Diagnosis of pain in patient with cerebral palsy using intrathecal catheter

MB Pankovich, MD, A Kundu, MD, AM Lynn, MD.  
Children's Hospital and Regional Medical Center, Seattle, WA

Introduction: Cerebral Palsy is associated with multiple comorbidities and can present diagnostic and therapeutic challenges. Spasticity and pain in a patient with severe developmental delay can be difficult to evaluate. Parental input is often most useful in the assessment of treatment efficacy. This case report demonstrates both the diagnostic and therapeutic potential of intrathecally administered medications for patients with refractory pain and spasticity.

Case Report: The pain service was consulted to evaluate and help manage the pain of an eleven year old boy with a history of cerebral palsy, spastic quadriplegia and dystonia that had progressed from intermittent to unremitting arching and extensor posturing. The patient was admitted to the hospital after two weeks of worsening symptoms of inconsolable arching and irritability. Radiographs revealed severe scoliosis and progressive subluxation of his left hip which was presumed to be the source of his pain. Due to poor control of the patient's spasticity, surgeons decided correction of the hip subluxation was unlikely to be successful.

Past history revealed failure of multiple treatments to help control the patient's spasticity including botox injections, sinemet and high dose intrathecal baclofen. Over the initial week of admission, the patient received systemic opioid analgesics and benzodiazepines at increasing doses without significant improvement and adverse respiratory effects and sedation. Some decrease in the muscle tone was noted during sleep, but during awake states the patient remained extremely irritable. Given the lack of therapeutic response to systemic therapy we decided that placement of a percutaneous intrathecal catheter would provide a diagnostic and possibly a therapeutic measure to determine whether local anesthetics or opiates added to the patient's intrathecal pump would provide relief of pain and/or spasticity, as well as determine the appropriate dose required.

With an informed consent, under general anesthesia and with the patient in prone position, an intrathecal catheter was placed under fluoroscopic guidance. A bolus of 1 cc of 0.5% bupivacaine given intrathecally resulted in a significant decrease in spasticity, arching and irritability. An intrathecal infusion of 0.5 % bupivacaine at 0.4-0.6 ml/hr was continued overnight. Response to intrathecal local anesthetic suggested a peripheral cause of the patient's pain and irritability. However, this did not distinguish whether the spasticity or pain was the major contributing factor. Thus, the following day after discontinuation of the local anesthetic, a bolus 0.2 mg of morphine was given via intrathecal catheter, which also induced a calmer state and decreased muscle tone in the patient. Given our findings, opioid or local anesthetic could potentially be added to the intrathecal pump as a therapeutic measure.

Discussion: When evaluating a patient with severe developmental delay and multiple sources for pain, determination of the best treatment can be a challenge. In our patient, standard treatment with opioid analgesics and benzodiazepines was ineffective and resulted in adverse effects. While placing a second intrathecal catheter carries risks of infection, bleeding, displacement or disruption of the existing intrathecal catheter and risk related to a general anesthetic, the benefits of diagnosing the cause of this child's pain and determining an appropriate treatment outweigh those risks. Neuraxially administered morphine has been shown to control spasticity in adults although it was less effective at controlling spasticity in our case. We recommended the addition of morphine to the patient's intrathecal pump to infuse at 0.2-0.3 mg/day. The addition of local anesthetic to the patient's pump, although an option for further improvement in spasticity, would require very frequent refills. Given the reservoir size of 10 ml, this option was not deemed appropriate for our patient at that time.

References:
1. L Green, MD, et al. Primary Care of Children with Cerebral Palsy. Clinics in Family Practice 2003