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KEY POINTS

- Injuries to the cervical spine occur in 2-6% of blunt trauma
- Current algorithms involve clinical judgment and exam to identify indicated imaging
- MRI is probably cost effective in patients who are obtunded or patients with continued cervicalgia

Injuries to cervical spine occur in 2%-6% of blunt trauma patients.^{1,2} The major injury type is fractures with ligamentous injury being less common.² There are currently two clinical algorithms to aid in diagnosing cervical spine injury, which are the Canadian C-spine rule and the National Emergency X-Radiography Utilization Study (NEXUS).^{3,4} The algorithms both utilize clinical judgment and exam to decide whether further imaging is required. Back in 2009, the Eastern Association for Surgery of Trauma (EAST) issued guidelines that state CT scan should be used over plain film radiography for clearance of C-spine.^{5,6}

Recent discussion has raised the idea that cervical MRI should be used in certain patients with a "negative" CT scan. Recent literature points to mainly two populations of patients that MRI would be recommended. First, the obtunded trauma patient. Second, the non-obtunded trauma patient with continued cervicalgia.^{7,8} MRI may be useful in this population since a CT scan accurately detects bony injuries, but may not identify all soft tissue injuries.⁸

Outside of injury to all three ligamentous columns (which is well known to be an unstable spine), the clinical significance of MRI in blunt trauma patients is not clear.⁸ The recent discussion on use of MRI to detect cervical injuries is because an unidentified isolated ligamentous or vertebral disc injury may result in permanent neurological deficits. The US lifetime estimated cost for both health care and living expenses range from 3.4 to 4.7 million in 2015 dollars for a 25-year old patient who develops cervical spine injury.⁸⁻¹⁰ Multiple studies have shown that MRI detected additional



injuries in patients with a "negative" CT scan who were obtunded or who had persistent cervicalgia and concluded that the significance or change in management of these patients were very small. Maung et al found that in patients with no neurological symptoms with a cervicalgia and a negative CT Scan, 13.8% had a ligamentous injury and 1.2% had a vertebral disc injury (compared to 24.8% and 0% with neurologic symptoms).⁸ In unobtainable patients with a negative CT Scan and no neurologic symptoms, they found that 17.1% had a ligamentous injury and 0.8% had a vertebral disc injury (compared to 12.0% and 12.0% in those with neurologic symptoms).⁸ Another study showed that the cost of 5000 MRIs on obtunded patients was equal to the cost of providing care for one quadriplegic patient.⁹ This number far exceeds the number needed to treat of 21 described in the study.⁹

The cost of MRI even though expensive should still be considered in specific situations given the fact that becoming a quadriplegic is catastrophic and drastically changes the quality of life for the patient and their family. An unanswered question is whether CT scanning can be used for ligamentous injuries as the quality of CT scans continue to improve. Further studies are needed to define when to use MRI to identify specific injuries that require treatment and delineating acceptable rates of missed injuries only detectable by MRI at this time.

References

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