TÜBİTAK

Original Article

Turk J Med Sci
2012; 42 (5): 913-917
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E-mail: medsci@tubitak.gov.tr
doi:10.3906/sag-1108-49

Sciatic nerve injury due to intramuscular injection: electrophysiological findings and one-year follow-up

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Aim: To investigate the electrophysiological findings of sciatic nerve injury following intramuscular injection and follow-up progression.

Materials and methods: Included in the study were 26 patients (16 men, 10 women) with sciatic nerve injuries due to intramuscular injections who were admitted to our electrophysiology laboratory. The age, sex, and body mass index (BMI), along with the clinical and electrophysiological findings of each of the patients, were recorded. Tibial and peroneal nerve motor conduction studies, sural and superficial peroneal nerve sensorial conduction studies, and needle electromyography were performed. The patients were reevaluated for electrophysiological evaluation at 3 and 6 months and 1 year after the procedure.

Results: The mean age was 44.85 ± 22.71. All of the patients had peroneal involvement; 22 had tibial involvement, 6 had a total lesion at the peroneal and tibial nerve, 18 had severe or moderate involvement (70%), and only 8 (30%) had mild involvement. Recovery was poor, except for those with mild involvement.

Conclusion: Sciatic nerve injury due to intramuscular injection is a significant health problem. Although most of the lesions were moderate, recovery was inadequate. Electrophysiological examinations give significant clues about the prognosis and treatment.

Key words: Sciatic nerve injury, intramuscular injection

Introduction

Sciatic nerve injury due to intramuscular (IM) gluteal injection is an iatrogenic problem that can cause significant health problems, especially in developing countries. It may lead to different clinical entities from mild paresthesia to serious neurologic sequelae. The mechanism of injury is unknown, but allergic reactions, direct nerve fiber damage, neuronal ischemia, and constriction of scar tissue are postulated (1,2). An injury due to a quinine dihydrochloride injection was reported in Africa (3), but antibiotics and analgesics are the most common etiological substances, most probably related to frequent use.

The patient's history, physical findings, and electrophysiological evaluation are important for diagnosis. The common peroneal nerve is most frequently affected, and recovery is minimal according to Fapojuwo et al. and Maqbool et al. (3,4).

Children are more often affected than adults because of a thin fat pad and lack of muscle bulk. Although there have been many reports regarding

Received: 23.08.2011 – Accepted: 22.11.2011

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sciatic nerve injury resulting from IM injections in children in the literature (2,4-7), there are limited data about this injury in adults (8-10). In addition, there are limited data about the progress of the injury and electrophysiological findings (2,3,9).

The aim of this study was to determine the electrophysiological characteristics of sciatic nerve injury due to IM injection and investigate the progression.

Materials and methods

Included in this study were 26 patients who were referred to the electroneuromyography laboratory due to sciatic nerve injury following intramuscular injection during a 3-year period. A history of injections was taken from each patient, and the patient's age, sex, name of the injected drug (if the patients knew), and time of injury were recorded. The body mass index (BMI) of each patient was calculated and patients with polyneuropathy, radiculopathy, lumbosacral plexopathy, or severe lower extremity edema were excluded from the study.

Neurological and musculoskeletal system examinations were performed on each patient. In the neurological examination, muscle strength, reflexes, and sensory responses were evaluated. In the electrophysiological examination, the following procedures were performed:

1. Bilateral tibial and peroneal nerve motor conduction studies.
2. Bilateral superficial peroneal nerve and sural nerve sensory conduction studies.
3. A concentric needle electromyography (EMG) examination of the tibialis anterior, peroneus longus, extensor digitorum brevis, medial head of gastrocnemius, long head and short head of the biceps femoris, and abductor hallucis muscles on the affected side.

In suspected cases, a needle EMG was performed bilaterally and widened to the other muscles to exclude radiculopathy, polyneuropathy, and plexopathy.

The patients were graded on a scale of 0-3 according to the severity of the electrophysiological findings, with 0 representing a severe lesion (complete or severe partial lesion), 1 representing a moderate lesion (motor and sensorial partial involvement), 2 representing a mild lesion (minimal involvement), and 3 representing normal electrophysiological findings.

The first electrophysiological examination was performed about 1 month after the injury. After that, neurological and electrophysiological examinations were performed at intervals of 3 months, 6 months, and 1 year after the injury. If recovery was not detected in those with grade 0-1 lesions, the patients were consulted regarding neurosurgery.

Results

Evaluated were 26 patients (16 men, 10 women) with a mean age of 44.85 ± 22.71 years. The mean BMI was 21.56 (min: 17, max: 41.7). Three patients were under the age of 12. The characteristics of the patients are presented in Table 1.

Fifteen patients had left lower extremity involvement and 11 patients had right lower extremity involvement. One patient had normal electrophysiological findings. All 26 of the patients had peroneal involvement, and 22 patients had tibial involvement. Six patients had total lesions at the peroneal and tibial nerve, while 5 patients had a total lesion at 1 of the nerves. In 4 patients, the tibial nerve was more affected than the peroneal nerve. Eighteen of the patients (70%) had severe or moderate involvement, while only 8 patients (30%) had mild involvement (Table 1).

Six patients had severe lesions at both the tibial and peroneal nerves. After 3 months, if no symptoms of recovery were found at the electrophysiological examination, we consulted with the neurosurgery department. One patient fully recovered after 3 months, and 5 patients fully recovered after 6 months. These patients were part of the 8 who had mild lesion involvement.

