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TITLE: VALVE INJURY: A NEW COMPLICATION OF INTERNAL JUGULAR VEIN CANNULATION

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Introduction: Although internal jugular vein cannulation is performed commonly in the practice of anesthesiology, most anesthesiologists are not aware of existence of the internal jugular venous valve. This is the only valve between the right atrium of the heart and the brain, and it has an important role of prevention of retrograde blood flow and increased back pressure to the brain. The valve incompetence due to injury from internal jugular vein cannulation may impair cerebral venous return, which might lead to intracranial venous engorgement and increased intracranial pressure.

In this study, anatomic appearance of human internal jugular valves is described, and the competency of these valves is assessed. And also we examined a safe approach to percutaneous cannulation of the internal jugular vein to avoid this complication.

Methods: In the cadaveric subjects the internal jugular vein with its valve was removed at the time of autopsy. These specimens were dissected open and the appearance of the valves was observed. In the living subjects, to examine the movement of this valve endoscopic visulalization utilizing the superfine fiberscope with an outer diameter of 0.8mm, ultrasound techniques with a duplex prove consisting of a 7-MHz imaging transducer and a 5-MHz Doppler transducer placing just above the clavicle, and invasive venography were applied. Next, to detect the competence of the jugular venous valve, transvalvular pressure gradients were measured. One catheter was positioned above the valve in the internal jugular vein and the other one was positioned below the valve in the superior vena cava. The competency of the internal jugular venous valve was tested by asking patients to produce a series of forceful coughs, thereby suddenly increasing intrathoracic pressure.

Results: 19 internal jugular valves were obtained from 20 cadaveric subjects. These valves were situated directly above the termination of the internal jugular vein into the inferior bulb. The valves in 16 of the subjects were bicuspid and semiluminar. 2 valves had single cusp. One valve contained a third cusp. All of the valve were very thin, translucent structures.

The opening and closing of the valve was easily visualized with both superfine fiberscope and real-time ultrasound technique. During the central approach which was performed at the summit of the cervical triangle, the needle was demonstrated to cross the internal jugular venous valve. On the other hand, in the high-point approach at the level of the cricoid ring or higher the needle could not reach this valve.

Patients with competent valves showed transvalvular pressure gradients of 50-100mmHg during cough-induced high intrathoracic pressure. Cephalad to the valve, the pulsed Doppler recorded forward blood flow with the valve open and no flow with the valve closed.

Discussion: Although many complications after internal jugular vein catheterization have been described, valve injury of internal jugular vein has not been reported before. In this study, internal jugular venous valve has shown to present 0.5-2.0cm above the union of the subclavian and internal jugular veins, and has shown to possess an important role of preventing retrograde blood flow to the brain.

Among the several different approaches, the central approach performed at the summit of the cervical triangle has shown to have a risk of injuring the internal jugular venous valve, which might lead to cerebral venous congestion during mechanical ventilation. To avoid this valve injury, it is recommended that the venepuncture should be performed at the level of the cricoid ring or higher in the neck.

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Title: ARE SOME PREOPERATIVE LABORATORY ASSESSMENTS MORE BENEFICIAL THAN OTHERS?

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Previous studies have suggested that the number of preoperative laboratory tests in asymptomatic individuals could be reduced without adversely affecting patient care. We undertook this study to determine which of a battery of commonly performed preoperative tests was least beneficial in the perioperative care of symptomatic and asymptomatic individuals.

With the approval of the review board of each institution and with patient consent, patients completed an automated health history questionnaire, HealthQuiz. This device provided a printout of suggestions for preoperative laboratory tests (Hct/Hb, WBC, Diff, Plt, PTT, PT, BT, Lytes, BUN, Cr, Glu, SGOT, SGPT, LDH, Ca, Mg, Alb, Prot, UA, ECG, CXR, Phos, Chol, AlkPhos) based on an algorithm utilizing the patient's symptoms. Surgeons and/or anesthesiologists also ordered preoperative tests for patients based upon their findings in a conventional history and physical examination. Abnormal and significantly abnormal test results were noted. Significantly abnormal results are those values outside of reported limits that might warrant treatment of a specific abnormality.[1] On the day of surgery, patients' anesthesiologists (different from the physicians who ordered the tests and blinded to the method of test selection) were queried postoperatively to determine whether any abnormal result changed perioperative patient management and if so, whether such a change resulted in harm or benefit to the patient.

Of a total of 21,318 test results obtained from 1,747 patients, 2,715 (12.7%) were abnormal, 727 (3.4%) were significantly abnormal, 137 (0.6%) affected care, and 92 (0.4%) benefited patients. In the judgment of the blinded anesthesiologists caring for the patients on the day of surgery, nearly 1% of the patients who had preoperative CXR (10:1034) and 2% of patients having preoperative ECG (22:1147) benefited from the pursuit of these abnormalities, whereas no patient received benefit from preoperative laboratory assessment of WBC (1584), Diff (1045), UA (715), LDH (869), or AlkPhos (661).

Since approximately half of the preoperative laboratory tests in this study were ordered after a thorough preoperative history and physical examination and not in a random, unscreened fashion, the design of this study was biased toward finding benefit from preoperative laboratory assessments. Nevertheless, in the case of WBC, Diff, UA, LDH, and AlkPhos, we were unable to demonstrate a single instance of patient benefit as a result of preoperative laboratory assessment. We conclude that abnormalities are commonly found on preoperative laboratory assessment. For the aforementioned tests, however, these abnormal results did not lead to beneficial changes in patient management. Given the high costs associated with these tests and the possibility of iatrogenic complications from the pursuit of false-positive results, our preliminary data suggest that it may be difficult to justify these tests in asymptomatic patients on a cost-benefit or risk-benefit basis for preoperative evaluation.

1. JAMA 253:3576-3581, 1985