



# CIRUGÍA y CIRUJANOS

Órgano de difusión científica de la Academia Mexicana de Cirugía  
Fundada en 1933

[www.amc.org.mx](http://www.amc.org.mx) [www.elsevier.es/circir](http://www.elsevier.es/circir)



## CLINICAL CASE

# Autologous mesenchymal stem cells and cutaneous autograft as a treatment for chronic ulcer secondary to diabetes mellitus 2<sup>☆</sup>



Gamaliel Benítez-Arvizu<sup>a,\*</sup>, Ícela Palma-Lara<sup>a</sup>, René Vazquez-Campos<sup>b</sup>,  
Raimundo Alfonso Sesma-Villalpando<sup>b</sup>, Alberto Parra-Barrera<sup>c</sup>, Gisela Gutiérrez-Iglesias<sup>c</sup>

<sup>a</sup> Departamento de Laboratorio de Morfología Celular, Escuela Superior de Medicina, Instituto Politécnico Nacional, México D.F., Mexico

<sup>b</sup> Servicio de Ortopedia, Hospital General de Puebla, Secretaría de Salud del estado de Puebla, Puebla, Puebla, Mexico

<sup>c</sup> Departamento de Laboratorio de Medicina Regenerativa y Cáncer, Escuela Superior de Medicina, Instituto Politécnico Nacional, México D.F., Mexico

Received 12 March 2014; accepted 31 October 2014

Available online 8 December 2015

### KEYWORDS

Mesenchymal stem cells;  
Chronic ulcer;  
Type 2 diabetes mellitus

### Abstract

**Background:** Diabetes mellitus 2 has become a global problem. It is estimated that 15–25% of patients could develop a chronic ulcer in their life, and nearly 33% of direct care costs of the diabetes mellitus 2 is spent on treating these ulcers. Mesenchymal stem cells have emerged as a promising cell source for the treatment of these ulcers.

**Clinical case:** The case is presented of a 67 year-old male with a history of diabetes mellitus, acute myocardial infarction, and chronic ulcer involving right foot and part of his leg. He was treated with mesenchymal stem cell management, resulting in skin graft integration and full coverage of the lesion.

**Conclusion:** The implementation of mesenchymal stem cell techniques for treatment of chronic ulcer is feasible. The impact on the population would lead to a significant improvement in their quality of life and reduce healthcare spending.

© 2015 Academia Mexicana de Cirugía A.C. Published by Masson Doyma México S.A. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<sup>☆</sup> Please cite this article as: Benítez-Arvizu G, Palma-Lara Í, Vazquez-Campos R, Sesma-Villalpando RA, Parra-Barrera A, Gutiérrez-Iglesias G. Células troncales mesenquimales autólogas e injerto cutáneo autólogo para tratamiento de una úlcera crónica secundaria a diabetes mellitus tipo 2. Cir Cir. 2015;83:532–536.

\* Corresponding author at: Av. Salvador Díaz Mirón s/n, esq. Plan de San Luís, Col.: Casco de Santo Tomás Miguel Hidalgo, C.P. 11340 Ciudad de México, D.F., Mexico. Tel.: +52 57 29 63 00 ext. 62811.

E-mail address: [gamaliel.benitez@imss.gob.mx](mailto:gamaliel.benitez@imss.gob.mx) (G. Benítez-Arvizu).

**PALABRAS CLAVE**

Células troncales mesenquimales;  
Úlcera crónica;  
Diabetes mellitus tipo 2

## Células troncales mesenquimales autólogas e injerto cutáneo autólogo para tratamiento de una úlcera crónica secundaria a diabetes mellitus tipo 2

**Resumen**

**Antecedentes:** La diabetes mellitus tipo 2 se ha convertido en un problema a nivel mundial. Se estima que del 15 al 25% de los pacientes desarrollarán una úlcera crónica a lo largo de su vida, y cerca del 33% de los costos directos de atención a diabetes mellitus tipo 2 se gasta en la atención de estas úlceras. Las células troncales mesenquimales han surgido como una fuente celular prometedora para el tratamiento de este tipo de úlceras.

