

Original article

Impact of obstructive sleep apnea in recruitment of coronary collaterality during inaugural acute myocardial infarction

Impact du syndrome d'apnée du sommeil sur le développement de la circulation coronaire collatérale en cas d'infarctus du myocarde inaugural

H. Ben Ahmed^a, H. Boussaid^{a,*}, S. Longo^{b,1}, R. Tlili^{b,1}, S. Fazaa^{b,1}, H. Baccar^{a,1},
M.R. Boujnah^{b,1}

^a Department of cardiology, Charles Nicolle University Hospital, 1006 Bab Saadoun, Tunisia

^b Department of Cardiology, Mongi Slim University Hospital, Sidi Daoud, 2046 La Marsa, Tunisia

Received 5 February 2014; accepted 20 January 2015

Available online 7 February 2015

Abstract

Background. – Obstructive sleep apnea (OSA) may lead to myocardial preconditioning by increasing coronary collateral vessel recruitment in patients with acute coronary occlusion.

Aim. – To determine the relationship between the severity of obstructive sleep apnea and coronary collaterality during acute myocardial infarction.

Methods. – This study prospectively included 71 patients with an inaugural myocardial infarction who had undergone a coronary angiography within 24 h of onset. All patients underwent an overnight polygraph before discharge and were classified according to the apnea–hypopnea index (AHI). Coronary collaterals were scored by visual analyses and according to the Rentrop grading system.

Results. – Mean age was 59 ± 11 years and 83% of patients were men. All patients had complete or subtotal occlusion of the infarct-related artery. After the sleep study, patients were divided into two groups: 25 were suffering from OSA (AHI > 15/h). Patients with OSA showed better collateral vessel development (Rentrop score ≥ 1) compared to non-OSA patients (68 vs. 41%, $P = 0.032$). AHI was significantly higher in patients with developed coronary collaterals (Rentrop ≥ 1) compared to those without collaterality (17.74 ± 13.2 vs. 12.24 ± 10.9 , $P = 0.025$).

Conclusion. – Coronary collateral development may be increased in OSA patients who are presenting with a first myocardial infarction.
© 2015 Elsevier Masson SAS. All rights reserved.

Keywords: Obstructive sleep apnea; Coronary circulation; Myocardial infarction; Apnea–hypopnea index

Résumé

Introduction. – Le syndrome d'apnées obstructives du sommeil (SAOS) peut contribuer à un pré-conditionnement du myocarde en augmentant le développement de la circulation coronaire collatérale chez les patients présentant une occlusion coronaire aiguë.

Objectif. – Déterminer la relation entre la sévérité du SAOS et la collatéralité coronaire en cas d'infarctus aigu du myocarde.

Méthodes. – Cette étude prospective a inclus 71 patients ayant présenté un infarctus du myocarde inaugural et ayant bénéficié d'une coronarographie dans les 24 heures. Tous les patients ont eu un enregistrement polygraphique et ont été classés en fonction de l'indexe apnée–hypopnée (IAH). Le développement de la circulation coronaire collatérale a été analysé selon la classification de Rentrop.

Abbreviation: AHI, Apnea hypopnée index; IRA, Infarct-related artery; OSA, Obstructive sleep apnea; PCI, Primary coronary intervention; STEMI, ST elevation myocardial infarction; TIMI, Thrombolysis in myocardial infarction.

* Corresponding author.

E-mail addresses: halfaouine2002@yahoo.fr (H. Ben Ahmed), boussaidhoussem@hotmail.fr (H. Boussaid), salma.longo@yahoo.fr (S. Longo), ramihenia@gmail.com (R. Tlili), fazaasamia@yahoo.fr (S. Fazaa), baccar.hedi@yahoo.fr (H. Baccar), rachidboujnah@yahoo.fr (M.R. Boujnah).

¹ Co-authors.

Résultats. – L'âge moyen de la population était de 59 ± 11 ans avec 83 % de sexe masculin. Tous les patients avaient une occlusion complète ou subtotale de l'artère coronaire responsable de l'infarctus. Un SAOS (IAH > 15/h) a été identifié chez 25 patients. Une collatéralité coronaire (Rentrop ≥ 1) était plus fréquente chez les patients apnéiques par rapport aux autres patients (68 vs 41 %, $p=0,032$). L'IAH était significativement plus élevée chez les patients ayant une circulation coronaire collatérale (Rentrop ≥ 1) par rapport à ceux qui n'ont pas de collatéralité ($17,74 \pm 13,2$ vs $10,9 \pm 12,24$, $p=0,025$).