Four patients dropped out of the study at the 6-month follow-up examination, and 3 patients dropped out at the 1-year follow-up. Therefore, we evaluated 10 patients after the 1-year examination. One patient had a normal electrophysiological examination, 5 patients had minimal recovery (all of these had grade 1 involvement), and 1 patient had a significant recovery (Table 2).

Table 1. Characteristics of the patients.

Patients	Age	Sex	BMI	Peroneal grade	Tibial grade	Drug
1. MF	78	M	21.2	0	0	Analgesic
2. ÖE	24	M		0	0	
3. FT	56	F	22.2	1	1	Analgesic
4. MY	11	M	17.8	0	0	
5. MÖ	75	F	25.5	1	1	Analgesic
6. FA	40	F	24.2	1	1	
7. AY	33	F	17	1	0	Analgesic
8. AÖ	78	M		0	2	
9. FT	12	M	19.2	2	3	Analgesic
10. NY	41	M		2	3	Analgesic
11. YO	41	M	22.6	2	0	Analgesic
12. KD	59	F	27.3	2	2	Analgesic
13. GÜ	32	F	19.7	0	1	Analgesic
14. RÖ	26	F	19.1	2	1	
15. TA	53	F	41.7	0	0	Analgesic
16. HA	33	M	18.9	1	1	Analgesic
17. YD	6	M	19.4	2	3	Antibiotic
18. MD	33	M	26.8	3	3	
19. SO	23	M	19.6	2	2	
20. AD	69	M	22.2	0	0	
21. CT	65	M	24.9	2	3	
22. SY	18	M	22.4	0	0	
23. HE	77	M	22.4	0	0	
24. ED	60	F	24.9	2	2	
25. BE	67	M	19	2	3	
26. HP	66	F	20.5	1	0	Analgesic

The names of the injected drugs were reported by 12 of the patients, 1 of which was an antibiotic while the others were analgesic drugs.

Discussion

In this study, we investigated sciatic nerve injury due to intramuscular injection and conducted a 1-year follow-up of the patients. We found that most of the patients had moderate or severe lesions, and their recovery was minimal.

The degree of postinjection sciatic nerve injury varies from sensory disorders to severe motor disorder. In the literature, most of the patients had partial involvement, and although the level of recovery depends on the severity of the lesion, most of the patients had minimal recovery (4,9,11). In this study, 6 patients had a total lesion, while most of the patients had severe and moderate lesions. Recovery was minimal in our group, with only the patients with mild lesions showing significant recovery after 1 year.

Table 2. Grades of injury in the patients at follow-up.

Patients	Peroneal/tibial	3 months	6 months	1 year
1. MF	0/0	0/0		
2. ÖE	0/0	0/0		
3. FT	1/1	1/1	1/1	1/2
4. MY	0/0	0/0		
5. MÖ	1/1	1/1	2/2	2/2
6. FA	1/1	1/1	1/2	1/2
7. AY	1/0	1/0	1/0	2/0
8. AÖ	0/2	0/2	1/2	1/2
9. FT	2/3	2/3	3/3	
10. NY	2/3	2/3	3/3	
11. YO	2/0	2/0	3/0	3/0
12. KD	2/2	2/2		3/3
13. GÜ	0/1	0/1	1/2	1/2
14. RÖ	2/1	2/1	2/1	
15. TA	0/0	0/0	1/0	1/0
16. HA	1/1	1/1	2/1	2/1
17. YD	2/3	2/3	3/3	
18. MD	3/3			
19. SO	2/2			
20. AD	0/0	0/0		
21. CT	2/3		3/3	
22. SY	0/0	0/0		
23. HE	0/0	0/0		
24. ED	2/2			
25. BE	2/3	2/3	3/3	
26. HP	1/0	1/0		

In the literature, many case reports or case series have been written about this issue, but most of them are about children (2,4-7). Mishra (6) reported that 80% of patients were affected in childhood. The present study was unlike these reports because only 3 patients were children. In addition, studies have shown that men have a higher risk of injury than women because of a thinner fat pad (1,2,8,9). Our findings support this hypothesis because 62% of our patients were male.

Studies also have shown that the common peroneal nerve is more affected because of its posterolateral position and smaller amount of supporting connective tissue (4,9). Although the peroneal nerve was affected in all of the patients, a tibial nerve lesion was also detected in 81% of the patients. In 4 patients, the tibial nerve lesion was more severe than the peroneal nerve lesion.

The reason for the injury is not yet known. Anatomic variations and neurotoxicity are important.

Some drugs, especially analgesics and antibiotics, have often been reported as the cause because of their frequent use. Sevim et al. (9) also reported that the drugs metamizole and cefazolin were responsible for injury. Most of our patients did not know the name of the injected drug, but 11 patients reported they had been injected with analgesics and 1 patient reported an antibiotic injection.

It has been reported that BMI might be an etiological factor for injury because patients with a low BMI have thinner pad tissue (8,9). In our study group, most of the patients had a low BMI.

The extent of the recovery time depends on the injury grade. In our group, severe lesions did not show recovery, even minimally, after 1 year. Only patients with mild lesions had a good prognosis. In the moderate group, recovery was very slow. Early treatment, such as decompression or microsurgical repair, might be important when an electrophysiological follow-up detects patients who would benefit from these treatments. In this study, 6 patients had severe lesion and no symptoms of recovery were detected. They were then sent to the neurosurgery department for consultation.

In conclusion, sciatic nerve injury due to intramuscular injection is an important problem, and electrophysiological examinations provide significant clues about the prognosis and treatment. We suggest that patients who have grade 0-1 lesions should consult a neurosurgeon about treatment options because of poor prognosis.

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