Review of Medicolegal Cases for Cauda Equina Syndrome: What Factors Lead to an Adverse Outcome for the Provider?

ELDRA W. DANIELS, BS; ZACHARY GORDON, MD; KEISHA FRENCH, BS; URI M. AHN, MD; NICHOLAS U. AHN, MD

abstract

Full article available online at ORTHOSuperSite.com. Search: 20120222-15

Cauda equina syndrome is 1 of a few true surgical emergencies involving the lumbar spine. Although treatment within 48 hours has been found to correlate with improved outcomes, recovery of bowel and bladder control does not always occur, and loss of these functions can be distressing to patients. An understanding of factors affecting the legal outcome can aid the clinician in determining risk management for medicolegal cases of cauda equina syndrome.

This study is a retrospective analysis of medicolegal cases involving cauda equina syndrome. The LexisNexis Academic legal search database was used to obtain medicolegal cases of cauda equina syndrome to determine risk factors for adverse decisions for the provider. Outcomes data on trial verdicts were collected, as were associated penalties. Case data were also compiled on age, sex, initial presentation site, initial diagnosis, whether a rectal examination was performed, time to consultation with a specialist, time to completion of advanced imaging study, time to surgery, and neurosurgical vs orthopedic consultation. Based on our study of court cases involving cauda equina syndrome, a positive association was found between time to surgery >48 hours and an adverse decision ($P<.05$). The actual degree of functional loss did not appear to affect the verdicts. Because 26.7% of the cases involved an initial presentation that included loss of bowel or bladder control, this study emphasizes the importance of cautioning all patients with spinal complaints of the potential risk for cauda equina syndrome.

Mr Daniels, Drs Gordon and Ahn (Nicholas), and Ms French are from the Department of Orthopaedic Surgery, University Hospitals Case Medical Center, Case Western Reserve University School of Medicine, Cleveland, Ohio; Dr Ahn (Uri) is from New Hampshire Spine Institute, Bedford, New Hampshire; Mr Daniels is also from Howard University College of Medicine, Washington, DC; and Ms French is also from SUNY Upstate Medical University, Syracuse, New York.

Mr Daniels, Drs Gordon, Ahn (Uri), and Ahn (Nicholas), and Ms French have no relevant financial relationships to disclose.

The authors thank Ms Nina McLaughlin and Ms Leslie Henry for their help with researching and acquiring the cases reviewed in this article.

Correspondence should be addressed to: Nicholas U. Ahn, MD, Department of Orthopaedic Surgery, University Hospitals Case Medical Center, Case Western Reserve University, 11100 Euclid Ave, Cleveland, OH 44106 (nicholas.ahn@uhhospitals.org).

doi: 10.3928/01477447-20120222-15

Cauda equina syndrome is a severe neurological disorder caused by compression due to extrinsic pressure on the terminal portion of the neural axon.[1] This disease process can be caused by any entity exerting pressure on the cauda equina, including herniated disks, hematomas, tumors, infections, or fractures. Clinical presentation may include low back pain, bilateral leg pain, saddle anesthesia, motor weakness, sensory deficit, and bladder or bowel incontinence. Mixter and Barr[2] first described this neurological disorder in 1934. Although no precise definition exists, most authors define cauda equina syndrome only when bladder dysfunction is present in the patient.[3,4] Most importantly, cauda equina syndrome may result in permanent bladder or bowel incontinence; therefore, it is considered a true surgical emergency and may be 1 of the few absolute indications for surgical treatment of a patient with a ruptured lumbar disk.[1,3,4]

Cauda equina syndrome is a relatively rare condition, comprising between 1% and 6% of all lumbar herniations undergoing surgical treatment.[4,5] Despite this low incidence, cauda equina syndrome continues to be a condition with a disproportionately high medicolegal profile.[6] Medical negligence can be due to a failure to document a patient's symptoms, signs, or progression; failure to complete a thorough physical examination as well as rectal examination; failure to diagnosis cauda equina syndrome; failure to obtain emergency imaging, consultation, or referral once a patient is diagnosed with cauda equina syndrome; and discharging a patient without ruling out the presence of cauda equina syndrome. Treatment within a 48-hour period has been found to correlate with improved outcomes.[1,7] Despite this, patients who receive the most expeditious treatment may be left with permanent neurological deficits causing a degree of disability and dependency that may motivate the patient and their lawyer to prove negligence and obtain redress. Litigation is common when a patient has persistent residual symptoms, especially if the likely outcome has not been fully explained and understood by the patient.[8]

