

Editorial

Syncope and bundle branch block: a single study with several take-home messages



Síncope y bloqueo de rama: un estudio y varios mensajes para recordar

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Article history:

Available online 23 March 2023

Syncope is defined as transient loss of consciousness due to cerebral hypoperfusion and is a prevalent symptom, estimated to affect 1 in 5 people older than 45 years at some point in their lives.¹ The cumulative incidence is 6.2 per 1000 person years,² and syncope is a common cause of emergency department attendance (1%-2% of patients) and of hospital admission (50% of patients attending the emergency department for syncope are admitted).³ Another frequent symptom in the general population is bundle branch block (BBB), which triggers late depolarization of the ipsilateral ventricle and eventually generates a wide QRS complex. Right BBB affects 1.5% of the population,⁴ and left BBB affects 0.3% to 0.4%.⁵

Syncope and BBB often occur together in clinical practice and, in a recent article in *Revista Española de Cardiología*, Francisco-Pascual et al.⁶ show that complete BBB increases the risk of arrhythmic syncope. This finding highlights the importance of investigating the possible co-occurrence of BBB in patients with syncope, and in light of this and other published studies, as well as the experience accumulated by practicing cardiologists, we can outline a number of observations and clinical practice recommendations, as outlined below.

IT IS IMPORTANT TO STUDY THE CAUSE OF SYNCOPE CO-OCCURRING WITH BUNDLE BRANCH BLOCK

Patients with a first syncopal episode are frequently managed more conservatively than those with recurrent episodes; moreover, a history of unexplained syncope is common in patients assessed in routine practice for any cause. Using a detailed protocol based on current clinical practice guidelines, Francisco-Pascual et al.⁶ analyzed a cohort of more than 500 patients presenting with syncope and BBB for possible differences in etiology, diagnostic yield, treatment, and prognosis according to whether the syncope was a first or a recurrent episode. The study found no differences

between the 2 patient groups in etiological diagnosis, electrophysiological study results, implantable cardiac monitor (ICM) diagnostic yield, prognosis, or appropriate treatment, thus demonstrating that there is no justification for treating these patient groups differently.⁶ All patients with BBB and experiencing syncope, whether a first or recurrent episode, should undergo a detailed, systematic workup to establish the cause, as this information is essential for determining appropriate treatment and prognosis.

AVOID THE DIAGNOSIS OF “SYNCOPE OF UNKNOWN CAUSE”

Syncope is a serious symptom with prognostic implications. In the Framingham Heart Study, individuals with syncope of any cause generally had a higher all-cause risk of death than the rest of the study population (hazard ratio [HR] = 1.31; 95% confidence interval [95%CI], 1.14-1.51).² The highest risk of death was found in patients with syncope of cardiac origin (10% of cases; HR = 2.01; 95%CI, 1.48-2.73), whereas patients with vasovagal or orthostatic syncope showed no difference in risk of death from the general study population.² Crucially, the Framingham Heart Study also recorded an elevated risk of death in patients with unexplained syncope (HR = 1.32; 95%CI, 1.09-1.60).² This finding underlines the need to pursue an etiological diagnosis and to reject the diagnostic category of “syncope of unknown cause”, since the situation of some patients in this category is serious and possibly even life-threatening. It is nevertheless important to recognize that diagnosing the cause of syncope is challenging; despite the use of systematic diagnostic protocols based on current clinical practice guidelines, the cause of syncope remains undetermined in as many as a third of patients experiencing a first syncopal episode.²

THE WIDER THE QRS COMPLEX, THE WORSE THE PROGNOSIS

Historically, right BBB has been viewed as benign and left BBB as malignant, since the latter is a marker of structural heart disease. However, more recent studies show that right and left BBB are both associated with an increased risk of cardiac death (HR = 1.9 [95%CI,

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<https://doi.org/10.1016/j.rec.2022.11.009>

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1.2–3.0] vs HR = 2.4 [95%CI, 1.3–4.7]) and demonstrate a direct correlation between the width of the QRS complex and the increase in risk.^{4,7}

SYNCOPE WITH BUNDLE BRANCH BLOCK IS GENERALLY BRADYARRHYTHMIC, BUT VENTRICULAR ARRHYTHMIA SHOULD BE SUSPECTED IN THE PRESENCE OF HEART DISEASE

The most common syncope mechanism in patients with BBB is atrioventricular (AV) block. AV conduction is mostly preserved in BBB and remains stable over many years; however, serial electrophysiological studies have shown progression of the AV conduction disorder in up to 30% of BBB patients, with second- or third-degree AV block appearing in 20% of these patients.⁸ The incidence is even higher when the BBB alternates between the right and left branches, which is a more severe form of conduction system disease. AV block in patients with BBB is not always located below the His bundle, and a supra-Hisian location is detected in as many as 40% of patients.⁸

Nevertheless, patients with BBB, especially of the left branch, have a relatively high prevalence of structural heart disease.⁷ In patients with syncope and BBB, the presence of structural heart disease indicates an elevated risk of sudden cardiac death due to ventricular tachycardia, especially if there is ventricular dysfunction or the patient has a history of myocardial infarction. This situation should prompt attending physicians to consider placement of an implantable cardioverter-defibrillator (ICD) without requiring an etiological diagnosis. In other patients, the cause of syncope should be diagnosed through a systematic stepwise approach similar to that used by Francisco-Pascual et al., including a general clinical and cardiological assessment, electrocardiographic monitoring, an electrophysiological study, and, if necessary, placement of an ICM.⁶

