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ORIGINAL ARTICLE

AN APPROACH FOR REMOVAL OF BRAIN, BRAIN STEM WITH SPINAL CORD FOR AUTOPSY AND ANATOMICAL STUDY

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ABSTRACT: After proper preparations of body, removal of brain, brain stem with spinal cord were done. Total thirty (30) cadavers were dissected in a span of three (3) years in Katihar Medical College, Katihar, Bihar, India with good results. The removal of vault of skull, squamous part of occipital bone, posterior arch of atlas, followed by bilateral laminectomy of vertebrae, helps in viewing of brain, brain stem and spinal cord along with spinal nerve roots and cauda equina. This approach helps in total removal of brain, brain stem and spinal cord with its covering with large venous sinuses remaining intact however small venous sinuses are sacrificed in this process. The specimen thus obtained can be used for autopsy or anatomical study.

KEYWORDS: Removal of brain, brain stem, spinal cord, anatomical study.

INTRODUCTION: The approach adopted mostly for removal of brain entails beginning with removal of scalp enmasse and then a saw cut around the bare skull bones. The procedures results in inevitable damage to the brain stem with some of the nerve roots being severed and clear visibility of the posterior fossa is not possible - a limitation of the conventional procedure. On above view an alternative approach for removal of brain with spinal cord has been contemplated and is being practiced in department 0f anatomy, with good results. This approach will be helpful for the orthopedic and neurosurgery students. For forensic study blood haematoma is easily seen and spinal cord injury can be assessed.

MATERIALS AND METHOD: Cadavers after proper embalming were selected for this study, the work done in Katihar Medical College, Katihar, Bihar. Thirty (30) cadavers were dissected in span of three (3) years. Instrument used for this dissection were toothed & untoothed forceps, scissors, scalpel, chisel, hand saw, hammer, periosteum elevator, long bladed knife, retractor, bone nibbler, bone cutter and electric saw.

In this study, the approach followed is a combination of the classical approaches for removal of brain and spinal cord (brash J.C 1958) with an addition involving the removal of the remains of the squamous part of the occipital bone left over after the removal of skull cap by a circumferential cut and posterior laminectomy of all vertebrae (canale S.T -1998). On the dissection table, before starting the dissection, the cadavers selected were laid in supine position.

The head was cleanly shaved, with skin pencil a circular mark was drawn (anteriorly 2 cm above the margin of the orbit, laterally above the auricle and posteriorly 1 cm above the occiput).By a sharp long blade knife along the marked line the scalp enmasse is freed from the skull cap. The avulsed scalp is made to hang by pedicle at the root of the nose. Next a circular saw cut is given across the skull, keeping the cutting edge of the saw on the top of the skin edge surrounding the lower part of the head, thus a little more than vault of skull is removed leaving the endosteal layer of dura and venous sinuses with the brain.

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In the next step of removal of brain with meninges by lifting the basal aspect of the frontal lobe, rootlets of olfactory nerves are cut. After separating the dural attachments from the posterior margin of lesser wing of sphenoid bone, the optic nerve is approached and cut closed to their exit from the optic canals. Next the third and fourth cranial nerves are cut at their points of entry into cavernous sinus, after that tentorium cerebelli is cut along the superior border of the petrous part of temporal bone results in exposure of cerebellum, which conceals the ventrally lying pons and medulla oblongata.

On the inferior surface of brain 5th, 6th, 7th and 8th cranial nerves are identified and cut. After identification, the lower cranial nerves are carefully dissected out. In next step, the cadaver is turned prone and the remaining scalp is cleaned, two oblique incisions are given from the cut margin of squamous part of the occipital bone and extend up to posterior arch of atlas. Posterior nuchal muscles are removed as well as squamous part of occipital bone is nibbled and removed in piece meal. With the meninges posterior aspect of brain is clearly exposed.

The obvious long midline skin incisions are given and it continued down up to the coccyx with dissection of paravertebral muscle and soft tissue laterally and bilateral laminectomy is done with a bone nibbler interspinous and supraspinous ligaments are cut. This exposes the spinal cord within the meninges with the roots of spinal nerves and caudally the cauda eqiuna. The roots of spinal nerves and cauda eqiuna are cut which freed the brain and spinal cord enabling their removal, the specimen so obtained is kept in museum or used for academic purpose.

DISCUSSION: Brain is severed from the spinal cord by a cut through the lower part of medulla is classical method of removal (Brash J.C-1958). In the newer approach the intact removal of brain, brain stem, the spinal cord, the meninges, the nerve roots along with the cauda equina is accomplished with some extra efforts (Canale S.T 1998). This method of dissection holds out a great promise for viewing the spinal cord within its meninges as it lies within the vertebral canal (Wood bkrne R.T, Burkle W.E - 1994).

The whole brain plus spinal cord removed may be kept as a museum specimen or it can also be used for teaching & research purpose. The posterior Laminectomy done in this method is the basic operative procedure for spinal decompressive neurosurgery (Hopperfield S, Pietde Boer - 1999), (Rob C Smith R-1979). This will help the neurosurgery and orthopaedic students. For forensic study (Knight Bernerd-1996) collection of blood hematoma is easily seen whether it is extradural or subdural and spinal cord injury and fault of operation (medico-legal) can be assessed. In the brain, brain stem, spinal cord and canal space occupying lesion are better observed.

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Intact brain and spinal cordd with cauda equina with its meninges and nerve roots.

Visualization of brain and spinal cord with cauda equina with its meninges and nerve roots.

Brain and Spinal cord with its meninges and nerve roots.

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