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LETTER TO THE EDITOR

Clinical relevance of different responses of elastic and muscular arteries in acute hemorrhage—perspectives from anesthesiologists

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To the Editor:

Hypovolemia, excessive vasodilation, and impaired ventricular function are considered the three major pathophysiologic conditions of intraoperative hypotension [1]. One of the typical situations in which these three elements must be properly assessed and managed is immediately after weaning from cardiopulmonary bypass in cardiac surgery. Although the information provided by the objective arterial pressure waveform is significant in the assessment of these three elements, we often experience poor radial artery pressure waveforms while the femoral artery pressure waveform is good [2].

Regarding this, we read with great interest the article "The responses of arterial stiffness parameter Beta-derived index of the aorta and iliac-femoral artery to acute hypovolemia in rabbits" by Toshiro Ito and colleagues [3]. In their study, the authors assessed changes in stiffness of the elastic artery (aorta) and muscular artery (iliac-femoral artery) in acute hemorrhage rabbit models. They revealed that in response to rapid bleeding, the elastic and muscular arteries stiffened and less stiffened (softened), respectively.

This observation implies that in acute hemorrhage, the blood flow is more likely to be preserved in the iliac-femoral artery than in the aorta, which is well known and often observed in clinical practice by anesthesiologists. For example, the blood flow from the iliac artery is also considered important to maintain the spinal cord blood flow in acute hemorrhage [4]. It is plausible that a similar mechanism contributes to the difference in waveforms immediately after weaning from cardiopulmonary bypass.

Ito et al.'s results may be a physiological explanation of what we observe in our clinical practice. The difference in responses to acute hemorrhage between elastic and muscular arteries may be an important mechanism for changing blood flow distribution at the time of hemorrhagic shock (for example, blood flow to the heart and that to the brain tend to be well preserved, while intestinal sensation is likely to be sacrificed). Further clinical and physiological investigation is warranted to confirm this mechanism.

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