**Caso clínico:** Masculino de 67 años con antecedentes de diabetes mellitus tipo 2, infarto agudo de miocardio y úlcera crónica en miembro inferior derecho que involucra la cara interna del pie y parte de la pierna derecha; se le trató con células troncales mesenquimales, resultando una adecuada integración del injerto de piel y la cobertura total de la lesión.

**Conclusión:** La implementación de células troncales mesenquimales para el tratamiento de la úlcera crónica es factible. El impacto en la población sería importante, al mejorar la calidad de vida de los pacientes y disminuir los costos de atención.

© 2015 Academia Mexicana de Cirugía A.C. Publicado por Masson Doyma México S.A. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Background**

Diabetes mellitus type 2 has become a global problem. It is estimated that in the year 2030 a 70% concentration of patients with this disease will live in developing countries, and Mexico will Rank sixth or seventh in the international league.<sup>1</sup> If we take into consideration current trends and behaviour patterns of diabetes mellitus type 2 patients, the long-term complications of this disease, which include nephropathy, retinopathy, peripheral vascular disease and neuropathy pose a real challenge to the medical profession due to their complexity.<sup>2,3</sup> It is estimated that 15–25% of diabetes mellitus type 2 patients will develop a chronic ulcer during their lifetime, and this population is also 10–20 times more likely to undergo non-traumatic amputation of a limb, compared with the population which does not present with this pathology.<sup>4–9</sup> The social impact of this type of lesion must be considered, since the average duration of an ulcer is between 12 and 13 months; nearly 70% of patients who have had an ulcer will present with at least one other ulcer during their lifetime, with a consequential estimated loss of 2 million working days from inability to work.<sup>10</sup> In 2010 alone it was estimated that Mexico spent 778,427,475 US dollars on DM2 medical attention<sup>11–17</sup> (US\$343,226,541 on direct costs and US\$435,200,934 on indirect costs),<sup>18</sup> and nearly 33% of direct care costs of diabetes mellitus type 2<sup>11–17</sup> was spent on treating chronic ulcers.<sup>19</sup>

One of the problems we encounter on treating this type of lesion is the low probability of success, since under the best conditions only 50% of all cases remit, and for the other 50% of patients the ulcers are one of the main reasons for amputation, with an estimated one-year survival for 70% of patients and five years for 20%.<sup>20</sup> Regarding the organic characteristics leading to the ulcers, including insufficient tissue perfusion from microvasculature damage,<sup>2,3</sup> treatment based on cells or their products (cell therapy) has recently been proposed to improve microvasculature repair

mechanisms and stimulate re-epithelisation.<sup>21</sup> These new alternatives propose a treatment based on mesenchymal stem cells, on the premise that these cells produce modulators which affect both the inflammatory response and growth factors for tissue regeneration.<sup>11,22</sup>

Mesenchymal stem cells are formed during embryonic life in the mesoderm, giving rise to connective tissue, bone, muscle and cartilage. Once the embryo has formed stem cells reserves remain almost throughout the whole body and they may be identified, as may their function, through the use of specific cell markers. These cells have been identified in bone marrow, the umbilical cord, fatty tissue and placenta tissue. Clinically they may be used in ulcers of diverse aetiology, with the exception of neoplastic ulcers.

The aim of this paper is to share our recorded experience with autologous mesenchymal stem cells as treatment for a patient with a chronic ulcer secondary to diabetes mellitus type 2.<sup>11–17</sup>

**Clinical case**

A 67 year old man with a 15 year history of diabetes mellitus type 2 was assessed by the Orthopaedic Unit in the Hospital General de Puebla for a chronic ulcer (of one-year duration) in the right pelvic limb, which had spread from the inner side of the foot on the sole, involving the first and second toes, up the inner side of the leg to its middle third. Culture testing of the lesion revealed *Staphylococcus* sp. and *Escherichia coli*. Given the conditions of the ulcer and the fact that this was a multi-treated patient, therapeutic amputation or the use of mesenchymal stem cells with autologous skin graft was indicated. Subsequent to describing the procedures, the risks and probabilities of both improvements from both procedures, the patient chose mesenchymal stem cells and autologous skin graft and gave his written consent to the same.

Download English Version:

<https://daneshyari.com/en/article/4283412>

Download Persian Version:

<https://daneshyari.com/article/4283412>

[Daneshyari.com](https://daneshyari.com)