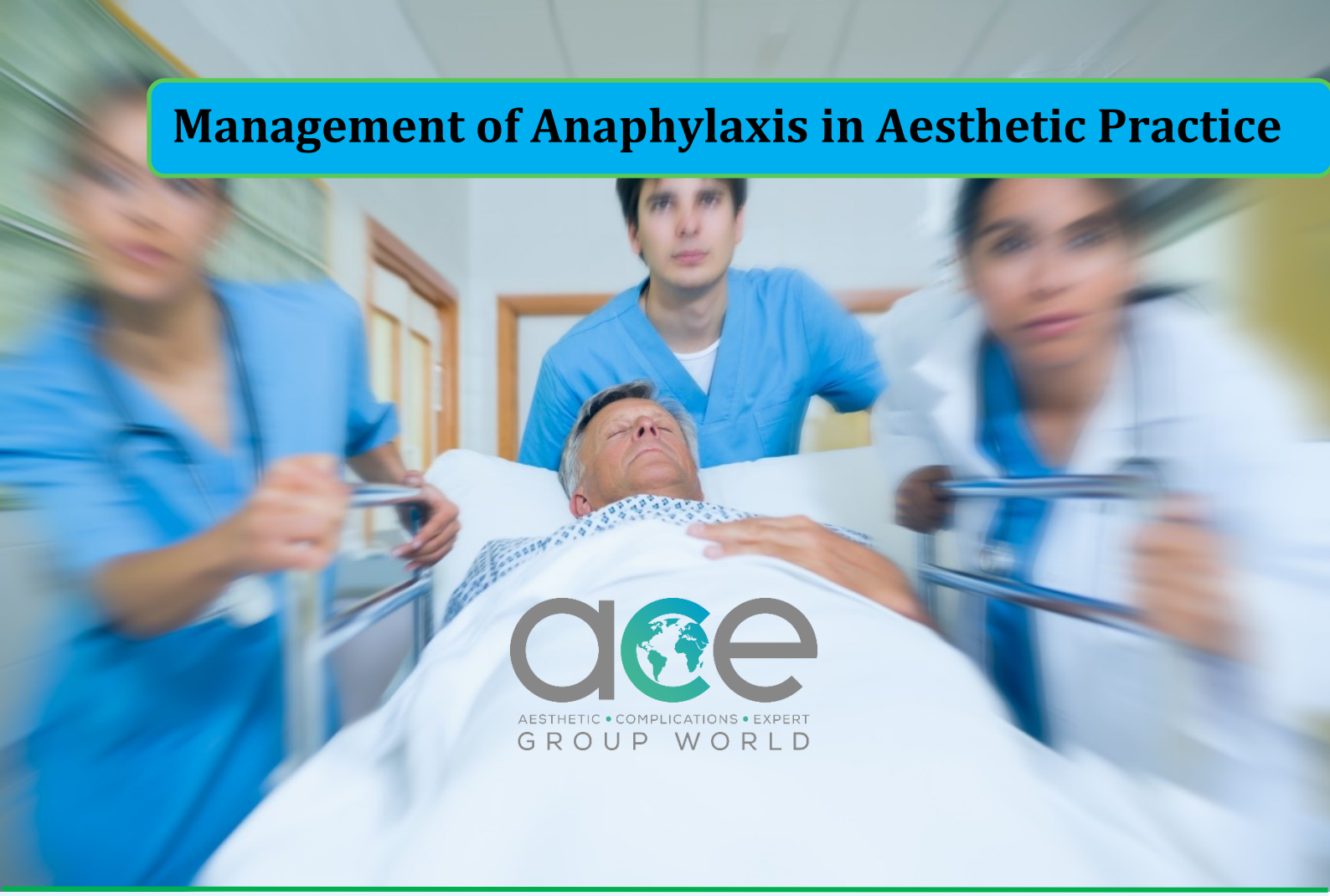
Management of Anaphylaxis in Aesthetic Practice



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Seriousness		Frequency	
Minor		Common	
Minor to Moderate		Occasional	
Moderate		Infrequent	
Serious		Rare	
Major	X	Very rare	X

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Aims:

This guideline aims to update the previous Aesthetic Complications Expert Group guideline, due to changes in the management of Anaphylaxis following consultation between Resuscitation Council UK (RCUK) and the National Institute for Health and Care Excellence (NICE) (2022). It will also help to provide a basic understanding of allergy and anaphylaxis. It should not, however, be used as a substitute for carrying out anaphylaxis training.

