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Case Report

Contiguous multiple cervicothoracic spinous process fractures in an adult: A case report

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ABSTRACT

Fracture of isolated spinous processes at multiple levels is a rare injury. Herein, we present a 45-year-old male with cervical pain and swelling following a road traffic accident. Computerized tomography and magnetic resonance imaging revealed fractures of spinous process from C7 to D6 vertebra. The patient was managed with rest, analgesics and immobilization. At the 1-year follow-up, the patient is doing well without any neurological problem.

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1. Introduction

Fractures of isolated spinous processes of cervical and thoracic vertebrae are called as Clay shoveler's fracture.^{1–3} These are the avulsion type of injury due to stress on the interspinous ligaments attached to the spinous process. These injuries are rare and usually occur due to trauma or as stress fractures in sports-related injuries.^{4,5} These injuries are usually stable and treated by conservative means. In this report, we present a case of contiguous multiple cervicothoracic spinous process fractures in an adult with associated extradural hematoma treated conservatively.

2. Case report

A 45-year-old male was presented to the emergency department with cervical pain and swelling following a road traffic accident due to fall from a motorcycle resulting in collision of neck on road. The pain was severe in intensity and was localized to lower cervical and upper dorsal region. There was no history of radiating pain in upper limbs. There was no history of loss of consciousness, bleeding from ear, nose or throat, and vomiting. On examination patient had tenderness and diffuse swelling at lower cervical and upper dorsal spine. There was no neurological deficit and bladder and bowel

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Fig. 1 – Radiograph of cervicothoracic spine showing loss of spinous process of C7 vertebra.

Figs. 2 and 3 – CT sagittal view and reconstruction of cervicothoracic spine showing fracture of spinous process at multiple levels.

involvement. Radiographs of cervical spine revealed suspected spinous process fracture of C7 vertebrae (Fig. 1). Computerized tomography (CT) revealed fractures of spinous process from C7 to D6 vertebra (Figs. 2 and 3). Magnetic resonance imaging (MRI) of cervicodorsal spine was done to confirm the findings of radiographs and CT scan, and to rule out any occult injury to the spinal cord. MRI of cervical and dorsal spine showed fractures of contiguous spinous process from C7 to D6 vertebrae (Figs. 4 and 5). In addition, there was very thin posterior epidural T1/T2 hyperintense collection seen to be extending from D3 to D8 levels suggestive of hematoma. There was no evidence of canal compromise seen. The patient was managed with rest, analgesics, and muscle relaxant initially followed by immobilization for 8 weeks duration. Patient's spine was immobilized by Philadelphia cervical collar and thoracic brace. Gradually after 8 weeks, the patient was advised to do a range of motion exercises of cervical spine. At

the 1-year follow-up, the patient is doing well without any neurological problem.

3. Discussion

Fractures of the cervical spinous processes are relatively rare injuries.^{1–3} Clay shoveler's fracture with contiguous involvement of multiple spinous processes is a rare injury with only few cases being reported in the literature (Table 1). The mechanisms of spinous process fractures can be due to direct trauma to the posterior aspect of the neck, and repetitive stresses on muscle and ligament due to shoveling by manual laborers. Though shovel load was previously common, these injuries are now rare due to earth-moving machineries. Nowadays, fall and road traffic accidents are the most likely cause of these fractures. Recently these fractures have been

(4)

(5)

Figs. 4 and 5 – MRI of cervicothoracic spine sagittal view T1w and T2w images showing fracture of spinous process at multiple levels with soft tissue edema (hematoma).

Table 1 – Review of contiguous spinous process fractures in the literature.

