Rising Tendency of Intramuscular Injection Induced Peripheral Nerve Injury: Time to Act

Abstract
Objective: This study is conducted to look for the rising tendency of intramuscular (IM) injection induced nerve palsy. It is thus hoped that the research will influence the policy makers to institute policies for the prevention of this problem.
Study Design: Cross Sectional Study.
Place and Duration of Study: This study was carried out in the Neurology Department of Pakistan Institute of Medical Science, Islamabad, Pakistan from Jan 2005 to Aug 2010.
Materials and Methods: A total of 206 cases of IM injection induced nerve palsy, referred to EMG lab of PIMS for nerve conduction study (NCS), were included in the study. Patients having root or plexus lesion and if NCS located lesion at site of entrapments were excluded. Nerve palsy confirmed and severity of lesion classified using standard electrodiagnostic test.
Results: Out of 206 cases, 55.83% were males. Mean age was 34.6 years (range 2-85 years). Children less than 15 years were 14.6%. There was wrist drop in 62.62% and foot drop in 25.24%. Among all, 67% had radial and 30.1% had sciatic nerve palsy. Eighteen percent each had complete and severe partial and 57.77% had partial nerve damage. Two patients had mild nerve damage while 8 patients had only neuralgia with normal NCS. Rising trend of IM injection related nerve palsy was noted as 79 cases were recorded from 2005 to 2007, while from 2008 to 2010 (Aug) the recorded cases were 127. Injections administered were 52% by dispensers at private hospitals, 36% by quacks while 12% were given by nurses.
Conclusion: There was a rising trend of IM injection related nerve palsy, which is a serious health hazard that can be avoided by safe injection practices. The dispensers of private clinics and quacks are responsible for majority of these cases. There is a need to enforce policies that only qualified and trained nurses are employed by private clinics and adopt effective strategies to end quackery in our country.
Key words: Peripheral nerves, Injection related nerve palsy.

Introduction
Intramuscular injection (IM) has been used as a means of parenteral drug administration for more than a century. Reasons for using the IM route for administration of drugs, and the technique adopted, vary worldwide. IM injection may be appropriate for patients with nausea, vomiting, diarrhoea or dehydration. It may also be appropriate when there is a need to confirm the delivery of medication, such as when the patient is unreliable or uncooperative or non responder to oral treatment. 

In general practice, injection is given as a routine part of practice, sometimes on patient’s demand for rapid relief of symptoms. Although such injections are considered routine office procedures, there is increased risk of neurovascular injury if they are performed incorrectly. Another risk factor is when injections are administered when patients twist over in bed. This may cause their anatomical landmarks to be distorted. In patients with reduced muscle mass secondary to e.g., old age, cancer, prolonged bed rest, denervation; properly placed injections can still cause nerve damage because
the muscle mass is much reduced, causing the needle to be deeper than usual.

The complications which have followed intramuscular injection include abscess and cyst formation, necrosis, and sloughing of skin, scar formation, lingering pain, periostitis and peripheral nerve injuries with consequent neurological deficits. 4

Frequently utilized sites for IM injection are deltoid or gluteal muscles. Gluteal injections are more common in children, 5 while deltoid injections are more frequently used in adults. 6 Axillary nerve can be damaged if a deltoid injection is placed too posteriorly. 7 Radial nerve can be damaged if IM injection is placed too caudally (near the spiral groove), or posterior where the radial nerve passes into the posterior compartment of the upper arm, resulting in wrist drop. Sciatic nerve can be damaged if gluteal injections are not strictly placed in the upper lateral quadrant of the buttock, resulting in foot drop. 7,8,9,10,11

We have observed a yearly increase in the number of patients diagnosed to have post injection nerve palsy in our tertiary healthcare institute and carried this study to look for the rising tendency of intramuscular injection induced nerve palsy. It is thus hoped that the research will influence the policy makers to institute policies that could lead to the prevention of this problem by proper training of health care professionals.

Materials and Methods

This study was carried out in the EMG Laboratory of Neurology Department of Pakistan Institute of Medical Sciences (PIMS), Islamabad, Pakistan from Jan 2005 to August 2010. Patients of any age referred to EMG lab of PIMS for nerve conduction study, having wrist drop or foot drop or neuralgic pain, immediately or soon after intramuscular injection in upper arm or buttock were included in the study. Patients were specifically inquired about site of injection and by whom they were injected. Patients having root lesion, plexus lesion and if nerve conduction study located lesion at site of entrapments were excluded from the study. NCS was done on digital EMG machine of Cadwell Company, (USA made) by standard methods. Needle EMG study was done for further confirmation and excluding the other possibilities. Severity of lesion was classified as complete, severe partial, partial, mild and normal having only pain depending on recruitment pattern in EMG and response size in NCS.

Results

Total number of cases was 206. Among these 55.83% (n=115) were males and 44.17% (n=91) were females. All were thin built. Mean age was 34.6 years (range 2-85 years). Children less than 15 years were 14.6% (n=30). Average duration from onset to nerve conduction study was 10 months.