Definition:

The World Allergy Organisation (WAO) Anaphylaxis Committee broadly defines anaphylaxis as "*A serious systemic hypersensitivity reaction that is usually rapid in onset and may cause death. It is characterised by potentially life-threatening compromise in airway, breathing and/or the circulation, which may occur* ***without*** *typical skin features or circulatory shock being present",* (Cardona, 2020). This definition is aligned with the Resuscitation Council UK (RCUK) definition (RCUK 2021). Common triggers can be food, medicines, insect stings, general anaesthesia, contrast agents, and latex. In some cases, idiopathic anaphylaxis occurs when the cause of anaphylaxis cannot be identified (Kim & Fisher, 2011).

Introduction:

Anaphylaxis tends to have a sudden onset with a rapid progression of symptoms. The quicker the onset of symptoms of anaphylaxis, the more likely it is to be severe and life-threatening (RCUK, 2021). Severe allergy remains rare within aesthetic practice, the incidence of immunologically mediated reactions that have occurred are few and far between, however, the practitioner must be competent to diagnose and manage any allergic or anaphylactic reaction. Analysis of the causes of anaphylaxis that have occurred have been difficult to interpret, due to co-administration of other medications, excipients, and/or topical agents (LeWitt, 2018).

Regardless of the cause, anaphylaxis requires immediate and appropriate treatment. It is the responsibility of the aesthetic practitioner to know how to recognise and deal with it appropriately. If the practitioner is not competent in managing anaphylaxis, aesthetic treatment should not be administered to patients until the necessary skills and equipment are gained. ACE Group World recommends that all aesthetic practitioners hold current and relevant certification in the management of cardiopulmonary resuscitation and anaphylaxis.

Anaphylaxis can occur at any time and from any products used. For example, injectable products such as botulinum toxin, soft tissue fillers, local anaesthetics (injected or topical), and topical agents. Other potential causative agents include chemical peels, particularly peels containing acetylsalicylic acid, which would be contraindicated in a patient with an aspirin allergy. Skin cleaning agents such as chlorhexidine and environmental allergens can also pose a risk.

All patients should be asked about allergies and previous anaphylaxis as part of their medical history and may not be suitable for treatment if there is an increased risk. RCUK (2021), states that for individuals with prior anaphylaxis, the risk of a further episode is approximately 1 in 12 per year in the UK.

Allergies occur when the immune system identifies a substance (allergen) as something dangerous and subsequently triggers an immune response. The most common causes of IgE-mediated anaphylaxis are foods, particularly peanuts, tree nuts, shellfish, cow's milk, wheat, and eggs (Kim & Fischer, 2011). Medications can also cause anaphylaxis, particularly penicillin. A further common cause of severe allergy is latex.

Allergens can be ingested, injected, inhaled, or cause a reaction via the skin. There are over 200 types of airborne allergens that fall into 4 different categories: animals, mould, dust mites, and pollen. Once an allergen has entered the body it can then cause an immunologic mechanism that involves IgE. The immune system triggers a response known as a hypersensitivity reaction. Mast cells, as well as being instrumental in allergy and anaphylaxis, also play an important protective role in wound healing and release inflammatory mediators such as histamine, leukotrienes, tryptase, and prostaglandins (Kim & Fischer, 2011). Histamine binds to cell receptors leading to allergy symptoms, such as sneezing, coughing, rhinorrhoea, etc. These allergies, although unpleasant, are not usually life-threatening. However, should this allergic response

become severe then it can lead to anaphylaxis. Allergy symptoms can start mild but can rapidly lead to anaphylaxis. While medicinal products are much more common triggers in older people, food is a more common trigger in children and younger people.

