

Case Report & Case Series (CRP)

Multi-level isolated spinous process fractures with delayed deterioration observed radiographically: A case report



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ABSTRACT

We describe a rare case of multi-level isolated spinous process fractures not clearly detected on admission and subsequently diagnosed on radiography 2 months after traumatic injury. Early recognition of a small crack in the spinous process and treatment with rest and immobilization is crucial to prevent chronic back pain or stiffness.

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1. Introduction

Isolated spinous process avulsion fracture is typically observed in the lower cervical or upper thoracic spine [1,2]. This type of fracture is most common in manual laborers requiring forceful contraction of the trapezius and rhomboid muscles, sometimes called as clay shoveler's fracture [3]. One level isolated spinous process fractures are sometimes recognized, however, multi-level isolated spinous process fractures are very rare [1,2]. In this manuscript, we report a case of isolated spinous process fracture involving four levels in the thoracic vertebrae. This case was unique because delayed deterioration of fracture was confirmed radiographically.

2. Case report

35 year old male.

Chief complaint: Neck and thoracic back pain.

Present illness: When the patient was driving a car, the other car hit from behind. He was brought to our hospital. Glasgow coma scale (GCS) on arrival was 13 and no motor weakness was observed in four extremities. Cranial CT revealed contusional hematoma in right frontal lobe (Fig. 1A), which was treated conservatively. The patient also complained of neck and thoracic back pain. Cervical MRI (Fig. 1B, C) and CT (Fig. 1D) was performed and no apparent abnormal lesion was detected at this point. In axial image of spinal CT at the level of Th2, however, small fracture of spinous process was suspected (Fig. 1E, F).

For the neck and thoracic back pain, therefore, he was treated with analgesics and compresses. His consciousness improved gradually and the patient discharged three weeks after admission. At the time of discharge, his GCS was 15 and no motor weakness and sensory disturbance was observed in four extremities, but still complained of neck and thoracic back pain. After discharge, his neck and thoracic back pain did not improve. Two months after the accident, therefore, spinal MRI was performed again and fracture of spinous process was recognized (Fig. 2A, B). Whole spine CT was additionally performed, and spinous process fracture from Th2 to Th5 was clearly demonstrated (Fig. 2C, D, E), but no other spinal fracture was detected. We asked patient and confirmed that he did not suffer any head or thoracic back trauma after admission. This fracture was treated conservatively including the restriction of physical activity. He did not become pain free but his pain alleviated gradually. Thoracic spinal CT performed 6 months after accident demonstrated bone union of fractured spinous process (Fig. 3A, B, C).

3. Discussion

Isolated spinous process fractures are generally recognized in single vertebral level and multi-level isolated spinous process fractures are very rare. Only 10 cases have been reported in literature, which are caused by motor vehicle accidents or sports or osteoporosis [1,2]. In this case, the patient was admitted because of traffic accident, and cervical CT initially detected only small fracture of spinous process fracture, which deteriorated and spinous process fracture from Th2 to Th5 was clearly demonstrated two month after injury. To the best of our knowledge, this is the first report of multi-level isolated spinous process fractures in which delayed deterioration was confirmed radiographically. Isolated spinous process fractures are generally caused by high shear forces generated by contracting the trapezius and rhomboid

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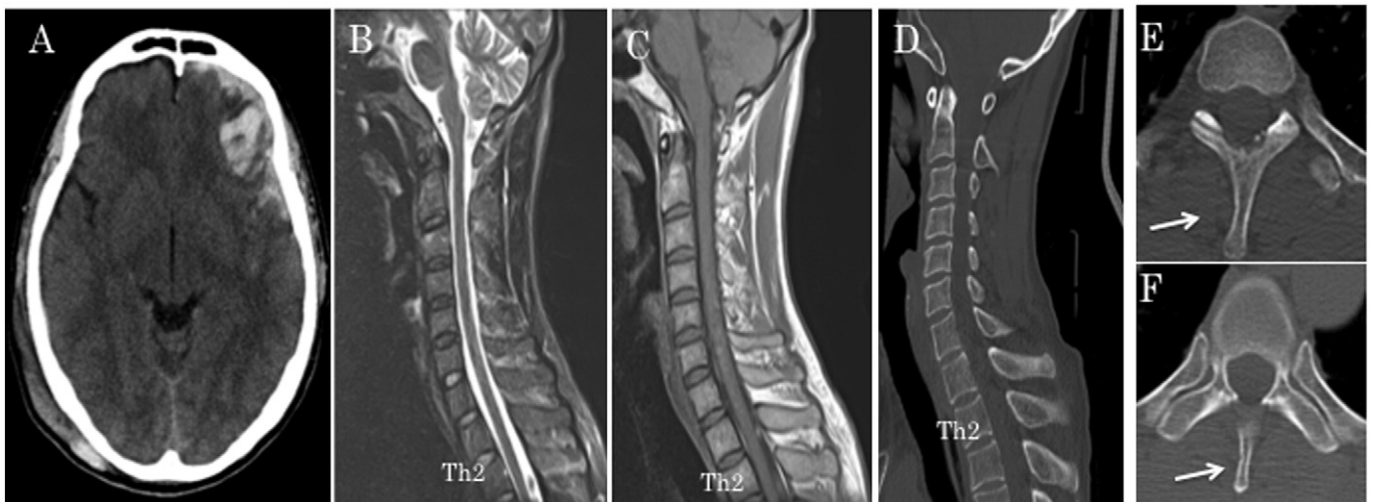