Previous studies in the United Kingdom have demonstrated that between 2003 and 2007, the total payout for medical malpractice in cauda equina syndrome was £6,720,000 ($10,748,018.43), with £759,000 ($1,213,950.30) as the largest settlement.[6] Such substantial costs are a reflection of the damaging and distressing nature of the disease. These statistics also indicate the vital importance of correctly diagnosing cauda equina syndrome. Literature detailing why surgeons and institutions are sued is rare. To our knowledge, no previous study has investigated the total medical malpractice payout involving cauda equina syndrome in the United States. The purpose of this study was to determine risk factors for adverse decisions in medicolegal cases of cauda equina syndrome.

MATERIALS AND METHODS

The LexisNexis Academic legal search database was used to identify state and federal cases involving cauda equina syndrome. LexisNexis Academic is a database that compiles primary and secondary source material in the forms of law, statutes, and law reviews.[9] It offers information on US Supreme Court decisions from January 1790 to the present, all federal laws from 1988 to the present, and state court decisions at all court levels for all 50 states and territories.[9] The following terms were searched: *cauda equina syndrome*, *neurogenic bladder*, and *neurogenic bowel*. These searches yielded a total of 104 lawsuits in which each federal and state case report was individually reviewed. All cases included in this review had an obvious timeline of the presenting illness and its treatment course. Cases that did not pertain to cauda equina syndrome, did not contain sufficient background information, or involved Social Security disability or lawsuits against employers were excluded from this study.

A total of 15 lawsuits were identified that contained adequate background information and appropriate timeline of the presenting illness along with treatment. Each of the 15 cases were lawsuits filed against treating physicians for the management of cauda equina syndrome, with lawsuit dates ranging between September 1983 and May 2010. Case data were compiled on age, sex, initial presentation site, initial diagnosis, whether a rectal examination was performed, time to consultation with a specialist, time to completion of advanced imaging study, time to surgery, and neurosurgical vs orthopedic consultation. Outcomes data on trial verdicts were collected, as were associated penalties. Although uniform in structure, each case varied considerably in how much detailed medical evidence and facts were presented.

Univariate logistic regression analyses were performed to determine the association between adverse decisions and case data. Linear regression analyses were performed to determine the association between the penalties and case data as well. Significance was determined as $P<.05$ for each linear combination.

RESULTS

Table 1 demonstrates the complete list of cases reviewed in this study. Of the 15 lawsuits filed against physicians, 6 were in favor of the plaintiff, with a mean award of $1.57 million (range, $230,000-$7,502,674). Table 2 specifies the category distribution of cases excluded from the study. Table 3 demonstrates the comparison between plaintiff verdicts and defendant verdicts in regard to sex and surgical specialty consultation distribution along with mean age, time to operating room, time to advanced imaging, and time to consult. Univariate linear regression demonstrated no significant relationship between verdict and age ($P=.58$) or sex ($P=.84$). Permanent bowel or bladder dysfunction occurred in 83.3% of plaintiff cases and 63% of defendant cases; how-

Table 1A

Cases Reviewed

Case	Patient Sex/ Age, y	Initial Setting	Initial Presentation	Initial Diagnosis	Time to Consult	Time to Imaging	Time to OR	Rectal Exam	Specialty	Outcome	Complaint	Verdict
Rutledge & Rutledge v USA	F/43	Out clinic	Loss of sensation in groin	Sciatica	31 d	31 d	31 d	No	Ortho	Permanent neurological and genitourinary injuries	Failure to diagnose correctly; no immediate referral to specialist	Plaintiff: $7,502,674
Owen v USA	M/34	ER	Back pain, leg numbness, leg pain	Lumbosacral strain and radiculitis	1 d	23 h	30 h	No	Ortho	Lower-extremity numbness; bowel, bladder, and sexual dysfunction	Failure to meet standard of care (delayed diagnosis)	Plaintiff: $500,000
Dollard v Allen, Whip	F/32	Out clinic	Back pain and numbness in buttocks	NA	1 d	4 d	5 d	No	Ortho	No sequelae	Failure to meet standard of care	Defendant
Jimerson v USA	M/NA	ER	Inability to walk, numbness and pain radiating from back to legs and feet	Prolapsed disk	1 d	1 d	36 h	NA	NS	NA	Failure to diagnose and delay in advanced imaging	Defendant
Kling & Kling v Disclafani	M/NA	Hospital inpatient	Difficulty urinating	Urinary problems resulted from preexisting condition	NA	4 h	9 h	No	NS	Chronic pain, impotence, and urinary dysfunction	Failure to diagnose in timely manner	Defendant
Skrzypchak & Skrzypchak v Jensen	M/NA	ER	Lower back pain, tingling in legs and trouble urinating	NA	<24 h	<24 h	2 d	NA	NS	Neurogenic bladder	Failure to diagnose in timely manner	Plaintiff: $1,000,000
Stitt v Dept of Corrections State of Georgia	F/NA	Out clinic	Numbness in hip and groin	Malingering	65 d	65 d	65 d	No	NA	Neurogenic bowel and bladder	Failure to diagnose in timely manner	Plaintiff: $880,000
Harty v Lenci	F/NA	ER	NA	Cauda equina syndrome	<3 h	<1 h	3.5 h	NA	NA	Permanent injuries	Failure to diagnose and delay in initiation of surgery	Defendant
Jarret v Midstate Radiology	F/NA	ER	Severe back pain, inability to urinate, bowel dysfunction	Acute low back pain	9 d	5 d	9 d	NA	Ortho	Permanent injuries	Failure to diagnose and treat	Plaintiff: $NA

