The difficult management of anaphylaxis in the elderly

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Purpose of review
In this article, an overview of the main characteristics of the anaphylaxis in the elderly, a subset of the population with particular clinical and physiological features that might influence the presentation and management of this entity, is performed.

Recent findings
Life expectancy of the population is increasing and so is the prevalence of allergic diseases in the elderly, including anaphylaxis. Older people present higher risk of fatalities after anaphylaxis, and some comorbidities and pharmacological treatments they may use might also increase that risk.

Summary
Recognition of the main triggers, the risk factors, and the wide variety of presenting symptoms of anaphylaxis is therefore helpful in its management, as well as a prompt initiation of the treatment and a complete follow-up.

Keywords
adrenaline, anaphylaxis, comorbidities, elderly, epinephrine, management, risk factors

INTRODUCTION

Life expectancy of the population is increasing and it is estimated that in the year 2030, people more than 65 years old will reach 20% [1]. This aging of the population is a result of socioeconomic changes – improvement in nutrition, hygiene and health – which allows a greater survival and a global increase in the quality of life. Although allergic diseases are commonly associated with childhood or adolescence, the prevalence of allergic diseases in the elderly is estimated to be around 5–10%, and these data are destined to increase [2▪]. This involves the need to assess the impact of such diseases in this age group as well as a deep knowledge of its presentation and its main triggers.

Anaphylaxis is a clinical entity difficult to define because of the heterogeneity in its terminology and definition [3], but all of them include the concepts of a serious, generalized or systemic, allergic or hypersensitivity reaction that can be life-threatening or fatal [4▪▪]. Anaphylaxis occurs as a result of the sudden release of mediators from mast cells and basophils. It may present with different symptoms, at any age and with different triggers, as far as it fulfils the proposed diagnostic criteria [5].

Because anaphylaxis is a life-threatening reaction, frequently difficult to predict, with uncertain evolution and response to treatment, and with no randomized placebo-controlled trials available (due to ethical reasons) which could provide additional information, it is useful to know the main causes that can trigger these reactions, as well as the risk factors that could prompt or accelerate them. This is especially relevant in old patients, a subset of the population, which usually has comorbidities or regular medication that might modify the management or evolution of the anaphylaxis. In this article, we reviewed the main manuscripts on anaphylaxis published in peer-reviewed indexed journals over the last few years, and focused on the characteristics of the anaphylaxis in the elderly.

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KEY POINTS

- Definition of older people needs to be clarified, and perhaps it would be more appropriate to have a subclassification that took into account frailty, comorbidities and usual treatment.
- Recognition of the presenting symptoms of anaphylaxis, specially in cases of unusual presentation, is crucial for an adequate and a prompt management.
- Epinephrine is the treatment of choice for anaphylaxis and there are no contraindications whatsoever for its administration, although risk/benefit balance should be assessed in patients with CVD.
- Once a patient has experienced an anaphylaxis reaction, follow-up should be arranged with a specialist, together with standardized educational intervention to prevent new episodes.

IMMUNOSENESCENCE

The passage of time also affects the immune system, resulting in the elderly in what has been called immunosenescence. It affects both the innate and the adaptive immune systems, causes changes on immune cells [1], and consists of a 'remodelling' of the immunological response, which would lead to a proinflammatory state defined as 'inflammaging', with an overproduction of cytokines of both the Th2 and the Th1 pattern [2▪]. The number of T-regulatory cells (T reg) has also been reported to increase with age [6], and might also trigger an inflammatory state [7]. Furthermore, trace elements, such as zinc and iron, and vitamin D, which are relevant for the immune efficiency, are usually lowered in older people [1].

Along with the changes in the immune system and the physiological changes affecting the elderly, structural changes in specific organs should also be taken into account, as they might also have an effect on the clinical features of allergic diseases in aged people.

