CLINICAL VIGNETTE

When is Treatment Worse than the Cure?

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Case Report

An 87-year-old generally healthy and vigorous man presented to the ED with neck pain for one week. Symptoms began acutely after he slipped off a chair while bending over to adjust the pedal on his stationary cycle. He had no head injury or loss of consciousness and was able to get up unassisted. He had gone about his usual activities during the week after injury and had no symptoms other than a "wrenched" neck. Past medical history was significant only for mild hypertension and prostate cancer treated with radical prostatectomy 17 years prior, with no biochemical evidence of recurrence.

Physical examination was unremarkable except for decreased range of head and neck motion and tenderness to palpation of the neck musculature. There were no neurologic deficits. CT imaging revealed a fracture of the odontoid process of the C2 vertebra with 3 mm subluxation. MRI/MRA showed no compromise of the vertebral vessels and no acute intracranial process.

The patient was hospitalized and neurosurgery recommended non-operative management with a rigid cervical/thoracic brace for an estimated period of six months. He was given pain medication, fitted with the brace, and discharged home two days later. Because of the imposed reduced mobility of upper body and head, the patient, who previously had been completely independent in all ADLs, required assistance in bathing, dressing, eating, ambulation, and other activities. He was unable to sleep in supine or side posture and required an adjustable hospital bed. He was unable to drive. His 88-year-old wife could not physically provide all assistance, necessitating hiring a private pay caregiver to supplement the twice weekly home health visits covered by the patient's insurance.

Two weeks after discharge the patient developed a MRSA cellulitis and decubitus on his mid-back from friction of the brace. Antibiotic treatment was initiated and nursing began home visits for wound care. To relieve pressure and improve fit, the cervical/thoracic brace was exchanged for a longer and more rigid cervical/thoracic/lumbar brace, further reducing the patient's mobility from head to pelvis. Balance and walking became more difficult, and he had three falls, without injury but requiring the assistance of neighbors and paramedics to get up. He began using a wheel chair for safety and became increasingly sedentary and physically deconditioned. Weakness and wheelchair confinement potentiated urinary and fecal incontinence. He developed bilateral ischial decubiti requiring additional wound care.

Four months after discharge the patient became febrile and lethargic. He presented to the ED and was found to be in atrial fibrillation with chest xray showing pneumonia. He was admitted for treatment with antiarrythmics and antibiotics. Overnight he became hypotensive and bradycardic and was transferred to the ICU for pressors and management of septicemia. His cardiac rhythm deteriorated and he died in asystole, still strapped in his CTL brace. Cardiac resuscitation was not attempted in keeping with his advance directives, confirmed at time of hospitalization.

Discussion

Fractures of the second cervical vertebra account for approximately 20% of all spinal fractures and 55% of cervical fractures.[1] The majority of these are either odontoid (35-78%) or hangman's (11-25%) fracture. Type II odontoid fracture, the most common, occurs at the base of the odontoid between the transverse ligament and the C2 vertebral body. Hangman's fracture[2] is a bilateral fracture traversing the pars interarticularis of C2 causing subluxation of C2 onto C3 and implies a hyperextension and distraction injury, as occurs in a hanging. Among the young the odontoid fracture commonly results from high energy trauma, including motor vehicle or diving accidents. Among older persons with reduced bone density the injury commonly occurs from low energy trauma, such as a fall from standing height causing hyperflexion or hyperextension of the neck and posterior displacement of the odontoid.[3]

Odontoid fractures are considered relatively unstable and often result in atlantoaxial instability. Treatment options are either conservative or surgical. Conservative treatment includes immobilization in a cervical collar or halo vest. Surgical management includes anterior odontoid screw fixation or posterior C1-C2 instrumentation with fusion. Indications for surgical management include neurological deficit, an unstable subaxial spine injury, and symptomatic nonunion.[4]

Optimal management among the elderly remains controversial considering the risks of surgical intervention versus the morbidity associated with prolonged cervical immobilization.

Elderly patients with Type II dens fractures may present with minimal symptoms. Their only complaint may be posterior neck pain and they may have no motor or sensory deficits. However, because of risk of progressive myelopathy or sudden neurologic injury, operative stabilization may be recommended.

Regardless of treatment, older patients sustaining odontoid fractures have increased morbidity and mortality.[5] Nonunion rate may be as high as 85% and mortality may approach 60%.[6] Choice of management can affect mortality. Schoenfeld found mortality in the operative group to be 11% at 3 months and 21% at 1 year compared to 25% and 36%, respectively, in the non-operative group.[7] Younger patients fared better than older, with hazard ratios of 0.4 (65-74 years), 0.8 (75-84 years), and 1.9 (>85 years). Complications, however, may be higher in surgically managed elderly patients. Smith found that 62% of those in an operative group had at least one significant complication compared to 35% in the non-operative group.[8]

Fracture healing is low in all older patients regardless of treatment type. Mollinari showed only 28% of patients in an operative group demonstrated radiographic healing across the fracture site versus 6% in the nonoperative group.[9]

For older individuals it may be appropriate to consider less aggressive treatment with outcome goals other than osseous fusion. Medical interventions can disproportionately affect an older person's independence and function, including the need to enlist an extra person to assist in care, from basic activities (bathing, dressing, toileting, feeding) to higher levels of function (mobility, shopping, travel). What are the alternatives to treatment and what are the risks/benefits? What would the 86-year-old man in this case have elected if he knew the potential morbidity of treatment versus the morbidity of non- or lesser treatment? Should the goals of treatment have been re-evaluated and altered as he began to experience adverse effects? Choice of treatment should be shared decision making and remain consistent with an individual patient's values throughout treatment.

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