Original Article

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Post Gluteal Injection Foot Drop: Tibialis Posterior Transfer

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Abstract

Intramuscular injections are practiced regularly in hospitals and clinics. Adequate precautions have to be taken selecting the site of injections. Certain drugs which can cause irritation at the site of injection should be avoided, if it can be given through other routes.Foot drop cause a lot of problem during gait that may impact on the work done. This may further cause deformities in foot including equinovarus.

Keywords: Gluteal Injection; Foot Drop; Tibialis Posterior Transfer

Introduction

Intramuscular injections are practiced regularly in hospitals and clinics. Adequate precautions have to be taken selecting the site of injections.[1] Certain drugs which can cause irritation at the site of injection should be avoided, if it can be given through other routes. These intramuscular injections can cause many side effects including scarring, abscess, and intravascular, intra-articular nerve damage etc.[1] Sciatic nerve palsy after intramuscular injections is more commonly on seen after injections are given by untrained individuals and quacks.[2]

Foot drop cause a lot of problem during gait that may impact on the work done. This may further cause deformities in foot including equinovarus. These changes cause pain as well as problems in using the lower limbs. These patients may develop other deformities like shortening of other tendons like the tendoachilles, many bony and joint changes may develop.

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Materials and Methods

From December 2010 to April 2012, thirteen cases of foot drop were referred to the Plastic Surgery out patient department. Once patients presented to our OPD, these patients underwent thorough examination including status of tibialis posterior and the tendo Achilles. Muscle power was graded as per Medical research council (MRC) grading.[3] Nerve conduction studies and electromyography were done to confirm the diagnosis and to know the status of the posterior tibial nerve and the Tibialis posterior muscle.

Patients were posted for tibialis posterior transfer after 1 and ½ years post intramuscular (IM) injection foot drop. Eleven patients underwent the transfer. All patients underwent tibialis posterior strengthening exercises and were taught to use the muscle in isolation.

A vertical incision along the medial side of the leg about 2 cm posterior to the medial border of tibia was used to identify the proximal portion of the tibialis posterior. Dorsal foot incision was used to identify the insertion of tibialis posterior tendon to navicular bone, and the anterior group of muscles. Tibialis posterior tendon was divided from its insertion and pulled proximally through the proximal incision and was rerouted through the subcutaneous route to the ankle.[4] Tibialis

posterior was split into two tails.[5,6] One tail was fixed to the tibialis anterior tendon by Pulvertaft's method[7] with foot in 30 degree dorsiflexion. The other tail was fixed to the extensor digitorumcommunis, extensor halluces longus, and peroneus tertius by Pulvertaft's method with all toes in dorsiflexion and foot in eversion.

Post operatively they were put in a slab with foot dorsiflexion and eversion and toes dorsiflexion for 2 weeks. We changed the splint age to below knee cast with foot in dorsiflexion and eversion after wound healed and sutures were removed. Intermittent passive movement was started 4 weeks after surgery. Intermittent passive movement was advised followed by use of splintage after physiotherapy. Non weight bearing walking for 2 weeks and by the end of 8 weeks they were able to walk without foot drop.[8]

We applied the Stanmore assessment scoring, Table 1 for each of the patients[9,4] and evaluation criterion as proposed by Carayon et al.[10,11](Table 2)

Table 1: Stanmore assessment scores

Pain(15)	
Never	15
Occasionally	10
Sometimes	5
Serious pain	0
Need for orthosis (15)	
No need	15
Rarely (once a week)	10
Sometimes (twice a week)	5
Frequent (more than twice a week)	0
Ability to wear normal shoes (5)	
Yes	5
Only special models	3
No	0
Functions (10)	
Normal daily activity and normal recreation	10
Normal daily activity and limited recreation	6
Limited daily activity and limited recreation	3
Seriously limited daily activity and recreation	0
Degree of active dorsiflexion(25)	
Grade 4-5	25
Grade 4	20
Grade 3	10
Grade 2 and lower	0
Degree of active dorsiflexion(25)	
More than 6degree	25
0 to 5 degrees	20
-5 to -1 degree	10
-10 to -6 degree	5
Less than -11 degree	0
Foot posture(5)	
Plantigrade, balanced, no deformity	5
Plantigrade; mild deformity	3
Obvious deformity, misalignment	0

Results

These patients had weakness of lower limbs or foot drop of 6 months to 4 years duration. They all had intramuscular injections to the gluteal region before they developed the complaints. The patients were aged between 6 years to 52 years. There were 8 males and 5 females. They gave history that, they had taken injections for pain (5 patients), fever (4), 4 patients did not know what injection was given. All patients had injections on an OPD basis. All patients developed weakness of the lower limbs within 4-5 hours after the intramuscular injections. 4 patients developed gluteal abscess which were drained and the wound healed by secondary suturing.12 All patients underwent physiotherapy after they developed weakness.

In 11 patients dorsiflexion was grade 0 and grade II in 2 patients. There were no sensory disturbances. 2 patients had grade II power on presentation and it improved spontaneously to grade IV with physiotherapy. 8 patients had equinovarus deformity. There were no other symptoms.

Eleven patients did not improve with physiotherapy for 1and 1/2 years duration. One patient had severe tenderness in the gluteal region, she underwent MRI. MRI revealed pyriform muscle edema. She had to undergo exploration and external neurolysis after which she resumed her physiotherapy.

None needed to undergo tendoachilles lengthening in our study even though equinovarus deformity is common among the patients with ankle dorsiflexion weakness.[13] Foot drop splint were used after physiotherapy.

