CHANGES OF SPINAL CORD EVOKED POTENTIAL AFTER EXPERIMENTAL SPINAL CORD LATERAL COMPRESSION IN MONGREL DOGS-EFFECT OF METHYLPREDNISOLONE TO THE POTENTIALS AND MOTOR RECOVERY-

+*Michino, K; *Nozawa, M; *Kajihara, H; *Akiyama, K; *Nemoto, M; *Morita, M; *Enomoto, F; *Kurosawa, H
+*Dept. of Orthopaedic Surgery, Juntendo University, 1-3 Honogou 3-chome, Bunkyou-ku, Tokyo, Japan. 1-3 Honogou 3-chome, Bunkyou-ku, Tokyo, Japan, +81-3-5802-1087, Fax: +81-3-3813-3428, asakusa@wc4.so-net.ne.jp

(Purpose)
High dose administration of methylprednisolone (MPSS) immediately after spinal cord injury can promote the recovery of motor function. This study investigated the effect of MPSS on the recovery of ascending and descending spinal cord evoked potentials in the canine spinal cord injury model induced by lateral compression.

(Materials and methods)
Twenty five mongrel dogs underwent laminectomy between T11 to L2 under intravenous anesthesia using pentobarbital. The custom-made compression device was positioned to the right of the dura between T13 and L1, and lateral compression of the spinal cord was begun at the rate of 1 mm per 5 minutes. The bipolar electrodes were applied at the levels of T11(R1) and L2(R2). Descending spinal cord evoked potentials induced by transcranial electrical stimulation (BrE-SCEP) and ascending spinal cord evoked potentials induced by spinal electrical stimulation (SpE-SCEP) were measured during the period of increasing compression force and after the release of compression. Increase of the lateral compression of the spinal cord was continued until the SpE-SCEP disappeared. The compression force was then released. BrE- and SpE-SCEPs were observed at 5, 10, 15, 30, 60 minutes, 1 and 2 weeks after the release of compression. The motor function of the lower extremities was examined at 1 and 2 weeks after the release of compression. The dogs were divided into four groups according to the extent of compression time to the spinal cord and the administration of MPSS.

Group 1: Lateral compression was released just after the disappearance of the SpE-SCEP, and no MPSS was administered (5 dogs).
Group 2: Lateral compression was released just after the disappearance of the SpE-SCEP, and MPSS (30mg/kg) in physiological salt solution (50 cm3) was given intravenously over 15 minutes (10 dogs).
Group 3: Lateral compression was continued for 5 minutes after the disappearance of the SpE-SCEP, and MPSS was not administered (5 dogs).
Group 4: Lateral compression was continued for 5 minutes after the disappearance of the SpE-SCEP, and MPSS (30mg/kg) in physiological salt solution (50 cm3) was given intravenously over 15 minutes (5 dogs).

(Results)
Recovery of motor function
Two of 5 dogs in group 1 showed complete motor function recovery and three had incomplete recovery at 2 weeks. In contrast, 9 of 10 dogs in group 2 achieved complete recovery of motor function at 2 weeks. No dogs in group 3 showed complete recovery of motor function at 2 weeks. Two of 5 dogs in group 4 had complete recovery of motor function at 2 weeks.

Recovery of SCEP latencies
The latencies of BrE-SCEP(R2) increased at one hour after the release of compression in groups 1 and 2, and no difference was recognized at 2 weeks. The latencies of SpE-SCEP(R1) also increased at one hour in both groups. Many dogs in group 2 showed faster recovery of the latencies of both potentials. The latencies of both potentials in group 3 and 4 showed slower recoveries in comparison with those in group 1 and 2 at one hour. However, the latencies of both potentials in group 4 showed similar recoveries to those in groups 1 and 2 at 2 weeks.

(Discussion)
This experiment on the effect of MPSS on the recovery of BrE-SCEP and SpE-SCEP and the recovery of motor function after experimental spinal cord injury in dogs showed that administration of MPSS promoted better recoveries of motor function and potentials in both acute and chronic induced spinal injury. Clearly, MPSS administration is effective for the inhibition of secondary damage following spinal cord injury.