Conclusion. – Le développement de la circulation coronaire collatérale peut être augmenté chez les patients atteints de syndrome d'apnées obstructives du sommeil se présentant avec un infarctus du myocarde inaugural.

© 2015 Elsevier Masson SAS. Tous droits réservés.

Mots clés : Apnée obstructive du sommeil ; Circulation coronaire ; Infarctus du myocarde ; Index apnée–hypopnée

1. Background

Obstructive sleep apnea (OSA) is characterized by repetitive airflow reduction or temporary cessation of breathing caused by upper airway collapse, resulting in intermittent oxygen desaturation. There is increasing evidence that OSA is a risk factor for the development of cardiovascular disease, including myocardial infarction and stroke [1,2]. Furthermore, severe OSA has a negative prognostic impact on early and late outcomes after myocardial infarction [3].

The underlying pathophysiological mechanisms involve a complex interplay between intermittent nocturnal hypoxemia, sympathetic activation, endothelial dysfunction, and the release of pro-inflammatory cytokines [4–6].

In contrast to the deleterious effects of OSA, a protective role has also been described. A study has suggested that nocturnal cycles of repeated hypoxemia–reoxygenation may lead to myocardial ischemic preconditioning, conferring protection from acute coronary events [7]. In a recent observational study [8], infarct size, measured by peak troponin levels, was significantly lower in patients with OSA compared to those without sleep apnea. Steiner was the first to support this hypothesis, by showing that patients with OSA had better coronary collateral vessel development [9].

Coronary collaterals are anastomotic connections without an intervening capillary bed between the segments of the same coronary artery or different coronary arteries. In cases of acute myocardial infarction, the presence of coronary collaterals may help preserve the viability of myocardium until mechanical or pharmacological coronary reperfusion.

To our knowledge, no studies have been reported on the impact of OSA and the development of coronary collaterals in patients with inaugural acute myocardial infarction. In our study, we hypothesize that OSA is associated with better recruitment of coronary collaterals in patients with a first acute myocardial infarction and a total occlusion of an infarct-related coronary artery (IRA).

2. Methods

2.1. Study design and population

This prospective study included patients who presented with a ST segment elevation myocardial infarction (STEMI) between

April 2011 and March 2012. STEMI was defined as an ischemic symptom that lasted for > 30 min, elevated cardiac troponin T levels, and a ST segment elevation of ≥ 1 mm in at least two contiguous limb leads, or ≥ 2 mm in the precordial leads.

Patients admitted to our institution with a first STEMI and who had undergone a coronarograph for primary percutaneous coronary intervention (PCI) or to control fibrinolysis within 24 h of onset were included in the study. Non-inclusion criteria included a previous known diagnosis of OSA, electrical instability, cardiogenic shock, previous coronary events, previous documented myocardial ischemia, or an inability to give informed consent. Spontaneous or pharmacological recanalization of the infarct-related artery, defined as TIMI (thrombolysis in myocardial infarction) of grade 3 flow as assessed in the initial coronary angiogram was an angiographic exclusion criteria [10]. Patients with a central or mixed apnea syndrome, discovered after the sleep study, were also excluded. All patients provided their written informed consent.

2.2. Overnight sleep study

All patients underwent an overnight polygraph during their hospital stay, after leaving the coronary care unit and before discharge (not exceeding 15 days post-STEMI). The sleep studies were done in the Department of Cardiology with optimized conditions of sleep: in a quiet room without taking sleeping pills or sedatives.

The polygraph recordings were performed between 9:00 pm and 6:00 am using a portable diagnostic device (Medibyte Junior 2.0, Braebon, Ontario, Canada). The parameters measured included nasal airflow, thoraco-abdominal movements, arterial oxygen saturation (pulse oximetry), and heart rate. Outputs from the portable diagnostic device were analyzed by an investigator blinded to the clinical characteristics of the patient.

Respiratory events were defined according to recommendations of the American Academy of Sleep Medicine [11]. An apneic episode was defined as cessation of airflow for > 10 s and hypopnea as a > 50% reduction in airflow lasting > 10 s. An event was also considered to be hypopnea when a reduction in airflow did not reach the 50% criteria but was associated with > 3% desaturation of arterial oxygen.

Obstructive apnea was defined as the absence of air flow despite respiratory movement. Central sleep apnea was defined as the absence of both air flow and respiratory movement.

Download English Version:

<https://daneshyari.com/en/article/2868523>

Download Persian Version:

<https://daneshyari.com/article/2868523>

[Daneshyari.com](https://daneshyari.com)