

Management of Foot Drop due to Post Injection Sciatic Nerve Injury

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Abstract

A three year clinical study on 215 patients with post injection sciatic nerve injury was conducted and management was guided by nerve action potential (NAP) recordings, and thorough clinical assessment. During this study normal conventional and some modified methods were instituted in the rehabilitation treatment. The treatment included electrotherapy, Stimulation of calf and foot to prevent denervation atrophy, maintaining T.A flexibility by T.A stretching exercises, facilitating gait with the use of light weight Polypropylene AFO (foot drop splint), and use of same splint during night to maintain ankle at neutral position. Reassurance was given to care psychological set back caused due to foot drop.

Out of 215 patients 155 patients achieved remarkable recovery in one year, this included 5 patients with mild weakness without foot drop. 35 patients achieved improvement in 18 months and 19 patients had poor recovery where the drop foot did not recover, while as 6 patients were lost to follow up. It was concluded that patients attending earlier for rehabilitation programme had purposeful motor recovery, no TA tightness and minimum wasting. Light weight foot drop splint remarkably improved ambulation.

Key words : Foot drop, injection injury, Sciatic nerve, Peroneal division, Polypropylene Splint, ambulation.

Introduction

Injury to sciatic nerve due to intramuscular injections of therapeutic agents is common. The postulated mechanisms of injury include direct needle trauma, secondary constriction by scar, and direct nerve fiber damage by neurotoxic chemicals in the injected agent. Neurological sequelae can range from minor transient sensory disturbance to complicated condition like foot drop. Foot drop is a deceptively simple name for a potentially complex problem and can be defined as a significant weakness of ankle and toe dorsiflexion. The foot and ankle dorsiflexors include the tibialis anterior, extensor hallucis longus, and extensor digitorum longus. These muscles help the body clear the foot during swing phase and control plantar flexion of the foot on heel strike. Weakness in this group of muscles results in an equinovarus deformity. This is sometimes referred to as steppage gait, because the patient tends to walk with an exaggerated flexion of the hip and knee to prevent the toes from catching on the ground during swing phase.

The purpose of the clinical study was to present results to this commonest incidence of post injection sciatic nerve injury which leads to foot drop, causing immediate disabling condition of gait with severe psychological set back.

Material and Methods

The department of PM&R, SKIMS conducted a three year study on 215 patients. 145 patients were the male subjects between the age group of 7years to 69 years and 70 patients were female subjects between the age group of 10 years to 56 years. The patients were divided into four groups depending upon their reporting period to the department from the time of injection injury:- a) Group-1 1-2 weeks b) Goup-2 2weeks to 1 month c) Group-3 1 month – 2 months d) Group- 4 2 months and beyond. The follow up was carried out at least for 1 year to 18 months in all subjects excepting 6 patients who discontinued their rehabilitation treatment. 53 patients were managed on indoor basis at the start of their treatment and the follow up was continued on OPD basis. Rest of the subjects were managed on OPD basis. Management was guided by nerve action potential (NAP) recordings, and thorough clinical assessment besides

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Table I:

Patient group	Site of Injection	Involved Side		Gender of patients		First visit to PMR after injection injury	Complications
		Right	Left	Male	Female		
Group 1	gluteal region	23	18	27	14	1wk - 2wks	Foot drop except For 5 pts.
Group 2	gluteal region	88	40	85	43	2wks-1month	Foot drop
Group 3	gluteal region	19	09	22	06	1month-2months	Foot drop
Group 4	gluteal region	08	10	11	07	2months & later	Foot drop

Table II initial assessment & Follow-up result

Patient group	initial assessment			assessment by 15 th follow-up (1yr to 18 months)
	Motor	wasting	sensory	
Group 1	Gr0–Gr I 5 pts. had mild Sensory/motor Weakness.	nil	decreased	Gr III+–Gr IV 2pts did not recover
Group 2	Gr0–GrI	mild	decreased	Gr III–Gr IV 3 pts did not recover
Group 3	Gr0–Gr2	mild to mod.	decreased	Gr III–Gr IV 7 pts did not recover
Group 4	Gr0–Gr2	marked	variable	Gr III—Gr IV 7 pts did not recover

motor and sensory examination. During this study a normal conventional and some modified methods were instituted in the rehabilitation treatment of these patients.

Management: The following management goals were considered using rehabilitation team approach:-

1. To correct foot drop.
2. To prevent denervation atrophy.
3. To prevent tightness of T.A
4. To care for sensory impairment.
5. To re-assure the patient.

Correction of Gait due to foot drop: A light weight Polypropylene AFO (foot drop splint) was used to prevent foot drop, which facilitated a normal stance and swing pattern. The splint helps to clear the foot during swing phase and control plantar flexion of the foot on heel strike. This further prevents an injury hazard to forefoot and avoids extra-expenditure of energy during walking. The splint was used during night to maintain a neutral position at ankle (90deg). This helped in preventing the tightness of T.A.

