Neurosurgical Classic—X

ROBERT H. WILKINS, M.D.
Division of Neurosurgery, Duke University Medical Center, Durham, North Carolina

Shortly after the introduction of air myelography for the demonstration of spinal tumors1,2,5,6,13,14 Sicard and Forestier described positive contrast myelography employing an iodized poppy-seed oil (Lipiodol).3,7—10,12 Because this procedure provided sharper contrast and easier interpretation, it initially received widespread interest. However, it was soon found to be associated frequently with meningeal irritation. In addition, the viscosity of Lipiodol led to occasional false filling-defects, and made its complete removal difficult. Because of these problems, the interest in Lipiodol myelography waned, and it was not often performed after 1950.

During the following ten years, neurosurgeons became aware of the disease process of protrusion of the intervertebral discs, and interest in myelography was again stimulated. A number of new contrast media were proposed, but most were discarded because of unpleasant side effects.12 In 1941, the relatively nonirritating iodine-containing oil, Pantopaque, was introduced.4,11,15 This oil, less viscid than Lipiodol, was found to outline better the finer structure of the spinal canal, and proved easier to remove. Since that time, no better contrast medium for myelography has been introduced.4

The two papers reproduced below represent the two major steps in the development of present-day myelography.

References


GENERAL METHOD OF RADIOLOGICAL EXPLORATION BY IODIZED OIL (LIPOIDOL)*

By MESSRS. SICARD AND FORESTIER

For a long time it has been recognized that the preparation of iodized oil, the so-called Lipiodol,

has the capacity to stop X-rays. However, radiologists have pointed out this fact only as a matter of simple curiosity.

We have thought that this particular quality of Lipiodol could be applied usefully to the radiological study of the cavities of the body. The results obtained have confirmed our hypothesis.

Lipiodol results from the complete and total combination of iodine and poppy-seed oil (Lafay). (We owe Mr. Lafay thanks for the liberality with which he has made Lipiodol available to us, as well as for the determinations of iodine which he has been kind enough to make in patients subjected to this medication.) Iodine is found concealed in this combination. The product is transparent, keeps the coloring of the original oil, but appears of a great density, not supernatant, but falling to the bottom of the water. Under the influence of a long stay in the open air, it becomes blackish, "and in this case it is preferable not to inject it" (Lafay). One cc. of iodized oil contains about 0.54 gm. of iodine. This oleo-iodine is tolerated remarkably by the tissues. We have sometimes injected it in a dose of 10—12 cc. in a single lumbar-muscle hypodermic injection without provoking more than a local reaction of a transitory type. It causes no redness of the skin, it leaves no hardened tissue, and out of several hundred injections we have noted neither abscess nor general or local incident, and no appreciable tendency to encystment or to vaselinome. The injections can be repeated with impunity, even daily, into muscular or cellular tissues, up to an aggregate amount of 80-100 cc. (we have not yet exceeded this figure) without provoking the least sign of intolerance. It can be injected intravenously (Rathery).

Furthermore, because of its heavy density, Lipiodol responds to gravity and passes readily into cavities or muscular interstices. It gives, either with impregnations at some distance removed from the original site of injection (fluid cavities and cerebrospinal fluid, for example) or with uninterrupted passages through tissues (muscles, epidural cellular tissue, etc.), movements of iodized oil of great interest to follow under radiological control. It remains visible radiologically for a long time in the tissues.

Thus, it is proved that Lipiodol combines all requisite conditions for exploring the cavities of the body without danger: great opacity to X-rays, absence of causticity and of toxicity, absolute tolerance, capacity for passage and prolonged visibility.

We first studied in a therapeutic and diagnostic respect the action of Lipiodol injected into the epidural cavity in patients with lumbar hyperesthesia, lumbar arthritis, or in those with lumbo-ischialgia (see Sécard and Forestier. Exploration de la cavité épiphrade par le lipiodol. Société de Neurologie, December 1921). We have, thus, obtained most convincing radiological illustrations.

The epidural cavity can be approached by the sacrococcygeal hiatus, as we have already demonstrated, or through the yellow ligaments all along the vertebral segments.

Sacrococcygeal injection of 2 cc. of Lipiodol permits, as soon as the day following injection, recognizing radiographically the epidural upward extension of the oleo-iodine to about the 5th lumbar vertebra. Tracks and spaces of iodized oil appear at the level of the sacral canals.

Epidural injection of Lipiodol made higher up by the lumbar method in the way of ordinary spinal puncture—rachicentesis—(but with a special trocar needle designed to avoid the opening of the dura mater and the egress of cerebrospinal fluid) permits seeing as early as a few hours after injection the lower extension of the oleo-iodine to the coccyx. If by a mechanical contrivance, such as placing blocks of wood under the feet of the bed, a kind of so-called static Trendelenburg position maintained for some ten hours is realized in the patient so injected, radiography will permit revealing, after this lapse of time, the high epidural localization of the iodized oil to the vicinity sometimes of the upper dorsal vertebrae, and that is realized by the tracks of iodized oil uninterrupted from the point of original departure of the injection.

It is understood that, according to the amount of Lipiodol injected, 2-6 cc. for example, and according to the point-of-reference epidural stages, the epidural cavity can be consulted methodically in its different segments when there is investigation, for instance, of a neoplastic diagnosis or one of Pott’s disease, indicated by pressure.

The epidural injections of iodized oil are painless and remain painless. The radiographic pictures become fixed almost definitely twenty-four hours after injection. The extension is halted from that time on and the resorption of the Lipiodol is so slowly produced that radiologic pictures taken in case of need, even several months later, are hardly altered. Patients with lumbar hyperesthesia, lumbar arthritis, and lumbo-ischialgia benefit remarkably from the direct epidural therapy.

Injection of Lipiodol made no longer into the epidural cavity but into the cerebrospinal fluid after lumbar puncture is well tolerated, with this reservation, however, that the habituation of the subarachnoid sac to the foreign substance of iodized oil is accomplished only after a painful period of 2-3 days. It is necessary to warn about the appearance during this initial stage, 6-7 hours after injection, of symptoms of pain in the legs; namely, various paresthesia and formications, transitory reactions which are lessened markedly.