot-P in its health services as a useful therapeutic option addressed to optimize DFU patient care in a pilot study for later extension to the whole national territory (Figure). This study was carried out through a program divided in 3 different stages.

• *Organizational stage:* Started in January till February 2010. 49 days in total.

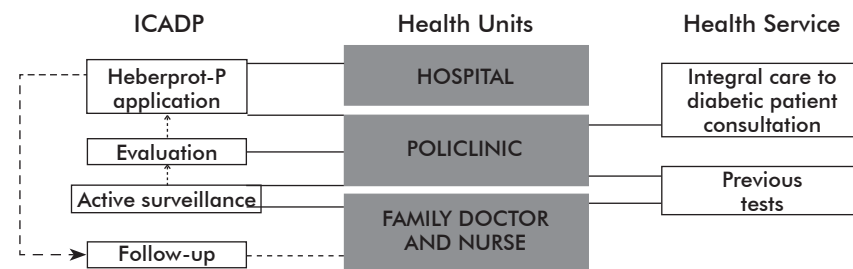


Figure 1. Integral Care Attention to Diabetic Patient System (ICADP) with dotted line it is remark the transit of DFU patients through the different program levels as well as the treatment in the different health units where they receive the corresponding services. The Heberprot-P treatment is offered at Hospitals and polyclinics but the patient only receive it at the particular unit where he has been previously remitted.

1. Heberprot-P - Atención integral al paciente con pie diabético + Heberprot-P (sitio web). Disponible en: <http://heberprot-p.cigb.edu.cu/> (Consultado: 23 de agosto de 2010).

2. Berlanga J, Lodos J, López-Saura P. Attenuation of internal organ damages by exogenously administered epidermal growth factor (EGF) in burned rodents. *Burns* 2002;28(5):435-42.

3. Berlanga J, Caballero E, Lodos J, López-Saura P, Ramírez D, Playford RJ. Epidermal Growth Factor prevents multi-organ failure induced by thioacetamide. *Gut* 1999;44(Suppl 1):A70.

4. Berlanga J, Prats P, Remírez D, López-Saura P, Aguiar J, Ojeda M, et al. Prophylactic use of epidermal growth factor (EGF) reduces ischemia/reperfusion intestinal damage. *Am J Pathol* 2002;161(2):373-9.

5. Berlanga J, Savigne W, Valdéz C, Franco N, Alba JS, Del Río A, et al. Epidermal Growth Factor intra-lesional infiltrations can prevent amputation in diabetic patients with advanced foot wounds. *Int Wound J* 2006;3(3):232-9.

6. Fernández-Montequín JI, Infante-Cristiá E, Valenzuela-Silva C, Franco-Pérez N, Savigne-Gutiérrez W, Artaza-Sanz H, et al. Intralesional injections of Citoprot-P® (recombinant human epidermal growth factor) in advanced diabetic foot ulcers with risk of amputation. *Int Wound J* 2007;4(4):333-43.

7. Fernández-Montequín JI, Valenzuela-Silva CM, Díaz OG, Savigne W, Sancho-Soutelo N, Rivero-Fernández F, et al. Intra-lesional injections of recombinant human epidermal growth factor promote granulation and healing in advanced diabetic foot ulcers: multicenter, randomised, placebo-controlled, double-blind study. *Int Wound J* 2009;6(6):432-43.

8. American Diabetes Association. Diabetes Facts and Figures. American Diabetes Association, Alexandria, VA, 2000.

9. Ministerio de Salud Pública. Anuario Estadístico 2007. Cuba.

- *Implemental stage*: Started in March till July 2010. 150 days in total.
- *Consolidate stage*: Since July up today.

During the organizational process first it was organized a Situational Room at Playa municipality. The mapping of the 9 health areas was carried out and the whole population was characterized including the evaluation of the target diabetic population. Several working groups formed by doctors specialized in General Integral medicine with knowledge in diabetes together with nurses, podiatry specialists, pharma epidemiologists, docents and basic working groups were created in each policlinic or health area from Playa. During this stage the working groups were trained at the National Center for Angiology and Vascular Surgery (CAVS) specializing them in detecting non complicated DFU (ulcers that might be even deep but without bacterial infection), this included the organization of cure stocks for carrying cure procedures using saline solution, hand surgical gloves, surgery blade, dressing, etc and Heberprot-P vials for using them in treatments.

Through the active DM massive screening in Playa municipality, 10 778 patients were detected. From them 1442 are DM type 1 patients and 9336 were DM type 2. This DM population is the 5.6% of the total Playa population, according with the national rate. All physicians who applied the Heberprot-P were trained to complete the requested papers and documents for pharmaco surveillance tracking. The documents were designed according a data dossier supplied from the Center for the Development of Pharmacoepidemiology (CDPE) to track each DFU patient treatment and its follow up as well.

For the implemental stage: the following previous conditions were taken into considerations: 1) Coordinating the active DFU patient screening and primary cure through involving the basic health team involving the family physician and the family nurse as the first door to the primary attention care. 2) Personalizing each patient characterization to personalize Heberprot-P treatment as well. 3) Combining the use of Heberprot-P with the use of the Cuban health guidelines for diabetic patients.

