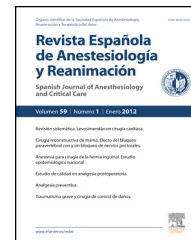




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ORIGINAL ARTICLE

Evaluation of postoperative myocardial injury by heart-type fatty acid-binding protein in off-pump coronary artery bypass grafting surgery[☆]

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Myocardial infarction;
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Abstract

Background and goal of study: Postoperative myocardial infarction is a serious and frequent complication of cardiac surgery. Nonetheless, diagnosis in this context is occasionally challenging. We sought to evaluate the kinetics and diagnostic accuracy of the new biomarker "heart-type fatty acid-binding protein" (h-FABP) in the early detection of myocardial injury in patients undergoing off-pump coronary artery bypass grafting, compared with classical biomarkers.

Materials and methods: A prospective study was conducted on 17 consecutive patients who underwent off-pump coronary artery bypass grafting during a 2-month period. Blood samples were drawn for measurement of myocardial ischemic injury biomarkers (h-FABP, troponin, creatine kinase [CK] and CK-MB), at baseline (T1), immediate post-coronary artery bypass grafting (T2), on ICU admission (T3), and after 4 (T4), 8 (T5), 24 (T6) and 48 h (T7). Perioperative ischemic complications, defined according to electrocardiographic, echocardiographic and hemodynamic criteria, were recorded.

Results: Earlier peak biochemical marker plasma values occurred at T4 with troponin (2.9 ± 5.2 ng/mL), and at T5 with h-FABP (37.9 ± 55.5 ng/mL). Maximum values of CK and CK-MB occurred later, both in T6 (741 ± 779 and 37 ± 51 U/L, respectively). The optimized cut-off obtained for h-FABP was 19 ng/mL, providing a sensitivity and specificity of 77 and 75%, respectively, for diagnosis of perioperative ischemic injury, with an area under the ROC curve for

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PALABRAS CLAVE

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h-FABP of 0.83 (95% CI 0.6–1.0) vs. 0.63 (95% CI 0.33–0.83) for troponin. This cut-off value for h-FABP is reached on average at T2 (mean value of h-FABP at T2: 18.9 ± 21.5 ng/mL).

Conclusion: This is the first study evaluating the kinetics of h-FABP biomarker in perioperative off-pump coronary artery bypass grafting, and the cut-off value established could help to extend earlier detection of myocardial ischemia in this context.

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Valoración del daño miocárdico mediante la medición de la *heart-fatty acid-binding protein* en cirugía de revascularización coronaria sin circulación extracorpórea. Estudio preliminar

Resumen

Introducción y objetivos del estudio: El infarto de miocardio posoperatorio es una complicación grave y frecuente de la cirugía cardíaca. El diagnóstico en este contexto es, en ocasiones, difícil. El objetivo de este estudio es evaluar la cinética y la precisión diagnóstica de un nuevo marcador, la *heart-type fatty acid-binding protein* (h-FABP), en la detección precoz de daño miocárdico en pacientes sometidos a cirugía de revascularización coronaria sin circulación extracorpórea en comparación con los biomarcadores clásicos.

Materiales y métodos: Se estudiaron prospectivamente 17 pacientes consecutivos sometidos a cirugía cardíaca de revascularización sin circulación extracorpórea. Se analizaron biomarcadores de lesión de isquemia miocárdica (h-FABP, troponina, creatinina [CK] y CK-MB) al inicio de la cirugía (T1), inmediatamente después de la revascularización (T2), al ingreso en la UCC (T3) y después de 4 (T4), 8 (T5), 24 (T6) y 48 h (T7). Se registraron las complicaciones isquémicas perioperatorias, definidas de acuerdo con criterios electrocardiográficos, ecocardiográficos y hemodinámicos.

Resultados: Los valores plasmáticos pico de la troponina se alcanzaron en T4 (2.9 ± 5.2 ng/ml) y en T5 con h-FABP (37.9 ± 55.5 ng/ml). Los valores máximos de CK y CK-MB fueron más tardíos, en T6 (741 ± 779 y 37 ± 51 U/L, respectivamente). El punto de corte obtenido para h-FABP para la detección de eventos isquémicos fue de 19 ng/ml, proporcionando una sensibilidad y especificidad del 77 y 75%, respectivamente, para el diagnóstico de la lesión isquémica perioperatoria, con un área bajo la curva ROC para h-FABP de 0,83 (IC 95% 0,6-1,0) vs. 0,63 (IC 95% 0,33-0,83) para troponina. Se alcanza este valor de corte para la h-FABP en promedio en T2 (18.9 ± 21.5 ng/ml).

Conclusión: Este es el primer estudio que evalúa la cinética del biomarcador h-FABP en el perioperatorio de la cirugía de revascularización sin circulación extracorpórea, y el valor de corte establecido podría ayudar a la detección temprana de la isquemia miocárdica en este contexto.

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Introduction

Perioperative ischemic events have a major impact on both long- and short-term surgical morbidity and mortality. Incidence following bypass grafting surgery ranges from 7% to 15%,^{1,2} the difference in reported rates being due to the lack of specific criteria (hemodynamic, ECG, echocardiographic and biochemical) and the different definitions used to diagnose such events in the perioperative period.³ The most commonly used myocardial injury biomarkers are troponin (I and T) elevation, myoglobin, and the MB fraction of creatine kinase (CK-MB), although cut-off levels for perioperative ischemia are still unclear.

A cardiac biomarker called heart-type fatty acid-binding protein (h-FABP), a small protein that transports fatty

acids from the cell membrane to mitochondria for oxidation, has recently become available. H-FABP is 20 times more cardiac specific than myoglobin and is released as early as 30 min after an ischemic episode, thereby allowing early detection and consequently better management of ischemic patients.^{4–7} Few studies in patients undergoing bypass grafting surgery have investigated this marker, and those published to date have focused on surgery performed with a cardiopulmonary bypass (CPB) pump.^{8–10} In these studies, h-FABP was found to have greater sensitivity and specificity than troponins, myoglobin and CK-MB. In a prospective study in 1298 patients undergoing heart surgery with CPB, h-FABP measurement was found to be an independent predictor of death and ventricular dysfunction in both the immediate and delayed postoperative periods.⁸

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