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Letter to Editor

Modified Allen´s Test

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Abstract

Traditionally, a positive modified Allen's test (=MAT) had been considered a reliable proof of impaired arterial circulation in the hand. All medical books and plenty of data base for medical students and junior doctors include MAT as an essential procedure before Arterial Blood Gas (=ABG) test is taken. And the instructions are precise and clear: do not perform ABG from the radial artery if modified Allen´s test is positive.

Nonetheless, any doctor that had worked in the UK, can attest that MAT is seldom performed before taking ABG, no matter in emergency department, medics or anaesthetics.

A search in the Literature was conducted. We could not find any evidence that demonstrate the usefulness of MAT prior to ABG. We conclude that unless further evidence is available, MAT should be withdrawn from exams as a rule of thumb prior to performing ABG (at least in the absence of peripheral vascular disease).

Keywords: Modified Allen´s Test; arterial blood gases

Dear Editor

Allen´s test was first described in 1929 by Dr E.V. Allen, for arterial supply to the hand assessment of 3 patients diagnosed with thromboangiitis obliterans. The original description was performed making a fist with the affected hand, occluding the radial artery for one minute, extending the fingers and watching for return of colour. No time limit for blushing of the palm was described [1].

Original Allen´s test has been altered and nowadays is called the Modified Allen's Test (=MAT) [2,3]. MAT is performed by having the patient make a fist for 30 seconds, causing the hand to blanch. Pressure is applied over the radial and ulnar arteries to occlude them. The patient is then asked to open the fist and the examiner releases the ulnar artery, but keeping pressure on the radial artery. On a theoretical basis, if collateral circulation is not impaired, return to normal colour to the hand (better seen in palmar area) should be within 3 to 12 seconds, thus being called a "negative" or "normal" MAT [4]. If it does not, then it is called a "positive" or "abnormal" MAT, and no intervention should be performed on that radial artery. Several studies had been published [5-7], concluding that MAT usefulness is severely limited: no consensus on the cut-off point between positive and negative MAT, observer biases in deciding when the normal palmar blush has returned, and methodologic errors (i.e.: hyperextension of the wrist or metacarpophalangeal joints or incomplete compression of the radial artery). Furthermore, most critically ill patients cannot cooperate for the performance of the test as described [8].

Traditionally, medical books and plenty of exams and data base (if not all of them) for medical students and junior doctors include MAT as an essential procedure to be performed before ABGs are taken, otherwise, you will fail that exam´s question [9].

Nonetheless, in current clinical practice in emergency departments both in Spain and in the UK, it is commonly disregarded and seldom used before taking ABG. Actually, in 2 year´s practice as A&E doctor throughout the United Kingdom, and having spoken with one hundred A&E doctors, I´ve only met two of them (both were very young) who routinely performed (or at least this was what I was told) MAT before taking ABGs.

What is the real cause of this mismatching between what had been taught and it is profusely written in OSCE´s and plenty of exam´s books, and what it is done in routine clinical practice in the Emergency Department? Is it the lack of time to perform it in A&E, neglect, or futility, the real reason(s) of this omission? Next question comes up immediately: is there any published paper about MAT´s usefulness before taking ABGs?

We searched the web looking for this evidence (Allen´s test, arterial blood gas). All the articles found where actually about MAT validation for radial artery cannulation. So we suspect that considerations about MAT and radial artery cannulation had been extrapolated to MAT and ABG sample taking…

Anyway, this should be of stronger value to our suspicions: if positive MAT is not even valid for prediction to avoid cannulation, lesser prediction value for just an ABG puncture…

Even though, no article could demonstrate that MAT is essential and indisputable before performing cannulation.

Certainly it looks like "further clinical experience is necessary to establish a more reliable screening method" both for radial artery cannulation and ABG performance.

Of course, some studies [10], stated that MAT is a good and valid screening test for the circulation of the hand: if the Allen test is negative it is safe to harvest the radial artery. If it is positive further examinations are needed to ensure safe harvesting of the radial artery.

Kohonen *et al* [11] demonstrated that in terms of morphology, there was no statistically significant difference between patient´s both hands (no matter dominant or contralateral). In the case of a non-harvestable radial artery in a hand there is clearly an increased risk for contraindication for radial artery harvest also in the contralateral.

But we think the most definitive proof about MAT uselessness prior to taking ABG is stated in Slogoff´s study [12]: 16 patients with positive MAT were cannulated from radial arteries, but no abnormal flow or ischemia detected. Furthermore, in 22 patients, the ulnar artery was cannulated after multiple unsuccessful punctures of the ipsilateral radial artery and also no ischemia was detected at all. Their conclusion was that in the absence of peripheral vascular disease, the MAT is not a predictor of ischemia of the hand during or after radial artery cannulation, that when decreased or absent radial artery flow follows cannulation it is of no clinical consequence.

If the conclusion about a great proportion of all the studies in the Literature agree that MAT before radial artery cannulation is not reliable and should not be considered a "standard of care", and ultrasound techniques should be used, if we extrapolate again those conclusions to ABG sampling, should we employ also US before taking ABG?

We can see that even MAT is stated as the absolute truth by exam´s books, no absolute evidence is available at the moment, no written consensus about the real role of the MAT whenever performing ABGs [6]. If so, why are we still forcing our students and junior doctors to study and learn by heart as an absolute truth, something that when get into real practice, they will ascertain is no longer useful? We honestly believe all doctors should know MAT, but we don´t agree about teaching dogmas in Medicine, when they are not. Unless further evidence is put on the table, MAT should be withdrawn out of exams as a rule of thumb prior to performing ABGs (at least in the absence of peripheral vascular disease).

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