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Anaphylaxis Management for Community Nursing Practice

INTRODUCTION

What is the Issue?

Anaphylaxis is a severe allergic reaction - the extreme end of the allergic spectrum. The whole body is affected, often within minutes of exposure to the allergen but sometimes it can be hours. Common causes include foods such as peanuts, tree nuts (eg almonds, walnuts, cashews, Brazils), sesame, fish, shellfish, dairy products and eggs. Non-food causes include wasp or bee stings, natural latex (rubber), penicillin or any other drug or injection. In some people, exercise can trigger a severe reaction - either on its own or in combination with other factors such as food or drugs (eg aspirin). Fresh fruit allergy may occur in people who are allergic to pollen. On occasions there may be no obvious trigger.

Any allergic reaction, including the most extreme form, anaphylactic shock, occurs because the body's immune system reacts inappropriately in response to the presence of a substance that it wrongly perceives as a threat.

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Anaphylaxis is of concern to community nurses because products, solutions, substances and medications we use in the provision of nursing care could be an allergen. Allergy and anaphylaxis are becoming more common and so it is imperative that nurses working in community settings are equipped with the knowledge and protocols to deal with this potential life-threatening emergency.

WHAT DID WE DO?

Our aim was to critically review the research literature that explores the management of anaphylaxis in a community setting. The questions that directed the conduct of this review were:

1. How is anaphylaxis defined in the literature?
2. Who is at risk of anaphylaxis?
3. What are the signs and symptoms of anaphylaxis?
4. What is the first line treatment for anaphylaxis in a community setting?
5. How safe is adrenaline when given for the treatment of anaphylaxis?

We included in the review reports of empirical research or expert opinion conducted between (2001 and 2005) and written in English. Literature focused on the management of anaphylaxis. The databases searched were Google scholar, Google, Medline and CINAHL.

FINDINGS AND IMPLICATIONS FOR PRACTICE

The increasing incidence of anaphylaxis

Anaphylaxis is becoming increasingly common and this is consistent with the increase in prevalence of allergic disease over the last two or three decades (The Resuscitation Council (UK), 2001). Langran and Laird (2004) claim that the rate of anaphylaxis in the UK has risen from 6 per million in 1990/1991 to 41 per million in 2000/2001. The cause of this rise is largely unknown but the literature suggests environmental factors such as pollution, increased allergen exposure and a generalised increased susceptibility to allergic conditions (Ferns & Chojnacka, 2003; Panesar *et al.*, 2003).

Clinical immunologists and allergy specialists in Australia and New Zealand state that although anaphylaxis is not rare, deaths from anaphylaxis are rare. There are approximately 10 deaths each year in Australia most commonly after exposure to medication or blood transfusion (Australasian Society of Clinical Immunology and Allergy (ASCIA), 2005).

The frequency in which anaphylaxis is caused by intravenous medication is difficult to ascertain from the literature. One paper states approximately 1 in 5000 exposures to a parenteral dose of penicillin or cephalosporin (Krause 2003 cited in Ferns and Chojnacka 2003). Dobson et al (2004) claim an estimated incidence of 1 to 5 in 10000 courses. However, the original source was dated 1992 and rates may have increased since this time. As argued by Sampson et al (2005) the true incidence of anaphylaxis is unknown largely because there are no universally accepted diagnostic criteria, coding or reporting.

Diagnosing anaphylactic reactions can be difficult as clinical manifestations may not be consistent and there is a wide range of possible presentations. The Resuscitation Council UK (2001) claim that it is for this reason that people with anaphylaxis may not receive appropriate medication. As previously mentioned, there has been lack of consensus for definition and management

and no definitive clinical trials exist in which to provide an unequivocal evidence base (The Resuscitation Council (UK), 2001). Controlled intervention studies are difficult to do in conditions such as anaphylaxis because of its acute and life threatening nature.

How to recognise anaphylactic reactions

Anaphylaxis is an immunological response that causes the release of histamine, leukotrienes and vasoactive mediators. Anaphylactoid reactions are not mediated by immunological mechanisms but occur with agents that cause direct histamine release such as aspirin, codeine, actylcysteine contrast media, food dyes and preservatives. Their presentation and acute management are the same. (Womens' & Children's Hospital, 2006).

There is no consensus on how to define anaphylaxis, there is disagreement about its prevalence, diagnosis and management. Definitions for anaphylaxis vary between countries, clinicians, organisations and clinical scenarios. ASCIA (2005), the peak professional body of clinical immunologists and allergy specialists in Australia and New Zealand, define it as:

'Anaphylaxis is a rapidly evolving generalised multi-system allergic reaction characterised by one or more symptoms or signs of respiratory and/or cardiovascular involvement and involvement of other systems such as the skin and/or gastrointestinal tract.

Symptoms/signs of respiratory/cardiovascular involvement are:

Respiratory

difficulty/noisy breathing, swelling of tongue, swelling/tightness in throat, difficulty talking and/or hoarse voice, wheeze or persistent cough

Cardiovascular

loss of consciousness, collapse, pale and floppy (in young children) hypotension.

