

# Contemporary management of patients with syncope in clinical practice: an EHRA physician-based survey

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## Abstract

Syncope is a heterogeneous syndrome encompassing a large spectrum of mechanisms and outcomes. The European Society of Cardiology published an update of the Syncope Guidelines in 2018. The aim of the present survey was to capture contemporary management of syncope and guideline implementation among European physicians. A 23-item questionnaire was presented to 2588 European Heart Rhythm Association (EHRA) members from 32 European countries. The response rate was 48%, but only complete responses ( $n = 161$ ) were included in this study. The questionnaire contained specific items regarding syncope facilities, diagnostic definitions, diagnostic tools, follow-up, and therapy. The survey revealed that many respondents did not have syncope units (88%) or dedicated management algorithms (44%) at their institutions, and 45% of the respondents reported syncope-related hospitalization rates >25%, whereas most (95%) employed close monitoring and hospitalization in syncope patients with structural heart disease. Carotid sinus massage, autonomic testing, and tilt-table testing were inconsistently used. Indications were heterogeneous for implanted loop recorders (79% considered them for recurrent syncope in high-risk patients) or electrophysiological studies (67% considered them in bifascicular block and inconclusive non-invasive testing). Non-pharmacological therapy was consistently considered by 68% of respondents; however, there was important variation regarding the choice of drug and device therapy. While revealing an increased awareness of syncope and good practice, our study identified important unmet needs regarding the optimal management of syncope and variable syncope guideline implementation.

## Keywords

Reflex syncope • Orthostatic hypotension • Orthostatic intolerance • Cardiac syncope • Syncope risk score • Event recorder • Implanted loop recorder • Driving with syncope • Syncope unit • EHRA survey

## Introduction

Syncope represents a sudden transient loss of consciousness due to global cerebral hypoperfusion, followed by rapid, spontaneous, and complete recovery.<sup>1</sup> Syncope has a high prevalence, with a 10-year

cumulative incidence of up to 6% in the Framingham study.<sup>2</sup> A much higher prevalence rate of 41%, with 13.5% prevalence for recurrent episodes, was reported in aviation personnel; however, more recently a 19% prevalence was noticed in general population older than 45 years.<sup>3,4</sup> Syncope represents one of the main complaint in

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### What's new?

- Awareness regarding proper diagnosis and management of syncope has increased.
- Important variations exist among physicians regarding diagnostic evaluation, monitoring and follow-up of patients with syncope.
- Absence of a Syncope Unit or structured management algorithms could be an important factor driving heterogeneous syncope management and inappropriate hospitalization and resource utilization.
- This survey identified several areas of discordance regarding diagnostic tools and treatment strategies that need to be addressed for uniformization of syncope management. Several practical issues (e.g. driving in patients with syncope) need more specific guidance.

emergency departments (ED), accounting for 1–2% of all visits,<sup>5,6</sup> and nearly half of these patients are hospitalized for evaluation.<sup>7</sup>

Syncope management poses increased burden on medical resources and expenses, with nearly 75% of total costs being related to hospitalization itself,<sup>8,9</sup> which is largely driven by physicians' fear of malignant or fatal events, despite reportedly low rates of short-term adverse events.<sup>10</sup> The aetiology of syncope involves three main categories: reflex (mainly vasovagal), orthostatic hypotension, and cardiac syncope. While reflex syncope is considered benign (with main concerns being related to the quality of life and risk of injuries), cardiac syncope is associated with a high risk of mortality.<sup>11,12</sup>

Appropriate management of patients with syncope includes elucidating whether the patient experienced a true loss of consciousness resembling syncope is the aetiology clear, is there a high risk of fatal events, what is needed for further evaluation, and which treatment or lifestyle changes should be recommended in specific cases.<sup>13</sup>

The 2018 European Society of Cardiology (ESC) Syncope Guidelines<sup>1,3</sup> offer a stepwise algorithm for the evaluation of the patient with syncope, emphasizing the role of detailed patient's history, clinical examination, and 12-lead resting electrocardiogram (ECG) as a first step. This initial evaluation would lead to certain or highly likely diagnosis in about half of patients but, unfortunately, it is often incomplete in practice, missing a detailed medical history taking, orthostatic blood pressure (BP) measurements, or carotid sinus massage (CSM) where appropriate, mostly owing to time constraints with ED visits. The next step comprises the assessment of the risk for short-term events, relying solely on the presence of high-risk features suggesting a serious condition, as there is currently no consensus or validated risk score. Notably, up to 30% of patients with syncope and structural heart disease have a reflex syncope.<sup>11</sup>

Further evaluation is often needed to clarify the aetiology, but the selected strategy should be based on clinical probability. Despite current knowledge regarding the value of different diagnostic tests in establishing the aetiology of syncope, many patients undergo repeated unnecessary tests, such as cerebral imaging or 24 h Holter monitoring, which yield a very low diagnostic power in unselected patients.<sup>14</sup>

Recognizing these issues, which may lead to missed diagnosis or unnecessary use of resources increasing the costs related to syncope

evaluation, the 2018 ESC Syncope Guidelines<sup>1</sup> emphasize the benefit of either in-hospital or ambulatory syncope unit, staffed by specialists with expertise in syncope. However, in many countries such units and/or syncope specialists are lacking.