EPIDEMIOLOGY OF ANAPHYLAXIS

Although the prevalence of anaphylaxis appears to be increasing [3,8▪,9,10], it has been traditionally considered as an underestimated entity, probably because of the use of a variety of case definitions or under-coding [11,12▪,13,14]. In addition to this, it has been widely discussed whether prevalence, incidence or cumulative prevalence is the best measure of the frequency of anaphylaxis [8▪]. Worldwide, 0.05–5.1% of the general population is estimated to have anaphylaxis at some point in their lives [9,15▪,16▪,17,18], with an incidence rate of 4–112 per 100 000 person-years [3,12▪,13,19]. Stratified by sex, there is a female predominance [20,21▪] with an incidence of 6.6/100 000 reported for male subjects and of 8.7/100 000 for females [13]. Regarding the elderly, although the highest number of anaphylaxis occurs in children and adolescents [3,8▪,10,13], age and male/female-specific rates show the following incidence (per 100 000 person-years): 6.7/8.0 in the group from 65 to 74 years, 5.0/4.7 in the group from 75 to 84 years, and 3.2/4.0 in the group ≥85 years [13].

The incidence of fatal anaphylaxis in the general population is low, ranging from 0.12 to 1.06 deaths per million person-years [8▪]. Older age was associated with increased fatal anaphylaxis rates regardless of the anaphylaxis cause, emphasizing that anaphylaxis is more challenging for elderly [22].

TRIGGERS OF ANAPHYLAXIS

Foods, followed by drugs, are the main causes of anaphylaxis in the general population. However, different anaphylaxis triggers predominate in different age groups; food anaphylaxis is more prevalent in infants, children, teens and young adults, whereas drug anaphylaxis is more common in middle-aged and older patients [8▪,13,16▪,17]. In addition to food and drugs, insect sting and unknown factors complete the main causes of anaphylaxis, and the latter two are also more frequent in middle-aged and elderly adults [10,11]. Although these triggers are universal, geographic variations might influence their frequency depending on local dietary habits, exposure or place of residency – rural or urban area [11]. The higher consumption of drugs in the adult age is probably also the reason why drugs are frequent elicitors of anaphylaxis in the elderly – most commonly antibiotics, nonsteroidal anti-inflammatory drugs (NSAIDs), neuromuscular blocking agents, antineoplastics/cytotoxic drugs and biologic agents/immunomodulators [16▪].

Old age has been associated with worse evolution of the reactions regardless of the anaphylaxis cause. In fact, medications have been reported as the most common cause of fatal anaphylaxis, followed by unspecified anaphylaxis, venom, and food (order in the causes of fatalities corresponds to the main triggers for anaphylaxis in the elderly) [22].

In addition to age, differences in the trigger of anaphylaxis according to the gender have also been described. Thus, in the ≥71 years group of age, males present insect sting anaphylaxis more often whereas females present drug allergy with higher frequency [13]. Idiopathic anaphylaxis occurs more often in women than in men in a 2 : 1 ratio, and underlying mast cell disorders should be considered [11,23].

Regarding the anaphylaxis mechanisms involved in the elderly, studies are needed to find out if the changes secondary to the immunosenescence could influence the usual mechanisms for anaphylaxis described in the general population [17].

RISK FACTORS FOR ANAPHYLAXIS

Most of the patient factors that influence the risk of severe or fatal anaphylactic episodes are similar worldwide [11].

Age

Although the elderly is not the age group with higher frequency of anaphylaxis, they are those who present a higher risk of fatalities [2▪,12▪,15▪,16▪,21▪,22]. This risk has traditionally been explained as a reduced capacity to tolerate the effects of hypoxia, hypotension and arrhythmia – which usually indicates underlying vascular illness [17].

Drugs

The increased risk of anaphylaxis in old people with drugs may depend on their increased drug consumption.