'A generalised allergic reaction is characterised by one or more symptoms or signs of skin and/or gastrointestinal tract involvement without respiratory and/or cardiovascular involvement'.

Skin: pruritus, urticaria/angioedema, erythema

Gastrointestinal: abdominal pain, vomiting, loose stools

(Australasian Society of Clinical Immunology and Allergy (ASCIA), 2005:22)

The above definition appeared to be the clearest and most useful for community nurses. Regardless of how anaphylaxis was described in the literature there was strong consensus that anaphylaxis is a severe systemic allergic reaction, which is potentially life threatening (Department of Health, 2004; Ellis & Day, 2003; Royal College of Nursing, 2000). Anaphylaxis requires medical attention as respiratory distress and /or vascular collapse can occur within minutes of exposure to the allergic substance (Phoon *et al.*, 2004).

What causes anaphylaxis?

Anaphylactic reactions may occur after vaccinations, after the administration of medications, insect stings, or foods (The Resuscitation Council (UK), 2001). Non steroidal anti inflammatory drugs and antibiotics are the most common drugs involved in anaphylaxis (Phoon *et al.*, 2004) which accounts for about 3% of anaphylactic reactions and symptoms can occur hours after ingestion (Langran & Laird, 2004).

Drug allergies occur when the immune system recognises and reacts to some medications as though they pose a threat to the body. Antibodies are generated that then bring about an often dramatic allergic response (Royal College of Nursing, 2000). Most cases are mild and involve minor skin rashes and hives, itching and generalised flushing of the skin. However, in some cases a life threatening acute reaction can occur. When an allergen is injected intravenously, cardiovascular problems such as hypotension and shock predominate (Royal College of Nursing, 2000). As explained by Langran and Laird (2004) someone who has had previous safe exposures to a potential trigger such as a medication may still experience an anaphylactic reaction in the future ((Royal Adelaide Hospital, 2004; Royal College of Nursing, 2000). This has implications for community nurses who are administering subsequent dose in the home. Ferns and Chojknack (2003) claim that the key to successful management of severe anaphylaxis is appropriate staff education so that the condition is identified early, assessed comprehensively and prompt treatment is initiated.

SIGNS OF ANAPHYLAXIS

Life threatening features:

•Upper airway obstruction – stridor due to oedema

•Lower airway obstruction – cough and wheeze due to bronchospasm

•Hypotension (vasodilation and capillary leak) – collapse/loss of consciousness

Associated features:

•Skin involvement – generalised erythema, urticaria and/or angiodema

•GIT involvement – nausea, vomiting, abdominal cramps and diarrhoea

Preceding symptoms:

•Nasal, palatal or ocular pruritis

•Coughing, clearing throat, sneezing

•Profuse sweating

•Faecal or urinary urgency or incontinence

•Abdominal pain

•Sense of impending doom

(Womens' & Children's Hospital, 2006)

There can be confusion between panic attacks, vasovagal and anaphylaxis. Whilst there may be hyperventilation with panic attacks and a sense of impending doom, other signs such as hypotension, pallor, wheeze or swelling will be absent. Problems can also arise with fainting (vasovagal) after vaccination, but the absence of rash,

breathing difficulties and swelling is an indication that it is not anaphylaxis as is the slow pulse of a vasovagal attack (The Resuscitation Council (UK), 2001).

According to Langran and Laird (2004) over 90% of people experiencing anaphylaxis will have cutaneous symptoms such as itching, urticaria and angio-oedema. This can help distinguish it from other conditions such as vasovagal. Similarly, Phoon et al (2004) reports 94% of presented cases in emergency had cutaneous features.

MANAGEMENT OF ANAPHYLACTIC REACTIONS

Adrenaline is generally regarded as the first line treatment and most important drug for any severe anaphylactic reaction as it is the only medication that has been proven to reverse the symptoms of anaphylaxis (Australasian Society of Clinical Immunology and Allergy (ASCIA), 2005; McLean-Tooke *et al.*, 2003; Resuscitation Council (UK), 2002; Sampson *et al.*, 2005). It works as a natural "antidote" to some of the chemicals released during the reaction. It works by rapidly reducing throat swelling, opening airways and maintaining blood pressure. Evidence has also demonstrated that posture is important during anaphylaxis (Dobson *et al.*, 2004). Clients should recline in a position of comfort. Lying flat with leg elevation may be helpful for hypotension but unhelpful for breathing difficulties (The Resuscitation Council (UK), 2001). All clients who experience anaphylaxis will need to go the emergency department for monitoring and observation as there may be a second reaction some hours later (Ellis & Day, 2003).

