Ultrasound for intrathecal injections in pediatric patients with severe scoliosis: isolated use or common practice?

Garcia B., Reinoso F., Fernández E., Huercio I., Martínez M.

Background: Previous reports show that 60 to 80% of spastic quadriplegia patients develop scoliosis. Baclofen has been shown to improve quality of life for these patients.

Case report: The patient is a 12-year-old male weighing 15 kg, ASA III, with a history of encephalopathy, Smith-Lemli-Opitz syndrome, severe congenital scoliosis and increased spasticity.

The patient's existing regimen of baclofen 10 mg q8h and botulinum toxin every 3 months was replaced by intrathecal baclofen pump.

This was achieved after a positive baclofen test.

The test was performed under deep sedation using a face mask and 1 to 2% Sevoflurane, with spontaneous ventilation. Methimazole was administered following the procedure.

Ultrasound was used to facilitate intrathecal injection, performed with a 22 gauge needle in the suspected L4-L5 space. The successful trajectory deviated significantly from the classical midline or paramedian approach. The procedure was completed successfully and without complication in 18 minutes after only one attempt. Spasticity improved after approximately 25 minutes; thus intrathecal pump implantation was recommended and recently implanted.

Discussion: "Neuraxial blocks were found to have a higher complication rate compared with peripheral techniques (1.5 vs 0 per 1000 blocks). Misidentification of vertebral level, unrecognized lateral needle placement or deviation, etc may contribute to direct needle injury of the spinal cord. **Ultrasonography or fluoroscopy could be considered as an adjunct for accurate determination of vertebral level in these challenging patients (eg, as may occur with obesity, kyphoscoliosis, and other conditions) (Class I)**"¹

By using ultrasound to identify the landmarks in the lumbar region, the appropriate puncture point can be determined allowing access to the intrathecal space with relative ease. This would decrease the need for fluoroscopy-guidance, the incidence of multiple punctures as well as reducing the procedure time and costs ².

Learning points:

Ultrasound provides the following advantages

- For the patient: shorter sedation time, less incidence of multiple punctures and free of ionizing radiation.
- For the institution: best cost benefit ratio, since it doesn't need ray technician, relatively inexpensive, portable and has the potential to reduce procedure time.
- For the anesthesiologist: confirms accurate anatomic localization, in a safe way, to determine indication for pump implantation- a standard tool for improving these patients' quality of life.

Our systematic algorithm to perform neuraxial approach

1. The Second ASRA Practice Advisory on Neurologic Complications Associated with Regional Anesthesia and Pain Medicine Executive Summary 2015 Joseph M. Neal, et al. Reg Anesth Pain Med 2015; 40: 401-430.

2. Case Report. Use of ultrasound to facilitate difficult lumbar puncture in the pediatric oncology population. Warhadpand S. et al. Int J Clin Exp Med 2013;6(2):149-152.