Co-morbidities and concurrent medication may also affect the severity of anaphylaxis and the response to treatment. Concurrent treatment with beta-blockers can interfere with the patient's ability to respond to adrenaline, which is the first-line treatment for anaphylaxis. Patients who are taking angiotensin-converting enzyme (ACE) inhibitors, may experience a more severe allergic reaction as they impact the patient's compensatory physiological response to anaphylaxis (Kim & Fischer, 2011). Practitioners should be aware that most cases of anaphylaxis will require intervention and treatment.

Anaphylaxis is extremely rare in aesthetic medicine, but potentially fatal without immediate and appropriate treatment.

Practitioners must be prepared to diagnose and administer initial treatment and acknowledge the risk associated with topical and injectable aesthetic medical treatments, but also the risk in the general population of environmental allergens, which may be coincidental and unrelated to treatment. The author notes that a history of anaphylaxis, irrespective of the allergen, has long been considered an absolute contraindication to treatment. There is no evidence to support this, and treatment can be carried out as long as there has not been any reaction to the product being used or a similar product range. Allergies are specific to antigens, though some antigens are related, and these relationships are understood. Hence an individual with anaphylaxis to penicillin does not necessarily suffer an increased risk of anaphylaxis to multiple antigens, but only to penicillin. Caution is advised in any patient with a history of an anaphylactic reaction and to ascertain the allergen that caused it and the severity.

Incidence:

Within the general population, the prevalence of anaphylaxis is approximately 2% and appears to be rising, especially within the younger age group. Despite this, there appears to remain some confusion over the diagnosis and treatment of anaphylaxis (NICE, 2021).

In the UK it is estimated that 500,000 people have had a venom-induced anaphylactic reaction and 220,000 people up to the age of 44 have had a nut-induced anaphylactic reaction. Available UK estimates suggest that approximately 1 in 1333 of the population of England has experienced anaphylaxis at some point in their lives. There are approximately 20 deaths from anaphylaxis reported each year in the UK, with around half the deaths being iatrogenic (caused by medical examination or treatment). It is thought, however, that this may be an underestimate (NICE, 2020).

Signs and symptoms:

As anaphylaxis is a generalised reaction, it can present with a wide variety of signs and symptoms, (Oswalt, 2007). This variety and unpredictability of symptoms may lead to it being underdiagnosed and inadequately treated. Diagnosis and management are challenging as reactions occur very quickly and are usually unexpected. The average onset of symptoms is 2-30 minutes following intravenous exposure and 2 hours from ingestion of foods (Marx, John, 2010). However, reactions can occur outside of these time frames (RCUK, 2021).

Signs and symptoms can involve the skin, respiratory and gastrointestinal tract, and the cardiovascular system. The most common signs of allergy/anaphylaxis are cutaneous, including urticaria, angioedema, erythema, and pruritus. These are noticeable in 80% of cases of anaphylaxis and absent in 20% of cases (RCUK, 2021). Patients suffering from anaphylaxis often describe a feeling of "angor animi", a feeling that they are going to die, or a feeling of impending doom, (Kim & Fischer, 2011). Be aware that the signs and symptoms of anaphylaxis can vary from patient to patient and from episode to episode. Therefore, the absence of a particular symptom, for example, urticaria, would not rule out the possibility of anaphylaxis. Death from anaphylaxis usually occurs because of respiratory obstruction and/or cardiovascular collapse.

The most common systems affected include (Simons FE, 2009):

- Skin (80–90%)
- Respiratory (70%)
- Gastrointestinal (30–45%)
- Heart and vasculature (10-45%)
- Central nervous system (10–15%)

Airway and breathing

1. Nasal congestion, sneezing, and coughing.
2. Swelling of the throat or tongue.
3. Difficulty breathing or swallowing.
4. Having a sensation of the throat closing.
5. Hoarse voice.
6. Stridor (a high-pitched breathing sound caused by a narrowed or obstructed airway).
7. Shortness of breath.
8. Chest tightness.
9. Increased respiratory rate.
10. Wheeze, due to smooth muscle contraction in the airways and tissue oedema.
11. Angioedema (this is swelling of deeper tissues for example the lips and eyelids and sometimes it affects the mouth and throat).
12. The patient can often begin to feel tired and may become confused due to hypoxia (inadequate oxygen levels). Patients can develop cyanosis and eventually, they may suffer a respiratory arrest.

