Case Report

The Danger of Failure to Recognize Injury in Cervical Spine X-ray for Trauma

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Abstract

We present a female with an acute traumatic fracture dislocation of the cervical spine. She sustained bilateral facetal dislocation at the C7/T1 junction without neurological deficit. This was not diagnosed on initial X-rays of the cervical spine. We highlight the danger of this failure and conducting dynamic X-rays in such a situation. The patient presented after 4 months and was operated upon safely with anterior/posterior fixation across the fracture site. She remains neurologically intact.

Key words: Cervical, disc prolapse, neck pain, spine trauma, spondylosis, spine, surgery

Introduction

Patients with traumatic injury to the cervical spine need to be evaluated carefully. The initial radiological investigation must be a complete cervical spine X-ray and incomplete imaging should not be accepted. This case highlights the dangers if this rule is not adhered to.

Case Report

The 43-year-old female was admitted with severe neck pain and a history of sustaining neck injury in a road traffic accident 4 months previously. She was on a motorbike that ran into a motor vehicle. She fell off the bike and walked away from the accident complaining of neck pains. The initial cervical spine X-rays performed at the local hospital [Figure 1] was reported as showing "degenerative changes" and she was discharged home with a soft cervical collar. She returned complaining of persistent severe neck pains and was diagnosed as being in "shock," suffering the "after effects of the injury."

She went to another hospital and had further imaging with computed tomography (CT), magnetic resonance imaging (MRI) scans and flexion and extension views of the cervical spine [Figures 2 and 3]. Further X-rays subsequently revealed fracture dislocation at the C7/T1 junction confirmed on both MRI and CT scans. MRI also showed an acute disc prolapse at the C7/T1 junction with significant kyphosis [Figure 4].

She was managed without surgical intervention until we saw her in a clinic, 4 months later. She had significant neck pain with a visual analog pain score of 6/10. There was no neurological deficit as she walked into the office.

She consented to surgery, and her preoperative X-rays are as shown in Figure 5. She underwent an anterior cervical discectomy and fusion at the C7/T1 level plus posterior cervical wiring from C6 to T2. She recovered well and was discharged 3 days later, without pain and in a hard cervical collar. The postoperative image is as shown in Figure 6.

Discussion

The most common causes of bilateral facet dislocation include motor vehicle accidents and direct head-loading injuries[1] due to hyperflexion injury of the neck.[1,2] A complete fracture dislocation at the cervicothoracic junction is generally accompanied by severe neurological injury.[2] Complete spinal cord lesions and quadriplegia occur in 50–84%.[3,4]

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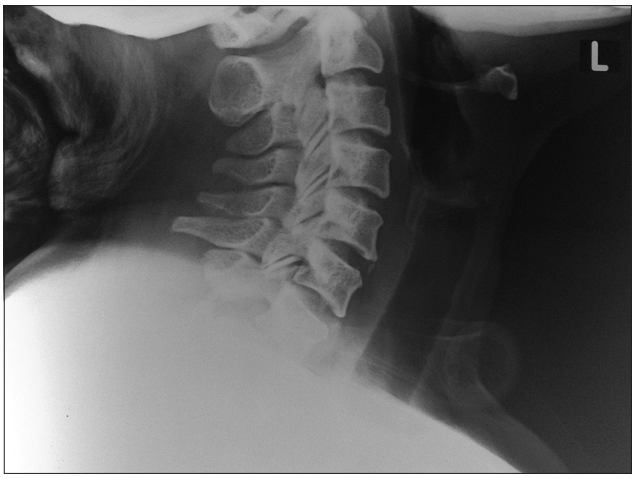

Figure 1: The initial lateral X-ray performed in August and reported as "normal" with cervical degenerative changes. The X-ray is incomplete since it did not show the C7/T1 junction but it actually shows a fracture of the C7 spinous process. The anterior-posterior view of her neck was not contributory

Figure 2: Dynamic flexion X-ray obtained demonstrating the severity of her dislocation, confirmation of the fracture of the C7 vertebra and spinous process with impending risk of complete spinal cord injury and quadriplegia

