Making collapsing pulse user-friendly

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ABSTRACT

Collapsing pulse is generally elicited by elevating the patient's arm. However, the pulse becoming stronger on arm elevation is a physiological phenomenon, which is bound to create confusion, if routine lifting of the arm in search of collapsing pulse is practiced. The name 'collapsing pulse' represents only the second component of this sign. It masks the more important first component - the slapping, bounding upstroke, characterised by its other name 'water-hammer pulse'. It is possible to elicit this sign by appreciating the slapping character on routine pulse examination. The insistence on arm lifting in medical school teaching is better avoided.

KEY WORDS:
Collapsing pulse; Arm lifting; Water hammer pulse

INTRODUCTION

Arterial pulse examination aims to determine the heart rate, rhythm, stroke volume and the pulse wave character. All of them could be performed at the radial artery. It is disturbing to note that the current teaching in medical schools appears to be to lift every patient's arm abruptly while feeling the pulse with the palm specifically to look for a collapsing pulse. Question arises, is this method necessary, and is it not rather misleading for the beginners? The author with his two decades' clinical teaching experience believes that this practice has become a crude step blindly followed by medical students as a necessary one in physical examination without understanding the mechanism of collapsing pulse. The author thinks that it would be less confusing, if the character of the pulse is appreciated during the routine pulse examination. Collapsing pulse is possible only in cases where there is a strong, bounding pulse due to the increased stroke volume in all conditions causing it.[1] Lifting of the arm of the patient may be needed, if at all, to confirm a collapsing pulse, when it is suspected to be present on routine examination. So, it is unnecessary to elevate the arm of the patient in search of a collapsing pulse in every case. The author believes that this very dramatic and useful clinical sign should not be unnecessarily glamourised, but made user-friendly.

Does the name 'collapsing pulse' fully define this clinical sign? The character of the pulse in aortic regurgitation (AR) and other conditions causing collapsing pulse is high volume, bounding and slapping followed by its sudden disappearance – the collapse. The other name for collapsing pulse - water hammer pulse - brilliantly portrays the initial slap, but not its second component – the collapse. Water hammer an obsolete Victorian toy, an empty tube with some water but no air inside produces a pistol shot like sound, when it is inverted.[2,3] The sound produced by the water hammer and the slap felt on palpation of collapsing pulse are comparable in their abruptness and intensity.

The issue

The name "collapsing pulse" is not fully descriptive of the phenomenon it represents, as it refers only to the second component of this sign. Anything to collapse has to rise high first. The collapsing pulse also rises high before it collapses. The steep, abrupt surge caused by a large stroke volume pumped into a rather empty arterial tree that imparts the easily recognisable water-hammer character is missing in this name. The characteristic sudden high rise causes a slapping effect, which is better described by the terms cannonball pulse and water-hammer pulse.

True, raising the arm accentuates the collapsing character.[1,3,4] But, if looked for, it can be appreciated even without the arm raising. A survey among medical students revealed that, many of them believed that the collapse occurs only when the arm of the patient is raised, and that it is essential to do this maneuver routinely in all patients while examining the cardiovascular system. Probably, this is what they are taught in the medical school. There is also a general impression that the arm should be raised abruptly.[5] There is no viable explanation to why the arm lifting should be done abruptly. The mechanism of AR does not change whether the lifting is abrupt or gentle and holding it up longer also does not change the character of the pulse.

A study by Carole A Warnes, et.al. published in the American Journal of Cardiology in the year 1983 demonstrated that the elevation of the arm increases the arterial compliance and deflection of the pulse, while the mean pressure and pulse pressure are decreased. The same changes, though less pronounced, were demonstrated in normal subjects as well as in patients with AR.[4] This being a physiological phenomenon, the routine lifting of the arm of the patient in search of collapsing pulse is bound to over-diagnose this clinical sign, although it might not affect the final diagnosis. It would be rather embarrassing to the student to diagnose collapsing pulse on peripheral examination and find no murmur on precordial examination to corroborate it.

Views of students

In order to explore the understanding of our medical students about collapsing pulse, they were given the task of writing a short essay on collapsing pulse, including its definition, mechanism, method of elicitation, causes and associated signs. The compiled results is given in the Table I.

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