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Anesthetic management of parturients with pre-existing paraplegia or tetraplegia: a case series



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ABSTRACT

With improvements in management and rehabilitation, more women with spinal cord injury are conceiving children. Physiologic manifestations of spinal cord injury can complicate anesthetic management during labor and delivery. Patients who delivered at Mayo Clinic, Rochester, Minnesota between January 1, 2001 and May 31, 2012 with a history of traumatic spinal cord injury were identified via electronic record search of all parturients. Eight patients undergoing nine deliveries were identified. Six deliveries (67%) among five patients (63%) involved a trial of labor. Among these deliveries, three (50%) occurred vaginally, all with successful epidural analgesia. Trial of labor failed in the remaining three patients, and required cesarean delivery facilitated via epidural (n=1), spinal (n=1) and general anesthesia (n=1). Three patients (33%) underwent scheduled cesarean delivery via epidural (n=1), spinal (n=1), and general anesthesia (n=1). Four patients having five deliveries had a history of autonomic hyperreflexia before pregnancy. One patient had symptoms during pregnancy, two patients had episodes during labor and delivery, and three patients described symptoms in the immediate postpartum period. These symptoms were not reported by any patient without a history of autonomic hyperreflexia. Neuraxial labor analgesia may have a higher failure rate in patients with spinal cord injury, possibly related to the presence of Harrington rods. Postpartum exacerbations of autonomic hyperreflexia are common in patients with a history of the disorder.

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Introduction

In the USA, 12000–20000 individuals sustain a new spinal cord injury (SCI) each year.¹ With improvements in acute management and rehabilitation, there are an increasing number of pregnancies in the spinal cord injured population, with 14% of these women becoming pregnant at least once.² Spinal cord injury is associated with complications including chronic urinary tract infections (UTI), decubitus ulcers, thrombophlebitis, anemia, decreased respiratory reserve, and autonomic hyperreflexia (AH).³ In addition to these complications,

pregnancy adds additional risks as it is associated with anemia, decreased respiratory reserve, a hypercoagulable state and increased risk for thrombophlebitis and UTI. Labor pains may not be perceived in patients with an injury above T10, which puts these patients at risk for unperceived delivery.⁴ Furthermore, pain during labor and delivery may stimulate an AH exacerbation in women with SCI.⁵ If unrecognized, AH can cause devastating complications during pregnancy such as intracranial hemorrhage, hypertensive encephalopathy and death.⁶

Although many case series exist in the obstetric and rehabilitation literature,^{5,7–9} only a few case reports^{3,10–18} and one case series of three patients⁸ focus on the obstetric anesthetic management of patients with paraplegia or tetraplegia for labor and delivery. This case series describes nine pregnancies in eight parturients with paraplegia or tetraplegia.

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Methods

Following Mayo Clinic Institutional Review Board approval, all patients admitted to the Labor and Delivery Unit at Mayo Clinic Hospital, Rochester, Minnesota from January 1, 2001 to May 31, 2012 were retrospectively identified from the unit's birth log. Clinical notes were queried within all electronic medical records for the following free-text terms: SCI, paraplegia, paraparesis, quadriplegia, quadriparesis, AH, autonomic dysreflexia, meningocele, spina bifida, spina bifida occulta, transverse myelitis and tethered cord. In addition, records were searched for the following International Classification of Disease (ICD) nine code prefixes: 344, 740, 741, 742, 756, and 952. These codes describe paralytic syndromes, anencephalus and similar anomalies, spina bifida, other congenital anomalies of the central nervous system, other congenital musculoskeletal anomalies and SCI without evidence of spinal bone injury, respectively.

The medical records of identified patients were then manually reviewed for details of their central nervous system pathology. Patients were excluded if there were no neurologic deficits at the time of delivery or they had lower motor neuron disease without evidence of upper motor neuron involvement. Demographic data including maternal age, American Society of Anesthesiologists physical status classification, parity and gestational age at delivery, as well as the patient's obstetric, medical and neurologic history, were recorded. Delivery data were extracted, including the type of delivery, type of labor analgesia, postpartum care and complications. All notes in the records, including outside records and reports, were included in the review. All patients had consent-for-research authorization on file.

Injury severity and extent were classified according to the American Spinal Injury Association (ASIA) Impairment Scale. The ASIA classification for each patient was determined via information in the medical record. The scale was developed to create standards for neurologic classification of SCI and categories are described as follows:

- ASIA A: complete injury with no sensory or motor function preserved in the sacral segments S4–5.
- ASIA B: preserved sensation but no motor function below the neurological level and extends through the sacral segments S4–5.
- ASIA C: motor function preserved below the neurological level and the majority of key muscles below the neurological level have a muscle grade <3.
- ASIA D: motor function preserved below the neurological level and the majority of key muscles below the neurological level have a muscle grade \geq 3.
- ASIA E: patient with normal sensory and motor function.

ASIA A refers to a complete injury and ASIA B–D refer to incomplete injury. The ASIA scoring system grades muscle strength on a scale of 0–5, where 0 is total paralysis and 5 refers to normal active movement with full range of motion against full resistance.¹⁹

Results

Eight patients with SCI undergoing nine deliveries were identified during the study interval. Obstetric and anesthetic management for all deliveries are summarized in Fig. 1. Obstetric history, details of SCI, AH history, deep vein thrombosis (DVT) management, and neonatal

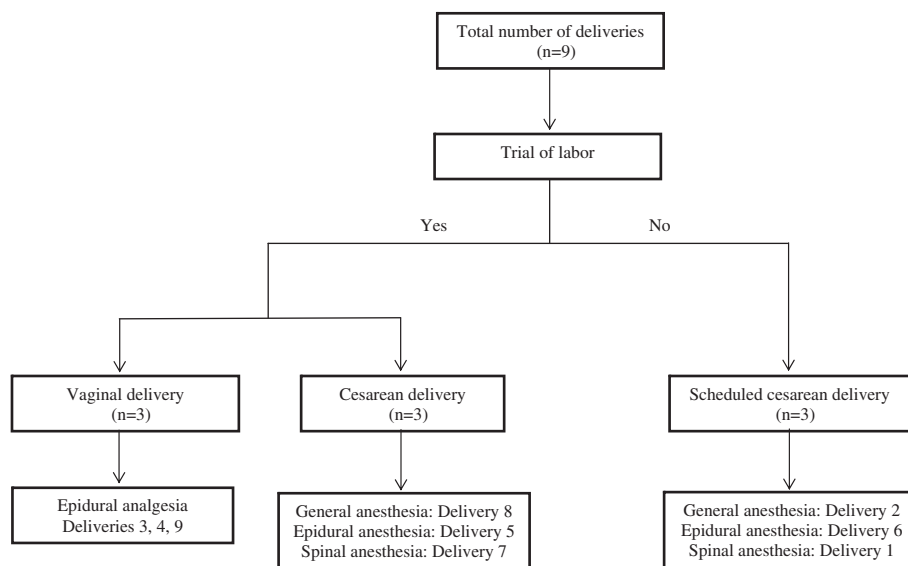


Fig. 1 Summary of obstetric and anesthetic management

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