The 2018 ESC Syncope Guidelines provide important information about syncope recognition, diagnostic, and prevention. This European Heart Rhythm Association (EHRA) survey was conducted to capture the current management of syncope and guideline implementation among European physicians.

## Methods

The 4-week physician-based snapshot survey was conducted using an internet-based questionnaire developed by the EHRA Scientific Initiative Committee. The survey link was sent to 2588 EHRA members requesting their anonymous voluntary participation. The questionnaire contained 23 multiple-choice questions and encompassed aspects regarding syncope management facilities, criteria for syncope diagnosis, diagnostic tools, treatment, and follow-up. The response rate was 48%; however, only 161 replies were complete for all questions and therefore considered in the present analysis.

### Statistical analysis

Owing to the observational study design, a descriptive analytical statistical approach was used. The values are presented as numbers with percentages.

## Results

### Participants

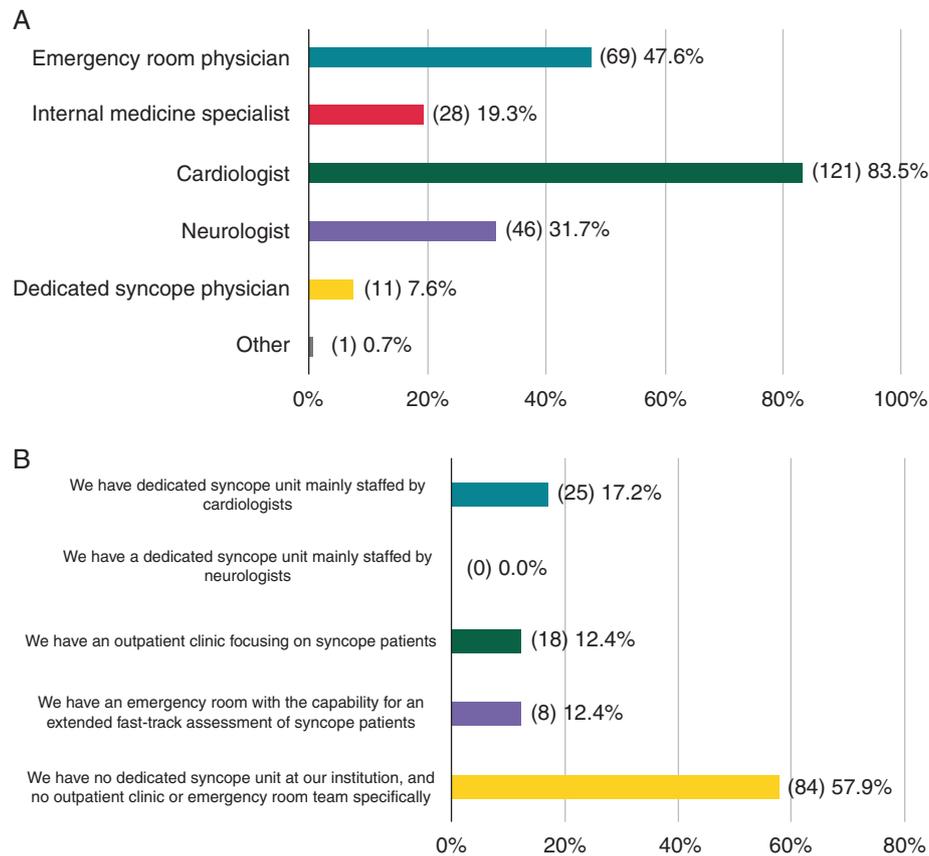
The survey encompassed 32 European countries, with most responses collected from Romania, Spain, Germany, Poland, Greece, Italy, Portugal, and the Netherlands; 68% of respondents worked in University hospitals, and 26.1% in non-university or private hospitals ([Supplementary material online, Figure 1A](#) and [B](#)). Among the survey participants, 53.4% had an electrophysiology competence, and 34.2% were general cardiologists ([Supplementary material online, Figure 1C](#)).

