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Lateral C2–C3 Subarachnoid Puncture for Metrizamide Myelography or Cisternography

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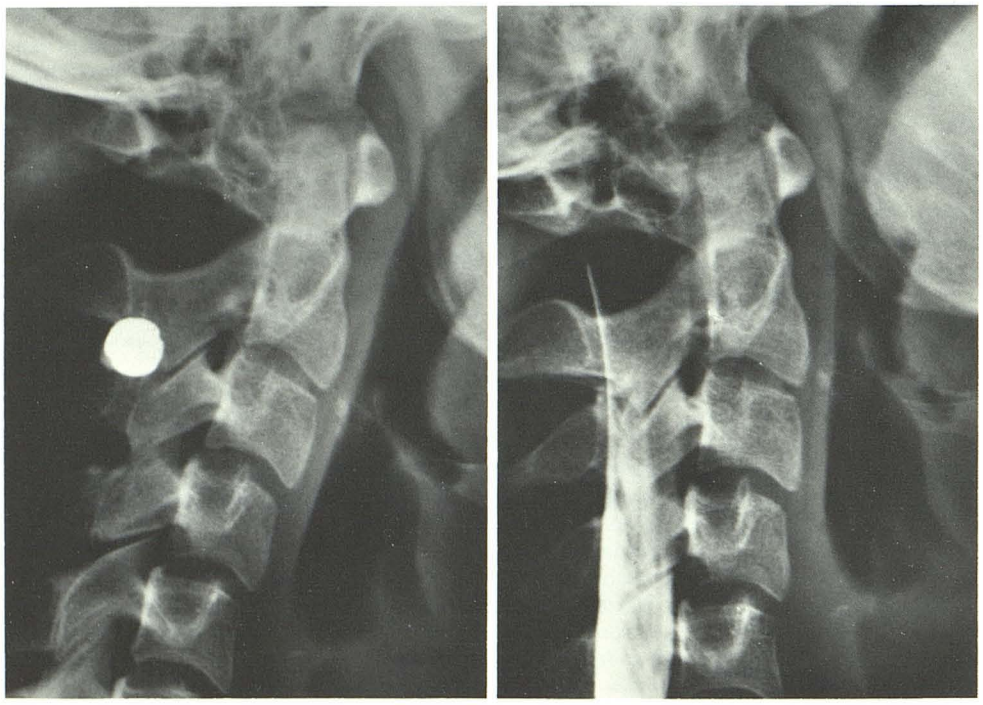
Metrizamide is useful for evaluating both posterior fossa and the cervical spinal canal [1, 2]. Because the contrast material is diluted by spinal fluid *enroute* from the lumbar region to the cervical spinal canal, the C1–C2 puncture technique has been advocated as the most suitable approach for instillation of contrast material [3]. The procedure is safe and without great technical difficulties, although problems with a puncture at this level have been reported with lesions centered at C1–C2, [4]. There is also the possibility of injury of a herniated cerebellar tonsil or anomalous caudal loop of the posterior inferior cerebellar artery. In patients with basilar invagination or congenital fusion deformities of the occiput and upper cervical spine, a C1–C2 puncture may be impossible. Thus, a lumbar puncture remains the safest approach in patients with possible tonsillar herniation or definite rostral cervical pathology. However, as an alternative, a C2–C3 puncture can be used to avoid lesions at the C1–C2 level. This retains the advantages of a C1–C2 puncture without significant increased risk.

A lateral subarachnoid puncture at the C2–C3 level can be made using a technique similar to that for the C1–C2 puncture [4]. The ideal puncture should be at the posterior part of the subarachnoid space behind the spinal cord. While the dimension of the cervical spinal cord at the C1–C2 and C2–C3 levels is the same, there is less subarachnoid space about the cord at C2–C3. When care is taken to remain in the most posterior part of the subarachnoid space, a safe puncture can be made. Flexing the spine increases the depth of subarachnoid space behind the spinal cord; extension brings the cord even closer to the posterior dura.



