TITLE OF THE ABSTRACT: Comparison of standard outpatient screening tools and nerve conduction studies for the diagnosis of diabetic peripheral neuropathy

DEPARTMENT: Physical Medicine and Rehabilitation

NAME OF THE CANDIDATE: Dr. Saraswathi Ramanathan

DEGREE AND SUBJECT: MD, Physical Medicine and Rehabilitation

NAME OF THE GUIDE: Dr. Raji Thomas, Professor and Head, Department of PMR.

INTRODUCTION: Diabetic peripheral neuropathy (DPN) is a common complication of diabetes mellitus, leading to foot ulcers, gangrene and amputation. Reported prevalence of DPN ranges from 10-90%, due to differences in screening tools and gold standard used. This study aims to compare various outpatient screening tools and nerve conduction studies (NCS) to diagnose DPN.

OBJECTIVES:

1. To study occurrence of DPN based on standard outpatient clinical tools and NCS.
2. To compare results of biothesiometry, Semmes Weinstein monofilament (SWMF) testing, NCS and MNSI (Michigan Neuropathy Screening Instrument).
3. To assess the usefulness of SRAR and minimal F wave latency
4. To study sensitivities and specificities of the above screening tools, sural radial amplitude ratio (SRAR) and minimal F wave latency, using NCS as gold standard.

METHODS: In a cross sectional observational study, on 48 patients with type 2 diabetes, excluding patients with ulcers, amputations and other causes of neuropathy,
MNSI, biothesiometry, SWMF and NCS including F waves and SRAR calculation were done and occurrence of DPN calculated. Results of the above were compared using Chi square test and diagnostic accuracies were calculated taking NCS as gold standard.

**RESULTS AND CONCLUSIONS:** Occurrence of DPN was 29.1%, 56.25%, 41.66% and 8.3% based on NCS, biothesiometry, MNSI and SWMF respectively. Clinical neuropathy according to MNSI was significantly related to NCS ($p=0.041$), SWMF ($p=0.013$) and biothesiometry ($p=0.001$). Neuropathy diagnosed by conventional NCS was significantly related to SRAR ($p=0.07$) and minimal F wave latency ($p=0.003$). A significant relation was noted between mean minimal F wave latencies of all nerves and biothesiometry, thus showing that SRAR and minimal F wave latency are useful tools in early diagnosis of DPN. MNSI, biothesiometry, SWMF, SRAR and minimal F wave latency had a sensitivity of 64.3%, 78.6%, 14.3%, 100% and 78.6% and specificity of 67.6%, 52.9%, 95.1%, 20% and 67.6% respectively, with reference to NCS. SRAR and biothesiometry are quick to perform. F wave study requires relatively longer time and expertise, however is less time consuming than the entire NCS. NCS, though considered the gold standard for DPN diagnosis, is cumbersome, time consuming, painful and needs expertise. Biothesiometry, SRAR and F wave together had a sensitivity and specificity of 71.4% and 91.2% respectively. Hence, combination of these three evaluations, can help to limit the need for conventional NCS to selected cases.

**KEY WORDS:** DPN, biothesiometry, NCS, SRAR, F wave