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Appearance of Plica Mediana Dorsalis during Epidurography

To the Editor:

The plica mediana dorsalis (PMD) is thought to be a band of connective tissue, which divides the epidural space at the dorsal midline. Existence of the PMD has been controversial since its first description in 1963 (1). The PMD has been regarded as a potential cause for unilateral epidural blockade (2, 3). For purpose of discussion, we present a case of a patient who presented for an interlaminar lumbar epidural steroid injection. Under epidurography, a structure similar in appearance to a PMD was identified, but it did not interfere with bilateral contrast flow.

The patient was a 47-year-old male, 114 Kg in weight and 1.83 m tall, with symptoms consistent with left L5 radiculitis. MRI scan performed two months prior to presentation showed previous L4-5 right hemilaminectomy, and left-sided L4-5 disc herniation. He was scheduled for an interlaminar epidural steroid injection at the left side of the L5-S1 interspace. After informed consent was obtained and a "time-out" was conducted, the patient was placed in the prone position. The L5-S1 interspace was optimized under anterior-posterior (AP) view with fluoroscopy. Skin prep and drape were performed. Local anesthetic infiltration was performed with 1% lidocaine [AstraZeneca LP, Wilmington DE], an 18 g 9 cm Tuohy needle was directed toward the left side of the L5-S1 interspace using AP (Fig. 1) and lateral fluoroscopic images. A 5 cc ground glass syringe containing 3 cc normal saline and a 1 cc air bubble was used for loss of resistance

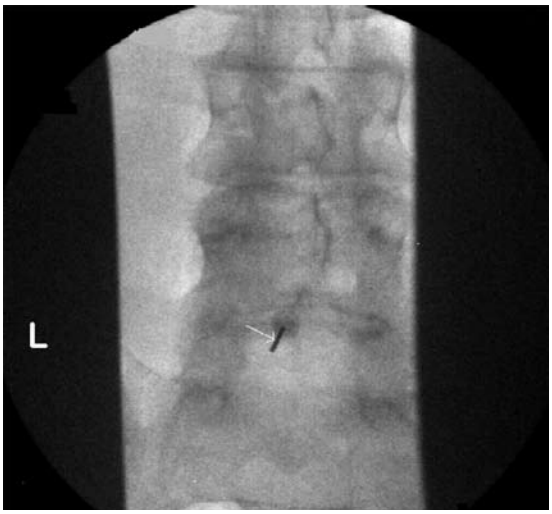

Fig. 1: *Precontrast anterior-posterior fluoroscopy image of lumbosacral spine during epidural needle placement at L5S1. Epidural needle (white arrow) enters far left side of L5S1 interspace.*

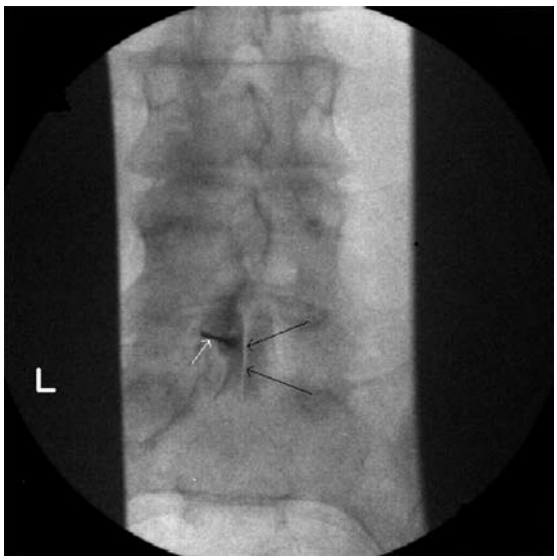

Fig. 2: *Epidurogram showing plica mediana dorsalis. Epidural needle (white arrow) enters far left side of L5-S1 interspace. Contrast flows from left to right, with non-filling sagittal white line (black arrows) showing the presence of a plica mediana dorsalis.*

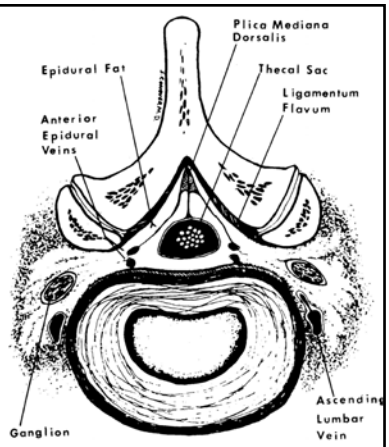

Fig. 3: *Diagram showing common features of anatomy observed in 40 patients having CT-epidurography. Revised, from Savolaine ER, Pandya JB, Greenblatt SH, Conover SR. Anatomy of the human lumbar epidural space: new insights using CT-epidurography.* Anesthesiology *1988;68:217-220 (with permission).*