### Facilities for syncope management

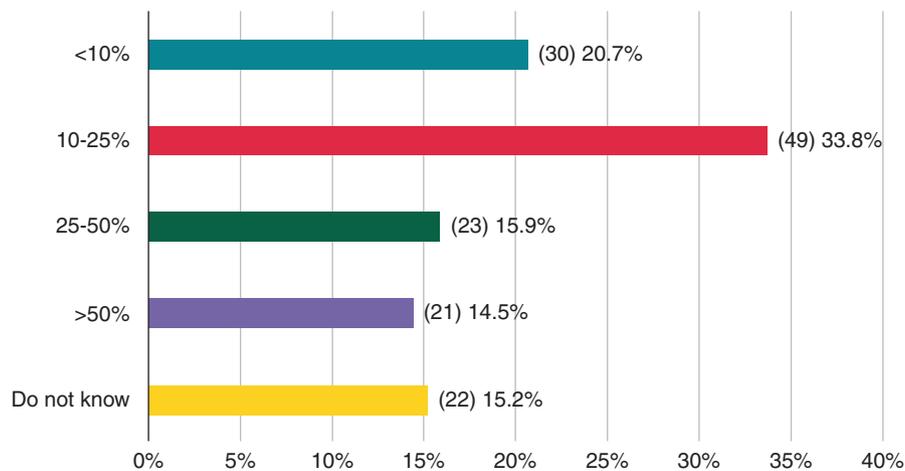
Only 7.6% of patients presenting with syncope were seen by a syncope specialist, while others were seen by a cardiologist (83%), and/or an emergency physician (48%), neurologist (32%), internal medicine specialist, or other specialties ([Figure 1A](#)). In 58% of cases, the respondent's institution had no dedicated syncope unit. However, in one-quarter, there were facilities for fast-track assessment of patients with syncope at the level of ED or outpatient clinic ([Figure 1B](#)). More than half of participating physicians (55%) did not use a specific protocol when assessing a syncope diagnosis, and 54% of respondents hospitalized <25% of syncope patients presenting to ED. However, more than 14% of respondents would admit to hospital more than 50% of patients presenting with syncope ([Figure 2](#)).

### The diagnosis of syncope

In respect to the clinical features suggestive for a diagnosis of syncope, the majority of respondents regarded transient loss of



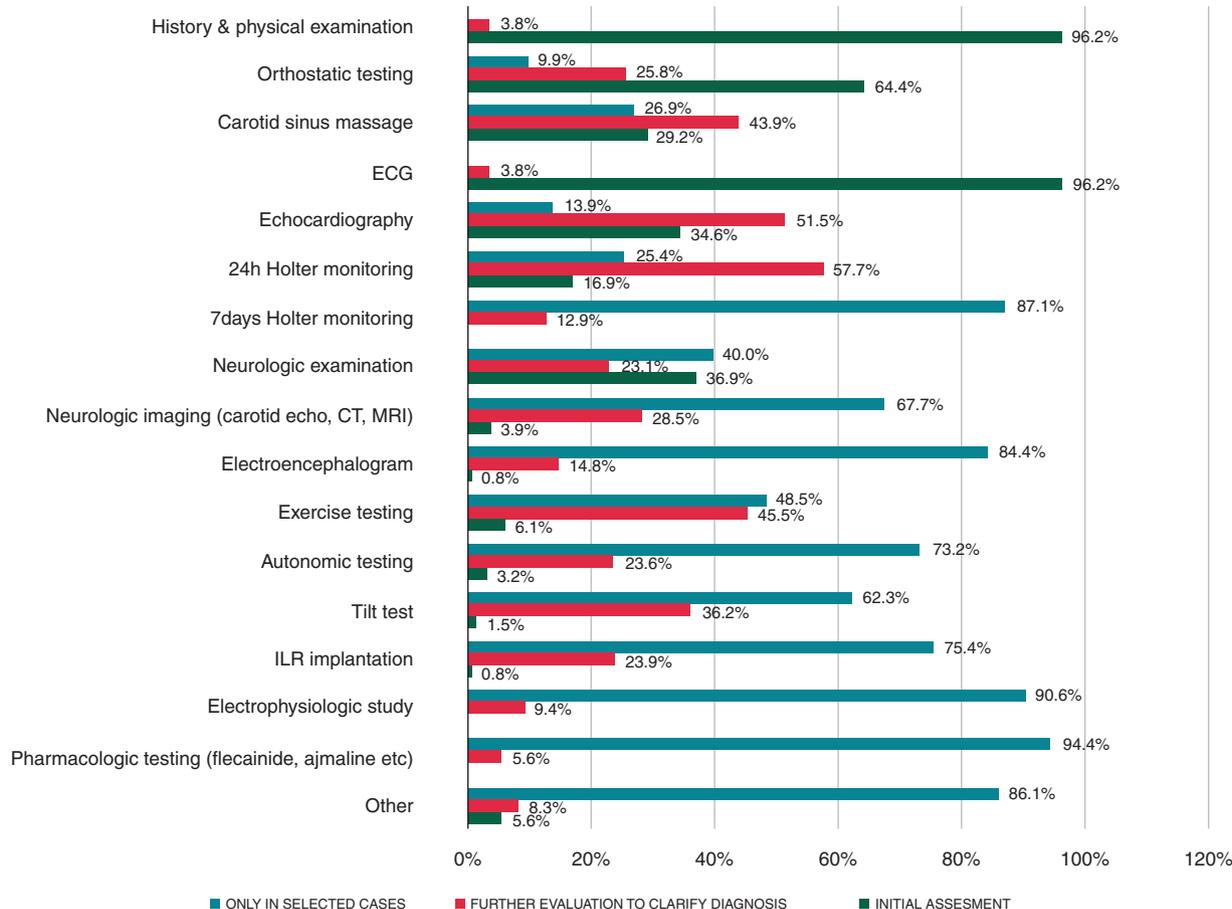
**Figure 1** Facilities for syncope management: Specialists involved in syncope management (A); syncope unit or other dedicated units for syncope management (B). Numbers in brackets represent counts.



