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Case Report

Multiple cervical spinous process fracture (clay shoveler fracture): Case report

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Abstract
Clay-Shoveler's is fracture of one or more spinous processes to include lower cervical or upper thoracic vertebrae. In this article, it was aimed to investigate possible mechanisms of Clay-Shoveler's fracture and share radiological results of q case of 11 years (2003) follow-up after the traffic accident. A 25-year-old male patient complained of neck pain spreading to both shoulders, and there was an in-car traffic accident two weeks ago. Patient's motion restriction was 50% for active flexion, lateral flexion and rotation, and 20% for active extension movement. Imaging revealed a minimal inferior displaced avulsion fracture in C6, C7 and T1 vertebra spinous processes. Patient returned to daily activities in 3rd month after immobilization with medical treatment and neck collar. Clay-Shoveler's fracture is most commonly seen in T1, then C7, T2, T3 and C6. Surgical treatment is not planned because patient has no limitation of neck movements and neck pain which responds to medical treatment.

Keywords: Clay Shoveler; Servical Vertebra Fracture; Spinous Processes.

INTRODUCTION

The term of Clay-Shoveler's fracture is based on Western Australian Clay-Shoveler's in 1930's. It is used for single or multiple spinous process fracture including lower cervical or upper thoracic vertebrae. Since then, many alternative terms including Clay-Shoveler's fracture are used; such as Snow Shoveler's fracture, gold digger's fracture, miner's fracture and Shoveler's fracture.

A form of which occurs at childhood is defined as avulsion fracture of the secondary ossification center of spinous process and named as Schmitt Disease. Today the most common cause is vehicle or non-vehicle traffic accidents.

In this study we purpose to discuss mechanism of the fracture and the clinical importance of injuries by publishing the radiographic results of eleven year follow-up of Clay-Shoveler's fracture caused by vehicle accident.

CASE REPORT

In 2003, a 25 year old male patient registered the outpatient clinic for cervical pain spreading both shoulders. He had a vehicle accident two weeks before. According to the patient his neck had a sudden hyperextension during the accident. Physical examination findings include tenderness in posterior cervical vertebrae. No clinical finding was found in the physical examination of other vertebrae. No pathological finding was found at both upper and lower extremities. Neurological examination was normal. No loss of consciousness was occurred during the accident.

Active range of motion of cervical flexion, lateral flexion and rotation movement were %50 decreased and extension was %20 decreased.

With rotation and lateral flexion to the left side, pain on the left part of the vertebra was occurred. In lateral and flexion-extension x-rays, bone fragments and vertebra bodies were found immo (Figure 1–2). No dislocation was spotted in vertebral bodies. At MRI, no abnormality was seen in spinal cord and soft tissues (Figure 3).

Conservative treatment including analgesic and anti-inflammatory drugs was administered. For four weeks immobilization with cervical collar was used. A month later the patient registered the outpatient clinic again for no decreasing cervical pain. Nonunion of spinous fractures were found in x-rays.

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Figure 1. Double spinous process sign in the AP cervical x-ray

Figure 2. C6 and C7 spinous process fracture in the lateral radiographs

After 3 months, minimal callus tissue was seen; but no sign of union was seen in x-rays. Spinal manipulative therapy was started to upper cervical vertebrae during the process. Upper body strengthening exercises and cervical rehabilitation were started. After three months the patient was back to his daily routine activities.

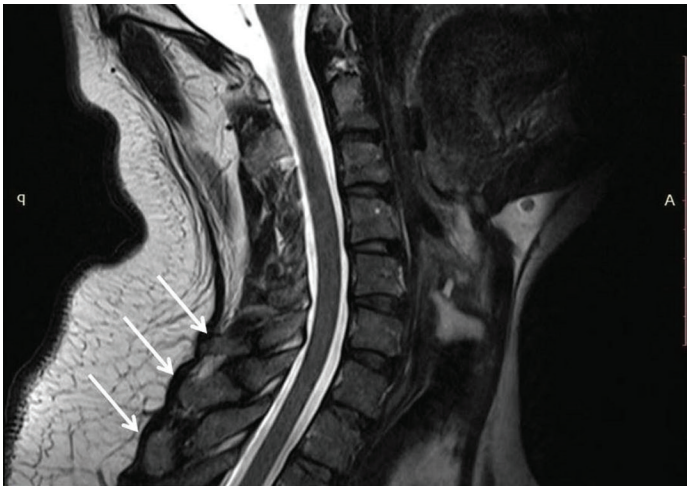

Figure 3. C6, C7 and T1 spinous process fracture-Sagittal MRI images

DISCUSSION

There are three types of mechanisms causing Clay-Shoveler's fractures, which are defined as direct, indirect and stress related. Indirect mechanism is the most common among them. In this mechanism, cervical vertebrae exposes to a type of ballistic movement by flexion, extension and rotational forces. During sudden hyperextension-flexion as a result of contrary forces of supraspinous, infra spinous and nuchal ligaments, avulsion of spinous process may occur (1-3). Normally, fracture occurs at the weakest point of spinous process. The weakest point is found to be the narrowest point, 1/3 inch to the tip of process (4).

X-rays show typical features. At lateral x-ray fracture line is more commonly oblique travels between processes spinous and spinolaminar intersection. Atypically it can travel along the spinolaminar line (5). Distal spinous fragment displaces posterior or posteroinferiorly. Lateral displacement is best seen on anteroposterior imaging. At anteroposterior imaging lining fault and displacement of distal spinous process leads to imaging of caudal displacement of tip of spinous process and base of fracture. This sign is called double spinous sign (Figure 1) (6).

Single spinous process fractures mostly occur at T1, then C7, T2, T3 and C6 vertebrae (3). In literature, the range between C6-T9 is reported as the most affected part of vertebrae (7). The severity of trauma can be enlighted by accompanying multiple spinous process fractures. In these cases it is likely to be more serious additional injuries. Clay-Shoveler's fractures tend to be stable as long as includes isolated spinous process. Treatment should start with a conservative method. Cervical collar should be used at intervals of 4-6 weeks to prevent atrophy of muscles.

After 4-6 weeks generally pain will likely to subside however no union of bone can be seen due to the contractions of the local muscles. In literature, it is reported that fractures cause severe pain and temporary disability should undergo surgery (8). In our case no union was seen at disassociated parts of spinous processes even after 11 years. At May of 2014 freed bone fragments of the avulsion fracture of spinous processes of vertebrae were remarkable at MRI. However no surgical intervention was planned because of full range of motion and neck pain responds to conservative treatment.

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