A B

Fig. 1.—**A**, Lateral view after puncture shows needle hub overlying posterior spinal canal at C2–C3 interspace. **B**, After metrizamide injection.

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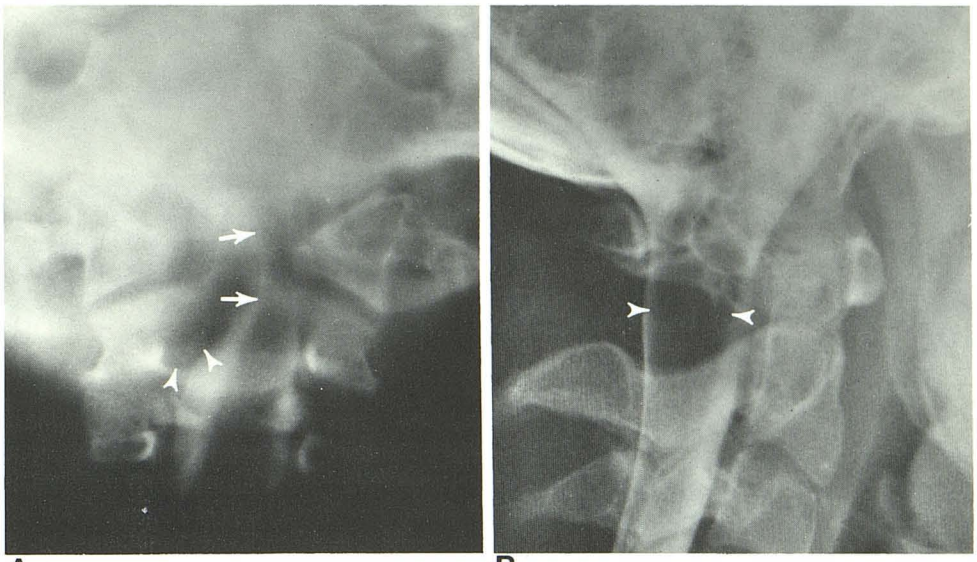

Fig. 2.—**A**, Anteroposterior polytome shows right C1–C2 extradural neurofibroma (*arrowheads*) displacing subarachnoid space and spinal cord (*arrows*) to left. **B**, Metrizamide myelogram after C2–C3 puncture shows widening of distance between posterior elements of C1 and C2 and increased anteroposterior dimension of upper cervical spinal cord (*arrowheads*) secondary to compression by extramedullary neurofibroma.

Technique

Local anesthetic should be injected with a 25-gauge needle into the skin and soft tissues with care to avoid introduction into the subarachnoid space. A 20- or 22-gauge spinal needle is directed under fluoroscopy or plain film localization to the posterior segment of subarachnoid space at C2–C3 (fig. 1). The patient should be in a position that involves the least manipulation. The area of interest should be dependent to avoid contrast dilution and to take advantage of the hyperbaric qualities of the contrast material. Direct lateral approach may be impossible. The facets of C2 may project posteriorly enough that a slightly oblique approach with angling from posterior to anterior may be needed to avoid the lateral articular structures. When cerebrospinal fluid return is established, a specimen can be obtained for laboratory analysis. Metrizamide is introduced in a concentration of 220 mg/cc or higher (fig. 2). Appropriate films are then obtained.

REFERENCES

1. Corrales M, Tapia J. Encephalography with metrizamide. *Neuroradiology* **1977**;13:249–254
2. Gonsette RE. Metrizamide as contrast for myelography and ventriculography: preliminary clinical experiences. *Acta Radiol* [Suppl] **1973**;335:346–358
3. Rice J, Bathia A. Lateral C1–2 puncture for myelography: posterior approach. *Radiology* **1979**132:760–762
4. Amundsen P, Skalpe IO. Cervical myelography with water soluble contrast material (metrizamide). A preliminary clinical report with special reference to technical aspects. *Neuroradiology* **1973**;8:208–212