**Figure 2** Proportion of syncope patients requiring hospitalization. Numbers in brackets represent counts.

consciousness and spontaneous recovery as characteristic. However, 25% did not consider complete recovery or a rapid onset as part of the definition, and only 69% included cerebral hypoperfusion in the diagnosis (Supplementary material online, Figure 3A). The most commonly considered features suggestive of reflex syncope were the

presence of triggers such as awakening pain (65%), straightening from bending or rising from squatting (56%), loud laughing or unexpectedly meeting an acquaintance (55%), or experiencing nausea and pallor after the syncope (42%). However, 23% of respondents considered the occurrence of syncope while supine, whereas 17% of



**Figure 3** Diagnosis assessment of syncope: initial (green), further evaluation (red), only in selected cases (blue).

respondents—upon hearing an alarm clock, as indicative for a reflex mechanism (Supplementary material online, Figure 3B).

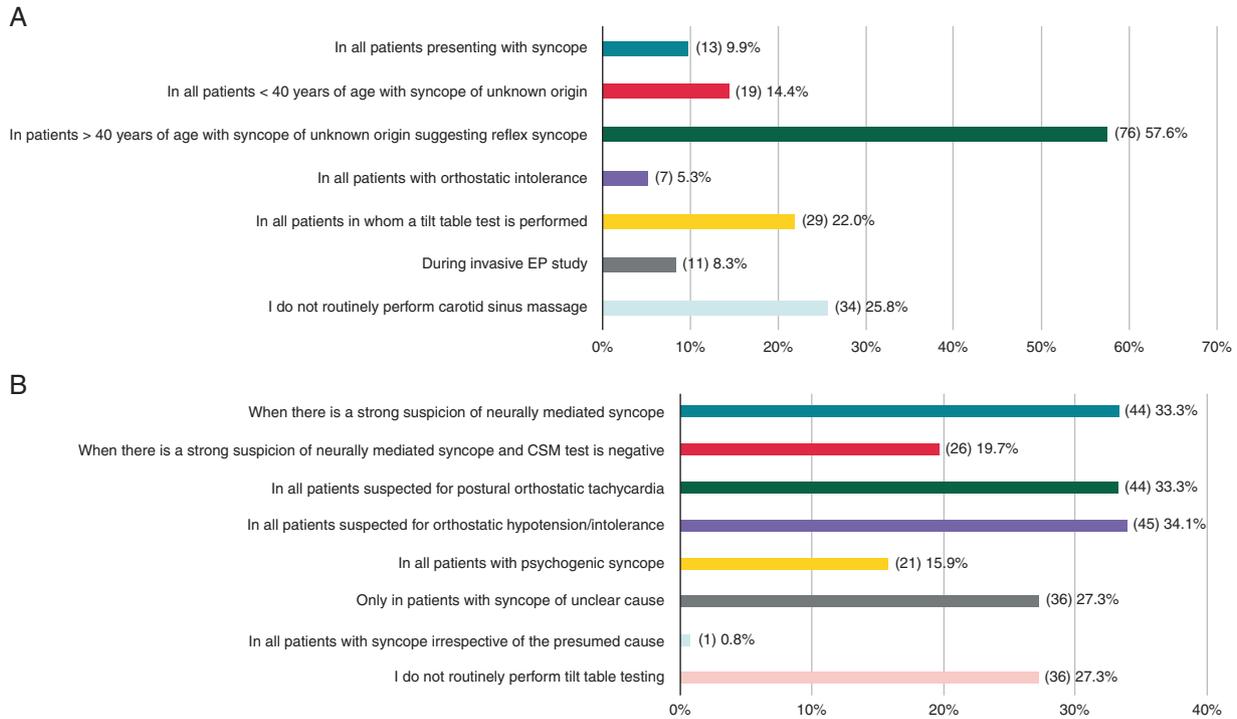
## Diagnostic evaluation and follow-up

Hospitalization or extended monitoring in syncope patients was prompted by the presence of structural heart disease (93%), syncope during exercise (88%), heart rate below  $40 \text{ min}^{-1}$  while awake (81%), intraventricular conduction disturbance or left ventricular hypertrophy (86%) and any syncope resulting in significant trauma (head trauma, fracture etc.; 68%). Sixty-one per cent of respondents considered syncope while supine as an indication for hospitalization or prolonged monitoring. Eighty per cent of respondents recommended hospitalization or long-term monitoring in those presenting with palpitations at the time of syncope while other for first degree or second-degree type 1 AV block (63%), systolic pressure below 90 mmHg (43%), prolonged history of recurrent syncope with similar characteristics (19%), or syncope provoked by head rotation (10%) (Supplementary material online, Figure 4).

Almost all respondents (96%) used history, physical examination, and ECG for the initial assessment of syncope, whereas 65% considered orthostatic testing mandatory for initial evaluation. Less

frequently utilized tests in this regard included echocardiography (35%), neurologic examination (37%), or 24 h Holter monitoring (17%), with only a few respondents considering neurological imaging (4%) or tilt-testing (2%) for the initial assessment. Most respondents would consider neurological imaging, autonomic testing, electroencephalogram, implantable loop recorder (ILR) implantation, and exercise or pharmacologic