(1) Beta-blockers may blunt the response to epinephrine and could make anaphylaxis more difficult to treat [15▪], and together with angiotensin-converting enzyme (ACE) inhibitors appear to increase the risk (or severity) of anaphylaxis [12▪,16▪,17,21▪]. It has been suggested that this risk is further increased by concurrent use or combination of a drug from each class [16▪,24]. Although this increase in severity might be associated with defects in mediator degradation pathways, which would lead into an increase in mast cell-mediators concentration [11], or reduced bradykinin clearance with resulting marked vasodilatation in the case of ACE inhibitors [12▪], the mechanisms of action are still incompletely understood [16▪].
(2) The intake of NSAIDs can result in severe anaphylactic reactions as a result of increased leukotriene formation and facilitated absorption of ingested allergens (acting as a cofactor) [12▪].
(3) The use of sedating drugs or psychotropic substances that alter the ability of recognizing symptoms of anaphylaxis may increase the risk of fatalities in patients of any age [11,16▪,17,25], and patients on monoamine oxidase inhibitors, tricyclic antidepressants or stimulant medications have also been reported as having increased risk factors requiring hospital admission after an anaphylaxis reaction [21▪].

Comorbidities

Several concomitant diseases have been reported to increase the risk of anaphylaxis in the general population and, thus, might likely be also valid for the elderly:

(1) Cardiovascular disease (CVD) [15▪,16▪]. Apart from the disease itself, the pharmacologic management of patients at risk of anaphylaxis with CVD represents a challenge for clinicians, because some of the medications used to treat this disease also increase anaphylaxis severity, as previously mentioned [15▪].
(2) Severe or uncontrolled asthma and/or chronic obstructive pulmonary disease (COPD) [8▪,16▪,26].
(3) Atopy [27], and previous history of anaphylaxis [28].

Mast cell diseases

Allergic diseases coexist in patients with systemic mastocytosis with similar frequencies as compared with the general population. Nevertheless, the prevalence of anaphylaxis in patients with mastocytosis is higher compared with the general population (22 [23] vs. 0.05 to 5.1% [9,15▪,16▪,17,18]). Thus, having a mast cell disease is a risk factor of anaphylaxis itself, regardless of age. Among patients with systemic mastocytosis or clonal mast cell activation diseases, idiopathic anaphylaxis is the main cause of anaphylaxis, followed by insect sting. The latter are significantly more frequent over more than 65 years of age (unpublished data by the Spanish Network on Mastocytosis).

Co-factors

Exercise, ethanol, NSAIDs, acute infections, stress, and perimenstrual status potentially amplify anaphylaxis by decreasing the threshold of allergen exposure in the general population [15▪,16▪]. With the exception of perimenstrual status, and maybe exercise – patient related – there is no evidence that the rest of the co-factors may not amplify anaphylaxis in the elderly as well.

Others

(1) Gender: in adults, anaphylaxis is more common in women, probably because of oestrogens enhancing mast cell activation and allergic sensitization [29].
(2) Increased socioeconomic status is related with higher risk of anaphylaxis [3,27].
(3) Geographic location: due to variations in vitamin D levels [3,30], along with weather

and seasons that largely relate to insect sting exposures, are also considered risk factors [3,31].

SYMPTOMS OF ANAPHYLAXIS

Presenting symptoms of anaphylaxis may vary, as long as they fulfil the proposed criteria [5], and usually occur a few minutes to hours after allergen exposure (when the aetiology is known). In 80–90% of cases skin and mucous membrane is involved, followed by respiratory tract affection (70% of cases), and cardiovascular and/or gastrointestinal systems, both involved in up to 45% of cases. A minor number of patients (15% approx.) may present symptoms affecting the central nervous system (headache, dizziness, confusion, tunnel vision) [3,11,14,16▪,17,25]. Main sings and symptoms of anaphylaxis are described in Table 1 [10,17,32–37]. In pregnant women, anaphylaxis can cause uterine cramping that can induce labour and lead to miscarriage [3]. When anaphylaxis is presented with atypical or infrequent symptoms, it can be difficult to recognize at its onset, and this might increase the severity of the reaction [16▪,25]. This is most evident in cases of absence of skin or mucosal involvement – frequent in patients with mastocytosis [34,38] or in perioperative settings [16▪,39]. In a large survey performed among health professionals, only 55% of responders were able to recognize the case scenario of anaphylaxis without skin signs, whereas 80% of them correctly identified it when skin and respiratory symptoms were involved [40].