Figure 3: Dynamic X-ray of the cervical spine in extension

Figure 4: Sagittal T2 magnetic resonance imaging scan of the neck showing acute disc prolapse, compression of the spinal cord and kyphosis at the C7/T1 junction

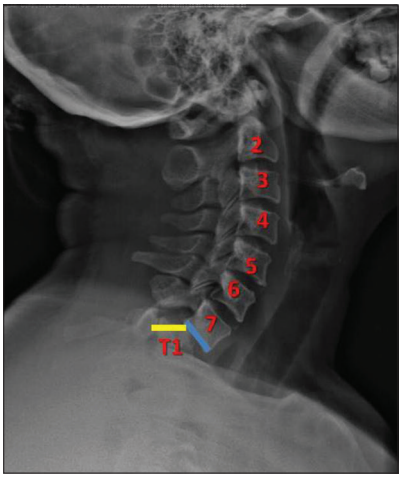

Figure 5: The preoperative image of the cervical spine at 4 months following the injury, annotated in color

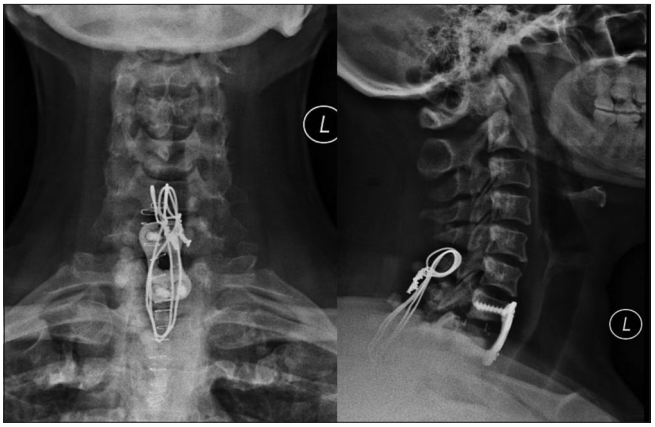

Figure 6: The postoperative X-rays of the cervical spine showing fracture fixation with plate and screws anteriorly (C7/T1) and posterior cervical wiring (C6 to T2)

Our patient suffered a significant injury following the accident. The injury suggests that she suffered acute hyperflexion injury with fracture of C7 and bifacetal dislocation. She had no neurological deficit and walked away from the accident.

Clearing the cervical spine following trauma is a very serious and important task.[5] A lateral cervical spine X-ray is obtained as an initial trauma series X-ray. Unstable cervical spine injuries will be detected about 80% of the time with this single view.[6] Other views including anterior-posterior view, open mouth, and swimmers view serve to provide further information.

Of note, some unstable injuries are not seen with routine X-rays, so spine immobilization is necessary whenever significant force could have caused an injury and maintained until complete evaluation after initial resuscitation.[5] Plain cervical spine X-rays are inadequate to fully evaluate the cervical spine after blunt trauma, and supplemental CT is commonly required. Complete cervical spine CT is available, efficient, and accurate.[7]

Radiographic clearance for injury must be provided accurately.[8] Neglected spinal injuries are injuries not treated in a timely fashion ARE found late when options are limited. They can go undiagnosed if radiographs are not available, incomplete or are misread, if a radiograph fails to demonstrate a lesion properly, or if the patient has had multiple traumas or is unconscious and intoxicated.[3]

This case is unusual because highly detrimental effects such as quadriplegia are expected with such extreme subluxation as presented by our patient. The patient presented with signs of impending and imminent neurological injury. She describes feeling of heaviness all over the body on removing her hard cervical collar. She was also doing physiotherapy exercises with her broken neck. In effect, she was not being properly managed with strict immobilization of the fracture.

This was a potentially calamitous decision as she could have easily suffered significant spinal cord injury. In treating patients with cervicothoracic problems, one should do careful clinical and radiologic survey to avoid missed or delayed diagnoses.[5,7]

The initial lateral X-ray of the cervical spine obtained in trauma is incomplete unless it actually shows the C7/T1 junction. That was not the case in this patient. The fact that the patient returned still complaining of significant neck pain should have set alarm bells ringing and called for a CT scan of the neck for definitive evaluation of the cervical spine.