Circulation

1. The patient begins to look shocked with pale and clammy skin.
2. Rapid and increasing heart rate, tachycardia.
3. Hypotension.
4. Dizziness.
5. Syncope.
6. Possible decreasing conscious level.
7. Angina.
8. Cardiac arrest.

Neurologic and emotional

1. A sense of impending doom.
2. Feelings of anxiety and panic.
3. Light-headedness.
4. Confusion.
5. Possible decreased conscious level caused by hypoxia and/or circulatory collapse.

Skin and mucosal changes

1. Erythema.
2. Angioedema
3. Pruritus.
4. Urticaria.
5. Itching in or around the mouth.
6. Tingling or swelling of the lips, tongue, or palate.

Gastrointestinal problems

1. Nausea and vomiting.
2. Odynophagia (painful swallowing)
3. Abdominal pain, due to fluid redistribution in the bowel and smooth muscle contraction.
4. Diarrhoea.
5. Incontinence.

Differential Diagnosis

Other diagnoses that can present in a similar way to anaphylaxis are conditions that produce signs and symptoms akin to the symptoms of anaphylaxis such as difficulty breathing, hypotension, pallor, bradycardia, weakness, nausea, and vomiting. For example, acute respiratory problems such as asthma attacks, choking on a foreign body, and panic attacks, are a few of the conditions that may be confused with anaphylaxis. In-depth and detailed history-taking is therefore paramount to ascertain if the patient has any of these pre-existing conditions. Atopy, the tendency to produce an exaggerated immune response to otherwise harmless substances in the environment, should also be considered.

When considering a differential diagnosis, the presence of additional signs and symptoms can help discern between them. For example, asthma does not generally present with itching or gastrointestinal symptoms, a vasovagal episode may cause pallor of the skin, but a rash is very unusual and panic attacks may cause flushing, but hives are not a recognised sign.

Minimising the risk:

A full medical history should always be taken and plays a pivotal role in minimising risk factors associated with potential allergic reactions and/or anaphylaxis. The patient's age, lifestyle, co-morbidities, and medications should be considered.

Caution should be shown with the following:

- Medications: Antibiotics, Non-steroidal anti-inflammatory medication (NSAIDs), including ibuprofen and aspirin, chemotherapeutic agents, loperamide, vitamins, folic acid supplements, herbal treatments, and biological agents such as cetuximab, infliximab and omalizumab (Simons, 2010).

- Products that contain protein excipients, for example, botulinum toxins (highly unlikely as human albumin is the excipient used in the most commercially available toxins, however, added caution with toxins of dubious origin). Toxins of unknown origin may have excipients akin to those used in some vaccines, such as gelatine, egg, or dextran (Estelle & Simons, 2010).

- Patients with an insect venom allergy should also be treated with caution if they are wishing to have a soft tissue filler treatment. This may pose a risk if they were to require hyaluronidase treatment, as they may also be allergic to the hyaluronidase (Morris, 2014).

- Latex gloves should be avoided due to the risk of allergic reactions. Patients with a history of atopy (asthma, allergic rhinitis, eczema) are at a higher risk of allergy to food, latex, and contrast medium but not from injectable medications (Lee & Vadas, 2011).

- Ensuring that food, especially high-risk foods such as nuts, are not consumed in patient areas.

Anaphylaxis Clinic Kit:

An anaphylaxis kit must be present and should include:

- Stethoscope and sphygmomanometer or blood pressure monitor.
- Two ampoules of adrenaline (epinephrine) 1:1000/1ml (more may be required in rural areas where an ambulance response is likely to take longer than the national average).
- Four 23G x 25-30mm needles.
- Four graduated 1 ml syringes.
- A resuscitation pocket mask suitable for adults.

