

Significant Neurologic Recovery After Late Surgery in Spinal Cord Injury: A Case Report

Geç Dönemde Opere Edilen Spinal Kord Yaralanmasında Görülen Belirgin Nörolojik İyileşme: Olgu Sunumu

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ABSTRACT

The role and the timing of surgical interventions in acute spinal cord injury (SCI) have been a controversial topic for years. Even there are evidences for benefits of surgical decompression of spinal cord after injury, these are not beyond statistical significance. Here we present an extraordinary neurologic recovery after delayed surgery in a patient with cervical SCI. A 20-year-old patient with cervical SCI was decided to conservative treatment after injury. After three months, he was observed to have a poor improvement with this treatment and underwent a decompression surgery. Following operation he demonstrated remarkable improvement that he could walk independently. Present case was a spesific condition of incomplete spinal injury and ongoing spinal compression. The significance of this case is to provide a conclusive support for benefits of surgery in SCI with that kind of spesific condition even it is much delayed. (*J PMR Sci 2010;13:149-51*)

Keywords: Neurologic recovery, decompression surgery, spinal cord injury

ÖZET

Akut spinal kord yaralanmasında (SKY) cerrahi müdahalelerin rolü ve zamanı uzun senelerdir tartışma konusudur. Yaralanma sonrası, spinal kordun cerrahi dekompresyonunun faydaları hakkında kanıtlar olsa da, bunlar istatistiksel olarak anlamlı olmanın ötesine gitmemektedir. Biz, servikal SKY bir hastada ertelenmiş cerrahi sonrası görülen olağan dışı nörolojik iyileşmeyi sunmaktayız. 20 yaşında servikal SKY erkek hastaya, yaralanma sonrası konservatif tedavi verilmesine karar verildi. 3 ay sonra hastada bu tedavi ile çok az iyileşmenin olduğu gözlemlendi ve hastaya dekompresyon cerrahisi uygulandı. Cerrahi sonrası hasta belirgin iyileşme gösterdi ve bağımsız olarak yürüyebildi. Bu olgu inkomplet SKY olması ve kompresyonun devam ediyor olması açısından spesifik bir durumdur. Olgumuz, çok geç dönemde uygulansa dahi bu gibi spesifik durumu olan SKYda cerrahinin kesin faydalarını göstermesi açısından önem arz etmektedir. (*FTR Bil Der 2010;13:149-51*)

Anahtar kelimeler: Nörolojik iyileşme, dekompresyon cerrahisi, spinal kord yaralanması

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Introduction

The effectiveness and the timing of decompression surgery in the treatment of acute traumatic spinal cord injury (SCI) remains controversial. Despite presence of many

reviews in the literature on this topic, there has not been a definite consensus on benefits of surgery in SCI. Pathophysiology of acute SCI involves two injury mechanisms. Vertebral burst fracture or dislocation leads a rapid spinal cord compression, which is called primary injury. Then it initiates a secondary

injury mechanism including some biochemical and inflammatory events (5). It is suggested that surgical decompression improve neurological outcome by stopping a secondary injury resulting from persistent compression of spinal cord. Early surgery being performed within 24 hours of injury is recommended in acute SCI especially. However, clinical studies examining role of surgery in SCI are only limited to class II and III evidence (3).

We present a patient with cervical traumatic SCI that underwent surgery three months later after accident and showed remarkable neurological and functional improvement after operation. Our object is to discuss that even such a late surgery may provide great benefits on neurologic recovery in SCI.

Case Report

A 20-old-year man who had a C3 vertebra dislocation (Figure 1) resulting from a car accident had not had any surgery to improve dislocation. He stayed one month in the neurosurgery clinic and used cervical collar during this period. Hereafter, he was referred to our rehabilitation center for acute rehabilitation. He took a rehabilitation program for SCI which lasted two months. During the rehabilitation period, any significant neurologic improvement was not observed. Therefore, he was evaluated again by neurosurgeons and physiatrists. His muscle strengths were poor (Table 1) and his sensory level was C4 in neurological examination three months after injury. He had deep anal sensation and voluntary anal contraction. He was C4 American Spinal Injury Association Level C and had motor score of 32. There was no radiologic change compared with findings immediately after surgery. A decompression surgery was decided and he went through C3 and C4 vertebra stabilization operation (Figure 2). Then he was admitted for postoperative rehabilitation and hospitalized two months. At the end of his second rehabilitation program, a remarkable neurologic recovery observed (Table 1). His sensory level progressed to C7 and he was C6 American Spinal Injury Association Level D. His motor score was 87. He could ambulate independently long distance.

