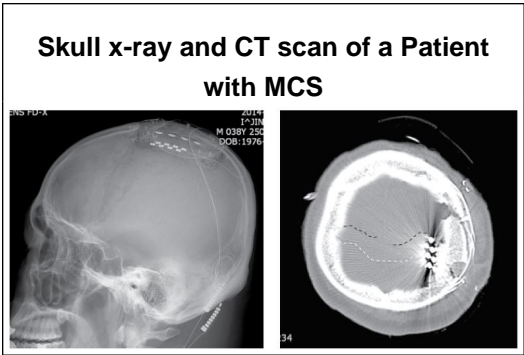


Introduction

Although motor cortex stimulation (MCS) has been used for more than 20 years in the treatment of chronic neuropathic pain, there is still a debate in the efficacy of MCS.

Methods

To investigate the long-term results and the factors associated with long-term success in chronic MCS, 21 patients who underwent MCS trial were classified into central poststroke pain (CPSP), central pain of spinal cord injury (SCI pain), and peripheral neuropathic pain (PNeP), and we investigated the clinical factors associated with long-term success and degree of pain relief.



Demographics								
Patient, No.	Sex/age, years	Diagnosis	Duration of pain, years	Location of pain	NRS preop.	Sensory loss	Motor weakness	Mechanical allodynia
1	M/47	CRPS-2 hemibody extension	3	lt. arm	9	ms	ms	yes
2	M/50	CP, TBI BG, insula		lt. hemibody	7	ms	ms	yes
3	F/55	SCI, cervical	2	rt. arm, leg	7	mi	mi	no
4	M/47	CRPS-2 amputated stump	5	lt. arm shoulder	8	ms	no	yes
5	M/63	SCI, TL	39	lt. hemibody	9	ms	ms	no
6	M/32	CRPS-2 BPA	6	bil. legs, rt. >lt.	8	ms	ms	no
7	M/62	SCI, cervical	3	rt. leg	7	mi	mi	no
8	M/57	CPSP BG, insula	3	rt. arm	8	mi	ms	no
9	M/66	CPSP brain stem	5	lt. arm	8	mi	ms	no
10	F/65	SCI, thoracic	2	bi. legs	7	ms	ms	no
11	M/63	CRPS-2 BPI, gunshot	37	rt. arm, trunk	9	ms	ms	no
12	F/59	CPSP lt. thalamus	12	rt. arm	7	mi	no	no
13	M/53	SCI, thoracic segmental pain	2	rt. trunk	9	ms	ms	yes
14	F/56	CPSP BG ICH	5	lt. leg	9	mi	ms	no
15	F/56	CPSP BG ICH	5	rt. trunk, leg	8	mi	no	no
16	F/52	CPSP BG ICH	3	rt. arm, leg	7	mi	ms	no
17	M/61	CPSP BG ICH	2	rt. hand	7	mi	mi	no
18	M/75	CPSP thalamus ICH	1.5	lt. arm	7	mi	mi	no
19	F/59	CPSP thalamus	4	lt. leg	8	ms	ms	yes
20	M/37	CRPS-2 hemibody extension	3	lt. leg, arm	9	ms	no	yes
21	F/32	Cervical syring	5	rt. arm	8	mi	no	no

BG = Basal ganglia; BPA = brachial plexus avulsion; BPI = brachial plexus injury; CP = central pain; CPSP = central poststroke pain; CRPS = complex regional pain syndrome (types 1 and 2); F = females; ICH = intracerebral hematoma; lt = left; M = males; mi = mini-mal; ms = moderate to severe; rt = right; TBI = traumatic brain injury; TL = thoracolumbar.

Results

Of the 21 patients, 16 (76.2%) had a successful trial and underwent chronic MCS. In the long-term follow-up (53 ± 39 months), only type of pain (CPSP and PNeP) was associated with long-term success defined as more than 30% pain relief compared with baseline (p<0.05, chi-square test). The difference in pain relief was not significant in SCI pain (>0.05, one-way Annova). The other variables did not show any significant influence in the long-term success and degree of pain relief (>0.05, one-way Annova).

Conclusions

MCS was more effective in the treatment of chronic neuropathic pain of CPSP and PNeP than that of SCI pain in the long-term.

Outcome of MCS

Patient, No.	NRS preop.	Trial success	Length of FU, months	NRS, 1 month	NRS, 1 year	NRS at last FU	PPR at last FU
1	9	yes	171	4	6	6	33
2	7	yes	48	2	3	4	42.6
3	7	yes	36	4	6	6	14.3
4	8	yes	96	5	6	6	25
5	9	yes	84	5	7	7	22.2
6	8	yes	60	3	5	5	37.5
7	7	no					
8	8	yes	24	2	2	4	50
9	8	yes	65	3	4	5	37.5
10	7	yes	40	4	6	6	14.3
11	9	yes	62	4	6	5	44.4
12	7	no					
13	9	no					
14	9	yes	38	4	5	7	22.2
15	8	yes	36	4	4	5	37.5
16	7	yes	34	4	4	4	42.9
17	7	no					
18	7	yes	28	4	4	4	42.8
19	8	yes	14	4	4	4	50
20	9	yes	12	5	6	6	33.3
21	8	no					

FU = Follow-up; preop. = preoperatively; PPR = percentage pain relief.

Learning Objectives

To learn about the long-term results of motor cortex stimulation in neuropathic pain syndrome

References

9.Son BC, Kim MC, Moon DE, Kang JK: Motor cortex stimulation in a patient with intractable complex regional pain syndrome type II with hemibody involvement. Case report. J Neurosurg 2003;98:175-179.

17.Son B, Choi ES, JT Hong, SW Lee. Motor cortex stimulation for central pain caused by traumatic brain injury. Pain 2006;121:43-52.

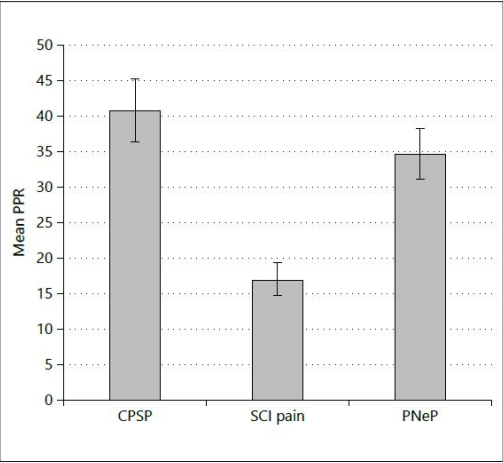
Long-term Results of Motor Cortex Stimulation in the Treatment of Chronic, Intractable Neuropathic Pain. Im SH, Ha SW, Kim DR, Son BC. Stereotact Fucnt Neurosurg 2015;93:212-218

Summary of long-term results of MCS

Diagnosis	Success in trial	Mean follow-up, months	PPR at last follow-up	Chronic responder (>30% of relief)
CPSP	8/10 (80)	35.9±15.514	40.7±8.853	7/8 (87.5)
SCI pain	3/6 (50)	34±26.633	16.93±4.561	0/3 (0)
PNeP	5/5 (100)	80.2±58.917	34.6±7.086	4/5 (80)

Values represent numbers with percentages in parentheses or means ± standard deviation. CPSP = Central poststroke pain; PNeP = peripheral neuropathic pain; PPR = percentage pain relief.

Mean plot of PPR



CPSP = Central poststroke pain; PNeP = peripheralneuropathic pain.