Lone workers must have immediate access to a telephone to call emergency services.

Packs should be checked regularly to ensure the contents are within their expiry dates.

It is important next of kin contact details are recorded with patient contact details and medical history. In the unlikely event that a patient suffers a severe allergic reaction and must be sent to hospital, the practitioner will be able to inform their next of kin on their behalf with their consent.

The Resuscitation Council does not recommend auto-injectors for use in healthcare settings, for the following reasons:

Auto-injectors are relatively expensive with a limited shelf life compared with the cost of an ampoule of adrenaline, syringe, and needle. Anaphylactic reactions are uncommon and most auto-injectors purchased for the healthcare setting will not be used.

Auto-injectors come with standard length needles which may not be long enough to give intramuscular adrenaline for some patients.

Most healthcare staff likely to deal with an anaphylactic reaction in the healthcare setting should have the skills to draw up adrenaline and give an intramuscular injection of adrenaline.

If there is no other form of adrenaline available, it would be appropriate for a healthcare professional to use an adrenaline auto-injector for the treatment of an anaphylactic reaction.

Treatment:

<u>As per Resuscitation Council Guidelines</u>

1. Recognition. Anaphylaxis is likely if a patient is exposed to a trigger (allergen), and then develops a sudden, unexpected illness (usually within minutes of exposure), with rapidly progressing skin changes and potentially life-threatening airway and/or circulation problems.
2. A single set of criteria will not identify all anaphylactic reactions. There is a range of signs and symptoms, but it is more likely to be anaphylaxis if there is a combination of skin symptoms and breathing/circulatory symptoms.
3. Administer early IM adrenaline as per RCUK guidelines (if in doubt a single dose of IM adrenaline is usually well tolerated and poses minimal risk) and call for help (999). Adrenaline remains the first-line treatment for anaphylaxis. A single responder must always ensure help is coming.
4. Follow an Airway, Breathing, Circulation, Disability, and Exposure (ABCDE) assessment, approach and treat life-threatening problems. Treat the greatest threat to life first.
5. Give a second dose of adrenaline after 5 minutes if there has been no clinical improvement following the first dose. Once help arrives, the patient can be transported to the hospital. In the

hospital setting, refractory anaphylaxis can be dealt with (little or no improvement despite at least 2 doses of adrenaline) (RCUK, 2021).

6. The new guidelines highlight the increased importance of avoiding sudden changes in posture and maintaining a supine/semi-recumbent position. Moving the patient from supine to upright or semi-recumbent positions has been associated with cardiovascular collapse and fatal outcomes (Pumphrey, 2003 and RCUK, 2021). Ideally raise the patient's legs, even if they are sat upright.
7. Remove the trigger if possible.
8. Corticosteroids such as hydrocortisone are no longer routinely recommended for the emergency treatment of anaphylaxis.
9. Antihistamines are not recommended for the treatment of anaphylaxis. They are of no benefit in treating life-threatening symptoms of anaphylaxis, and their use may delay more appropriate treatment (e.g. adrenaline, fluids, oxygen).
10. Non-sedating antihistamines should only be given after the patient is stabilised in a hospital setting, in preference to chlorphenamine, which can cause sedation and hypotension.
11. Give detailed history to paramedics along with next of kin details.
12. Record detailed notes contemporaneously, including a description of the signs and symptoms, timings, and a list of administered treatments (RCUK,2021). Ensure you record patient vital signs, treatment administered, and response to treatment.

Patients who have suffered anaphylaxis, even if their symptoms are improving, must go to hospital for observation and further treatment if necessary. A period of in-hospital observation for between 2 and 24 hours is recommended for people once they have returned to normal due to concerns of biphasic anaphylaxis.