Table 1: Strengths of key muscles before and after surgical decompression

Right		KEY MUSCLES	Left	
Preop.	Postop.		Preop.	Postop.
1+	5	C5 elbow flexors	1	5
1+	5	C6 wrist extensors	1	3
1+	5	C7 elbow extensors	1	4+
3-	5	C8 finger flexors	0	3
1	4+	T1 finger abductors	0	4
4	5	L2 hip flexors	1	4+
4	5	L3 knee extensors	1	5
4+	4+	L4 ankle extensors	0	4+
4+	5	L5 toe extensors	0	3
4+	5	S1 ankle flexors	0	4+

Discussion

Increasing comprehension of pathophysiology demonstrates involvements of two injury mechanism in acute SCI. First of them is primary injury, the direct mechanical impact of trauma which is generally reversible and caused by vertebral burst fracture and dislocation. Second injury initiated by this traumatic event implies a cascade of some mechanisms such as vascular changes, electrolyte dearrangement, inflammation and loss of energy metabolism (3,4,5). Comprehension of this pathophysiological mechanisms led to use of new treatment ways in SCI. Use of high-dose methylprednisolone within early hours of SCI was shown to attenuate secondary injury (1,2). Persistent compression of spinal cord is a reversible source of secondary injury as well. Accordingly, decompression surgery

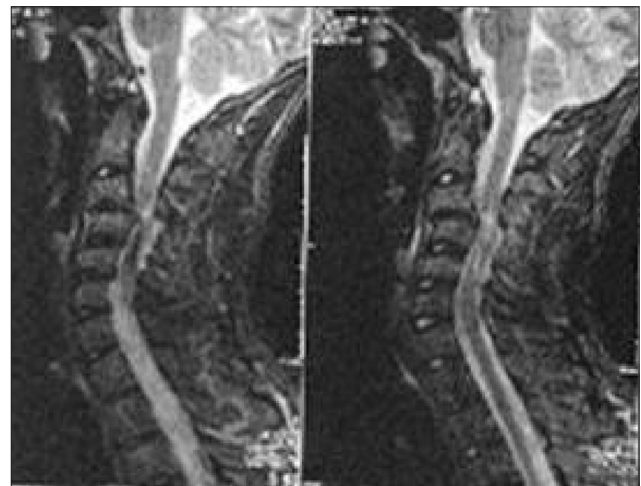


Figure 1. MRI shows C3 vertebra dislocation

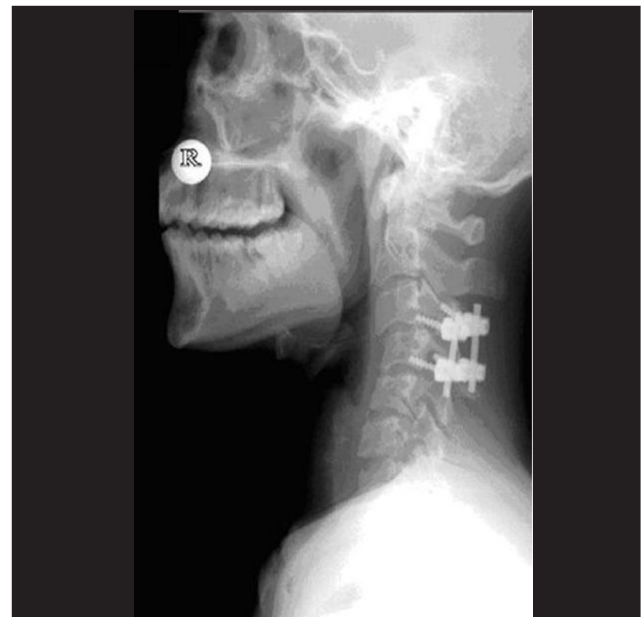


Figure 2. Plain radiograph of surgical C3-C4 stabilization

theoretically improves neurologic recovery and is used widespread in acute SCI. However, it is unclear that how surgical intervention affects this process and when it should be done, because of absence of enough well-designed and well-executed randomized controlled studies. Early surgery seems to have statistically more benefits on neurologic recovery compared to late surgery and conservative treatment (3,4). In the light of concordant experimental trials and clinical studies on the role and the timing of surgery, decompression within first days of injury is offered as reasonable practice option in acute cervical SCI as a class III evidence-based recommendation (4).

Present case was a specific condition of incomplete spinal injury and ongoing spinal compression. With our case, it is suggested that removal of compression of spinal cord in SCI with that kind of specific condition even three months later may improve recovery. Furthermore, our patient had stunning functional gain by surgery that he fulfilled to ambulate independently. This case report may not contribute to our scope of timing of surgery in SCI. It could be estimated that an

earlier surgery wouldn't have given the patient more neurologic benefits than this late one did. On the other hand, this is a striking example to demonstrate efficiency of a decompression surgery in SCI.

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