

Management of a stable atlas fracture in a patient with comorbid schizophrenia and alcohol use disorder

Abstract

To our knowledge, there are no existing case reports documenting how to treat a fracture of the high cervical spine in a nonadherent patient. In this case report, we present an adult male with longstanding diagnoses of schizophrenia and alcohol use disorder who originally presented with neck pain after a fall due to alcohol intoxication. He had already been placed in a cervical neck brace (C-collar) at presentation. Preliminary imaging revealed a fracture of the left lateral mass of C1 extending into the left transverse process of the odontoid, without significant widening of the joint, no involvement of the dens, and no vascular compromise. The C-collar remained in place and the patient was transferred to the intensive care unit (ICU) for monitoring of his fracture and alcohol withdrawal. The patient was admitted to the psychiatric unit nine days later through an involuntary hold to ensure proper initial care for the atlas fracture and address his primary psychotic disorder. The patient was ultimately lost to follow up.

Because of the sensitive nature of the fracture, and the nonadherence of the patient due to his comorbid schizophrenia and alcohol use, orthopedic surgeons instituted a unique care plan to best suit this individual patient's needs. In the management of stable high cervical fractures in patients with questionable adherence, conservative measures are more safe, plausible, and effective than surgical intervention.

Keywords: alcoholic intoxication, cervical vertebrae, patient compliance, psychotic disorders, schizophrenia, spinal fractures

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Rachel McDonald,¹ Lewis Tian,¹ Dirk Alander,² William Newman³

¹Saint Louis University Hospital, USA

²Department of Orthopedic Surgery, Saint Louis University Hospital, USA

³Department of Psychiatry, Saint Louis University Hospital, USA

Correspondence: William Newman, Department of Psychiatry, Saint Louis University Hospital, 1438 South Grand Blvd, Saint Louis, MO 63104, USA, (+1) 314-977-4826, Email wjnewmanmd@gmail.com

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Introduction

In this case report, we present the case of an adult male with longstanding schizophrenia and alcohol use disorder who arrived intoxicated with a C1 spinal fracture to Saint Louis University Hospital emergency department (SLUH ED). Unsure how to manage this type of injury in patients who were nonadherent, did not have decision-making capacity, and/or were a danger to them, caregivers consulted orthopedics. Together, they decided the best course would be to forego surgery and treat the fracture conservatively. Soft and semi-rigid collars are best used for stable fractures, but these C-collars must be worn until the fracture heals or fuses, which ranges from four weeks to six months.¹ It is the conservative option that necessitates close monitoring and follow-up, as surgical solutions tend to heal more quickly. Although scant literature does exist on the development of psychosis in relation to alcohol use disorder² and orthopedic orthoses^{3,4}, there is no literature to be found regarding the spinal care of patients with a primary psychotic disorder.

Many physicians and other medical professionals report challenges with treating psychiatric patients on non-psychiatric hospital services. Unfortunately, this has contributed to the stigmatization of patients with primary psychiatric disorders, causing additional problems in caring for these patients. The existing stigma has repeatedly been shown to result in individuals with mental health issues having more trouble accessing optimal health care.^{5,6} However, there are practical issues related to mental health and substance use issues that must be considered. We present an example of that in this case.

Case report

Mr. A was a 52-year old Caucasian male with longstanding schizophrenia and alcohol use disorder who initially presented to the ED of SLUH, a Level I trauma center, via emergency medical services (EMS) from an outside hospital (OSH) with neck pain, a C-collar in place, and acute alcohol intoxication. Per the patient and the OSH records, he had sustained a fall in which he did not lose consciousness and walked into their ED with a friend's assistance. Imaging and blood work at the OSH revealed an atlas fracture and a blood ethanol level of 349 mg/dL, respectively. Shortly after transfer, Mr. A sustained two witnessed generalized tonic-clonic seizures, each lasting for approximately two minutes. He became more agitated after the seizures, attempting to remove his C-collar and peripheral access lines, and required restraint. He was admitted to the trauma ICU for monitoring of his fracture with alcohol withdrawal precautions in place.