Cardiovascular symptoms are significantly more likely to occur in more than 65-year-old people [15▪]. Whether this is due to a higher prevalence of CVDs in older age or because of limited cardiovascular reserves remains unclear. In elderly patients, the presence of symptoms such as cyanosis, syncope and dizziness are highly predictive of shock development and their early recognition is critical to adopt the adequate treatment [41]. Mast cells are the main effector cells involved in anaphylactic reactions, through activation-degranulation, and are found in most parts of the human body, including the heart and vessels. The concurrence of coronary spasms in patients without pre-existing coronary disease as a result of mast cell mediators degranulation (so called Kounis syndrome [42]) can also be the presenting symptom of anaphylaxis and may rapidly progress towards severe dysrhythmias and/or collapse. Kounis syndrome is mostly described in adults after allergic reactions due to drugs, insect sting and foods, but it has also been described in childhood [43,44]. Additional clinical presentations involving the heart have been reported; in 10% of severe anaphylaxis with extreme hypovolemia, a paradoxical bradycardia may be present in patients with conduction defects, increased vagal tone due to a cardio-inhibitory (Bezold-Jarisch) reflex or in those who take sympatholytic medications [3,39].

Reported recurrence of anaphylaxis within 72 h of the initial anaphylactic event (biphasic anaphylaxis) without re-exposure to the trigger, ranges from 1 to 20% [16▪,45]. It usually appears within 8 h of the first symptoms [3,14,25,46]. Patients who presented with hypotension or who had an unknown inciting trigger might have an increased risk of a biphasic anaphylaxis [3,16▪,45]. The duration of observation in an emergency department (ED) should be risk-stratified according to the clinical characteristics and severity of the episode [16▪].

DIAGNOSIS OF ANAPHYLAXIS

Given the lack of rapid diagnostic tests, diagnosis of anaphylaxis is primarily based on the recognition of typical signs and symptoms according to the proposed criteria [5], and prompt initiation of definitive therapy afterwards [3,14,16▪,17,25].

Identification of specific triggers relies on an accurate history recall and in subsequent allergic in-vivo and/or in-vitro work-up. Nevertheless, there is a lack of an optimal method for distinguishing between allergen-sensitized individuals who are clinically tolerant and those who are at risk of anaphylaxis after exposure to the relevant allergen [47]. Thus, objective evidence of mast cell degranulation is needed to demonstrate the mechanism involved in the reaction. Currently, acute serum tryptase is the mast cell activation marker of choice. The quantification of markers other than tryptase as activation parameters is a controversial issue. Histamine and prostaglandin D2 (PGD2) are also released during mast cell activation. However, histamine is not very specific, and both histamine and PGD2 lack sensitivity [48]. Therefore, although tryptase is considered the marker of choice, when it is not available or the results are not conclusive, alternative markers, such as histamine metabolites (methylhistamine) or PGD2 in 24-h urine (or its metabolite, 11β-2α-platelet-derived growth factor) can be used [49–52]. Quantification of mast cell mediators might not be definitive either, and it is not unusual to find normal serum tryptase values after acute episodes – as in cases of food-dependent anaphylaxis, because of a low amount of tryptase on mucosal mast cells compared with connective tissue mast cells [14].

