# Epidural Stimulation Surgery / C4-C5, Egypt

Patient Case Report
#ES180032

## Patient Overview

**Age:** 18

**Sex:** Male

**Nationality**: Egyptian

**Diagnosis on Admission:** Spinal Cord Injury, C4-C5

**Treatment Received:** Epidural Stimulation Surgery, Medtronic Restore Advance 16-electrode MRI Compatible Device. MSCs and hAFSC 120 million.

**Date of Admission:** 16/06/2018

**Date of Discharge:** 26/07/2018

## Patient's Condition on Admission

Patient sustained a C5 fracture-dislocation with marked compression on his spinal cord from a dive into shallow water on August 2, 2015. Patient is incomplete quadriplegic (with limited upper limb function) and complete paraplegic (with total loss of motor function in lower limbs). He has limited hand and arm function, but lacks any significant finger function. Patient can control upper back and is able to sit with minimal support, but has poor sitting balance. Patient does not suffer severe spasms, spasticity or neuropathic pain, but does experience knee flexor spasms at night. Patient has no control of his bowel and bladder functions. He is dependant on assistance to perform normal activities in daily life.

## Previous Therapies and Treatments

Patient underwent corpectomy of C5 and fixation with titanium mesh between C4 and C6 vertebrae. In 2017, patient received cytotherapy in the form of IV infusion. Minor improvements in affected areas were reported.

## Treatment Received

After a Spinal MRI scan, EMG, and comprehensive blood work, patient underwent Laminectomy and implantation of Epidural Stimulation device on June 17, 2018. The surgery was completed without significant adverse effects and the surgical wound healed normally. No serious complications were reported during the hospital stay.

Device Mapping and therapy were carried out after surgery for 35 days, then patient was discharged.

## Device Mapping and Therapy

| Post-Surgical Care | Total Sessions | Sessions Per Week | Time (Hr) Per Session |
|---|---|---|---|
| Mapping | 112 | 28 | 1 |
| Physical Therapy | 23 | 6 | 1 |
| Occupational Therapy | 11 | 2 | 1 |

## Regenerative Medicine Treatment

| Type | Amount | Delivery Method | Number of Applications |
|---|---|---|---|
| MSCs | 40 Million | IV Injection | 1 |
| hAFSCs | 80 Million | Lumbar Puncture Injection | 2 |

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# Symptoms Improvement Post-Surgery

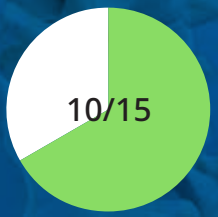
| Abilities & Symptoms | Motor & Sensory Function (below injury level, before ES surgery) | Improvement Observed (35 days after admission) |
|---|---|---|
| **Motor Function** | | |
| Standing with support | Not Possible | Yes |
| Stepping with support | Not possible | Yes |
| Gross motor Skills | Not Present | Yes |
| Fine Motor skills | Not Present | No |
| Balance | Poor | Yes |
| Coordination | Poor | Yes |
| Muscle Mass | Low | Yes |
| Stamina | Low | Yes |
| Fatigue | Present | Yes |
| Spasms | Present | Yes |
| Spasticity | Present | Yes |
| **Sensory Function** | | |
| Neuropathic pain | Present | No |
| Bladder Function | No | No |
| Bowel Function | No | No |
| Sweating Ability | No | No |

*Improvements are monitored in 15 targeted areas: 11 Motor areas and 4 Sensory areas. However, the number of targeted areas may vary depending on patient's condition prior to admission. If patient does not experience symptoms in certain Motor/Sensory functions, or is not impaired in a specific targeted area prior to surgery, it is excluded from the report (Not Applicable). If there is progress in any given area -- either mild, moderate, or significant -- it is measured and reported as positive ("Yes"). No improvement, the existence of pain or spasms, or an inability to perform a measured function is reported as "No".*

Motor Functions


Sensory Functions


Overall Functions




# Results Interpretation

In this patient, Motor Function improved in 10 out of 11 targeted areas when the Epidural Stimulation device was switched on. Patient has not noticed any changes in Sensory Function areas, and more feedback will be collected after 3 months to note any improvements made by cytotherapy. Overall, improvements were recorded in 10 out of 15 targeted Motor and Sensory Function areas.

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# Treatment Summary

After the Epidural Stimulation surgery, patient received 112 Mapping sessions, 23 Physical Therapy sessions and 11 Occupational Therapy sessions. Patient also received 40 millio MSCs through one IV injection and 80 million hAFSCs through two lumbar puncture injections. All three applications went well without adverse effects and no short-term or acute complications have been reported.

Patient is able to stand well using a hoist device, but cannot stand at a parallel bar due to weak upper body and no trunk control. With the support of hoist, patient is able to take steps. He can lift both feet and lock both knees very well. Mild improvement was noticed in coordination of both legs while stepping, but he does require assistance in foot placement. He has good hip and knee flexion in both legs.

Improvements were notice in Gross Motor Skills, including ankle, hip and knee flexion, and knee extension (kicking out) when Epidural Stimulation device is switched on. Patient did not notice any improvement in Fine Motor Skills. Small improvements were observed in the patient's balance, but he still requires support when sitting. Spasms and spasticity are lessened when Epidural Stimulation device is switched on. Therapy has reduced nighttime knee flexor spasms significantly.

Patient is not able to control bladder and bowel functions, but he received cytotherapy so they will be reviewed in 3 months time. After 35 days, patient was discharged and will continue his physiotherapy back home.

## For more information please contact:


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