Flexion and extension views of the cervical spine should not be performed on patients with unstable cervical spine fractures. Flexion and extension X-rays are ordered only in patients with no obvious fractures or dislocation to detect patients with possible ligamentous injuries. The availability of MRI and CT means that dynamic cervical spine X-rays have little utility.[5] Cervical CT scan is the most efficient imaging tool in detecting skeletal injuries, showing a sensitivity of 100%.[5]

Previous authors have reported cases of thoracic fracture dislocation that remained neurologically intact and discussed 11 other previously published well-documented cases.[4] In cases in which bilateral pedicle fractures occur at the site of significant thoracic subluxation and/or translation, preservation of the spinal canal and spinal cord neurological function can rarely occur.[9]

Many different surgical procedures have been employed in the treatment of fracture dislocation at the middle to lower cervical spine. Unilateral and bilateral facet fracture subluxations may be surgically stabilized by anterior cervical discectomy, fusion, and plating, posterior instrumentation, or both.[8,10] The first step in the surgical management is an anterior cervical discectomy and allograft fusion with plating.[3] If necessary, internal fixation can be performed with some or no reduction in deformity, especially if the anatomic reduction will require forces that put neurological function at risk.[4]

We must also mention the risk due to potential difficult intubation in such patients. Manipulation of the neck could lead to further neurological injury. The way out in these situations is intubation with in-line stabilization of the neck and careful extension during intubation. An advanced way out is also the use of fiber optic intubation device which allows the anesthetist to avoid neck manipulation.

Conclusion

The cervical spine is injured in 3% of major trauma patients, and such injury constitutes a major cause of morbidity.[7,9] Therefore, lack of neurological deficit is uncommon and only rarely reported. This is a report of such a condition in Nigeria.

Cervical spine X-rays are anteroposterior, lateral and open mouth views and need to be reviewed by an experienced radiologist. The consequences of a missed "significant" injury can be devastating for the patient and can create potential medical-legal consequences for involved physicians. The role of CT scan of the cervical spine in significant trauma cases cannot be overemphasized.

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Conflicts of interest

There are no conflicts of interest.

References

1. Ivancic PC, Pearson AM, Tominaga Y, Simpson AK, Yue JJ, Panjabi MM. Mechanism of cervical spinal cord injury during bilateral facet dislocation. Spine (Phila Pa 1976) 2007;32:2467-73.
2. Kim SW, Ciccarelli JM, Fedder IL. Bilateral cervical facet dislocation without neurological injury. Orthopedics 2004;27:1297-8.
3. Chakravarthy V, Mullin JP, Abbott EE, Anderson J, Benzel EC. Neurologically intact patient following bilateral facet dislocation: Case report and review of literature. Ochsner J 2014;14:108-11.
4. Shapiro S, Abel T, Rodgers RB. Traumatic thoracic spinal fracture dislocation with minimal or no cord injury. Report of four cases and review of the literature. J Neurosurg 2002;96 3 Suppl: 333-7.

5. Platzer P, Jaindl M, Thalhammer G, Dittrich S, Wieland T, Vecsei V, *et al.* Clearing the cervical spine in critically injured patients: A comprehensive C-spine protocol to avoid unnecessary delays in diagnosis. Eur Spine J 2006;15:1801-10.
6. Mirvis SE, Shanmuganathan K. Trauma radiology: Part V. Imaging of acute cervical spine trauma. J Intensive Care Med 1995;10:15-33.
7. Gale SC, Gracias VH, Reilly PM, Schwab CW. The inefficiency of plain radiography to evaluate the cervical spine after blunt trauma. J Trauma 2005;59:1121-5.
8. Song KJ, Lee KB. Posterior reduction/fusion followed by anterior decompression/fusion of unreduced bilateral facet fracture-dislocation in the lower cervical trauma. Neurosurg Q 2008;18:109-14.
9. Baker RP, Grubb RL Jr. Complete fracture-dislocation of cervical spine without permanent neurological sequelae. Case report. J Neurosurg 1983;58:760-2.
10. Menku A, Kurtsoy A, Tucer B, Oktem IS, Akdemir H. The surgical management of traumatic C6-C7 spondyloptosis in a patient without neurological deficits. Minim Invasive Neurosurg 2004;47:242-4.