Anaphylaxis can present similarly to a variety of other conditions. Exposure to a potential trigger

Table 1. Main symptoms and signs of anaphylaxis and main entities that should be included in the differential diagnosis

Symptoms and signs	Differential diagnosis*	Useful tests*
Cutaneous		
Itching, hives, swelling	Pruritus – essential (p. in the elderly) vs. secondary[a]	Blood tests according to suspicion[a]
	Prurigo, urticaria and vasculitis	Blood tests[a], allergic work-up or skin biopsy
	Inherited or acquired angioedema	C4, C1q, C1 inhibitor
	ACE inhibitor-induced angioedema	Plasma bradykinin[b]
Flushing	Menopause	FSH, LH, estrogen
	Carcinoid syndrome	5-hydroxyindoleacetic acid in 24-h urine
	Pheochromocytoma	Catecholamine and metanephrine in 24-h urine
	Medullary thyroid cancer	Serum calcitonin
	MCAS	REMA score[c]
	Monosodium glutamate/sulfites	Controlled oral challenge
Respiratory		
Chest and/or throat tightness, stridor, wheezing	Vocal cord impairment	Laryngoscopy, spirometry
	Aspiration of foreign body	Laryngoscopy, fibrobronchoscopy
	Inherited or acquired angioedema	C4, C1q, C1 inhibitor
	ACE inhibitor-induced angioedema	Plasma bradykinin[b]
	Asthma/COPD	Pulmonary function testing
	MCAS	REMA score[c]
	Panic attacks, Munchausen stridor	Psychiatric assessment
Gastrointestinal		
Diarrhoea and cramping, nauseas, vomiting	Irritable bowel	Endoscopy and biopsy
	Gallbladder disease	Endoscopy and biopsy, image testing
	Neuroendocrine tumors	Serum vasoactive intestinal peptide
	MCAS	REMA score[c]
	Scombroidosis[d]	Clinical suspicion
Cardiovascular		
Presyncope, syncope, tachycardia, hypotension	Autonomic impairment	Drop in blood pressure in orthostatism
	Cardiovascular diseases (arrhythmias and structural)	ECG, echocardiography
	Shock	Clinical correlation[e]
	MCAS	REMA score[c,f]
	Postural orthostatic tachycardia syndrome	Tilt test
Neurological		
Headache, dizziness, impending doom, tunnel vision	Migraine[g]	Imaging tests
	Vertigo	Otolaryngologist examination
	Epilepsy	EEG
	Stroke	Imaging tests
	MCAS	REMA score[c,h]

ACE inhibitor, angiotensin-converting-enzyme inhibitor; COPD, chronic obstructive pulmonary disease; EEG, electroencephalogram; FSH, follicle-stimulating hormone; LH, luteinizing hormone; MCAS, mast cell activation syndromes; REMA, spanish network on mastocytosis.
Adapted with permission [10,17].
*Only the main entities or diagnostic tests are depicted, but many others could also be taken into account.
[a]Pruritus may be secondary to metabolic disorders, hematologic, renal or liver diseases, malignant neoplasms, infestations and psychogenic states. When the above pathologies are discarded, the diagnosis of essential pruritus is reached. The prevalence of pruritus increases with age as a result of a decline in the normal physiological status of the skin, xerosis, and is the most common skin disorder in the geriatric population (also called pruritus in the elderly) [32]. Differential diagnosis and blood tests recommended for prurigo do not usually differ from those used in pruritus. In the chronic spontaneous urticaria diagnosis, when no symptom-inducing factor can be identified, only differential blood count, thyroid antibody and thyroid function tests, and assessment of the sedimentation rate and serum C-reactive protein are recommended [33].
[b]In ACE inhibitor-induced angioedema, bradykinin and its active precursors are accumulated. In angioedemas caused by mast cell mediator release, the bradykinin degradation protein chain is normal.
[c]REMA score is a screening tool with high sensitivity and specificity to predict clonality (mastocytosis and clonal MCAS) in patients in the absence of skin lesions suggesting mastocytosis [34]. It is based on demographic data (gender), symptoms and signs during the acute episodes and serum baseline tryptase level.
[d]This disease might also inlcude flushing and hypotension.
[e]Request complementary studies according to the clinical situation and suspected aetiology (hypovolemic, cardiogenic, distributive or septic shock).
[f]Clonal diseases may present with vascular symptoms [34] or with coronary vasospasm [35].
[g]In addition to headache, migraine could be also presented with gastrointestinal symptoms.
[h]MCAS have been reported to present with cerebral vasospasm [36].

