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Spinal taps carry higher risks for infants and elderly, study shows

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An X-ray-guided spinal tap procedure fails more than half of the time in young infants and should be used sparingly, if at all, for those patients, according to a new study done by researchers at Wake Forest University School of Medicine.

The study also shows that the X-ray-guided form of spinal tap, called fluoroscopy-guided lumbar puncture, causes a doubling in risk of bleeding for patients older than 80 compared to younger patients and that the risk of bleeding caused by the procedure can be reduced by doing the puncture at the middle of the lower back rather than at the lowest levels of the spine.

The full study appears in this month's issue of the American Journal of Neuroradiology, published by the American Society of Neuroradiology.

"The purpose of this study was to look at which factors related to doing a spinal tap result in a greater chance of bleeding caused by the needle," said Annette J. Johnson, M.D., M.S., the study's senior researcher and an associate professor of radiologic sciences. "We are trying to figure out how to minimize the number of times we cause bleeding when doing this procedure."

Fluoroscopy-guided lumbar puncture is used most often to diagnose patients who have sudden severe headache, possible meningitis infection or cancers around the brain.

Doctors perform this type of spinal tap to analyze cerebrospinal fluid, which can help determine why a patient is sick. A patient who has a fever and stiff neck, for example, might have abnormal white blood cells in his cerebrospinal fluid, indicating that the symptoms are caused by meningitis, whereas the cerebrospinal fluid of a patient with a severe, sudden headache might contain a significant amount of blood, a sign of possible ruptured aneurysm.

During the lumbar puncture, a small needle is inserted into the patient's lower spine. Fluoroscopy is the use of radiation in real time to take a picture that more precisely locates where to put the needle, avoiding bone spurs and bony narrowings related to scoliosis. Sometimes the placement of the needle during the procedure causes some bleeding into the cerebrospinal fluid. This type of problem, seen in up to a quarter of cases, makes it more difficult to diagnose the patient, Johnson said, because it is hard to determine if the blood is a symptom of the condition or a result of the lumbar puncture.

"Because cerebrospinal fluid tests provide very valuable information in making the diagnoses of several serious diseases - such as bleeding in the head, cancer of the brain or spine, meningitis, infection of the brain, or multiple sclerosis - and because obtaining the fluid involves insertion of a long needle into the spine, it is important that we optimize the most safe and effective methods of doing this procedure," Johnson said.

For the study, researchers reviewed the files of more than 750 patients ranging in age from less than 1 year to 90 years old. All had received a fluoroscopy-guided lumbar puncture in emergency room, outpatient or inpatient settings.

Results show that fluoroscopy-guided lumbar punctures failed in about 60 percent of the cases that involved very young patients, meaning that no cerebrospinal fluid could be obtained at all. The needle caused

bleeding into the cerebrospinal fluid in about 25 percent of the infant cases where the doctors were able to obtain the fluid, according to the study.

"This finding suggests that in infants, physicians may opt to use ultrasound to guide the needle for lumbar puncture or work without the cerebrospinal fluid altogether," Johnson said. "It's just not worth the radiation and high chance of failure or bleeding that fluoroscopy-guided lumbar puncture carries in these very young patients."

For patients older than 80, the researchers found that such bleeding happened in about 26 percent of cases - twice the rate seen in patients ages 1 to 80. Johnson said clinicians in those cases should attempt to insert the needle in the middle of the lower back, where the study found risk of bleeding is less likely. Clinicians should also double check to make sure these elderly patients are not taking medications that thin the blood and increase the chance of bleeding, she added.

Regardless of age, punctures in the lower part of the low-back were twice as likely to result in bleeding as were those in the middle low-back.

"We were somewhat surprised that needle size was not related to rate of bleeding caused by the needle," Johnson said. "This result may be related to the fact that only two sizes of needles were commonly used in our study and both were small. However, we did find that the risk of bleeding was higher as you went lower in the spine.

"Lumbar punctures will very likely continue to be a common medical procedure," Johnson added. "The findings of this study should help ordering physicians decide how best to order this test and should help radiologist physicians choose at which levels to perform the procedure."

Source: Wake Forest University Baptist Medical Center (news : web)