Risks of Laser Discolysis

TO THE EDITOR: The letter from Dr. Lavyné (Lavyné MH: Complications of percutaneous laser nuclease. J Neurosurg 76:1041, June, 1992 (Letter)) deserves comment. I do not know if the patient described was one of our patients treated at St. Luke’s Roosevelt Hospital Center, but the “carbonized, blue-discolored anulus and posterior longitudinal ligament adjacent to an encapsulated sequestrum of soft disc material” that he found at open discectomy indicates incorrect placement of the needle.

In our series of 204 procedures performed to date, we stress precise needle placement. Without this essential element, it is not possible to perform a successful percutaneous laser disc decompression. The needle must be parallel to the horizontal axis of the disc; midway between the two endplates, and the tip must be just beyond the anulus fibrosus. When the needle is so placed, it is not possible to vaporize the anulus since the optical fiber is in the nucleus pulposus and the laser track is only in the nucleus. In Dr. Lavyné’s patient, no laser track “was seen in the disc material obtained from the interspace.” This indicates that the laser beam did not impact on the nucleus, but rather on the anulus.

In in vitro experiments, when 1000 J of energy from a neodymium:yttrium-aluminum-garnet (Nd:YAG) laser is delivered through a 400-μ core quartz fiber, a 1.0 × 0.4-cm laser track is produced in the nucleus pulposus. This energy (1000 J) will reproducibly result in the same size of track in any nucleus, provided the water content is the same. In none of these experiments was there any retrograde laser ablation of the anulus.

It is possible that, in the patient reported by Dr. Lavyné, the needle tip was placed too posteriorly, with the optical fiber abutting the anulus, thus causing the laser damage to the anulus and posterior longitudinal ligament. The lack of laser effect on disc material is further proof of this hypothesis. In our 192 procedures, we have encountered one complication, a sterile discitis, for a complication rate of 0.5%. Properly performed, percutaneous laser disc decompression is both safe and effective.

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References


RESPONSE: The conceptual problem with laser discolysis that Dr. Choy fails to recognize is that one cannot determine with certainty the laser power needed to vaporize only degenerated disc material without injury to the surrounding structures, based upon our current radiographic techniques. As any neurosurgeon who has performed a series of lumbar discectomies well knows, the water content of degenerated disc material varies from patient to patient. Projecting laser power requirements from the experimental situation to the clinical one is impossible. The patient I reported received the laser treatment under Dr. Choy’s auspices and I assume that the needle tip was in the proper position when the laser was activated. Whether or not laser discolysis will prove to be an alternative to conventional discectomy for patients with single-level disc herniation has not yet been determined. I do know, however, that laser discolysis is not risk-free, even in a laser specialist’s hands.

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