followed by systemic symptoms is strongly suggestive of anaphylaxis. However, each symptom may mimic other states, and a complete differential diagnosis should be always carried out [10,17,37] (see Table 1).

MANAGEMENT OF ANAPHYLAXIS

Because of the sudden onset of anaphylaxis, it is of paramount importance that emergency clinicians recognize and treat the symptoms early and aggressively to avoid airway and cardiac compromise [10]. Treatment of anaphylaxis is similar in all age groups, but some considerations should be made in elderly patients.

Initial treatment

Collaborating organizations' guidelines (WAO, AAAAI/ACAAI, EAACI) concur with regard to recommendations for prompt initial treatment with epinephrine (adrenaline) injected intramuscularly in the mid-outer thigh, as soon as anaphylaxis is diagnosed or strongly suspected (ideally before ED arrival), and repeating the epinephrine dose after 5–15 min if the response to the first injection is not optimal [4▪▪]. At the same time, a rapid assessment of the patient should be made, removing the trigger if possible, calling for help and positioning the patient supine (or semi-reclining in a position of comfort if dyspnoea or vomiting) with elevation of the lower extremities [16▪]. If indicated at any time, supplemental oxygen, intravenous fluid resuscitation with a crystalloid such as 0.9% (isotonic) saline, and cardiopulmonary resuscitation should be started without delay, as indicated in Fig. 1. It is also widely accepted that H1-antihistamines, H2-antihistamines and glucocorticoids are second-line or even third-line medications in anaphylaxis. These medications are not life-saving and should not be used as initial or sole treatment [4▪▪,16▪].

Refractory anaphylaxis

Patients with anaphylaxis refractory to epinephrine, supplemental oxygen, intravenous fluids and second-line medications should be transferred to an ICU for ventilatory and inotropic support and continuous electronic monitoring [4▪▪]. Beta-blocker therapy should be first discarded, and if this treatment is confirmed, administration of glucagon should be initiated. Additional drugs have been reported to act as a bridge to recovery in refractory anaphylaxis: methylene blue, a selective nitric oxide-cyclic guanosine monophospate inhibitor used in septic shock, prevents vasodilation and can rapidly reverse the course of anaphylaxis, although adverse events and interference with pulse oximetry should be taken into account [16▪]. In patients with cardiovascular collapse, and cardiac arrest, extracorporeal membrane oxygenation (ECMO) has also been demonstrated to be helpful [16▪].

Elderly peculiarities

(1) Comorbid conditions and concomitant treatment: as mentioned before, the presence of comorbidities and polypharmacy has a marked influence in the elderly [2▪], and they are important risk factors for severe anaphylaxis with hospitalization, prolonged hospital stay and fatalities associated [4▪▪].

(2) Epinephrine administration: epinephrine is not contraindicated in the treatment of anaphylaxis in patients with known or suspected CVD, or in middle-aged or elderly patients without any history of coronary artery disease who are at increased risk of acute coronary syndrome (ACS) only because of their age [11]. Nevertheless, in CVD patients (especially those with ACS), the decision to administer epinephrine for anaphylaxis can be difficult, and its benefits and potential harms need to be carefully considered [15▪] since adrenaline increases coronary artery blood flow because of an increase in myocardial contractility and in the duration of diastole relative to systole through its beta-1 adrenergic effects [11]. The route of epinephrine administration can be crucial as well, with fewer adverse events with the intramuscular route, regarding intravenous (1 vs. 10%), and no overdoses with intramuscular injection vs. 13% after intravenous bolus administration [53]. When the intravenous route is needed, it is recommended that patients receive epinephrine as a slow continuous epinephrine infusion and the rate of administration be titrated to the response with continuous hemodynamic monitoring [3].

