Effect of sequential electrical surface stimulation on medication utilization following Selective Endoscopic Discectomy™: Initial evaluation

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Vol. 2, No. 1 (Spring 2002), pp. 36-38

Objective: To evaluate the effect of Sequential Electrical Surface Stimulation on medication utilization in patients who have undergone multilevel Selective Endoscopic Discectomy.

Materials and Methods: Forty subjects (Active Group) were randomly selected from patients who had undergone multilevel Selective Endoscopic Discectomy™ and received Sequential Electrical Surface Stimulation in addition to standard postoperative therapy. The utilization of medication was retrospectively compared to a matched group of 40 patients (Control Group) who received only standard postoperative therapy.

Results: The Active Group showed a decrease in average drug usage, especially in the patients that underwent discectomy at 2 levels.

Conclusion: The retrospective analysis supports the addition of Sequential Electrical Surface Stimulation to standard therapy following multilevel Selective Endoscopic Discectomy™.

Key Words: endoscopy, herniated lumbar disc, discogenic pain, sequential electrical surface stimulation

Selective Endoscopic Discectomy™ (SED) has been performed on over 1,500 patients at the Arizona Center for Minimally Invasive Spinal Care.[7-10] Improved optics, advanced instrumentation, evocative chromodiscography, chemonucleolysis, foraminoplasty, and thermocoagulation of annular fissures all add to the efficacy of the minimally invasive lumbar surgery.[1,8] While other studies have demonstrated the effectiveness of Sequential Electrical Surface Stimulation[3,6] (SESS) (RS Medical, Vancouver, WA) in various physiotherapy regimens, to date there has been no published report of its effect on medication usage in patients who have undergone multilevel SED.

Methods and Materials

Forty subjects (Active Group) were randomly selected from patients that had undergone SED at 2 or 3 levels and were treated with SESS in addition to standard postoperative therapy. Chromodi scography was routinely performed preoperatively to evaluate the disc levels adjacent to frank herniation. At least one level in each patient had a frankly herniated disc, and at least one level had painful annular tears causing discogenic pain. The indigocarmine dye aided in identifying degenerative disc material during SED. A Control Group of 40 patients who did not receive SESS postoperatively was matched by age, sex, and number of disc levels involved. Workers' Compensation patients were excluded from the study to decrease the potential for secondary gain. Average followup was at least 6 months.

The stimulation prescribed was 15 minutes of interferential stimulation to a level of comfort (10-20 mA RMS) followed by 30 minutes of muscle stimulation set to the highest possible intensity that was not painful or noxious (Fig. 1).

The interferential current utilized a base frequency of 5,000 Hz and produced a premodulated beat frequency sweep from 80-150 Hz. The relatively high base frequency overcomes the capacitive resistance (reactance) of the skin and can produce a comfortable rapid onset of analgesia.[2] The effect facilitates higher levels of muscle stimulation/contraction during the second segment of the SESS and may provide more efficient levels of rehabilitation. All medications in the form of muscle relaxants, analgesics, and opioids were recorded.

Figure 1

Table: Medication usage in Active Group vs. Control Group

	Stimulation Group		Non-Stimulation Group	
	2 levels	3 levels	2 levels	3 levels
no medication	13	6	7	3
muscle relaxants/analgesics	4	14	8	17
opoids	1	2	1	4

Results

Postoperative medication usage was significantly lower in the patients who received SESS in addition to standard postoperative therapy. Nineteen cases in the stimulation group required no medication versus 10 cases in the non-stimulation group. The need for medication including analgesics, muscle relaxants, and opioids documented the efficacy of SESS in patients who had undergone multilevel SED.

Discussion

The fact that 29 patients required no pain medication following SED attests to the superiority of minimally invasive lumbar surgery over standard laminectomy and discectomy. This preliminary retrospective study supports further examination of SESS in the regimen following multilevel and single level SED. Future investigation should include a drug diary that tracks all sources of medication and should utilize functional outcome measurement tools— visual analog scales and the Oswestry Disability Index.[4,5] Patients will be followed for at least 8 - 12 months after surgery.

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Comments

While other clinical studies have demonstrated the effectiveness of sequential electrical surface stimulation in physiotherapy regimens for various spinal disorders, to date there has been no published report of its effect on medication usage in patients who have undergone multilevel Selective Endoscopic Discectomy. This preliminary retrospective study supports further examination of sequential electrical surface stimulation in the regimen following multilevel and single level percutaneous endoscopic lumbar discectomy. Future investigation should include a drug diary that tracks all sources of

medication and should utilize functional outcome measurement tools or visual analog scales— the Oswestry Disability Index, modified MacNab criteria and/or the SF36 questionnaire.

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Posted 12/3/2002