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Radiofrequency Facet Denervation for Low Back Pain after Microscopic Discectomy

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Objective : There were few reports about statistically significant factor which contribute to low back pain(LBP) after microscopic discectomy. We analyzed the result of percutaneous radiofrequency neurotomy(PRN) for low back pain after microscopic discectomy in lumbar disc herniation.

Methods : Forty four patients with LBP after microscopic discectomy who were treated by one level microscopic discectomy from January 2003 to March 2004 were included in this study. They were divided into two groups by the presence of preoperative LBP into preoperative back pain group (group I) and postoperative back pain group (group II). Radiofrequency procedures were performed in the usual manner, targetting the medial branch of L4, L5 and S1. Pain relief was estimated at 1 week, 1 month and 6 months following the procedure, using the visual analogue scale. Above 50% pain relief was defined as the positive response.

Results : Positive responders were 16 patients (73%) at 1 week, 12 patients (55%) at 1 month, and 7 patients (32%) at 6 months after PRN in group I. In Group II, 18 patients, 15 patients and 13 patients responded positively after 1 week, 1 month and 6 months after PRN, respectively.

Conclusion : PRN is an effective treatment for newly developed low back pain after microscopic discectomy. There was no morbidity in our series, but long-term follow up is necessary.

KEY WORDS : Back pain · Microscopic discectomy · Radiofrequency neurotomy.

Introduction

Microscopic disectomy is a standard surgical procedure for lumbar disc herniation, and it has been approved as the safe method to alleviate radiating pain and other neurological symptoms[9,10]. Despite the relief of radiating pain, low back pain(LBP) presented prior to surgery may remain, or new back pain may develop after operation in some cases. The reports on the overall clinical outcome and complication of discectomy are abundant[4,9,10]. Nevertheless, the reports on the factors influencing the severity of postoperative back pain or their treatment are scarce. Hence, we performed this study to facilitate the treatment principle for the cases with persistent or newly developed back pain after discectomy.

Materials and Methods

The study population

This study was performed on 44 patients who underwent PRN for LBP and buttock pain. The patients were selected among the cases who received microscopic discectomy for lumbar disc herniation at our institute from January 2003 to March 2004.

The criteria of the study population were that among patients with LBP and buttock pain after microscopic discectomy, the cases without significant neurological deficit, without recurrence, inflammation or other specific findings in radiological study, and in diagnostic medial branch block performed prior to PRN, over 50% pain was alleviated. They were classified again into group I, LBP present prior to microscopic discectomy (Group I, n=22) and group II, without or mild LBP or buttock pain present prior to microscopic discectomy with

Table 1. Baseline characteristics of patients

Characteristics	Group I (n=22)	Group II (n=22)
Age (mean, years)	32~68 (49)	38~71 (52)
Male : female	14 : 8	16 : 6
Minimal follow up (months)	12	12

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newly developing LBP after microscopic discectomy (Group II, n=22). Industrial accident cases or traffic accident cases were excluded, and the cases with diabetes or inflammation were also excluded from our study (Table 1).

Surgical procedure

The consent of patients was obtained by sufficiently explaining the procedure. On the radiolucent operative table, with the prone positioned of patient, the C-arm fluoroscopy was adjusted to an A-P view, so that the superior and inferior margin of the vertebral body were merged as a single line. Subsequently, the imaging intensifier was rotated approximately 10~15 degrees to detect the pedicle well. Under X-ray inspection, a 22 guage with 5mm active tip, 100mm cannula (SMKC10 needle) was inserted toward Burton's point where the superior articular process and transverse process meet. On the lateral radiography, its accurate location was confirmed. Subsequently, the probe was removed from the cannula and an electrode was inserted. High frequency thermal coagulation instrument (N50R, Leibinger, Germany)was connected to assess the sensory reaction first, under 50Hz, 0.2~0.4 volts. Electric stimulation was confirmed by increasing gradually up to a maximally of 0.8~1.0 volts, burning dysesthesia was assessed. To evaluate the reaction of motor nerve, after the increase of the voltage to 2Hz, 0.8 volts gradually, the fasciculation of the multifidus muscle controlled by the medial branch of posterior primary ramus was observed, and once the fasciculation was confirmed, the voltage was raised to 3 volts, it was confirmed that the fasciculation did not occur in the muscles of lower limbs, and the lesion was made at 80°C for approximately 90 seconds. After the formation of the lesion, to prevent discomfort and the development of neuritis, 0.5ml 1% lidocaine and 5mg triamcinolone acetonide (TamcetoneR, Hanol Inc., Korea) per lesion were administered and the surgical procedure was completed.