testing only in selected cases (Figure 3). More than half of responders routinely performed CSM in patients older than 40 years with syncope suggestive of a reflex mechanism, whereas 26% did not perform routine CSM (Figure 4A). Tilt-table testing (TT) was used mainly in patients suspected of orthostatic hypotension, postural orthostatic tachycardia, with a strong suspicion for neurally mediated tachycardia, or in syncope of unknown origin (SUO). However, 27% of interviewed physicians never used TT routinely (Figure 4B).

Whereas 62% of respondents did not perform autonomic testing in syncope patients, 20% would use it in patients with a BP drop to a plateau while standing, with or without fainting (Supplementary material online, Figure 5A). The most commonly used tests included the four phase Valsalva test, deep breathing test with beat-to-beat BP and ECG monitoring, and ambulatory 24 h BP monitoring (Supplementary material online, Figure 5B).



**Figure 4** Use of carotid sinus massage (A) and tilt-table testing (B) for diagnostic assessment of syncope. Numbers in brackets represent counts.

An invasive electrophysiological study (EPS) would be used by 67% of participants in patients with syncope and inconclusive non-invasive testing in the presence of bifascicular block, or a previous myocardial infarction (59%) (Supplementary material online, Figure 6).

For close follow-up of patients with recurrent syncope within a short inter-event interval (2–4 weeks), most respondents preferred event recorders over Holter monitoring (Figure 5A). The main indication for implantable loop recorders (ILR) was SUO in high-risk patients, whereas 45% of respondents preferred this modality for any kind of SUO. In addition, 35% would use such monitoring in patients with suspected epilepsy in whom drug therapy was ineffective (Figure 5B).

Whereas 57% of surveyed physicians would advise against driving in patients with syncope, until definitive diagnosis and effective therapy is initiated, 13% of respondents would not make any specific recommendation concerning driving (Figure 6).

## Syncope therapy

Regarding the management of reflex syncope, all respondents acknowledged the role of patient education and lifestyle modification, 47% would reduce hypotensive drugs in all patients, 36% would consider ILR-guided management in patients with non-prodromal syncope, 53% would endorse pacing only in severe cardioinhibitory syncope, and 14% would opt for such treatment for non-prodromal cardioinhibitory syncope. Physical manoeuvres for reflex syncope management were encouraged by 68% of participants.

