A Microsurgical Training Model For Anterior Cervical Discectomy in Fresh Sheep Spine

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Summary

The main purpose of this study is to develop a practical microscopic training model of a fresh cadaveric sheep cervical spine that simulates the human anterior cervical discectomy under operating microscope. According the study results, it has been claim that this model simulates well standard anterior cervical discectomy of the human spine and is a useful method for trainees.

Key words: Microneurosurgery, training model, surgical training, cadaver dissection, sheep cadaver

INTRODUCTION

Anterior cervical discectomy is performed using the standard well described and well utilized anterior approach to the cervical spine. Laboratory training models are essential for developing and refining surgical skills. Model in fresh cadaveric sheep spine does perfectly satisfy our aim to provide residents of neurosurgeon physicians with familiarity with a basic spine surgical technique in access to the anterior cervical discectomy in the earlier years of their neurosurgeon physicians residency program.

MATERIAL AND METHODS

This study was performed at the Dr. Lutfi Kirdar Kartal Research and Education Hospital. The sheep cervical spine was obtained from a local butcher. The material consisted of a 2 year-old fresh cadaveric sheep. It was kept in the refrigerator at 40 C for 6 hours after the specimen was obtained. The surgical steps then begin, under the magnification (66–106) of the operating microscope (Zeiss OpMi 991, Carl Zeiss,Inc., Germany).
RESULTS

The sheep cervical spine is placed supine. Under operating microscope, the anterior longitudinal ligament (ALL) over the disc space is incised using a no.15 blade knife. Disc material and the cartilaginous end plates are removed from the vertebrae superior and inferior to the disc. After removal of the annulus fibrosus, the underlying posterior longitudinal ligament (PLL) was seen. The PLL was open and dura mater was demonstrated. Using a long nerve hook or dissector, the relationships of the pedicle, nerve root.

DISCUSSION

Many simulation model of different surgeries are designed for use in laboratory practice of neurosurgical trainees\(^1\)\(^,\)\(^2\)\(^,\)\(^,\)\(^,\)\(^3\)\(^,\)\(^4\)\(^,\)\(^5\)\(^,\)\(^6\). Kalayci et al. and Reid et al. were described in sheep a training model for lumbar discectomy and sheep lumbar intervertebral discs as model for human disc respectively\(^5\)\(^,\)\(^6\). Our two recent reports described the usefulness of laboratory study simulating the lumbar microdiscectomy in fresh cadaveric sheep spine, and laboratory training model using fresh sheep spines for pedicular screw fixation\(^7\)\(^,\)\(^8\)\.

Our proposed biological model of anterior cervical microdiscectomy performed in a fresh cadaveric sheep spine represents a very useful method to accustom the residents of neurosurgery to the performance of basic steps in standard the anterior cervical discectomy, simulating anterior cervical discectomy performed on human. The differences between the anatomy of sheep and human lumbar spines were negligible in terms of

Figure 1: Anterior cervical discectomy is done using the microscope. Self-retaining retractor system stabilizing the specimen. Training session photographs taken under the operating microscope. (A) The anterior longitudinal ligament is incised using a no.15 blade knife. (B) Small microcurette and rongeur allow for removal of the annulus fibrosus. (C) The posterior longitudinal ligament is exposed. (D) The dura and nerve root are clearly visualized.
microneurosurgery under operating microscope.

Practice on a cadaveric sheep cervical spine has several advantages. The preparation of our model is simple. The material is cheap and easy to obtain. Junior residents can practice microsurgery on fresh organic tissue in the early residency period. They learn how to use microneurosurgical instruments under the operating microscope in a three dimensional surgical field simulating surgery.

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Received by: 27 May 2013
Revised by: 27 July 2013
Accepted: 29 October 2013

The Online Journal of Neurological Sciences (Turkish) 1984-2013
This e-journal is run by Ege University Faculty of Medicine, Dept. of Neurological Surgery, Bornova, Izmir-35100TR as part of the Ege Neurological Surgery World Wide Web service.
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Journal of Neurological Sciences (Turkish) Abbr: J. Neurol. Sci.[Turk]
ISSN 1302-1664

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