Lumbar intradiscal stem cells implant for discogenic pain: our experience in 20 patients

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Abstract:

Introduction & Statement of the problem: Low back pain is one of the most frequent pains we see in our daily practice. It can have different etiologies and disc degeneration is one of the main ones leading to discogenic pain. The use of mesenchymal stem cells (MCSs) has increasingly scoped within the field of regenerative medicine and in recent years they have begun to be implanted in degenerative lumbar spinal discs with promising results. The evidence is still low grade of recommendation. We have gathered an n of 20 patients who went through this treatment with the aim of improving their pain, functionality and slowing down the catabolic and degenerative disc cascade or if possible regenerating partially or totally the disc. We developed a work protocol and want to show our experience and contribute with our results to the scientific community.

Methodology: Based on clinical and imaging diagnosis we carried out a rigorous selection of patients following inclusion and exclusion criterias. We scheduled the procedure in the surgical room between March and December 2023. Under neuroleptoanesthesia, with strict asepsis and antisepsis measures, we performed an aspiration of 80mL of bone marrow (BMA) from the iliac crest. With 4 syringes of 20mL and propelling the embolus appropriately we extracted BMA. Subsequently, this material was centrifuged at 2400RPM/min for 10 min to produce a 30mL bone marrow concentrate (BMAC). From this amount, we precisely extracted the buffy coat and plasma with 10ml syringes and a 50/8 needle obtaining a total amount between 13 to 16mL. Guided by fluoroscopy, we injected 1,5 to 2mL of this concentrate rich in stem cells (BMSCs) into the pulposus nucleus of each degenerated lumbar intervertebral disc with a Pfirrmann grade between I and IV, regardless of Modic grade (1, 2 or 3). After the implant, the patients continued to be assessed in three main parameters: a) reduction of pain using the Owestry index at 3, 6 and 12 months b) functionality evaluated in kinesiology and using the SF 36 scale at 3, 6 and 12 months c) Lumbosacral MRI without contrast between 10 to 12 months post implant.

Results: In our n of 20 patients we saw improvements in at least two of the 3 proposed objectives within a year of the treatment. 70% (n=14) improved their pain and functionality after 3 months. 15% (n=3) achieved improvement in their pain and functionality at 6 months. The remaining 15% did not improve after 3, 6 or 12 months. Only 2 patients have reached 10 months of follow-up and only in one we have observed minimal intradiscal changes, which might show encouraging results.

Conclusion: In our experience, mesenchymal stem cells extracted from BMAC and applied into degenerative lumbar intervertebral discs in selected patients with discogenic pain show promising results, generating improvement in the pain and functionality of the patients. 85% showed improvement in pain and functionality at 6 months. We showed that all patients who improved their functionality also improved their pain at 3 and 6 months. Signs of intradiscal rehydration on MRI is a parameter that we cannot yet evaluate since our patients do not have the described sufficient follow-up time to observe changes in them (10 to 18 months).

We may conclude given the above results, that the well known immunomodulating effect of MCSs (growth factors, proangiogenic, antiapoptotic, chemoattraction, others) are seen in clinical outcome (reduction of pain and improvement of functionality) long before any changes and signs of rehydration in MRI are yet observed.

Biography



Natalia Ayala Vazquez , MD and neurosurgeon currently medical director of PNL stem cells in Buenos Aires (pain and longevity) with experience in improving patients quality of life by implementing regenerative medicine in her daily practice.
Specialized in Neurosurgery, Pain medicine and biological therapies she combines these 3 main areas to treat and prevent frequent pathologies focusing on longevity and patients well being.
Furthermore she is a passionate professor in Pain medicine, international instructor in simulation and part of the academic commitee that coordinates medical students and profesors at Austral University, Argentina.

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Published 2017 Nov 15.

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