Biphasic anaphylaxis is the recurrence of symptoms within 1–72 hours with no further exposure to the allergen. Reports of incidence vary with some studies claiming as many as 20% of cases. The recurrence typically occurs within 8 hours and is managed in the same manner as anaphylaxis (Lieberman P, 2005).

Adrenaline is the most important drug for the treatment of anaphylaxis and although there have not been any Randomised Controlled Trials (RCTs), evidence has been gathered from observational data and clinical experience. Adrenaline is an alpha-receptor agonist that reverses peripheral vasodilation and reduces tissue oedema. Its beta-receptor activity dilates the bronchial airways, and it suppresses the release of histamine and leukotrienes. It also acts directly on beta-2 adrenergic receptors on mast cells and inhibits their activation (RCUK,2021).

Algorithm:

It is recommended practitioners download and print for display and easy reference the Resuscitation Council Algorithm (Appendix 1).

Reporting:

There appears to be a lack of reporting of anaphylaxis in the general population (NICE, 2021), and cases of anaphylaxis within aesthetic practice remain few and far between. However, this could be due to underreporting. It is therefore essential that any occurrence be reported. If it is suspected that allergy, severe allergy, and/or anaphylaxis, has occurred due to a prescription-only medication or a medical device then this should be reported to the MHRA:

http://www.gov.uk/report-problem-medicine-medical-device

Severe allergy/Anaphylaxis can also be reported at the UK Anaphylaxis Registry.

Appendix 1: Reproduced with the kind permission of the Resuscitation Council (UK)

Resuscitation Council UK

GUIDELINES 2021

Anaphylaxis

Anaphylaxis?

A = Airway B = Breathing C = Circulation D = Disability E = Exposure

Diagnosis – look for:

- Sudden onset of Airway and/or Breathing and/or Circulation problems1
- And usually skin changes (e.g. itchy rash)

Call for HELP

Call resuscitation team or ambulance

- Remove trigger if possible (e.g. stop any infusion) •
Lie patient flat (with or without legs elevated)
  – A sitting position may make breathing easier
– If pregnant, lie on left side

Give intramuscular (IM) adrenaline2

Inject at **anterolateral aspect** – middle third of the thigh

- Establish airway
- Give high flow oxygen
- Apply monitoring: pulse oximetry, ECG, blood pressure

If no response:

- Repeat IM adrenaline after 5 minutes
- IV fluid bolus3

If no improvement in Breathing or Circulation problems1 despite TWO doses of IM adrenaline:

- Confirm resuscitation team or ambulance has been called
- Follow REFRACTORY ANAPHYLAXIS ALGORITHM

1. **Life-threatening problems**

Airway
Hoarse voice, stridor

Breathing
↑work of breathing, wheeze, fatigue, cyanosis, SpO2 <94%

Circulation
Low blood pressure, signs of shock, confusion, reduced consciousness

2. **Intramuscular (IM) adrenaline**
Use adrenaline at 1 mg/mL (1:1000) concentration

Adult and child >12 years: 500 micrograms IM (0.5 mL)
Child 6–12 years: 300 micrograms IM (0.3 mL)
Child 6 months to 6 years: 150 micrograms IM (0.15 mL)
Child <6 months: 100–150 micrograms IM (0.1–0.15 mL)

The above doses are for IM injection **only**.
Intravenous adrenaline for anaphylaxis to be given **only by experienced specialists** in an appropriate setting.

3. **IV fluid challenge**
Use crystalloid

Adults: 500–1000 mL
Children: 10 mL/kg

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Management of Anaphylaxis in Aesthetic Practice

ACE Group World has produced a series of evidence-based and peer-reviewed guidelines to help practitioners prevent and manage complications that can occur in aesthetic practice. These guidelines are not intended to replace clinical judgment and it is important the practitioner makes the correct diagnosis and works within their scope of competency. Some complications may require prescription medicines to help in their management and if the practitioner is not familiar with the medication, the patient should be appropriately referred. ACE Group World provides help and support via an Emergency Helpline, forum, App, and email in the management of complications. Practitioners have a duty of care and are accountable to their professional bodies and must act honestly, ethically, and professionally.

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