Several meetings with different society sectors as Medical doctors, opinion and community leaders, diabetes clubs and health promoter activists were carried out to promote massive knowledge about the integral care of diabetic patients and about the risk of DFU. In this effort the use of public information media as radio and TV broadcasting stations were exploited. Also a documentary film was launched compiling testimonies of healed patients after receive treatment with Heberprot-P.

Regarding the specific issue of treating patients with DFU with Heberprot-P, it is important to remark that before starting any treatment with Heberprot-P, each patient must be submitted to an integral clinical evaluation that covers internal medicine, endocrinology, ophthalmology and podiatric analysis. The clinical and laboratory tests include: glucose determination, complete blood cell count, creatinine and erythro sedimentation determinations, also image studies as Rx of thorax and ulcer affected area, plus abdominal, prostatic and gynecologic ultrasounds are included as well

in patient characterization too. Once all these tests are analyzed, the physician decide if the patient qualify or not for Heberprot-P application.

For better implementation of this integral DFU treatment program with the use of Heberprot-P, an appropriate reference and counter reference system has been implemented at the health secondary level system. in this case headed by the National Institute of Angiology and Vascular Surgery (NIAVS). In each consultation office, There are compiled general and personalize records containing the evolution of each treated patient with Heberprot-P. In this sense it is important to remark that 2 of the treated patients (3.1%) ended their Heberprot-P treatment in their respective Policlinic area, allowing a better contact and interaction between the specialized hospital and the health area.

Discussion

The implementation of a system to extend Heberprot-P use at the Health Primary Level Attention Area (HPLAA) could be considered as a valuable tool for fast and easy treating lesser complicated DFU. This program constitutes a solution to a previous non solved problem until the design and implementation of this system.

It is a guarantee to count with this implemented service at the HPLAA, because it is there where patients can be first identified and either treated at this area or submitted for a more specialized health services. To implement a Heberprot-P service at the HPLAA allows to treat most of the patients in an ambulatory form. This possibility reduce the risk of complications allowing a faster healing and a return to social life in better conditions than in hospital treatments.

The published literature does not record any other program able to cover an integral care of DFU patients as the one is described here in this article. Our strength are supported by the possibility to produce a high standard recombinant human epidermal growth factor, properly formulated as Heberprot-P together with a well developed Primary Health System extended to all the national territory of Cuba and validated in more than 50 countries by Cuban medical brigades working there. In this moment, we are arriving to a new momentum in the Program for the Integral care of the Diabetic Foot Ulcer patient expressed in putting Heberprot-P treatments available at the primary health services. The Program is supported as well by a network of communitarian structures and by radio and TV broadcasting stations able to assume health educational activities to improve the quality of life of the communities where the program is extended and implemented. The interaction between all the different levels of the health sectors are a strength in this program, which in this moment is incrementing the professional motivation among different specialists at the Primary Health Attention Level once they realize that a product as novel as Heberprot-P is available for them.

So far now Heberprot-P has been extended and used in 9 Policlinics of Playa municipality with a total amount of 28 low complexity level DFU patients. All of them were treated ambulatory showing a fast positive healing evolution and diminishing the treatment

cost for avoiding in hospital treatments. Because the program implementation, other disease complications linked to Diabetes mellitus were easily controlled as well.

A course addressed to professional personnel linked to DFU treatment is in process to be implemented, the course will focus in how to treat DFU at the Primary Health Attention Level. The course, once functioning will allow bringing new elements about how to treat DM and how to detect DFU at early state plus teaching how to treat DFI with Heberprot-P from an integral new clinical and surgery perspective.

Why it is important to focus in the DFU complications and its associated problems at the Primary Health Attention Level?

Professionals from the Primary Health Attention Level including family physicians, nurses and basic working personnel are aware about the community population they care, including familiar and social aspects. This guarantees the access and follows up of each patient attention. By extending the care of DM and DFU to the Primary Health Attention Level, the patient care is much better from the biological, psychological and social point of views. With this program, Professionals from the Primary Health Attention Levels are closer to the patients' social environment guaranteeing better results. The program interacts with different social spaces as Health councils, schools and working centers. Staffs are trained in communication techniques helping to establish better communication chan-

nels with patients. The health attention is implemented focusing different aspect of health-disease states described as: health promotion, prevention, diagnosis, treatment and rehabilitation. Everything is developed in coordination with other health attention levels as family physicians, basic working groups, nurses, social workers etc. This integration helps to promote and to implement at the community level fast methods to challenge different health problems and solve them. The Primary Health Attention Level get in contact with community problems through professionals trained in interviews addressed to increment the quality of the service offered by the Primary Health Attention Level.

Conclusions

By implementing an adequate model for extending the use of Heberprot-P in the Primary Health Attention Level, UPD patients will receive a better attention at this level facilitating the articulation of the received services with the Secondary and Tertiary Health Attention Levels.

The human resources trained at the Primary Health Attention Level improve the way to implement an integral care of diabetic patients with DFU. In this sense it is needed to maintain and extend the human resource preparation at the Primary Health Attention Level.

Considering the established medical practice in Cuba at the Primary Health Attention Level, the clinic evolution of UPD patients treated with Heberprot-P and their follow up can be done through permanent and active pharma surveillance.

Received in July, 2010. Accepted for publication in August, 2010.