—Photogravure—

Anatomical Bases of the Spread of Anesthetic Solution in the Paravertebral Region

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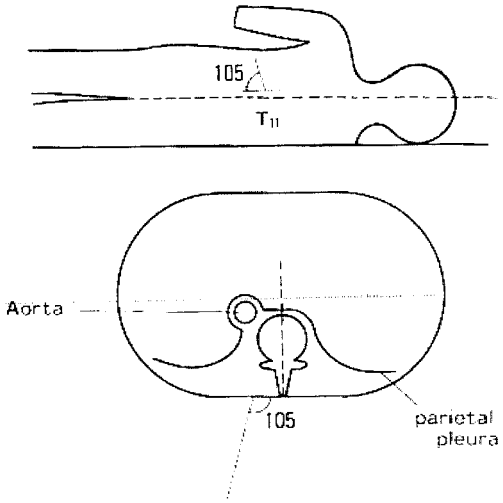

Fig. 1

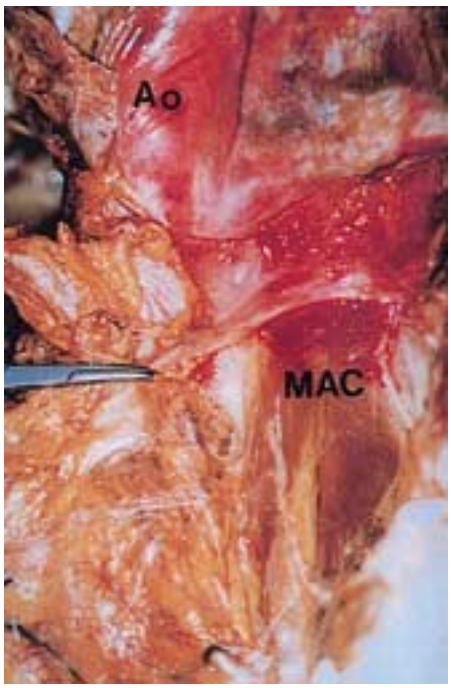

Fig. 3

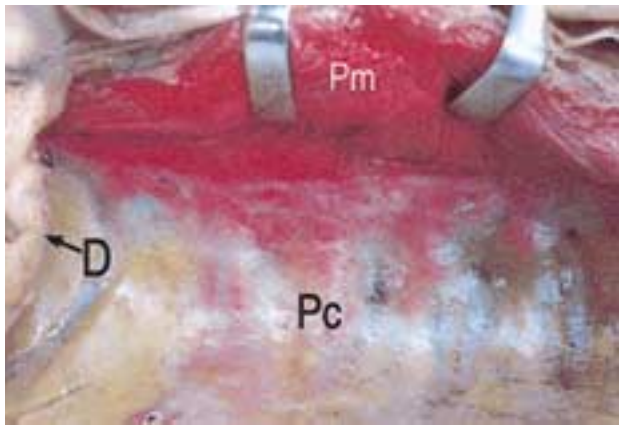

Fig. 2

An injection of a local anesthetic in the paravertebral region produces an analgesic field on the same side of the body. However, the spread of the anesthetic solution in the endothoracic fascia in the paravertebral region is not clearly elucidated yet. One point in question about the block in this region is whether the local anesthetic spreads from the thoracic to the lumbar level of the paravertebral region. We investigated how the anesthetic fluid traveled to the lumbar paravertebral region. A dye was injected into the paravertebral region in the thoracic cavity of cadavers to study the spread of the anesthetic solution.

The dye spread into the abdominal cavity through the medial and lateral arcuate ligaments of the diaphragm while the dye also spread in the chest cavity in the endothoracic fascia posterior to the parietal pleura. In the abdominal cavity, the dye was found to have spread so widely in the transversalis fascia that the subcostal, iliohypogastric, ilioinguinal, genitofemoral, lateral femoral cutaneous and femoral nerves, and the celiac ganglion were involved. Although the cadavers were fixed with formalin solution and although there was no blood circulation in the cadavers, the spread of the dye was comparable to the analgesic region produced by anesthetic solution in the human study in previous studies (ref. 3, 4). The functional structure around the vertebral column is yet to be elucidated.

Fig. 1 Diagram illustrating placement of needle for dye injection. The needle tip reaches the endothoracic fascia just posterior to the parietal pleura (paravertebral region).
Fig. 2 Spread of dye in the chest cavity of a cadaver. The dye spread under the parietal pleura.
Pm: mediastinal pleura. Pc: costal pleura (parietal pleura). D: diaphragm

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Fig. 4

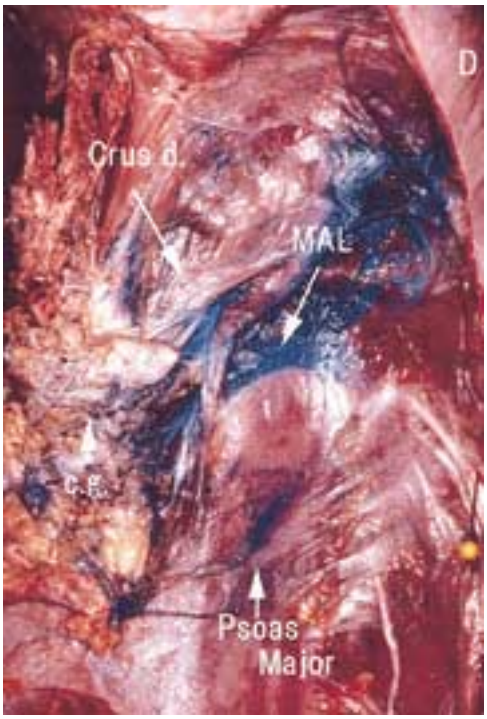

Fig. 6

Fig. 5

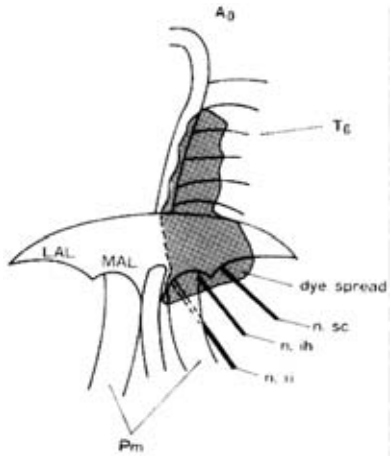

Fig. 7

Fig. 3 Spread of dye in the abdominal cavity. The diaphragm and kidney have been removed to give the clearest evidence of dye spread. Ao: aorta. MAC: medial arcuate ligament.

Fig. 4 Spread of dye to the lumbar nerve segments. The genitofemoral, lateral femoral cutaneous and ilioinguinal nerves were affected by the dye. GF: genitofemoral n. CFL: lateral femoral cutaneous n.

Fig. 5 Spread of dye to the lumbar nerve segments, focusing on the region under lateral arcuate ligament. LAL: lateral arcuate ligament. II: ilioinguinal n.

Fig. 6 Spread of dye toward the celiac ganglion along the greater and lesser splanchnic nerves. The dye reached the celiac ganglion. Crus d: diaphragmatic crus. c. g. : celiac ganglion. MAL: medial arcuate ligament.

Fig. 7 Summary of dye spread after an injection at the left side of the endothoracic fascia. n. sc: subcostal n. n. ih: iliohypogastric n. n. ii: ilioinguinal n.

References

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