Most of the patients were presented with wrist drop 62.62% (n=129) and foot drop 25.24% (n=52), Figure 1. Sixty seven percent patients (n=138) had radial nerve palsy following injection in upper arm and 30.1% patients (n=62) had sciatic nerve palsy following intragluteal injection, while three patients had bilateral sciatic nerve palsy, Figure 2. Left side was more frequently affected (65%).

![Figure 1: Presenting symptoms post IM Injection related Nerve Palsy](image1)

![Figure 2: Nerves Affected in IM injection related nerve palsy](image2)

![Figure 3: Severity of nerve lesion in post IM injection nerve palsy](image3)
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A total of 206 cases of intramuscular injection related neuropathy were diagnosed at the EMG lab, neurology department of Pakistan Institute of Medical Sciences, Islamabad. These results were from one centre (PIMS) and about 20 electrodiagnostic facilities are doing NCS and EMG in the whole country. Collecting data from all of these centers is difficult. In addition some patients may not be referred for NCS. The incidence of IM injection related nerve palsy is considered to be a rare entity in new world due to the proper training of health care providers. While in the developing countries the post injection nerve palsy was more frequently diagnosed due to increasing access to electrodiagnostic facilities and partly due to lack of proper adherence to safety guidelines by quacks and untrained nursing staff. Data collected in cross-sectional studies in India and Pakistan have found a high frequency of indiscriminate use of injections in these regions. 7

In our study the average duration from onset to nerve conduction study was 10 months, which results in loss of precious time for the surgical repair of such case. Delay in recognition and therefore treatment contributed to the poor outcome in many cases. 12, 13

In our study adults with IM injection related nerve palsy were 176 (85.6%) while there were few reports on the subject in adults. Twenty eight adults patients were diagnosed with post injection sciatic neuropathy by Sevim et al., 2009 in eight years. 14

In our study children less than 15 years were 14.6% and according to Mansoor et al., 2005, out of the 5627 acute flaccid paralysis cases reported, 456 were identified as traumatic injection neuropathy by case review among children under 15 years and it was further reported that the condition was more common in younger children who were also more likely to have persistent paralysis. 15, 16

In our study most of the patients had wrist drop 62.62%, as adults in our country prefer deltoid for IM injection and that too on the non dominant arm, supported by the fact that left side was more frequently affected (65%) in our study. While foot drop occurred in 25.54%, mostly children as parents or injection giver prefer large gluteal region for this age group.

Severity of lesion is dependent on the site, needle length, tissue depth, proximity to the nerve and the agent administered and the improper injection technique. 4,5 In our study about 18% each had complete and severe partial nerve damage, while 57.77% had partial nerve damage. Two patients had mild nerve damage while eight patients had only neuralgia with normal NCS.

Rising trend of IM injection related nerve palsy was noted in our study. Seventy nine cases were recorded in three years from 2005 to 2007, while in the next three years i.e., from 2008 to 2010 (Aug) the recorded cases were 127. The yearly no of cases from 2005 to 2010 (Aug) were 31, 23, 25, 43, 47 and 37. The increase in the number of cases is partly due to increased referral for electrodiagnostic studies and partly due to the increase in the number of cases.

It was further seen that dispensers of private clinics were responsible for these nerve palsies in 52% of cases, quacks in 36% of cases and trained nurses in government hospitals in 12% of cases. Many of our patients suffer at the hands of the untrained people who set themselves as experts of injection. Safe injection practices need to be understood by doctors and nurses alike. There is a need to develop ethical practice guidelines in medical professionals, thereby avoiding unnecessary use of injections in routine practices.

Discussion

A total of 206 cases of intramuscular injection related neuropathy were diagnosed at the EMG lab, neurology department of Pakistan Institute of Medical Sciences, Islamabad. These results were from one centre (PIMS) and about 20 electrodiagnostic facilities are doing NCS and EMG in the whole country. Collecting data from all of these centers is difficult. In addition some patients may not be referred for NCS. The incidence of IM injection related nerve palsy is considered to be a rare entity in new world due to the proper training of health care providers. While in the developing countries the post injection nerve palsy was more frequently diagnosed due to increasing access to electrodiagnostic facilities and partly due to lack of proper adherence to safety guidelines by quacks and untrained nursing staff. Data collected in cross-sectional studies in India and Pakistan have found a high frequency of indiscriminate use of injections in these regions. 7

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Conclusion

There is a rising trend of IM injection related nerve palsy, which is a serious health hazard that can be avoided by safe injection practices. The dispensers of private clinics and quacks are responsible for majority of these cases. This study should be an eye opener for health care policy makers in our country. There is a need to enforce policies that only qualified and trained nurses are employed by private clinics and adopt effective strategies to end quackery in our country, so...
that the avoidable disabilities can be prevented, and humanity can be served in a better ways.

References