In the series presented by Francisco-Pascual et al., electrocardiographic monitoring and electrophysiological study on admission identified the cause of syncope in 56% of patients (with the cause being arrhythmic in 83% of these patients). Subsequent ICM placement identified the cause of syncope in 41% of the patients with no etiological diagnosis on admission (arrhythmic in 64% of these patients). The overall diagnostic yield of the stepwise protocol was 74% (arrhythmic in 78% of these patients). The most frequent diagnoses were AV block (51%), orthostatic syncope (9%), and sinus dysfunction (4%). Syncope was attributed to ventricular tachycardia in just 1% of the patients; however, it should be noted that the study excluded patients with a direct indication for ICD placement or an ejection fraction < 35%.⁶

ELECTROPHYSIOLOGICAL STUDY OF PATIENTS WITH SYNCOPE AND BBB: A HALF FULL GLASS

Electrophysiological study for syncope generally has a low diagnostic yield, especially in patients with a normal electrocardiogram and echocardiogram. Nevertheless, the electrophysiological study retains an important role in syncope diagnosis in specific patient groups, such as those with structural heart disease or ventricular scarring, especially if the patient has a history of myocardial infarction (indication class I, level of evidence B) or BBB (class IIa, level B).⁹

The electrophysiological study can identify specific features of AV conduction disorder, such as prolongation of the HV interval or induction of infra-Hisian block with atrial stimulation. The sensitivity of the electrophysiological study can be increased by intravenous administration of procainamide or flecainide. Findings compatible with a supra-Hisian AV conduction disorder are harder

to define and depend on extrinsic factors such as the neurovegetative balance and the degree of patient sedation during the test.

Scheinman et al.¹⁰ followed 401 patients with BBB for an average of 30 months after electrophysiological study. Patients with a baseline HV interval ≥ 70 ms had a higher risk (12%) of progression to second- or third-degree AV block than patients with an HV interval < 70 ms (3.5%). Of the patients with an HV interval ≥ 100 ms, 1 out of 4 developed second- or third-degree AV block during follow-up.

The study by Francisco-Pascual et al.⁶ provides a meticulously detailed presentation of electrophysiological findings from more than 500 patients with BBB and syncope. This valuable analysis identified the cause of syncope in half of these patients, largely because it detected a severe AV conduction disorder in 44% of them. Programmed stimulation in patients without structural heart disease carries a low risk of inducing ventricular tachycardia, but in patients with BBB the risk can be as high as 5% to 10%.^{6,11}

DIAGNOSIS WITH AN IMPLANTABLE CARDIAC MONITOR: GOOD, BUT LATE

The ICM is a useful and powerful tool for syncope diagnosis. In a randomized clinical trial of patients with BBB and syncope of unknown cause after clinical assessment and electrophysiological study, cardiac monitoring with an implantable device performed significantly better than conventional follow-up, identifying the cause of syncope in 37% of these patients (vs 11% by conventional follow-up).¹² This is comparable to the 41% added diagnostic yield reported by Francisco-Pascual et al. in patients receiving an ICM and followed up for an average of 2.9 years,⁶ and similar yields have been reported for other series.¹¹ Among patients with an ICM diagnosis, the most prevalent cause of syncope was AV block, and the likelihood of ventricular tachycardia being identified as the cause was less than 1%.

Given the low diagnostic sensitivity of electrophysiological study, one might be tempted to recommend monitoring with an ICM as the primary diagnostic text. However, omitting the electrophysiological study of syncope co-occurring with BBB would, at the very least, delay diagnosis of the cause of syncope in half the patients. This delay would put patients at risk of further syncopal episodes, which are linked to significant morbidity in 5% of patients and minor traumatic consequences in 7%. Moreover, delayed diagnosis would also increase the risk of death, since up to 10% of electrophysiological studies identify a ventricular arrhythmia as the potential cause of syncope even in patients with no structural heart disease.^{11,13}

EMPIRICAL PACEMAKER IMPLANTATION IS LIKELY NOT THE BEST OPTION FOR PATIENTS WITH SYNCOPE AND BUNDLE BRANCH BLOCK

After excluding patients with an indication for immediate ICD placement, the most frequent cause of syncope in patients with BBB is bradyarrhythmia, with the most prominent type being AV block. Francisco-Pascual et al. report pacemaker implantation in 60% of patients with syncope and BBB over a mean follow-up of 3 years, and 20% of these patients had previously been monitored with an ICM. This raises the question as to whether it would be safer and more cost effective to directly indicate placement of a permanent pacemaker for patients with syncope and BBB and no indication for ICD placement.⁶

However, such a strategy seems unwise given the excessively high rate of recurrent syncope after empirical pacemaker implantation in patients with BBB, which ranges from 14% to

27%.¹⁴ In a recent small randomized trial in patients with syncope, BBB, and preserved ejection fraction, empirical permanent pacing did not reduce syncope recurrence vs ICM recording.¹⁵ In current European Society of Cardiology guidelines, empirical pacing in patients with syncope and BBB is a class IIb recommendation (level of evidence B).⁹

The article by Francisco-Pascual et al.⁶ contains information of immense value to the readership of *Revista Española de Cardiología*. The authors are to be congratulated not only for the main study conclusions, but also for providing a thorough and memorable summary of the factors that determine the correct approach to the treatment of patients with syncope and BBB.

FUNDING

No funding was received for the preparation of this article.

CONFLICTS OF INTEREST

None of the authors has conflicts of interest to declare.

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