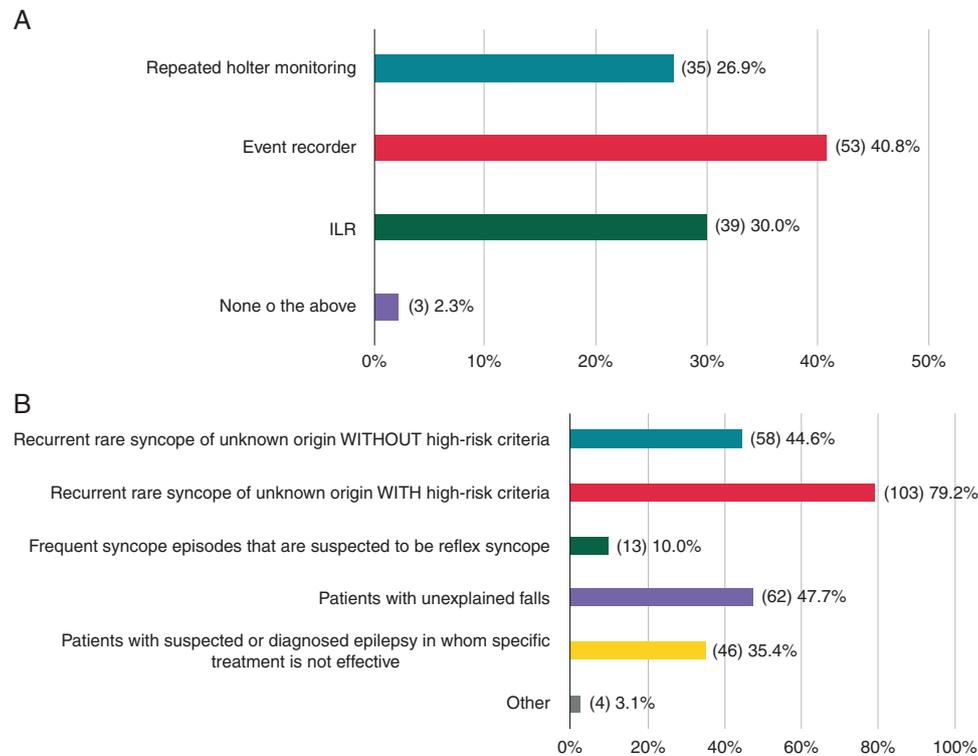
Fludrocortisone, midodrine, or theophylline for low-adenosine phenotype were recommended by few responders (Figure 7A).

In the case of syncope due to orthostatic hypotension, most respondents valued the role of patient education, adequate salt and water ingestion, and avoidance of triggers. Physical manoeuvres, compressive stockings, or abdominal binders would be considered by half the respondents, with only a minority advising head-up tilt sleeping or drug therapy (Figure 7B).

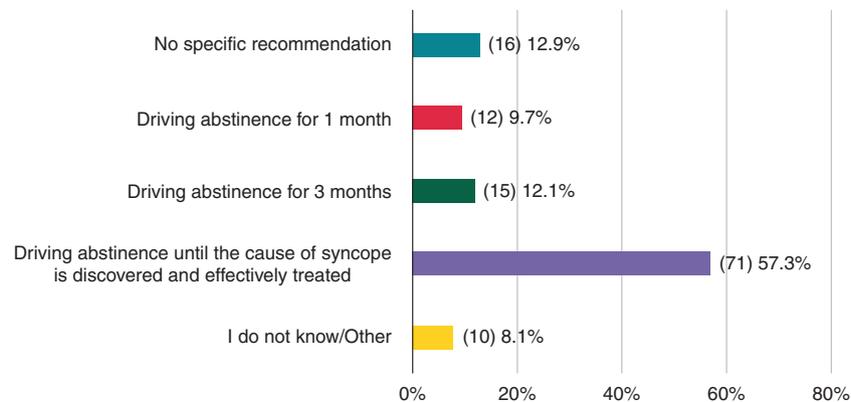
In most respondents' centres, pacemaker implantation was indicated when a correlation between syncope and AV block or bradycardia was evident, and in 75% of centres a pacemaker was implanted in case of third-degree AV block even in the absence of correlation between block and syncope. Ablation of atrial fibrillation or other supraventricular arrhythmias is possible in 76% of centres. ICD implantation in patients with ventricular arrhythmias and syncope due to structural heart disease is possible 89% of centres. In 27% of centres, a pacemaker implantation was carried out in elderly patients with syncope and intraventricular conduction disturbances, and in 11% of centres in patients with bradycardia even when correlation between bradycardia and syncope was missing (Supplementary material online, Figure 7).

## Discussion

The main findings of this physician-based survey by EHRA were as follows: (i) an increasing awareness and knowledge of syncope and a better management following the 2018 ESC Syncope Guidelines, as



**Figure 5** Type of monitoring (A) for patients with short inter-critical interval (2–4 weeks) and indications (B) for an implantable loop recorder (ILR). Numbers in brackets represent counts.