Author	Age/sex	Level of involvement	Mode of injury	Diagnosis	Treatment	Outcome	Remark
Akhaddar et al. ²	40/not known	T2–T8	Road traffic accident	Diagnosed on CT	Conservative, immobilization for 6 weeks	Good	More than five thoracic vertebrae
Kang and Lee ⁵	40/M	T1, 2	Golf player	Radiograph normal, diagnosed on CT	Conservative, immobilization for 8 weeks	Good at 10 months	
Kim et al. ⁶	45/F	C6, 7	Golf player	Dynamic cervical radiograph and MRI	Conservative, cervical collar for 6 weeks		
Kose ⁷	58/M	T5–T10	Road traffic accident	Radiograph normal, diagnosed on CT	Conservative, 3 months hyperextension brace	Pseudoarthroses of all the 6 spinous process at 12 months, clinically asymptomatic	
Solaroğlu et al. ³	32/M	C6, 7	Road traffic accident	Dynamic cervical radiograph and MRI	Conservative, cervical collar for 4 weeks	Good	
Umredkar et al. ¹		C6–T4	Road traffic accident	Normal radiograph; diagnosed on CT and MRI	Conservative, hard cervical collar for 4 weeks	Good	
Unay et al. ⁸	39/M	C7, T1	Osteoporosis	Diagnosed on radiograph and CT scan	Conservative, 6 weeks collar, alendronate, and long-term rest	Good at 24 months	Renal transplant on corticosteroid
Han and Sohn ⁹	34/M	C4–T8	Motorcycle accident	Diagnosed on radiograph and with CT scan and MRI	Conservative, 4 weeks with cervical collar and thoraco-lumbar brace	No union at 3 months	
Akhaddar and Mandour ¹⁰	29/F	C6–T9	Road traffic accident	(CT) scan	Conservative, 6 weeks brace	Good	
Present case	45/M	C7–D6	Road traffic accident	Diagnosed on radiograph and with CT scan and MRI	Conservative, 8 weeks Philadelphia cervical collar and thoracic brace	Good at one years	Concomitant extradural hematoma

reported due to athletic events, for e.g. volleyball and golf.^{4,5} Deceleration forces caused by the pull of the trapezius, rhomboids, and the ligamentum nuchae on the neck probably exert repetitive traction on their attachment sites to the narrow spinous processes resulting in fracture in these cases. These spinous process fractures have also been reported in osteoporotic bones and in renal transplant patients on steroid.⁸

Though radiographs fail to demonstrate an accurate view of thoracic spinous processes due to overlapping of ribs at cervicothoracic region, these fractures are best seen on lateral view X-rays. The displaced fractured spinous process of C6 or C7 mimics double spinous process on AP view and is called ghost sign. Though Clay shoveler's fractures are stable injuries, dynamic radiograph (flexion and extension views) can be performed to see for associated vertebral instability.⁶ We have not done the dynamic radiograph in our case at the time of presentation because the patient had history of road traffic accident. Rarely these fracture patterns may be unstable, so one must watch for extension of fracture line into the lamina.¹¹ Early CT scan helps in detecting disruption of the spinolaminar line, which indicates a complex spinous process fracture with extension into the lamina and spinal canal. Spinous process

fractures with spinolaminar breach may have associated posterior ligamentous injury with greater potential for delayed instability, spinal cord injury, and neurological deficit.¹² The spinolaminar fracture was not seen in the present case at any level. MRI should be performed in all these cases to rule out spinal cord involvement. There was an extradural hematoma present in our case and this could have been missed if no MRI was done. MRI can provide additional important findings, including the extensive posterior paraspinal muscular injury (edema), disruption of the supraspinous ligaments and interspinous ligament, compression fractures (marrow edema) involving multiple contiguous cervical and thoracic vertebral bodies, and extensive prevertebral edema as well as fluid (hemorrhage). MRI should be indicated if the spinous process avulsion occurs due to direct trauma. MRI may be required in suspected spinous process fracture in patients with normal radiographs, and if fracture line extends into the lamina.¹³

Because of the inherent stability of spinous process fractures, these can be treated conservatively with rest, orthotic support, analgesics and physical therapy. Brace application should be used only to control pain in the acute setting. Most of these fractures unite in due course of time.

Dynamic radiographs can be performed before mobilization of spine to see for any instability. Dynamic radiograph was not done in our case. Pseudoarthrosis of spinous processes, even at multiple levels, is a clinically insignificant entity.⁷

In conclusion, the isolated spinous process injury at multiple levels is rare. Early diagnosis with the help of CT scan and MRI is important to rule out spinolaminar fracture and injury to neural structures to avoid untoward complications.

Conflicts of interest

The authors have none to declare.

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