Adrenaline: route for administration

Studies have shown that the subcutaneous route has a delayed time absorption as compared with the intramuscular route and therefore has no role in the treatment of anaphylaxis (McLean-Tooke *et al.*, 2003; Sampson *et al.*, 2005; The Resuscitation Council (UK), 2001). Intravenous administration has been associated with fatal cardiac arrhythmias and myocardial infarction and as such is reserved only for those with unresponsive anaphylaxis and should only be administered by medical staff with appropriate training and experience (McLean-Tooke *et al.*, 2003; The Resuscitation Council (UK), 2001). Intramuscular is the route of choice for adrenaline (Phoon *et al.*, 2004).

Adrenaline: dosage

Some disagreement exists about dosage. Most literature agrees on 0.01 mg/kg in infants and children, North American guidelines suggests a dose in adults of 0.3-0.5 mg where as European literature suggests 0.5-1.0 mg (McLean-Tooke *et al.*, 2003). No comparative trials have been conducted. Most patients only require one dose but repeat dose may be given at 5 minutely intervals until symptoms improve (McLean-Tooke *et al.*, 2003).

What about other treatments? (antihistamines, corticosteroids and B2 agonists)

Adrenaline is the most important and must not be delayed by giving antihistamines, corticosteroids or asthma medications as these have no effect on the immediate and dangerous effects of anaphylaxis (Australasian Society of Clinical Immunology and Allergy (ASCIA), 2005; Phoon *et al.*, 2004; The Resuscitation Council (UK), 2001). The use of B2 agonists (salbutamol) is effective for bronchospasm but must not be used instead of adrenaline (Australasian Society of Clinical Immunology and Allergy (ASCIA), 2005; Phoon *et al.*, 2004; The Resuscitation Council (UK), 2001). Adrenaline is generally the only drug available for use by community nurses (Resuscitation Council (UK), 2002). It is anticipated that other medications will be given once the ambulance arrives and the person is taken to emergency services.

What is the evidence for nurses carrying adrenaline?

Adrenaline is generally regarded as the first line treatment and most important drug for any severe anaphylactic reaction as it is the only medication that has been proven to reverse the symptoms of anaphylaxis (Australasian Society of Clinical Immunology and Allergy (ASCIA), 2005; McLean-Tooke *et al.*, 2003; Resuscitation Council (UK), 2002; Sampson *et al.*, 2005) .

Palpitations, tremor, general pallor or blanching at the site of injection are the main side effects. It is well tolerated in children and when given as specified its benefits would always outweigh the risks (Australasian Society of Clinical Immunology and Allergy (ASCIA), 2005; McLean-Tooke *et al.*, 2003; The Resuscitation Council (UK), 2001).

Evidence suggests that poor outcomes from anaphylaxis are associated with late administration of adrenaline. McLean-Tooke et al (2003) uses the example of a retrospective study of 27 patients with anaphylaxis occurring outside of hospital. All of those treated within 30 minutes recovered compared with 2 deaths in those where treatment was delayed more than 45 minutes. Langran and Laird (2004) agree saying that early recognition of symptoms, removal of the trigger and prompt administration of adrenaline are the fundamentals of good management. A retrospective study by (Pumphrey, 2000) aimed to investigate the circumstances leading to fatal anaphylaxis. The author retrieved detailed information about fatal reactions from coroners and medical staff involved in the care of individuals who had died as a result of anaphylaxis. There were 164 fatalities between 1992 and 1998. Only 20% of those given adrenaline received it before they went into cardiac arrest. This was due to both the rate of reaction and the availability of adrenaline. The study highlights the speed at which anaphylaxis can progress and associated importance of having protocols, staff education, availability of adrenaline and appropriate dosing (Pumphrey, 2000). Within the data there were at least 3 deaths attributable to adrenaline overdose (Pumphrey, 2000).

Despite this risk, the literature recommends that community nurses be able to administer adrenaline in case of anaphylaxis (Department of Health, 2004; Hammond, 1998; Royal College of Nursing, 2000; The Resuscitation Council (UK), 2001). However, authors such as Dobson et al (2004) disagree as they argue that the risk-benefit analysis does not support the routine provision of adrenaline for home IV administration. They strongly believe that a global approach of adrenaline for people just because they are receiving IV antibiotics is potentially dangerous. They argue it must take into account clients age, cardiac history, concurrent medications, pregnancy, allergy history and whether the client is receiving a first or subsequent dose (Dobson 2004). Similarly, the symposium held in the United States found that there are insufficient data to support or refute the benefits and/or safety of basic medical service responders using self injectable adrenaline (Sampson *et al.*, 2005).

CONCLUSION

It is essential that community nurses are aware of the symptoms and respond to the situation appropriately. Diagnosis and effective management of anaphylaxis involves cooperation and collaboration between the client, community nurses and an interdisciplinary team of health care professionals. Nurses can help clients distinguish mild allergy symptoms from those requiring immediate medical attention.

This literature review has highlighted the need for community nursing organisations to reassess policies and procedures for managing anaphylaxis in the home. It is common practice that only nurses who administer vaccinations are trained in the use of adrenaline. However, with the increasing prevalence of allergy and anaphylaxis, community nursing organisations and individual nurses need to reconsider the role and responsibilities of nurses working in the community in managing anaphylaxis.

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