Basic Research for Ar. Laser for the Spinal Cord (2)
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So far the effect of the laser to the spinal cord is not evaluated quantitatively by biological and physiological measurement. The authors reported at the 3rd. annual meeting of Japan society for laser medicine as follows: 1) when the smaal lesion was superficially demarcated on the dorsal column by an Ar. laser radiation, the early components of somatosensory evoked potential (S.E.P.) was disappeared. The histological finding revealed the destruction of the irradiated dorsal column. 2) The photoactivation effect of the Ar. laser was studied in the spinal cord with fluorescein drug.

In this study the local temperature and the reversibility at the Ar. laser radiation were investigated in the spinal cord.

(material and method)
Cats were anesthesized with chloralose intraperitoneally. The thoracic spinal cord was exposed with a laminectomy at T4 to T8. A small craniectomy was performed at the primary sensory area, a silver ball electrode was positioned epidurally. The sciatic nerve was stimulated, and S.E.P. was recorded. An Ar. laser system(Aloka IIIA) was used as a light source. It was modified to produce a single line emission at 487 nm wave length and a quartz fiber was coupled to the Ar. laser using a fiber holder assembly. The intensity exposed through this fiber was 200 to 250 mW. The tip of the quartz fiber with a defocused beam was applied at 2mm in diameter on the dorsal column.

(Result)
(I) Temperature rise
The temperature of the irradiated dorsal column was measured with biothermometer (THB-200, produced by unique medical).
Two types of method for laser radiation were used ; (1) continuous radiation (150 sec.), (2) fractional radiation- radiation for a period of 10 sec. with 120 sec. interval. (1) continuous radiation
Non-fluorescein group took 13°C(mean) rise after laser radiation for 150 sec. while fluorescein group took 25°C(mean) rise after laser radiation for 150 sec. (2) fractional radiation
Non-fluorescein group took 6°C(mean) rise after radiation for 10 sec. Fluorescein group took 20°C(mean) rise after radiation for 10 sec.

(II) Reversibility of the spinal cord after laser radiation
Change of S.E.P. amplitude, latency and wave form were analized in relation to the course of the exposure of the Ar. laser.
Group of which the early components of S.E.P. were disappeared after radiation did not recover 180 min. after the radiation was stopped. While group of which the early components of S.E.P. had the minor change of wave form seemed to recover 180min. after the radiation was stopped. The histology of the latter was mainly edem of the dorsal column.

(discussion and summary)
The authors discussed as follows ; (1) The heat effect of Ar. laser wasn't negligible especially in using photoactivation dye fluorescein drug. (2) The S.E.P. monitor during radiation was useful.
The minor change of the early components of S.E.P. should be paid attention during radiation not to damage the normal cord.