Abbreviations: Dept, department; ER, emergency room; Exam, examination; F, female; M, male; NA, not available; NS, neurosurgeon; OR, operating room; Ortho, orthopedic surgeon; Out, outpatient.

Table 1B

Cases Reviewed

Case	Patient Sex/ Age, y	Initial Setting	Initial Presentation	Initial Diagnosis	Time to Consult	Time to Imaging	Time to OR	Rectal Exam	Specialty	Outcome	Complaint	Verdict
Urban v Groth, Pourman, Coyle	F/38	ER	Lower back pain, severe headache, neck tenderness	Chemical meningitis or conversion disorder	2 d	2 d	NA	No	NS	Paraplegia, paralysis, incontinence	Failure to diagnose	Defendant
Sall v Ellfeldt, Hunt, Research Medical Center	M/NA	Out clinic	Back pain	Lower back sprain	8 d	7 d	12 d	NA	NS	Weakness in the lower extremities, paralysis in feet, impaired sexual function	Medical negligence	Defendant
Millard v USA	F/NA	ER	Pain radiating to shoulder, numbness and tingling sensation in buttocks	Sciatica	5 d	4 d	5 d	No	NS	Bowel and bladder dysfunction, impaired sensation in right foot, right lower-leg weakness	Failure to diagnose	Defendant
Jeffers v Weinger	F/NA	Hospital inpatient	Numbness in leg and foot	Possible bleed in wound site	NA	None	1 d	NA	Ortho	Numbness in vagina, bowel and bladder dysfunction	Failure to diagnose	Plaintiff: $900,000
Tadlock v Mercy HealthCare Sacremento	M/NA	ER	Back pain radiating down buttocks, groin, legs; inability to feel urination	NA	NA	1 d	NA	NA	NA	Loss of bowel and bladder function	Failure to diagnose	Defendant
Martin v Dyas	F/NA	ER	Burning sensation and sharp pain in back	Back strain	<24 h	<2 d	<2 d	No	Ortho	Partially paralyzed in legs and feet	Failure to diagnosis and treat in timely fashion	Defendant

Abbreviations: ER, emergency room; Exam, examination; F, female; M, male; NA, not available; NS, neurosurgeon; OR, operating room; Ortho, orthopedic surgeon; Out, outpatient.

Table 2

Distribution of Cases Excluded From Study

Category	No. (%)
Did not pertain to cauda equina syndrome	31 (34.8)
Insufficient background information	3 (3.4)
Involved Social Security disability	37 (41.6)
Lawsuit against employer	18 (20.2)

ever, no significant association was found between the verdict and severity of disability or whether permanent deficits occurred ($P=.65$ and $P=1.0$, respectively). Similarly, no association existed between the verdict and whether the patient initially presented with loss of bowel or bladder control or saddle anesthesia ($P=.34$, $P=.46$, and $P=.27$, respectively). No significant association existed between verdict and loss of sexual function ($P=.37$). No significant association in verdict existed with the health care provider surgical specialty (orthopedic surgeon or neurosurgeon) seen at initial presentation ($P=1.0$). Also, no significant association was found between verdict and initial setting where patient presented for treatment ($P=.41$).

