Effect of catheter-based patent foramen ovale closure on the occurrence of arterial bubbles in scuba divers.

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Abstract

OBJECTIVES: This study sought to evaluate the effect of catheter-based patent foramen ovale (PFO) closure on the occurrence of arterial bubbles after simulated dives.

BACKGROUND: PFO is a risk factor of decompression sickness in divers due to paradoxical embolization of bubbles. To date, the effectiveness of catheter-based PFO closure in the reduction of arterial bubbles has not been demonstrated.

METHODS: A total of 47 divers (age 35.4 ± 8.6 years, 81% men) with a PFO (PFO group) or treated with a catheter-based PFO closure (closure group) were enrolled in this case-controlled observational trial. All divers were examined after a simulated dive in a hyperbaric chamber: 34 divers (19 in the PFO group, 15 in the closure group) performed a dive to 18 m for 80 min, and 13 divers (8 in the PFO group, 5 in the closure group) performed a dive to 50 m for 20 min. Within 60 min after surfacing, the presence of venous and arterial bubbles was assessed by transthoracic echocardiography and
transcranial color-coded sonography, respectively.

RESULTS: After the 18-m dive, venous bubbles were detected in 74% of divers in the PFO group versus 80% in the closure group (p = 1.0), and arterial bubbles were detected in 32% versus 0%, respectively (p = 0.02). After the 50-m dive, venous bubbles were detected in 88% versus 100%, respectively (p = 1.0), and arterial bubbles were detected in 88% versus 0%, respectively (p < 0.01).

CONCLUSIONS: No difference was observed in the occurrence of venous bubbles between the PFO and closure groups, but the catheter-based PFO closure led to complete elimination of arterial bubbles after simulated dives. (Nitrogen Bubble Detection After Simulated Dives in Divers With PFO and After PFO Closure; NCT01854281).


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