Upon admission, the treating providers noted that Mr. A's airway was intact and his breathing was appropriate. A C-collar was in place and the patient was conscious without any acute distress. His Glasgow coma scale (GCS) score was 15 and revised Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar) score was >15. Scores >8-10 generally require medication for alcohol withdrawal syndrome [AWS].⁷

Mr. A remained neurologically intact throughout the interview but was notably paranoid and tangential with flight of ideas. He

discussed several delusional beliefs including the removal of several of his internal organs (including his liver), “saturation” with multiple psychiatric drugs by the government, and a conspiracy between former ex-presidents Clinton and Reagan with local police to reduce his “wealth exponent index” and prevent his graduation from law school by having him “institutionalized.” He also endorsed daily, heavy alcohol and tobacco use.

On local examination of the head and neck, the patient had an abrasion of the midline hairline on his forehead without appreciable ecchymosis, laceration or hematoma. The cervical spine was tender to palpation. Palpation of the thoracic and lumbar spine revealed no palpable step-offs or tenderness. There was an old bruise to the right hip, but the physical exam was otherwise normal.

Blood tests performed on admission to SLUH ED revealed several abnormalities (Table 1). White count and coagulation studies were within normal limits. Initial electrocardiogram (EKG) was unremarkable; although subsequent EKGs performed on day 4 and 6 demonstrated prolonged QTc intervals of 498 and 549ms respectively, thus delaying valproate administration.

Table 1 Pertinent laboratory findings on admission to SLUH ED

	SLUH values	OSH values
Alkaline phosphatase	162U/L(H)	
AST	180U/L(H)	
K ⁺	3.1mmol/L(L)	
Mg ²⁺	1.5mg/dL(L)	
RBC	3.61x10 ⁶ /L(L)	
Hemoglobin	12.7g/dL	
Hematocrit	36.50%	
Platelets	44000/ μ L(LL)	
Ethanol	194mg/dL(H)	349mg/dL(HH)

*L, low; LL, very low; H, high; HH, very high

Per the OSH, a CT spine without contrast showed a C1 fracture; this was confirmed upon arrival with an additional CT. The CT showed a fracture of the left lateral mass of C1. The fracture extended into the left foramen transversarium, left transverse process, and left aspect of the posterior arch of C1 and into the articulation between the left lateral mass of C1 on the left odontoid process. Significant widening of the joint was not appreciated by radiology or orthopedists on imaging. Radiology suggested a CT angiogram (CTA) be performed for further evaluation if clinically indicated; the OSH performed a CTA that revealed no vascular involvement thus a repeat CTA was not performed.

Mr. A remained in the ICU initially for one full day before being transferred to a medical floor. However, he became increasingly agitated on the floor with a CIWA score >15 and was transferred back to the ICU after two days. Mr. A spent three additional days in the ICU, and three additional days on a medical floor after that. At this point, he was transferred to the psychiatric unit for a 96-hour involuntary hold until a court hearing could be scheduled (primarily for the evaluation of Mr. A's insight into his psychiatric illnesses and spinal injury). A judge ultimately granted a 21-day involuntary hold due to the potential for self-harm associated with the patient's suspect

judgment and poor insight into his spinal injury. Of note, the judge carefully considered the evidence that Mr. A's mental health and substance use issues impaired his ability to adequately care for his neck injury outside of the hospital and agreed with caregivers.

Generally-within reasonable, defined parameters-if the joint congruity of both the occipital-C1 and the C1-C2 joints are present and the transverse ligament protecting the dens is preserved, then non-operative treatment can be accomplished using a cervicothoracic orthotic brace. However, management options are not always clear-cut, and treatment must be tailored to the patient and their circumstances. Stable fractures at this level can be treated with bracing but require close monitoring of the fracture position, compliance of brace wear, and medical management of the underlying psychiatric condition(s).

Mr. A maintained his C-collar for the entirety of his stay at the hospital (31 days). Psychiatry conducted a family meeting to discuss rehab and the importance of sobriety, especially given his recent neck injury and risk of re-injury. Follow-up and medication adherence were also discussed, after which Mr. A was discharged to the care of his father and brother.