Preventing Denervation Atrophy: Electric stimulation at a frequency of 30–50Hz was applied up to 20 minutes each day per session (each session 14 days). On average the patients received 4 sessions with one week gap between each session. Anterior and lateral compartments of leg were stimulated since the area is supplied by

peroneal nerve. This helped to keep tibialis anterior, peronei, EDL, EHL in better tone.

T.A Stretching: Stretching of Tendo Achilis is recommended in all patients, whether they attend the treatment immediately after injection injury, or late. The aim is to maintain normal flexibility of dorsiflexion at ankle so that it doesn't lead to equinus gait deviation and also doesn't inhibit the recovery of tibialis anterior and peronei, EHL and EDL. This is achieved by passive stretching of T.A and by the use of night splintage.

Care for sensory impairment: The patient is educated about the complications of hot and cold due to sensory impairment. The patient is instructed not to use hot bottle or hot water for warmth in order to prevent burn; instead the patient is instructed to use warm socks in cold temperatures to maintain the warmth.

Reassuring the patient: Most of the time the injection injury leads to foot drop. Many patients undergo psychological trauma as the foot drop leads to sudden gait disturbance and becomes evident and observable by the patient himself and by others around. Since the recovery has to take its course, the patient is educated and reassured about possibility of recovery and other measures like surgery.

Table III (Showing Comparative Study Of Post injection Sciatic Nerve Injury

<i>Author Year</i>	<i>Kline D.G 1998</i>	<i>Bina A 2003</i>	<i>Oyediji O.A 2006</i>	<i>Present study 2006</i>
No of Patients	230	50	40	215
Signs/ Symptoms	Radicular pain, Paraesthesia, Motor & Sensory deficit		Impairment & delay in crawling inability to walk	Paresthesias, numbness, pain, motor weakness with foot drop
Treatment given	Conservative	Conservative 2Pts had surgery to correct deformity Ankle foot orthosis 68%	Conservative	Conservative E.T, TENS, Exs, foot drop splint.
Outcome	Significant Grade III	Significant 36% No recovery 40% Partial recovery 24%	Defaulted from clinic insignificant recovery	14 pts. With residual foot drop, 190 pts recovered fully

Results

A total of 215 patients were studied during a period of three years in the department of Physical Medicine and Rehabilitation. Of the 215 patients 155 patients achieved remarkable recovery in one year from the onset of I/M injection injury; this included the 5 patients who presented with mild weakness but without foot drop, 35 patients achieved improvement in 18 months and 19 patients had poor recovery where the drop foot did not recover, while as 6 patients discontinued their follow up. The results show that out of 215 patients, 190 patients recovered their foot drop achieving grade III to grade IV dorsiflexors, besides having flexibility of TA maintained and wasting of associated muscles minimized.

Discussion

Post injection nerve injury can occur in both adults and children, and neurological sequelae can range from minor transient sensory disturbance to severe sensory disturbance and paralysis⁽¹⁸⁾. Oyediji et.al (2006) studied 398 post injection nerve patients and found that the injury was caused by unqualified health care providers especially in rural areas and from private hospitals and the same has been observed in our study. Physiotherapy may provide a better chance of recovery⁽⁴⁾ (Mayer, M., & Romain, O. (2001).), as also evident through our study. Patients who appeared late for physiotherapy and rehabilitation treatment had already sought various medical treatment and drugs and all these patients had developed moderate tightness of T.A, besides muscle wasting. For most of these neglected patients, the treatment in Physical Medicine and Rehabilitation was the last resort and for some of them the recovery was a distant reality, since their gait was further disturbed because of tightness of T.A and foot drop being already present. It is known that neurological recovery is usually spontaneous except for

the patients who have more axonal damage or more toxicity due to injected material⁽¹⁷⁾ (Hudson A et al 1980). Delay in the rehabilitation treatment may hamper the recovery as it happens when the tendo achilis becomes tight, the tibialis anterior and other supplied groups may not grow its strength as they stay stretched by tight TA. The recommended treatment ranges from a conservative approach which includes physiotherapeutic and rehabilitative techniques to exploration with neurolysis or resection and anastomosis⁽⁹⁾ (Villarejo & Pascual, 1993). In our study group-4 patients had a recovery rate of 61%, while as in group-3 patients recovery rate was 75%. Similarly recovery rate in group-2 was 97.5% and 95% in group-1 patients. Our results co-relate with the findings of⁽²³⁾ Greenfield, 1997⁽²²⁾ Grant, 1999 who also advocate that post injection sciatic nerve injury should have physiotherapeutic & rehabilitation attention from day one after injury or need the referral to physical medicine as soon as they are attended by other medical care concerns.

Conclusions

Based on this clinical study, it was observed that the patients which followed the PMR treatment protocol at the early stage had a purposeful motor recovery, no TA tightness, and minimum wasting. Furthermore patients were back to normal activity without foot drop with the use of polypropylene foot drop splint till their dorsi flexors regained power against gravity. Since neurological recovery is spontaneous in type- I injuries, the role of early rehabilitation in post injection sciatic nerve injury leads to smooth recovery with prevention of complications which lead to deformity and disability. It is also emphasized that in order to reduce the frequency of this handicapping condition, injections should be prescribed only when mandatory and administered by well-qualified and competent personnel.

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