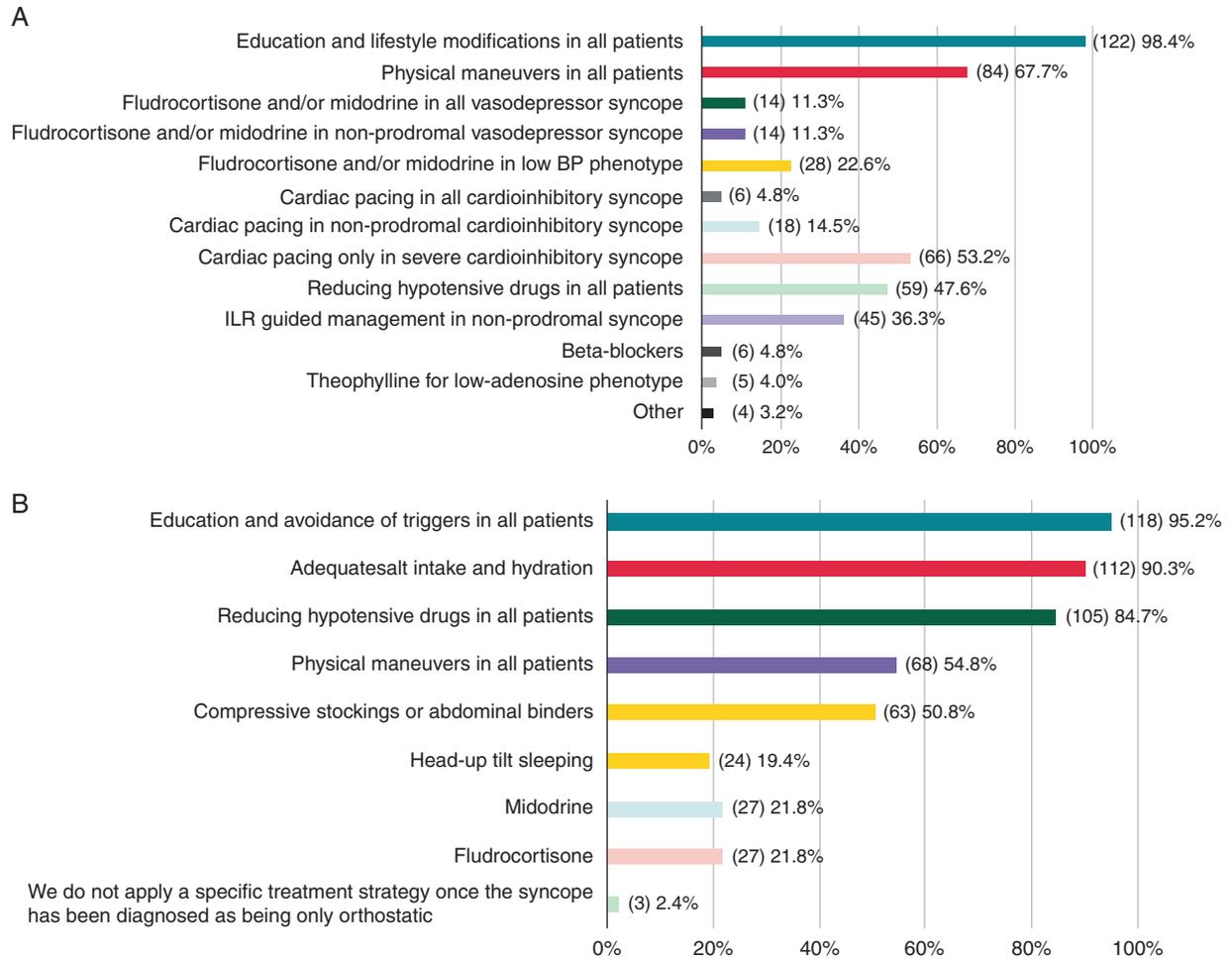
**Figure 6** Recommendations for driving with syncope. Numbers in brackets represent counts.

compared with the previous survey, (ii) a better utilization of diagnostic resources, (iii) a low level of implementation of syncope units and of specific algorithms for syncope management, (iv) heterogeneous management, (v) suboptimal use of important diagnostic tools (e.g. orthostatic testing, autonomic testing, or ILR monitoring), (vi) a high rate of hospitalizations, and (vii) a need for recommendations in specific situations, such as driving.

Since previous EHRA survey on syncope diagnosis and management<sup>15</sup> 6 years ago, new guidelines have been issued by the US cardiology societies<sup>3</sup> and ESC.<sup>1</sup> Although the present survey

demonstrated an improved awareness of the European Guidelines, a heterogeneity in guideline implementation and several unmet needs were evident. Extrapolating this survey to a more general population of physicians would probably result in a higher degree of discordance.