Evaluation of the pain was performed by applying the visual analogue scale(VAS). When performing the VAS, the case with pain alleviation over 50% was considered as a positive response. It was performed 1 week, 1 month and 6 months after the procedure took place and the number of patients with the pain alleviation is presented as the percentage.

Results

In group I which had LBP prior to microscopic discectomy, pain alleviation was evident after 1 week (73%), after 1 month (55%), and after 6 months (32%). In contrast, group II with newly developing LBP after microscopic discectomy, the pain alleviation was positive after 1 week (82%), after 1 month (68%), and after 6 months (59%). It was found that the effect

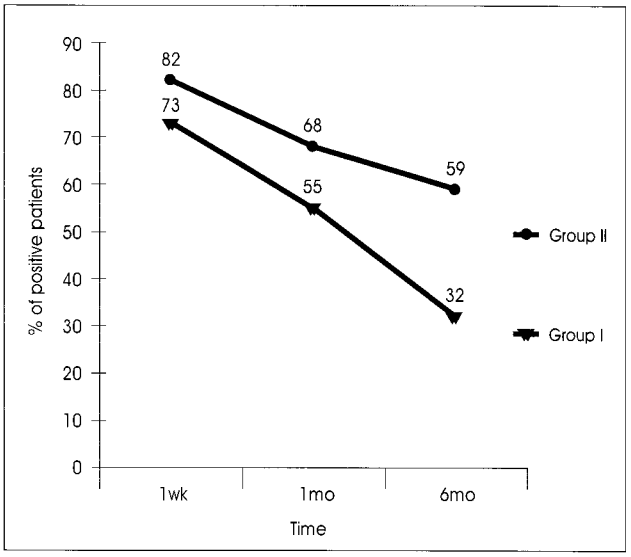

Fig. 1. Long-term results of percutaneous radiofrequency neurotomy on the medial branch of posterior primary ramus between group I and group II showing significant difference.

of pain relief was continuous in group II (Fig. 1). In a multiple regression test, the age of the patient, gender, pain alleviation after the diagnostic medial branch block and operation level did not show a clear cause-effective relation.

The average operative time per patient was 30 minutes. In all patients, neuritis, myalgia, hypoesthesia, and dysesthesia that may develop after PRN were not noted.

Discussion

Weight bearing on the lumbar vertebral area is distributed and supported by the anterior and posterior structure of vertebrates. In the anterior, the vertebral body and disc play an important role while in the posterior, the facet joint plays a main role with the ligaments maintaining the stability of posterior structures and intervertebral discs.

When discectomy is performed for the lumbar disc herniation due to degenerative change of discs, the disc space becomes narrow resulting in the imbalance of weight bearing on spinal structures, and consequently, the weight bearing on the facet joint is increased[2].

Several studies have reported the surgical outcome of microscopic discectomy. Finneson characterized the factors that influence the outcome of the surgery of lumbar disc hernation, and the selection of patients prior to surgery was particularly important[3]. They have reported prognosis determination, and as prognostic factor lowering the postsurgical score, back pain prior to surgery, obsesity, psychological factors, etc. were presented, and the postoperative prognosis is poor in the cases with such factors prior to surgery. Nevertheless, Dabbs has reported that in simple radiographic finding, the correlation

of the narrowing of intervertebral disc space prior to surgery and back ache was not detected[2].

It has been reported that facet joint irritation sign due to the movement of facet joint does not concur to the distribution of dermatomes, at the various steps of spinal location, symmetrically or asymmetrically, continuous pain was detected, it was exacerbated during the extension or flexion, and it may appear as the radiating pain in the buttock area or lower limbs, it shows normal findings in neurological tests.

In 1975, after Shealy[6] reported a 70% success rate after performing RF facet denervation in patients with back pain, it was subsequently applied to the treatment of back pain frequently with diverse success rates of 40~79% being reported[1,7,8]. In comparison with the methods using neurolytic agents, PRN can form lesions accurately with selective destruction of the medial branch, feasible by controlling the temperature. It can distinguish motor-sensory components and lower the incidence of complications such as neuritis. It does not destroy adjacent tissues and thus a scar is not formed. Its advantage is that it can be performed repeatedly[5].

In our study, a good result was obtained for LBP which was newly developed or aggravated after microscopic discectomy, and it was thought weight bearing on the facet joint is increased. Nevertheless, its limitation is that the alleviation of pain in patients can be only evaluated by subjective measures. Therefore the evaluation of the objective result of PRN is difficult to conclude. However but it is believed to be a method that could be performed safely and repeatedly for newly developing LBP after microdiscectomy. A long-term result observation and a study on a larger control group are required in the future.

Conclusion

For newly developed or aggravated low back pain after microscopic discectomy, PRN may be considered as an effective and safe treatment option. However, long-term follow up is necessary.

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