A significant association existed between time to surgery (>48 hours) and a decision for the plaintiff ($P<.05$; odds ratio=2.1). Of the plaintiff verdicts, 66% were associated with patients who underwent surgery >48 hours after onset

of symptoms; this was in contrast with defense verdicts in which 42.8% were associated with patients who underwent surgery >48 hours after onset of symptoms. Thus, a shorter time to surgery was associated with a higher likelihood of a verdict for the defense. No significant association was found between verdict and time to consultation ($P=.12$) or time to advanced imaging ($P=.09$). Amount awarded had no significant association with time to surgery >48 hours ($P=.21$).

In the 14 cases analyzed, no rectal examination was performed. Furthermore, 4 (26.7%) of the 15 cases involved an initial presentation that included loss of bowel or bladder control. Thus, the majority of these cases were associated with patients who presented without having a true cauda equina syndrome with loss of bladder and/or bowel control.

Table 3

Comparison of Plaintiff Verdicts Versus Defendant Verdicts

Variable	Plaintiff Verdicts	Defendant Verdicts
Sex, %		
Male	33.3	44.4
Female	66.6	55.5
Median age, y	38.5	35
Median time to consultation, d	5	1.5
Median time to imaging, d	5	2
Median time to OR, d	5.5	1.5
Surgical specialty consultation, %		
Ortho	80	28.6
NS	20	71.4

Abbreviations: NS, neurosurgeon; OR, operating room; Ortho, orthopedic surgeon.

Discussion

The clinical presentation of cauda equina syndrome has varied from chronic back pain and sciatica that gradually progresses to a loss of urinary function, to acute trauma-related sciatic pain with immediate urinary problems. Although a precise definition of cauda equina syndrome has not been established, most authors believe that an element of bladder dysfunction is required for a true cauda equina syndrome diagnosis.[1,3,7] Our results demonstrate that the verdict does not necessary depend on whether the patient presented with a true cauda equina syndrome. Patients may have developed cauda equina syndrome later during the course of their disease process. The only time the clinician may be at fault is if a true cauda equina syndrome was misdiagnosed or not treated appropriately because this is the only instance in which a true surgical emergency is present. In many cases, a true cauda equina syndrome was not misdiagnosed and yet the verdict was still against the clinician. Of the 6 cases ruled in the favor of the plaintiff, 1 (16.7%) had loss of bladder control on initial presentation. This suggests the importance of giving cauda equina syndrome precautions in all patients with spinal complaints, regardless of whether true cauda equina syndrome is present on initial presentation.

Although patients with cauda equina syndrome may present to their family practitioner or a specialist, 60% of the cases reviewed revealed that the patient presented to the emergency room for initial evaluation and treatment. Therefore, the emergency department and related personnel must recognize that cauda equina syndrome is a surgical emergency requiring immediate referral or consultation with a qualified spine surgeon. The patient cannot be allowed to linger without advanced imaging or consultation. Time to surgery (>48 hours) is significantly associated with increased likelihood of plaintiff judgment. In the cases we reviewed, if time to surgery was >48 hours, an 83% chance existed for a verdict favoring the plaintiff. This demonstrates that lawyers are well aware of the published literature regarding treatment of cauda equina syndrome.

In 1986, Kostuik et al[3] detailed 31 patients with cauda equina syndrome, of whom 10 could be diagnosed with acute cauda equina syndrome presenting with bladder dysfunction and other cauda equina syndrome signs and symptoms. In those patients with acute cauda equina syndrome, the time to operation ranged from 6 to 48 hours (average, 1.1 days). Twenty-one patients who presented with a gradual onset of cauda equina syndrome underwent operative treatment within 1 to 5 days (average, 3.3 days). The authors found no association between time to the operating room and clinical outcome.

However, more recent studies indicate that prognosis improves with earlier decompression of cauda equina syndrome, in particular, patients who undergo surgery within 48 hours have a better outcome than patients who do not undergo surgery within 48 hours. Nielsen et al[10] demonstrated that detrusor function return was greatest in patients who had decompression within 48 hours of cauda equina syndrome onset, whereas Shapiro[7] demonstrated a 100% resolution of urinary and stool incontinence when decompression was performed within 48 hours of cauda equina syndrome onset and a 33% resolution in surgery after 48 hours. Ahn et al[1] reported that a significant advantage existed to treating patients within 48 hours vs >48 hours after the onset of cauda equina syndrome.[1] The authors specifically demonstrated that patients who underwent surgery ⩾48 hours after the onset of cauda equina syndrome, when compared with patients treated <48 hours after onset, were at 2.5 times the risk of continuing to have a urinary deficit, 9.1 times the risk of continuing to have a mo-

tor deficit, 9.1 times the risk of continuing to have rectal dysfunction, and 3.5 times the risk of continuing to have a sensory deficit.