Long-term management

Several situations have proven to be beneficial in the management of anaphylaxis and showed to be helpful in preventing or not requiring hospital admission:

(1) Referral to allergy/immunology specialists after the stay in ED, who would clarify the diagnosis and correctly identify the trigger [16▪,21▪].

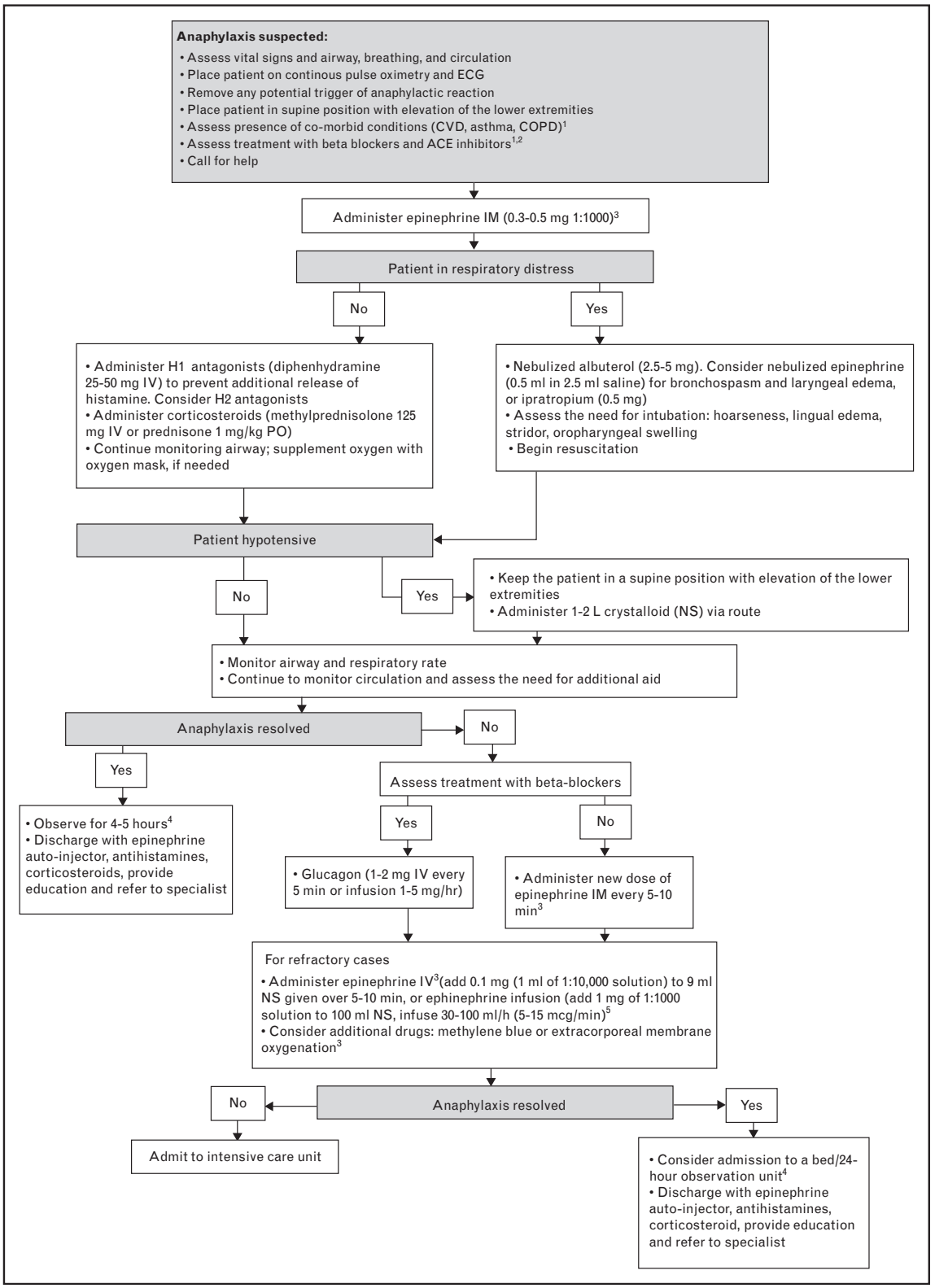

FIGURE 1. Algorithm for the management of anaphylaxis in the elderly in the emergency department (ED). Adapted with permission [10]. ACE, angiotensin-converting-enzyme; COPD, chronic obstructive pulmonary disease; CVD, cardiovascular disease; ECG, electrocardiogram; IM, intramuscular; IV, intravenous; NS, normal saline (0.9%); PO, *per os* (oral administration). [1]May aggravate symptoms of anaphylaxis. [2]May interfere with anaphylaxis treatment. [3]Assess risk/benefit in patients with CVD. [4]The duration of observation in an ED should be risk-stratified according to the clinical characteristics and severity of the episode. [5]Should be administered in an ICU.

Fewer than a quarter of the patients receive follow-up care by an allergist/immunologist after the anaphylaxis [54].

(2) Epinephrine auto-injectors (EAIs) prescription: under-prescription and under-use of EAIs in anaphylaxis is likely to contribute to fatalities, and individuals who are at high risk of anaphylaxis should carry an EAI and receive training and support on how, when and why to use it [55]. Patients aged over 60 years are significantly less likely to have an EAI prescription filled than other age groups [15▪,21▪]. Furthermore, elderly patients may present cognitive dysfunction or difficulties in understanding and remembering the management of epinephrine. Different EAIs are available in some countries and differ significantly with regard to size, ease of carrying, ease of use, needle protection and robustness. Prescribing more than one EAI is recommended because more than one dose of epinephrine is needed in about 20% of anaphylactic episodes [4▪▪].

