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Case Report

Exploration of Surgical Site In Vertebral and Spinal Cord Injury- A Unique Approach and Experience

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Article Info

Key words

Vertebro-spinal
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Spinal Cord
Dissection,
Vertebral Dissection.

Abstract

Introduction: Conventional methods of autopsy are essential for valid scientific outcome. But in many cases, unforeseen circumstances may lead an autopsy surgeon to utilise unconventional methods to perform post mortem examination. Hence, it is important to be flexible in practical fields to obtain best possible results. Spinal cord in autopsy can be removed via anterior & posterior approach; anterior approach being the best accomplished one. **Objective:** To depict the experience including difficulties and improvisation during autopsy of a post spinal surgery case with unique method of dissection and post mortem exploration of surgical site. **Case History:** 61 years old male had history of road traffic injury & expired 35th day post injury. **Findings:** During autopsy, a longitudinal midline surgical incision 20cm long over back of neck and thorax, placed vertically, was revealed on external examination. On further dissection of the surgical site, a prosthetic implant is explored but cannot be taken out through posterior approach dissection only. Thus, another unique manoeuvre was performed to reveal rest of surgical sites and implants. The prosthesis has anterior and posterior component. The posterior component was larger and longer compared to the anterior ones. Spinal cord was also dissected accordingly through the unique approach. **Discussion:** Anterior vertebro-spinal dissection permits removal of spinal cord and peripheral nerves in continuity. Posterior approach is recommended to visualise cervical spine and cranio-cervical junction better. But in this case, performing these conventional methods was not enough for completing autopsy. Hence, recognition of this procedure is essential for future use by autopsy surgeons. **Conclusion:** This case highlights unique method of spinal cord dissection and exposure of prosthesis.

1. Introduction

In the field of forensic medicine, a trained eye, a questioning mind and a flexible approach are essential for the pathologist to come to the best conclusions. In many post mortem examinations, examinations, limiting oneself to conventional techniques may result in important

observations being missed. This case report demonstrates the importance of flexibility in ones

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autopsy techniques to achieve the best possible outcomes.

The ability to undertake vertebral column and spinal cord dissection is a necessary skill for any autopsy surgeon. Post mortem examination of the spinal cord is important to assess injuries in traffic accidents, homicides, suicide by various modes of asphyxia and also to detect poisons.¹ Vertebral or vertebro-spinal injuries are commonly seen as a result of fall from height, fall on ground by slipping, road traffic injuries or in some pathological conditions. It is commonly seen in adult or old age group, but also encountered in children or young population.²

There are two methods of approach, anterior and posterior, each having its own merits and demerits. Anterior approach is usually attempted to remove the spinal cord and peripheral nerves in continuity. While, the posterior approach is done to visualise the cervical spine and cranio-cervical junction better along with dissecting out the spinal cord intact.^{3,4,5}

Case History:

61 years old male had history of road traffic injury. He was first taken to a nearby Peripheral Health Centre, referred to SSKM Hospital, from which he was referred and finally admitted in private nursing home. A clinical diagnosis of traumatic cervical vertebrae and spinal injury with quadriplegia was made. He was operated on the 3rd day post injury. The patient was then transferred to the ward and after being admitted in the nursing home for over a month, he finally expired on the 35th day post injury. Being an unnatural death, the case had undergone medicolegal autopsy at the authors' institution.

Post Mortem Findings:

On external examination it was observed that the subject was average built and moderately nourished. Rigor Mortis was present all over the body. Cornea was hazy with pupils dilated and fixed. Scalp hair was 8 cm in length and beard and moustache each 2 cm in length all mixed black and grey hair. Vene-puncture mark was present over the dorsum of the right hand and also over left inguinal region 7.5 cm below left anterior superior iliac spine.

On external examination, a surgically made faint subcutaneous incised wound was present over the right side of the anterior aspect of the neck [Refer to Fig 1] and a surgically made incised wound 20 cm long was present over the back of neck and thorax placed vertically on midline [Refer to Fig 2].

Fig-1: Subcutaneous incision mark on the anterior aspect of the neck



Fig-2: The surgically incised wound is apposed by 53 metallic clips



Fig-3: Prosthesis extends from lower border of C3 to lower border of T3



Hence, the body was made prone and posterior approach was attempted first. The wound started 5.5 cm below external occipital protuberance going downward up to 135 cm above heel. The margins of the wound were apposed by 52 metallic clips. On removing the clips, underlying soft tissue & muscle planes were found to be stitched in layers with surgical sutures. There was extravasation of blood over the back of the neck and back of the upper thorax present 25 cm x 10 cm area longitudinally.

On further dissection, one longitudinal metallic prosthesis was found present from lower border of C3 to lower border of T3 [Refer to Fig 3]. It had two longitudinal metallic curved rods (convexity laterally), each 16.5 cm long and 0.5 cm diameter which is 3.5 cm apart above and 4.6 cm apart below, having 7 screws on each rod. Upper 4 screws are shorter (1.7 cm length) and lower 3 screws are longer (3.6 cm length). Below 4th screw from above there is a narrow metallic transverse bar connecting both longitudinal rods. But even after removing the screws the whole prosthesis could not be removed posteriorly.