Limitations to this study include that it is retrospective study and that legal cases involving cauda equina syndrome are difficult to locate. In particular, we sought to find cases that involved a patient suing a health professional. A total of 89 cases had to be excluded from the study due to not pertaining to cauda equina syndrome, insufficient background information, or involving Social Security disability or lawsuits against employers. Although the LexisNexis Academic database is an excellent source to locate lawsuits, the consistency of the background information (eg, timeline of events) varied from case to case. The United Kingdom established the National Health Service Litigation Authority to indemnify English National Health Service bodies against claims for clinical negligence.[11] Unlike the United Kingdom, the United States lacks a database for recording clinical negligence in orthopedics and other specialties.

Because the outcome is binomial insofar as the verdict being either for the plaintiff or for the defense, it was most appropriate to perform a logistic regression analysis. In addition, because the numbers were small for the study cohort, it was not realistic to obtain significant results if a multivariate analysis was performed. For this reason, we performed a univariate logistic regression analysis with each of the different variables.

CONCLUSION

Practitioners must continue to view cauda equina syndrome as an emergency that requires emergent diagnostic, consultation, and treatment actions. Any patient with urinary dysfunction must be studied on an emergent basis, particularly if the patient has suffered an acute change. A thorough history and physical examination, including rectal tone and perianal sensation, should be documented. The burden to the patient in the setting of missed or delayed diagnosis of cauda equina syndrome may be devastating. Patients can lose bowel, bladder, and sexual function, which can negatively affect patient health and quality of life. If the patient chooses to sue, the patient must bear the burden of establishing the standard of care while proving the physician deviated from that standard. The burden of the physician is that one's medical knowledge may be considered negligent, and the physicians' institution may be held financially responsible. In a study by Atrey et al,[11] a missed or delayed diagnosis of cauda equina syndrome had an average payout of $459,622. By operating <48 hours of cauda equina syndrome onset and communicating with the patient the potential outcome, a greater chance exists that one can reduce the considerable financial burden to institutions and have a less adverse outcome in court.

REFERENCES

1. Ahn UM, Ahn NU, Buchowski JM, Garrett ES, Sieber AN, Kostuik JP. Cauda equina syndrome secondary to lumbar disc herniation. *Spine (Phila Pa 1976)*. 2000; 25(12):1515-1522.
2. Mixter WJ, Barr JS. Rupture of the intervertebral disc with involvement of the spinal canal. *N Engl J Med*. 1934; 211:210-215.
3. Kostuik JP, Harrington I, Alexander D, Rand W, Evans D. Cauda equina syndrome and lumbar disc herniation. *J Bone Joint Surg Am*. 1986; 68(3):386-391.
4. Spector LR, Madigan L, Rhyne A, Darden B II, Kim D. Cauda equina syndrome. *J Am Acad Orthop Surg*. 2008; 16(8):471-479.
5. Kostuik JP. Medicolegal consequences of cauda equina syndrome: an overview. *Neurosurg Focus*. 2004; 16(6):e8.
6. Gardner A, Gardner E, Morley T. Cauda equina syndrome: a review of the current clinical and medico-legal position [published online ahead of print December 31, 2010]. *Eur Spine J*. 2011; 20(5):690-697.
7. Shapiro S. Cauda equina syndrome secondary to lumbar disc herniation. *Neurosurg*. 1993; 32(5):743-747.
8. Lavy C, James A, Wilson-MacDonald J. Cauda equina syndrome. *BMJ*. 2009; 338:b936. doi: 10.1136/bmj.b936
9. LexisNexis Academic & Library Solutions. LexisNexis Web site. http://academic.lexisnexis.com. Accessed December 3, 2010.
10. Nielsen B, de Nully M, Schmidt K, Hansen RI. A urodynamic study if cauda equina syndrome due to lumbar disc herniation. *Urol Int*. 1980; 35(3):167-170.
11. Atrey A, Gupte CM, Corbett SA. Review of successful litigation against English Health Trusts in the treatment of adults with orthopaedic pathology: clinical governance lessons learned. *J Bone Joint Surg Am*. 2010; 92(18):e36.