(3) Educational programs: instructions on how to avoid the culprit allergen, how to recognize the symptoms of anaphylaxis and how to inject epinephrine in the future might be insufficient [56]. Furthermore, compliance with carrying and using epinephrine is generally poor [20]. There is a pressing need for improved public health initiatives regarding anaphylaxis recognition and adequate preparation for future episode treatment in order to achieve the patient's self-management [9,56,57].

CONCLUSION

The time has come to deal with allergic diseases in older ages, including anaphylaxis. Since no clinical randomized trials and observational real-life studies will be specifically conceived for this entity, and even less for people over 65 years [26], we need to know all the factors that can influence its occurrence and handling. Nevertheless, the definition of older people needs to be clarified, and perhaps it would be more appropriate to have a subclassification into several ranges after 65 years of age that may take into account increasing frailty, comorbidities and dependence [1].

Epinephrine is the treatment of choice for anaphylaxis and there are no contraindications whatsoever for its administration, although in patients with CVD the risk/benefit balance should be assessed. Comorbid conditions in the elderly such as asthma, COPD or ischemic cardiac disease may aggravate anaphylaxis, along with medications these patients might take regularly as a treatment for their disease (especially beta-blockers and ACE inhibitors).

As anaphylaxis cannot be usually predicted, in order to avoid fatalities or undesired situations – especially in a subset of patients particularly as vulnerable as the elderly – it is mandatory to know whatever might be related to this entity and its management. And once it has occurred, follow-up should be arranged with a specialist, together with standardized educational intervention to prevent new episodes.

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Conflicts of interest

There are no conflicts of interest.

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- ▪ of special interest
- ▪▪ of outstanding interest

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