Syncope is a non-specific syndrome, and a correct diagnosis and careful detailed anamnesis are usually sufficient to establish the cause and guide further evaluation, thus sparing time and resources. Especially for ED physicians, syncope is a common challenge leading to 50% admissions, many of them unjustified.<sup>10</sup>



**Figure 7** Recommended therapy for reflex syncope (A) or syncope due to orthostatic intolerance (B). Numbers in brackets represent counts.

In our survey, syncope patients were mainly seen by cardiologists, neurologists, or emergency physicians and, as in the previous survey, there was no specialized unit or protocol for most respondents' institutions, which could explain the high hospitalization rate (>25%) in over a third of respondents. There is a consensus across guidelines concerning the definition of syncope.<sup>16</sup> However, around 25% of our respondents did not heed one or more characteristics of syncope (rapid onset, complete recovery, or cerebral hypoperfusion), and there were heterogeneous opinions on reflex syncope triggers. Most respondents utilized close monitoring or hospitalization in specific clinical situations and high-risk patients, in accordance with guidelines recommendations: structural heart disease, arrhythmias, significant cardiac conduction disturbances, syncope while supine or after exercise or severe trauma.<sup>1</sup> However, two-thirds were concerned about minor conduction disturbances (first- or second-degree type I AV block), and some inappropriately considered monitoring or hospitalization for syncope provoked by head rotation or long-term recurrent syncope with similar characteristics. Furthermore, a significant proportion of respondents lacked awareness of the high risk associated with syncope when supine, or in a patient with unexplained low BP (<90 mmHg) at the ED. Notably, the relation between orthostatic

hypotension and outcomes in the elderly, despite being included in several risk scores,<sup>17</sup> is still a subject of debate.<sup>18</sup>

Almost all respondents were in line with current guidelines when considering detailed history and physical examination as the most important tools for initial syncope assessment, followed by ECG monitoring. Indeed, early ECG monitoring, using ambulatory ECG recording devices, seems to be warranted, especially for patients presenting to the ED with SUO or suggestive of an arrhythmic origin, resulting in reduced hospitalization and wasteful resource use.<sup>19,20</sup> Moreover, a recent systematic review showed that clinical examination together with an ECG included in multi-item scoring may accurately identify patients with cardiac or non-cardiac syncope.<sup>21</sup> However, more than one-third of respondents do not consider orthostatic testing as part of the initial evaluation, despite current guideline recommendations.

Our survey demonstrated that CSM and TT are not appropriately employed in clinical practice. Likewise, autonomic testing is routinely used only by a minority of physicians. The current syncope guidelines recommend EPS in specific situations, such as unexplained syncope in patients with myocardial scar (class I), bifascicular block (class IIa), unexplained asymptomatic sinus bradycardia, or syncope preceded

by sudden palpitations (class IIb) when non-invasive testing fails to reveal the mechanism. The US Guidelines support EPS in syncope if an arrhythmic origin is suspected (class IIa).<sup>16</sup> The survey participants acknowledged this recommendation, as syncope associated with bifascicular block was the sole indication for EPS among more than 55% of respondents. An event recorder was the preferred non-invasive monitoring method, and ILR was indicated by the majority in high-risk patients with rare recurrent syncope. However, the role of ILR in establishing optimal therapy in low-risk patients with recurrent syncope or in cases of suspected epilepsy but failure of specific therapy is less well known. Only a few respondents opted for beta-blockers in reflex syncope, in accordance with the class III recommendation in the European Guidelines.<sup>1</sup> Half the respondents only opted for pacemaker implantation in cases of severe cardioinhibitory syncope, concordant with the class III indication in the European Guidelines to avoid pacemaker implantation in absence of a documented cardioinhibitory syncope. There were heterogeneous answers regarding the management of reflex syncope, orthostatic intolerance, or specific cardiac syncope, with the exception of a consensus regarding the role of education and lifestyle measures for the first two types, and of device implantation for severe AV block/bradycardia or malignant arrhythmias. The European Guidelines do not contain specific recommendations regarding driving in patients with syncope. Over half of respondents would advise driving abstinence until definitive diagnostic and efficient therapy is instituted. However, quantification of the potential risk of harm associated with various categories of drivers is necessary for more pertinent indications.<sup>22</sup>

## Limitations

The present survey included a limited number of selected physician respondents, all members of the EHRA Electrophysiology research network. However, it represents an illustrative snapshot encompassing both acceptance of 2018 ESC Syncope Guidelines and current practice.

## Conclusion

There is an increased awareness of syncope types and mechanisms, but there is a considerable room for better uniformity in clinical practice. There is an unmet need for specialized syncope facilities and dedicated diagnostic and treatment algorithms. The rate of hospitalization and other healthcare resources utilization, including costly unnecessary investigations, is still high, despite warnings launched by the previous and present syncope guidelines.

## Supplementary material

Supplementary material is available at *Europace* online.

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