Nerve Conduction Velocity Tests

Version: 2
Replaced by version: 1
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Summary: To confirm the presence of diabetic neuropathy, nerve conduction velocity (NCV) studies are performed. The animals are anesthetized with 30/2.5 mg/kg ketamine/xylazine to prevent discomfort. Body temperature is monitered with a dermal temperature probe and maintained at 32º C with a warming lamp during NCV. Body temperature is maintained at 37ºC after NCV using a warming pad to ease animal stress from anesthetic. The nerve studies last less than 30 min per rat or mouse. The electrodes are cleaned with 70% alcohol between animals to maintain pathogen-free status.

Reagents and Materials:

Equipment:

- **Nicolet VikingQuest Portable System with Nerve Conduction Studies VikingQuest software run on Windows NT**
- HP laser printer
- Nicolet 12mm .4mm diameter disposable platinum EEG subdermal needles
- Niclot disposable ground
- Heating lamp
- **Infrared thermometer**
- Heating pad
- Flexible tape measure
- 8”x 8” Styrofoam
- Ketaset 100mg/ml (3 parts) and Rompun 20 mg/ml (1 part) --- stock solution should be diluted 1/10 for mice and as is for rats.

Protocol:

Settings:

- Motor tests
  - Duration .02 ms
  - Range 25 mA
  - low frequency filter 1 Hz
  - High frequency filter 10 kHz
  - Sensitivity 1 mV
  - Time 2 ms/div

- Sensory test
  - Duration .02 ms
  - Range 25 mA
  - low frequency filter 1 Hz
  - High frequency filter 10 kHz
  - Sensitivity 50 μV
  - Time 2 ms/div

Procedure:

To confirm the presence of diabetic neuropathy, nerve conduction velocity (NCV) studies are performed. The animals will be anesthetized with 30-100/2.5-10 mg/kg ketamine/xylazine to prevent discomfort. Body temperature is monitored with a dermal temperature probe and maintained at 37º C with a warming lamp during NCV. Skin temperature is maintained at 34º C during NCV using an infrared thermometer. Body temperature is maintained at 37ºC after NCV using a warming pad to ease animal stress from anesthetic. The nerve studies will last less than 30 min per rat or mouse. The electrodes are cleaned with 70% alcohol between animals to maintain pathogen-free status.

Sciatic-tibial motor NCV is determined by stimulating distally at the sciatic notch and distally at the ankle via bipolar electrodes with supramaximal stimulation. The conduction velocity is calculated using two the points of stimulation along the nerve and measuring the resultant onset latency and distance.

Sensory NCV is determined by stimulating the sural nerve distally at the ankle via bipolar electrodes with supramaximal stimulation and recording at the fourth and fifth digit. The conduction velocity is calculated using the onset latency and distance.

Tail motor latency is determined by stimulating distally along the tail at a recorded distance of 3 cm. The onset latency is used for the latency measurement.

Tail sensory NCV is determined by stimulating proximally along the tail at a recorded distance of 3 cm. The Conduction velocity is calculated using the onset latency and distance.