Fig. 1. Axial cranial CT image on admission demonstrating cerebral contusional hemorrhage (A). Sagittal T1, T2-weighted magnetic resonance (MR) images (B and C) and sagittal CT image of cervical spine (D) revealed no apparent lesion. In axial CT image at the level of Th2 and Th3 (E and F), a small crack in spinous process was suspected (arrow).

muscles on the lower cervical and upper thoracic spinous processes during thrusting of the neck and/or shoulders [1,2]. When an even small crack is confirmed in lower cervical or upper thoracic vertebra after trauma, deterioration of fracture may occur by shear forces generated by contracting the trapezius and rhomboid muscles. When patients after traumatic injury complain of cervical or thoracic back pain, a fracture of spinous process particularly in lower cervical and upper thoracic vertebra should be carefully investigated and even small fracture should be treated carefully with rest or immobilization.

Another unique point of this patient is that the bone union of spinous process was confirmed with the restriction of physical activity. In reported cases, immobilization of the spine usually reduces pain, but healing of the fracture does not usually occur. Gershon-Cohen et al. found osseous union only in only 7 of their 38 cases [4]. Isolated spinous process fractures are stable, although nonunion may result in chronic

cervical or thoracic back pain or stiffness. In cases of fractures that produce significant pain and temporary disability, surgical intervention is required [5].

Because conventional radiographic assessment of the thoracic posterior elements is often limited by overlying osseous and soft-tissue structures, cases of clinically suspected spinous process fracture often require CT evaluation to confirm the diagnosis. In adolescents, the apophysis at the tip of the spinous process may not be ossified and therefore not visualized on radiographs [3]. So MRI may be indicated to diagnose in clinically suspected spinous process fracture in adolescents with normal radiographs.

We first demonstrated a case of isolated multiple spinous process fracture whose delayed deterioration was confirmed. Early recognition of small crack of spinous process and treatment with rest, immobilization is important to prevent chronic back pain or stiffness.

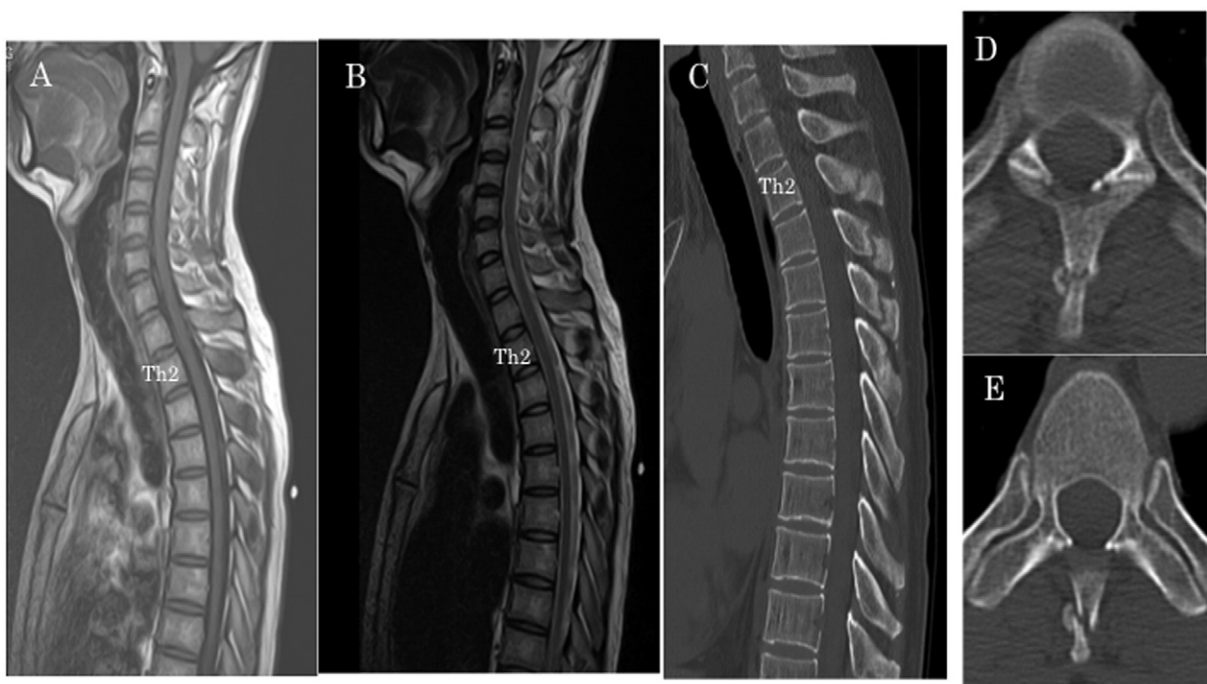


Fig. 2. Sagittal MR image of cervical spine 2 months after trauma shows spinous process fractures of Th2–4 (A: T1 weighted image, B: T2 weighted image). Spinal CT confirmed spinous process fractures of Th2–4 and no other abnormal lesion was detected (C: Sagittal image, D: Axial image at the level of Th2, E: Axial image at the level of Th3).



Fig. 3. Spinal CT 6 months after trauma demonstrating bone fusion of spinous process. (A: Sagittal image, B: Axial image at the level of Th2, C: Axial image at the level of Th3).

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