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Low-cost method of presenting visual stimuli during MR.

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LETTERS

Low-Cost Method of Presenting Visual Stimuli during MR

Although most current magnetic resonance (MR) systems allow communication with the patient as well as musical entertainment, visual distraction remains difficult, because conventional video technology will not function in strong magnetic fields. There are commercial visual display systems available that address this problem, but most are quite expensive. We developed a low-cost approach for projecting slides and used a patient survey to investigate whether this visual distraction improved the patient's MR experience.

For the Siemens radio frequency room, a slide projector and translucent ground glass screen were positioned behind the bore of the scanner. This radio frequency room design uses a screen at the back of the magnet bore and as an integral part of the radio frequency enclosure. The projector then is outside the radio frequency cage, avoiding interference from the fan motor. Images were projected on the ground glass screen and viewed by the patient through prism glasses. During the MR exam, we projected 80 exotic travel slides provided by Jan Reynolds (Out There, Stowe, Vt) using the timer function on the projector.

We surveyed 40 patients' responses to MR, but only 20 viewed the slides. The questionnaire consisted of five questions each, with five possible responses: strongly agree, agree, no feeling, disagree, strongly disagree. These questions focused on several aspects of the imaging experience. We also questioned the patients regarding their expectations before imaging.

We found there was no significant difference between the study group and controls regarding preimaging expectations. We did find that the group who saw the slides consistently reported their imaging more pleasant and less confining than the patients who did not view the slides. The greatest difference was found in patient perception of boredom. The group who saw the slides indicated much less boredom.

In the general examining room, a translucent screen was suspended from the ceiling at the foot of the patient table, and the slide projector was positioned on the technologist's console. The slides were projected through the screen in front of the operator's console and viewed by the patient through the mirror in the head coil. This system currently is being used for presentation of images during cognitive studies with functional MR imaging. Images of words and faces are projected during the exam. There is no significant degradation of brightness or clarity of the images when projected through the radio frequency screen, and the subjects report no difficulty in seeing these projected images.

In some of our early attempts to use slide projectors in the MR environment, we encountered problems with the projectors. Two fan motors burned out in a short operating

time, presumably because of uneven forces on the bearings. The newer self-shielded magnet designs facilitate the use of slide projectors because of the limitations of the fringe field.

Our experience suggests that the presentation of visual stimuli during imaging alleviates patient perception of boredom and confinement. Centers that image children frequently or out-patient MR centers that want to provide a unique service might find immediate applications for this low-cost approach to image presentation. For cognitive studies, this is an effective technique for image presentation in the MR unit. It is our hope that future MR systems will incorporate some more elegant solution in view of the positive patient response to images.

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Preoperative Spinal Angiography for Lateral Extracavitary Approach to Thoracic and Lumbar Spine

We enjoyed reading the interesting article by Champlin et al (1) describing the value of preoperative x-ray angiography in the lateral extracavitary surgical approach to the thoracic and lumbar spine in the management of spine trauma. The authors are to be congratulated on the excellent discussion of blood supply and pathophysiology of spinal cord infarction as a result of this type of procedure.

A rich and complex system of intraspinal and extraspinal anastomoses forms the pathways of vicarious circulation in the spinal cord (1-3). Thus, it is critical to understand the patterns of collateral circulation at the level of the segmental arteries before surgical management is undertaken (4). Furthermore, it is well known that the segmental arteries and the longitudinal anastomoses play an important role in the prevention of spinal cord ischemic injuries, not only in vertebrospinal surgery but also in thoracic and abdominal aorta surgery (5).

The authors stress that when there is damage proximal to the collateral channel of adjacent segmental arteries, there is a lesser chance of inducing spinal cord ischemia

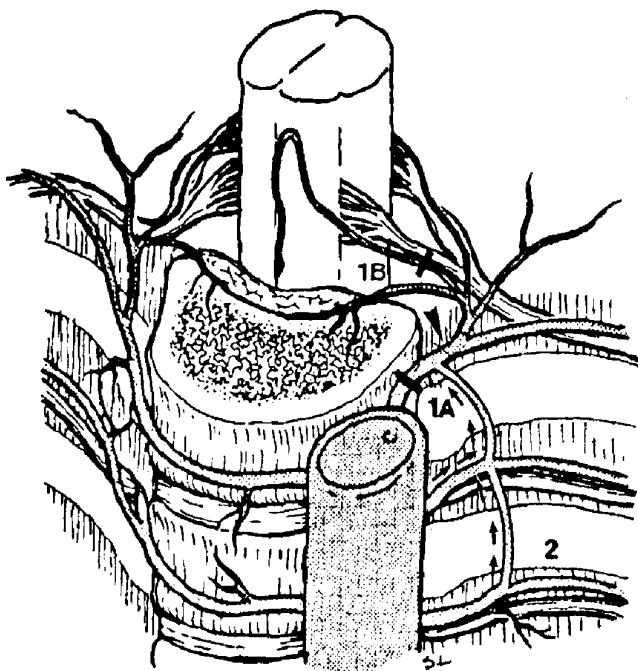


Fig 1. A and B indicate the potential sites of spinal artery surgical ligation in the anterior approach (A) and the lateral extracavitary approach (B) (modified from Champlin et al [1] Fig 2). The ligation of the segmental artery should be performed at a site that is as close to the aorta as possible to allow collateral circulation (2, arrows) to the spinal cord. The risk of spinal cord infarction increases when damage or ligation occurs more distally (arrowhead) between the longitudinal collateral anastomoses (2, arrows) and the take-off of the radicular artery during the anterior or anterolateral surgical approach.

(1). In their Figure 2, the authors clearly labeled two potential sites that may interrupt blood supply to the spinal cord. The first one is at the level of the segmental artery proximal to the collateral channels of adjacent segmental arteries, and the second is at the level of the radiculomedullary artery.

However, we think there is a third site with increased risk of spinal cord infarction when acute damage is induced at a more distal site of the segmental artery, between the longitudinal anastomoses and the branching of the radicular artery (Fig 1). Should injury occur in this region, spinal cord ischemia is likely attributable to a lack of major collateral supply.

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Reply

We appreciate Tartaro and Simonson's clear and cogent comments on arterial spinal cord and anastomotic channels. They appropriately pointed out another potential site of radiculomedullary artery surgical injury, that being distal to the two mentioned by us. This intradural site of potential interruption usually is not dissected at the time of surgery via the lateral extracavitary approach.

However, during intradural dissections (eg, for intradural extramedullary tumors), this site of potential vascular interruption provides a significant source for ischemic injury of the spinal cord. Spinal angiography perhaps should be considered in many of the patients undergoing this type of surgery. An angiogram should be carefully scrutinized for potential radicular anastomotic channels, and surgical decision making thus more appropriately accomplished.

Again, we thank Tartaro and Simonson for their comments and their elucidation of the anatomical nuances of spinal cord vascular supply. We hope we can achieve higher levels of diagnostic acumen with greater knowledge of vascular anatomy and their clinical implications.

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