Cauda equina syndrome

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Considerable confusion exists among health care providers, research data, and the legal profession concerning cauda equina syndrome. This monogram, I hope, will serve to clarify the ambiguities related to this entity. There are many causes of cauda equina syndrome (CES) and each will be discussed separately including those related to disc herniation, iatrogenic epidural hematoma, infection, tumor, and trauma. Furthermore, the implications related to the lack of or delay in rendering a diagnosis, a misdiagnosis, outcomes related to surgery, and the pertinent medicolegal issues are presented in detail.

One of the major sources of confusion is an exact definition of CES. In previously published literature, authors asserted that bilateral sciatica was a definitive characteristic. In subsequent publications, however, researchers have shown that the patient can have unilateral sciatica. If herniation occurs centrally at L5–S1, then the motor and sensory roots of the lower extremities may be spared and only the bowel and bladder function are affected by dysfunction.

A definition is understood in terms of changes in dysfunction in the bowel and bladder. Given that the daily frequency of urination is much greater than that of bowel evacuation, a description of the syndrome is dependent on bladder dysfunction and a decrease in perianal sensation. Without visceral dysfunction (bladder), CES does not exist.

Many question whether there is such a thing as impending CES. By definition, there is not, although one would be highly suspicious if a patient presented with truly marked limitation in straight leg raising and increasing pain in the presence of normal rectal tone and rectal and perianal sensation. The patient should be warned about the possibility.

The legal issues involve either the timing of surgery in relationship to syndrome onset or whether the syndrome could have been prevented. Prevention is based purely on clinical judgment; as long as a patient has been fore-

warned, there is no reason to suspect a continuance of any legal problem.

Analysis of the initial literature revealed that patient outcome was dismal if surgery was performed more than 12 hours after onset of the syndrome. Based on data from subsequent studies, however, one can infer that this is not the case; the majority of patients who undergo surgery within 48 hours of syndrome onset clearly have a better outcome than those who undergo surgery after 48 hours. There are insufficient data to determine whether an operation within 24 hours is better than one performed within 48 hours. Nonetheless, this does not mean that surgical treatment in patients with CES, regardless of disease onset, should be delayed. It is logical to conclude that operating sooner rather than later is better. Thus, a patient who has been seen 56 hours after syndrome onset should not, in my opinion, await surgery until the following day. Although patients have recovered function after many days from the onset of CES, it is preferable to operate as soon as possible.

The legal issues associated with CES do not rest only with orthopedic spinal surgeons or neurosurgeons (inappropriate communication, failure to examine the patient, and failure to render the correct diagnosis) but affect all health care professionals including nursing personnel.

Cauda equina syndrome can be confused with problems of the conus medullaris. Disease involving the conus medullaris, however, produces upper motor neuron lesions that affect the area's function and must be very dramatic to affect motor roots. By definition, CES is a constellation of symptoms and signs including back pain, radicular pain that can be either uni- or bilateral, motor loss, sensory loss, and, specifically, urinary dysfunction associated with a decrease in perianal sensation. "Urinary dysfunction" means "overflow incontinence, inability to void due to lack of synergy between the various sphincters of the urinary tract, inability to evacuate the bladder completely, and associated perianal hypesthesia or anesthe-

sia.” The normal renal tract produces between 30 and 50 ml urine per hour (of course, this is dependent on intake). A bladder that contains 1000 ml and is most likely insensate probably was affected by the onset of CES many hours previously.

Among the common causes of CES is a postoperative epidural hematoma. This can be a totally preventable complication. It is recommended that every patient, regardless of the spinal surgery undergone, have a postoperative rectal examination that includes testing of perianal sensation and digital tone to establish a baseline. If the patient complains of increasing back pain, increasing or

new radicular pain, or increasing numbness, subsequent follow-up data can be compared with the baseline data. The postoperative examination should be performed as soon as possible following surgery. Ideally, all patients undergoing spinal surgery, regardless of its type or purpose, should have a preoperative rectal examination as well.

I hope this monogram enlightens health care personnel to the problem of CES so that the significant stress associated with patient outcome and possible legal implications can be avoided in the future.