

USE OF AUTOLOGOUS ADIPOSE TISSUE DERIVED STEM CELLS FOR TREATMENT OF KNEE OSTEOARTHRITIS: ACLINICAL STUDY

Adel Refaat Ahmed, Helmy Samy Elwakeel,* Saeed Mohamed Mohamed Shekedaf, Ahmed Hossam Eldin Fouad Rida

Department of Orthopaedic Surgery and Traumatology, Department of Plastic Surgery,* Faculty of Medicine, University of Alexandria.

INTRODUCTION

Degenerative Osteoarthritis (OA) is considered to be the most prevalent form of arthritis and one of the main causes of disability. It is a condition that affects the joints causing pain, stiffness and difficulty in performing daily activities. The most commonly affected joint is the knee.

There is no cure for OA and most treatments aim to manage patients' symptoms. All these forms of treatments are palliative and only provide pain relief, failing to prevent cartilage damage and further destruction of other joint tissues. Joint replacement is the only currently available treatment able to provide pain relief and satisfactory function recovery, when the final stages of OA are reached.

The regenerative medicine field is developing and showing promising results aiming to stop and revert the degeneration associated with OA. Injection of adipose tissue derived mesenchymal stem cell (MSC) intraarticularly is one of these methods.

AIM OF THE WORK

The aim of this study was to evaluate the efficacy of intra-articular injection of adipose tissue derived mesenchymal stem cells (ADMSC) in the treatment of mild to moderate degenerative knee osteoarthritis.

PATIENTS AND METHODS

This study was carried out on 20 patients suffering from mild to moderate knee osteoarthritis who presented to El Hadra University Hospital.

The mesenchymal stem cells were obtained from- the patient own adipose tissue by liposuction. The liposuction procedure was done under strict aseptic technique using 3 ml harvesting cannula with 1ml diameter sharp side holes connected to a suction system. The lipoaspirate was divided into four 50 cc syringes and were allowed to settle then the top tissue layer which hosts ASCs was taken. First centrifugation step was carried out followed by mechanical fragmentation between two 20 cc Leur Lock syringes connected by a 1 mm connector. A Second centrifugation step was carried out and then SVF pellet was aspirated from the syringe and was ready for intra-articular injection using either the anteromedial or anterolateral approach.(Figure)

RESULTS

Intra-articular injection of ADMSC was associated with statistically significant decrease in mean WOMAC score from 65.2 ± 4.54 at baseline to 40.9 ± 6.97 at 6 months with a P value of 0.0001. (Table 1)

Patients walked a mean distance of 305 ± 64.69 m at baseline with a statistically significant improvement at 6 months where patients were able to walk a mean distance of 422.5 ± 81.88 with a P value of 0.001.(Table 2)

Table (1): Comparison between WOMAC score at different times of follow up post injection.

WOMAC	At base line	After 3 months	After 6 months
Range	57-73	22-64	30-52
Mean	65.2	49.5	40.9
S.D.	4.54	10.79	6.97
% Improvement		24.1	37.3
P1		0.0001*	0.0001*
P2			0.0024*

P1 comparison between base line and after both 3 and 6 months

P2 comparison between WOMAC after 3 and 6 months

* Significant at ≤ 0.05

Table (2): Comparison between 6 MWT at base line and after 6 months post injection.

	6 MWT at base line	6 MWT at end of follow up
Range	200-450	300-600
Mean	305	422.5
S.D.	64.69	81.88
% Improvement		38.5
T		3.98
p		0.001*

* Significant at ≤ 0.05



Figure: Centrifugation procedure, Mechanical break down, After 2nd centrifugation procedure and SVF before injection.

CONCLUSION

- 1- ADMSC based therapies showed safety and effectiveness in the treatment of OA with the ability to relieve pain and improve function in patients with symptomatic knee OA presenting various severities.
- 2- The procedure is safe, easy and can be done under local anesthesia.
- 3- Better results were obtained in younger patients with normal weight and mild to moderate OA .