Table 2: Evaluation criterion of Carayon et al

	Excellent	good	Moderate	poor
Active doriflexion	>15degrees	5-15 degrees	No active dorsiflexion	Presence of plantar flexion that prevent ankle motion, minimal dorsiflexion
Active palntar flexion	>30 degrees	15-20 degrees	Drop foot totatally corrected	
Active range of motion	>40 degrees	20-30 degrees	Plantar flexion possible upto 10 degree.	

Table 3: results of Stanmore assessment score

	A	B	C	D	E	F	G	H	I	J	K
Pain (15) Never 15 Occasionally 10 Sometimes 5 Serious pain 0	15	15	10	1O	15	10	5	15	10	15	15
Need for orthosis (15) No need 15 Rarely (once a week) 10 Sometimes (twice a week) 5 Frequent (more than twice a week) 0	0	10	10	5	15	15	5		5	10	0
Ability to wear normal shoes (5) Yes 5 Only special models 3 No 0	0	5		3	5	5	3	5	3	3	0
Functions (10) Normal daily activity and normal recreation 10 Normal daily activity and limited recreation 6 Limited daily activity and limited recreation 3 Seriously limited daily activity and recreation 0	3	6	6						6		
Degree of active dorsiflexion (25) Grade 4-5 (25) Grade 4 (20) Grade 3 (10) Grade 2 and lower (0)	10	25	25	20	25	25	25	25	20	20	10
Degree of active dorsiflexion(25) More than 6degree (25) 0 to 5 degrees (20) -5 to -1 degree (10) -10 to -6 degree (5) Less than -11 degree (0)	20	25	25	25	25	25	25	25	25	25	20
Foot posture (5) Plantigrade, balanced, no deformity 5 Plantigrade; mild deformity 3 Obvious deformity, misalignment 0	0	3	3	3	3	5	3	5	3	3	0
Total (100)	48	89	78	66	88	85	66	75	72	76	45

Wound healed well in 5 patients. 4 patients had epidermal necrosis on the edges of the incision, which healed with regular dressings in 2 weeks' time.

Dorsiflexion movement in 2 patients it was 15 to 20 degrees, in 6 patients, it was 5 to 15 degrees, and 0 to 5 degrees of dorsiflexion in 1 patient. The 2 patients who had 0 to -10 degrees of dorsiflexion needed foot drop splint after surgery. They refused further procedures.

Stanmore scoring, Table 3 was applied to all patients.[4] 3 (27%) patients scored very good with a score between 100-85, 4 (36%) patients scored good with a score between 84-70, 2 (18%) patients scored fair with ascore of 69-55 and 2 (18%) patients scored bad with a score of 55 and below. Table

Carayon et al scoring was excellent in 2 (18%) patients, good in 6 (55%) patients and rest of 3 (27%) patients had moderate scoring.

Subjective assessment when the patient were asked, the scoring was excellent in 5 (45%), good in 5 (45%), poor in 1 (9%).

Discussion

Patients present earlier to pediatric and physiotherapy OPD where they presented between 1 week and less to one month after the injection,[2] unlike the plastic surgery OPD as the reconstruction is done once the patients do not respond to physiotherapy.

Patients who have intramuscular gluteal injections are prone sciatic nerve palsy most often presenting with foot drop.[14] This was seen in our patients too. Sciatic nerve damage is caused by the caustic effect of the drug rather than direct damage.[14] We should avoid intramuscular injections. The effect of the drug would be the same if the drug is given in an infusion form or if possible oral route. We did not see total paralysis of the sciatic nerve. Namate et al has presented his observations that 90% of the patients with acquired foot drop in children had intragluteal injections.[15] Since children have variable thickness of subcutaneous tissue and the muscle, there are more chances of injuring the nerve.[2]

There was no gluteal fibrosis associated with foot drop after intramuscular injections as observed by Marek et al.[16] We have 4 cases with gluteal abscess as a complication of intramuscular gluteal injection along with the foot drop. The involvement of common peroneal nerve was only seen in our study, unlike other studies other nerves were also involved including sensory nerves.[17] Bhinaahuja has also mentioned that common peroneal nerve palsy is most common.[18]

Patients do well when physiotherapy is started early after injection induced weakness or palsy.[14] The improvement depends on the severity of the palsy. None of the patients had passive dorsiflexion less than 20 degrees and hence none required tendoachilles lengthening.[19]

Many types of tendon transfers are explained for tibialis transfer, interosseous route, extraosseous route, fixing it to the tarsal bone. The type of surgery depends on the available muscles and the residual deformity to be corrected. Intraosseus route may be considered if the length of the tendon that is required is longer. But it was rarely required since, we preferred to fix the tibialis posterior

tendon using a Pulvertaft's technique to the tendons of tibialis anterior, EHL, EDC, peroneus tertius which were all uninjured. More over the interosseous route transfer causes vascular injuries and late contraction.[4] We had 8 cases with equinovarus deformity and hence we did not try to fix the tibialis posterior muscle to the bone.

Only 15% of our patients had spontaneous grade IV power with conservative therapy unlike Ali et al who have 88% recovery[20] which was a physiotherapy unit. This may be because; the patients who were referred to plastic surgery department were for surgical intervention. The Stanmore assessment score of our study was comparable to other studies.

We had 6 (55%) patients who had good results and 2 (18%) patients who showed excellent results and rest of 3 (27%) patients had moderate results which was again comparable to Carayon et al.[10]

Patients who do not improve with physiotherapy should be given an option of tibialis posterior tendon transfer for foot drop. Tendon transfer will give good movement and patient satisfaction.

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