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A STUDY OF THE INEFFICIENT LUMBAR INJECTION IN THE CISTERNOGRAPHY.
Depresseux Jean-Claude, University of Liège Hospital, Liège, Belgium.

When it is made use of the lumbar way for performing the isotope cisternography, the lack or the insufficiency of the upwards diffusion of the radioactive indicator is a rather frequent occurrence. That inefficient injection occurs even when the spinal and cisternal subarachnoid spaces are perfectly permeable, as assessed by pneumo-encephalography, and in the absence of increased intracranial pressure. That "non obstructive" lumbar stasis set the problem of differentiating a dynamic alteration of the cerebrospinal fluid (CSF) circulation, a pathological function of prominent spinal resorption sites of CSF, or an instrumental perturbation of CSF dynamics.

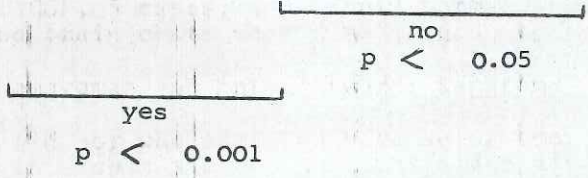
Seventy eight lumbar cisternographies, performed in 41 males and 37 females, 12 months to 71 years old, were reviewed with regard to the diffusion of the radiopharmaceutical in the spinal compartment. The cases of spinal or cisternal subarachnoid blocks and of increased intracranial pressure have been discarded and the selected patients were cases of normo or hypotensive communicating hydrocephalus, of cerebral atrophy and of dementia without atrophy. The technical procedure is standardized as follows : the puncture is performed in the L4 - L5 interlaminar space ; 100 μ Ci of 131 I-human serumalbumin or 1 mCi of 169 Yb-DTPA, in a maximum volume of 1 ml, are slowly injected after an equivalent removal of CSF ; the patient remains in the recumbent position for six hours ; 18, 20 and 22 gauge lumbar puncture needles were indistinctly used. Multissey and hemorrhagical punctures are discarded from the study. One week was the minimum delay from a previous diagnostic or therapeutical lumbar puncture.

The spinal diffusion of the indicator was considered as insufficient in 12 cases in which the cervical activity after a 6 hour interval was less than 0.05 % of the lumbar activity, as estimated on the ratemeter of the scanner. The frequency of that inefficiency of injection correlates strongly with the diameter of the puncture needle on use (see table), while there is no correlation with the diagnosis.

Correlation between the frequency of ineffective lumbar cisternography and the diameters of the needles on use.

Outer diameter of (mm) the needle	1.2	0.9	0.7
Gauge	18	20	22
Total number of cases	13	43	22
Number of ineffective injection	9	2	1

Contingency (χ^2 test)



As a discussion platform, it may be stated that the cisternography indicator distribution is ruled by complex laws and depends more particularly on the initial concentration and diffusibility of the indicator on the injected volume, on CSF fluxes, refluxes and turbulences, on confluents with non radioactive CSF and finally, on the physiological, pathological or instrumental withdrawals of CSF. The strong incidence of the diameter of the needle on the upwards diffusion of the indicator on the spinal compartment permits to conclude that, when a lumbar stasis of the cisternography indicator occurs, a CSF reflux through the puncture hole is frequently concerned. Some complementary conclusions may be derived.

- 1.- The study of the dynamics of the spinal transit of indicators is not a very decisive method for supporting the existence of reverse main flow in the spinal subarachnoid fluid and of lumbar sites of resorption of CSF.
- 2.- High gauge needles are to be discarded for cisternography indicator injection.
- 3.- The radiopharmaceutical dynamics may be considered as a model of the distribution pattern of the intrathecally injected drugs for therapeutical purpose : the use of high gauge needle may involve the pharmacodynamical inefficiency of such injections.
- 4.- When the sampling of small lumbar CSF volumes is desired, especially when cerebrospinal decompression hazards are to be avoided, the use of small gauge needle is preconized on the basis of this work.