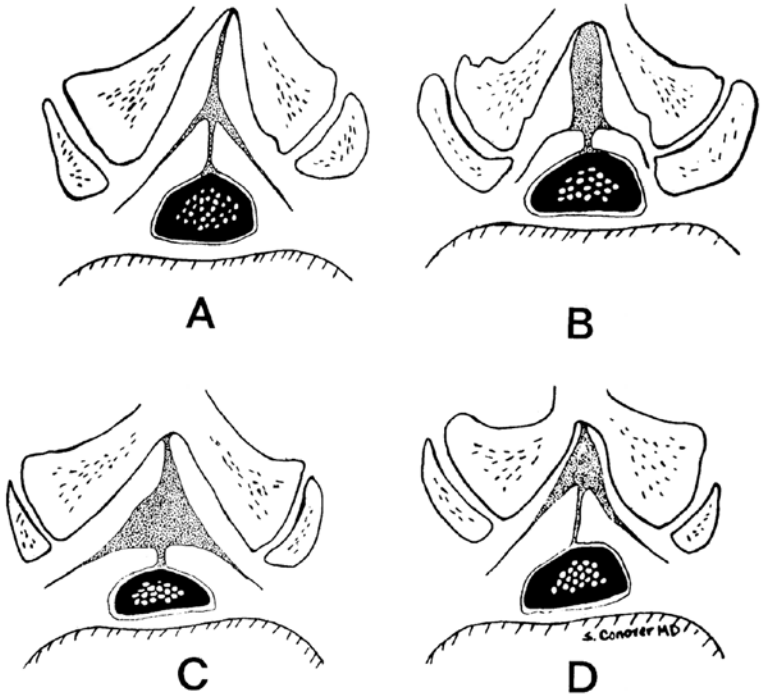

Fig. 4: *Specific patterns of anatomic configuration seen on CT-epidurography. 40 patients were examined. 7 showed pattern A, 2 showed pattern B, 18 showed pattern C, 13 showed pattern D. From Savolaine ER, Pandya JB, Greenblatt SH, Conover SR. Anatomy of the human lumbar epidural space: new insights using CT-epidurography.* Anesthesiology *1988;68:217-220 (with permission).*

(LOR) technique, to detect entry into the epidural space. A solid LOR was obtained at 7.2 cm depth. There was mild left leg pain with injection of 1 ml saline at LOR. The lateral fluoroscopic view showed appropriate needle depth. An epidurogram was performed to verify appropriate needle position. Injection of 2 ml Omnipaque 240® [Amersham Health, Princeton NJ] showed bilateral flow of contrast, and also outlined a linear contrast void in the sagittal midline. (Fig. 2) This structure was judged to be a plica mediana dorsalis. A mixture of 2 ml (80 mg) Depo-Medrol [Pharmacia & Upjohn Company, Kalamazoo MI], 2 ml 1% lidocaine [AstraZeneca LP, Wilmington DE] and 2 ml normal saline was injected with mild left leg pain. The needle was flushed with saline and removed, and a sterile dressing was applied.

The appearance of an apparent plica mediana dorsalis on a routine epidurogram piqued our interest regarding this topic. Our experience includes several hundred epidurograms done through a lumbar interlaminar approach, and this is the only patient in whom a PMD was demonstrated.

A number of studies using different modalities have shown the existence of the plica mediana dorsalis (Fig. 3).

Luyendijk first described the PMD in 1963 using epidurography, which was termed "canalography" (1). In that report he states "In the mid-zone of the central contrast column a narrow white stripe is usually seen…due to a median fold of the dural sac in the dorsal region of the peridural space." Of note is that the appearance of the "narrow white stripe" mentioned by Luyendijk exactly conforms to the midline contrast void described by us. Luyendijk reaffirmed his findings in 1976, presenting photographs taken during laminectomy, as well as with an autopsy section (4).

In 1980, Husemeyer and White published a study demonstrating the PMD by injecting polyester resin into the epidural space of fresh adult cadavers (5).

In 1988, a study by Blomberg using epiduroscopy performed with a "rigid thin needle arthroscope" described a dorsal connective tissue band in the midline of the epidural space in every one of 48 cadavers (6). This was followed by a study in 1989 by Blomberg and Olsson using epiduroscopy in 10 living patients, again using "a rigid needle arthroscope," with complete examination available in 8 of the 10 (7). A dorsomedian connective tissue band was seen in all eight subjects.

In 1989, a study by Savolaine et al. used CT-epidurography to examine the epidural space of 40 patients (8). In all 40 patients studied, the posterior epidural space was divided by a PMD and by an additional transverse connective tissue plane (Fig. 4). It was suggested that the PMD and associated membranes might interfere with the correct placement of epidural catheters. In 1995, Seeling et al. used epidurography followed by CT scan to evaluate the epidu-

ral space in 30 patients (9). Five of the 30 patients were shown to have a PMD on CT scan.

However, there is a debate about whether the PMD actually exists, or whether it is merely an artifact. There is also a debate over whether the presence of a PMD can cause unilateral epidural block. In 1991, Hogan reported findings from cryomicrotome sections of 38 lumbar spines, obtained from cadavers frozen within 15 hours after death (10). A PMD was not seen in any of the 38 spines, and "probably reflects an artifact due to dural tethering in the presence of unnatural transmural dural pressures during distension of the epidural space." Gallart et al. discuss the existence of a connective tissue plane, confirmed radiologically, in both dorsolateral compartments of the epidural space (2). Their case report indicates that X-ray proven unilateral epidural block was obtained on each side, with placement of bilateral epidural catheters. Similarly, Fukushige et al report a case of unilateral epidural block with the presence of dorsomedian connective tissue confirmed by CT epidurography (3). However, Hogan has presented 2 studies that do not show the presence of any "substantial fibrous barriers" that "partition the posterior or lateral epidural space," and states that "a far lateral catheter position is a more common cause of asymmetric block than anatomic barriers to solution spread" (11,12). Asato et al. have also published two studies that indicate there is no barrier to epidural solution spread provided by a median epidural septum, and that on epidurography of 7 patients with unilateral epidural block, placement of the epidural catheter into the anterior epidural space or transforaminally caused the unilateral block (13,14).

In conclusion, with our patient, the plica mediana dorsalis was clearly delineated on fluoroscopy. Despite its presence, bilateral epidural flow of contrast occurred easily. As such, it is our contention based on our experience that the plica mediana dorsalis does indeed exist, but is not commonly seen on epidurography. Even if a plica mediana dorsalis is present, it may well not affect the spread of solutions in the epidural space to any clinically evident degree.

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