This patient was lost to follow-up. Prior to discharge from the psychiatric unit, an inter-professional team meeting provided Mr. A and his family with instructions for follow-up and care of both his psychiatric and medical illnesses. Mr. A was scheduled for follow-up with orthopedics approximately 45 days after his initial presentation to SLUH ED (two weeks post-discharge); he did not maintain this appointment. He was also instructed to schedule a follow-up psychiatric appointment at a local free clinic, but the clinic has no record of our patient.

Discussion

The literature regarding management of high cervical spine fractures is extensive and well-studied by the orthopedic and neurosurgical specialties, except in the population of patients with psychiatric comorbidities. There is little to no literature regarding the management of *any* type of cervical spinal fracture in a nonadherent patient population with mental health issues.

In this case report, orthopedic surgeons deemed Mr. A's fracture stable enough to be treated non-operatively, but chronic schizophrenia and alcohol use complicated the care of his fracture by exacerbating nonadherence of brace care. Medical management should ensure compliance with needed medications for psychiatric illness, but physicians should be wary of adverse reactions-specifically, drug interactions with pain medication—and the additional stressors on the patient due to bracing.

Maintaining brace wear is extremely important when treating these patients non-operatively due to the risk of mortality, especially within the first six weeks of injury. Reinforcement of the brace's necessity, along with close supervision while an inpatient, can help form good brace care habits. More restrictive bracing is required for individuals who cannot or will not wear their brace. These options include: a hard brace covered in fiberglass to prevent removal or a halo ring and vest. If the individual lacks decision-making capacity, he or she can be held involuntarily and maintain a non-permanent rigid collar. Many patients will acclimate to the collar within a few weeks and become less inclined to remove it. The collar should be worn for 8-12 weeks depending on clinical symptoms. Patients should be seen and radiographed weekly for the first 3-4 weeks, and then monthly until

10-12 weeks post-injury or until there is clinical evidence of healing. A vast majority of patients will recover with few sequelae if the fracture is held stable while healing.

The prevalence of substance use disorders in individuals with chronic medical conditions is rising. The importance of this statistic relates to the problems incurred by the dual diagnoses. There are four major issues: complicated clinical evaluation of medical disease secondary to psychiatric disorder; focus on a primary medical concern may decrease detection of a primary psychiatric disorder; dual treatment may be difficult to administer or have pharmacologic contraindications; and lastly, psychiatric disorders increase inpatient stays and healthcare costs.^{8,9}

The prevalence of substance use disorders has also been rising within the population of individuals with severe psychiatric disorders.¹⁰ However, individuals with *any* chronic condition and comorbid substance use disorders have been shown to require more frequent inpatient treatment for their dual diagnoses, thus consistently incurring higher healthcare costs than individuals with a single diagnosis.⁸ But when the chronic condition is a primary psychiatric disorder, both diagnoses further negatively affect the healthcare received; the chronic mental illness is more challenging to treat while the substance use disorder is being co-treated and there continue to be poor outcomes associated with the treatment of the dual disorders. Furthermore, patient stigmatization may occur, and multiple diagnoses may contribute to nonadherence, aggression, and negativity toward healthcare workers. It is also more likely for females with both conditions to contract sexually transmitted infections (STIs) or HIV/AIDS, or be victims of violence,¹⁰ further exacerbating the issues surrounding care for individuals with multiple diagnoses.

Conclusions

In the setting of medical patients with comorbid psychiatric diagnoses, psychiatric considerations should play an integral role in the medical decision-making process. Primary teams for these complicated patients should have a low threshold for consulting psychiatry, so that these considerations may be taken into account with best practices in order to achieve optimal patient care. It is our ultimate goal to encourage more providers to share their experiences dealing with challenging medical problems in the setting of combined mental illness and substance use issues, and we hope this report can be a stepping-stone for caregivers who find themselves in similar healthcare predicaments.

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Conflicts of interest

Author declares that there is no conflict of interest.

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