Fig-4: Longitudinal rectangular metallic plate

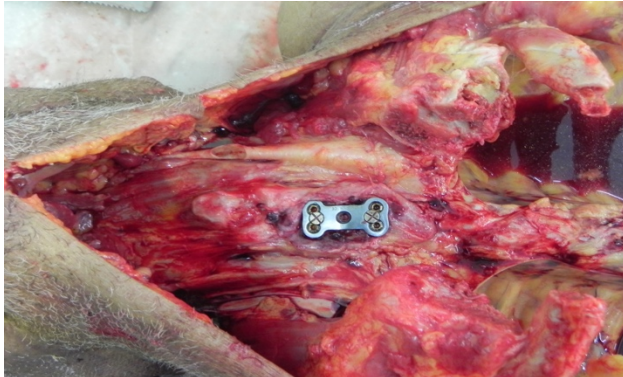
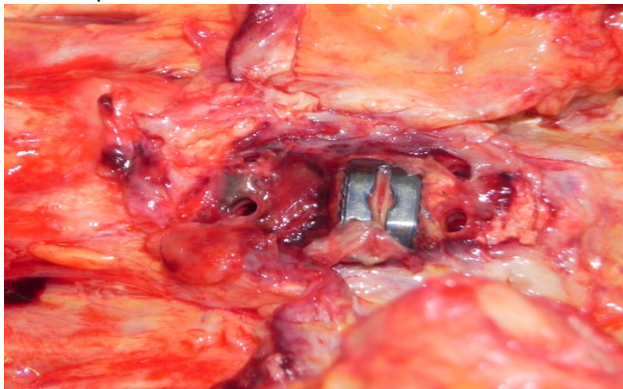


Fig-5: Cylindrical hollow implant exposed on removal of metallic plate



Hence, the body was made supine and the anterior approach was attempted. Anteriorly, on the right side of the neck, a subcutaneous incision was observed. It was 7 cm long and starts 10 cm below the symphysis menti going laterally and horizontally. On incision and removal of muscle and organs in layers the spine was exposed anteriorly. There was one longitudinal rectangular metallic plate measuring 3.5 cm x 2 cm fixed over the anterior surface of the body of C5, C6 and C7 vertebrae [Refer to Fig 4]. There were 6 screws (4 longer screws over four corners and 2 shorter screws in between) and a hole at the centre.

Fig-6: Posterior prosthesis



Fig-7: Metallic, centrally hollowed, cylindrical shaped implant



On removal of the metallic plate, there was another underlying metallic, centrally hollowed, cylindrical shaped implant measuring 1.3 cm x 0.7 cm x 0.7 cm in dimensions, placed within the anterior aspect of body of C6 [Refer to Fig 5]. "TA-GESCO-1281-CE" was written over it [Refer to Fig 6]. This implant was then removed. The body was then made prone again and the posterior prosthesis was removed.

“TA-TR-3X2-60-GESCO-CE” was written over horizontal bar of posterior prosthesis [Refer to Fig 7].

Discussion:

No dead body in authors` country can be legally disposed off (burnt or buried) without removal of all internal metallic foreign bodies or prosthesis. Moreover, as being the death an unnatural one, the medicolegal autopsy was performed. During medico-legal autopsy, improvisation is essential to come to a valid and scientific result. Spinal column and spinal cord examination is an awkward and potentially protracted procedure during autopsy. Numerous detailed complex procedures for dissection and examination of vertebral column and its contents have been described in many literatures till date. Thorough examination of vertebro-spinal column in situ is an effective method of demonstrating vertebral fractures and spinal injuries.⁶

After performing extensive review of literature, the authors found that antero-posterior dual approach of dissection of vertebral column for exploration of the surgical site during post mortem in a vertebro-spinal injury case has not been reported worldwide till date.

Post mortem vertebro-spinal dissection can be done by two approaches, anterior and posterior. In anterior approach, pedicles of the vertebrae are sawed by lateral cuts and the spinal cord is removed.^{7,8,9} While, in the posterior approach, the laminae of the vertebrae are sawed and the spinal cord is exposed.²The spinal cord should be removed via a dorsal approach when there is a likelihood of spinal injury. If a rostral cervical injury is suspected the spinal dissection should be performed before the brain is removed.⁶

In an ideal mortuary set up, cervico-thoracic instability of vertebra and spinal cord injury with or without fracture is best demonstrated by postmortem computed tomography (PMCT) and postmortem magnetic resonance imaging (PMMRI) which makes the autopsy procedure easy. But in this case the investigations were not available in the mortuary, so the task was more challenging.¹⁰

Studies have been published on postmortem radiological investigation to find out vertebro-spinal injuries before starting dissection. Flexion and

extension studies of the suspected areas were immensely helpful in demonstrating injuries and including occult lesions.^{11,12}

Conclusion:

Obscure and occult lesions in intervertebral discs, joints and also in the vertebral structures due to fatal road traffic trauma may be present at times which are not visible in naked eye during dissection. Non-invasive radiographic investigations before autopsy dissection are helpful, but not absolutely sensitive. So subtle lesions may still remain unrevealed leading to, underreporting of lesions during standard autopsy.¹³ In this particular case report, both anterior & posterior dual approaches have been attempted to dissect vertebra & expose spinal cord to visualize the lesions at best. This case has been published by the authors to enlighten the future autopsy surgeons encountering such situation during autopsy with ease of approach, and so that that they are not unprepared when a case as such, arrives at their hospital`s morgue.

Abbreviation:

PMCT- Postmortem Computed Tomography.

PMMRI- Postmortem Magnetic Resonance Imaging.

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