Anorectal pressure monitoring during surgery on sacral lipomeningocele

Case report

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Intraoperative monitoring of anorectal pressure was used in a case of sacral lipomeningocele accompanied by congenital dermal sinus to protect the physiological function of the anorectal sphincters. This monitoring system consists of a manometric anorectal balloon and neural electrical stimulation. The system was able to differentiate functioning neural structures from surrounding tissues during the operation.

KEY WORDS • intraoperative monitoring • anorectal pressure • sacral lesion • lipomeningocele

Anorectal dysfunctions such as marked constipation and fecal incontinence are frequently seen in patients with spinal dysraphism. Dysfunctions of sacral spinal nerves produce a loss of tone in the puborectalis sling, an abnormal anorectal angulation, and a tendency to rectal prolapse, constipation, and incontinence. Such neurogenic fecal incontinence is thought to result from paralysis of the external sphincters, which are innervated by the inferior rectal, pudendal, and levator ani muscular nerves that arise from S-2, S-3, and S-4.

We report the intraoperative use of an electrical stimulation system connected to a manometric anorectal balloon in differentiating neural structures from surrounding tissues in a patient with lipomeningocele and congenital dermal sinus in the sacral region.

Case Report

This 2-month-old baby girl was found to have a lump and a skin dimple on her back without any neurological deficit.

Examination. Myelography and metrizamide myelography followed by computerized tomography did not differentiate between a diagnosis of lipomeningocele or lipomyelomeningocele.

Operation. The patient was placed in the prone position and operated on under endotracheal anesthe-
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During the operation, the boundaries between the lipoma and the meningocele were sometimes indistinct. The lipomatous mass was differentiated from neural structures by electrical stimulation, and the mass was removed piece by piece. When a nervous system structure contiguous to the lipomatous tissue was stimulated, a response was obtained as shown in Fig. 2. The electrical stimulus parameters used were 3 V, 0.5 to 3 mA, 0.5-msec duration, and 1 count/sec frequency. These responses were thought to result from contraction of the external anal sphincter at the time of stimulation of sacral nerve roots. The tethering effect of the lipoma, which was continuous with the cauda equina, was safely released using this monitoring system.

**Postoperative Course.** The patient had no neurological deficit immediately following the operation. The postoperative course was uneventful and she remains well 2 months after surgery.

**Discussion**

About 50% of the patients with spinal dysraphism have anorectal dysfunction. In spite of decreased tonus of their anorectal sphincters, they have constipation more frequently than fecal incontinence, which is due to overflow from fecal impaction. Such anorectal dysfunctions have been evaluated by electromyographic, sphincter manometric, radiographic, and some neurological studies. Among sphincter manometric studies, the anorectal resting pressure, which is a good index of bowel function, is well correlated with the degree of paralysis of the external anal sphincters.

In the case of a lipomeningocele or lipomyelomeningocele in the sacral region, the subcutaneous lipoma is usually continuous with the cauda equina through a midline defect, or involves the spinal cord and conus medullaris. Recently, the tethering effect of lipomas has been stressed and early prophylactic surgery for tethered spinal cord has been advocated. Careless dissection of an intradural lipoma involving the neural structures may, however, cause new neurological deficits.

It is frequently difficult to differentiate neural structures from surrounding tissues during surgery. James, et al., reported the use of anal sphincter electromyography in monitoring operations on the conus medullaris and sacral nerve roots in patients with spinal dysraphism. Our intraoperative monitoring system is noninvasive and enabled us to recognize quickly any anal contraction by observing the oscillation of the recording stylus.

**References**

3. Cooper DGW: Detrusor action in children with myelome-
4. French BN: Midline fusion defects and defects of forma-
10. Sato T, Sato K: [Innervation of the levator ani and sphincter ani externus.] Shinkeinaika 10:313–320, 1979 (Jpn)

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