Is the Allen’s Test Accurate for Patients Considered for Transradial Coronary Angiography?

As a strong proponent of transradial cardiac catheterization who long ago stopped using the Allen’s test, I read the study by Greenwood et al. (1) with great interest. As correctly pointed out in the report, no published study of hand ischemia has been reported after transradial procedures nor after surgical harvest related to the state of the Allen’s test. This suggests that the hand circulation is very resilient and the sequela of hand ischemia is at least rare. Complications from indwelling radial arterial lines reported in the critical-care literature have likewise not shown an association with the results of an Allen’s test. Several high-volume transradial operators have told me that they too have abandoned the traditional Allen’s test as not clinically relevant.

It is reasonable to expect ischemia in any poorly collateralized vascular bed subjected to vascular occlusion as found by the researchers when they occluded certain radial arteries. Total occlusion of the femoral artery for 30 min will likewise probably cause elevated lactates and signs of limb ischemia. Multicenter trials of femoral closure devices and drug trials used during interventional procedures provide a real-world testimony of the hazards of transfemoral catheterization that is without precedent in the transradial catheterization experience (2). The results presented by Greenwood et al. (1) do lend support to the hypothesis that the Allen’s test may identify patients with the potential for poor collateral flow. Conversely, the conclusions reached by the investigators that transradial procedures should not be done in patients with an abnormal Allen’s test is not supported by the actual experience but rather appears to be a premature leap from a simple physiology experiment to a practice guideline with no weight of clinical evidence. Most patients with an abnormal Allen’s test, if presented the facts and given a choice, would probably stick with a transradial procedure and a theoretical risk of hand ischemia than opt for the transfemoral approach with a real risk of a vascular complication.

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REFERENCES


Use of the Allen’s Test and Transradial Catheterization

The study by Greenwood et al. (1) carefully assessed the relative contribution of collateral palmar circulation during 30 min of radial artery occlusion. Their conclusion, however, that “transradial cardiac catheterization should not be performed in patients with an abnormal Allen’s test” is not a valid interpretation of their data.

What they have elegantly demonstrated is that among patients with an abnormal Allen’s test, occlusion of the radial artery results in an immediate reduction in blood flow to the principal artery of the thumb by 90%, improving to a 75% reduction after 30 min of arterial occlusion. At the same time, pulse oximetry gives a strong signal in 0% of patients immediately following radial artery occlusion, rising to 64% at 30 min.

The investigators infer that this reduction in blood supply has physiological significance, and that the vascular reserve inherent in hand circulation is inadequate to compensate over time for occlusion of the radial artery, despite acknowledging that either the superficial or deep palmar arch is always complete in cadaver dissections (2). They assume that further clinically relevant collateral recruitment will not be achieved, despite having shown that blood flow in the principal artery of the thumb can improve by over 100% in the first 30 min after radial artery occlusion.

The radial artery approach has now been widespread for 15 years, and is used at hundreds of cardiac centers. Therefore, many thousands of patients have undergone transradial procedures either with a false positive Allen’s test (due to incomplete digital occlusion of the radial artery) or with no assessment of palmar arch circulation at all (3,4). If one accepts that 5% of these patients will develop radial artery occlusion, then if a true positive Allen’s test is an important prerequisite for a safe transradial procedure, there should be many examples of ischemic hands following transradial catheterization. Greenwood et al. acknowledge, however, that there are none.

Finally, there is no evidence that a normal Allen’s test is required for the safe undertaking of a transradial procedure. It is important not to deny this access site to patients with an abnormal test, particularly those in whom a femoral procedure carries increased risks (5).

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