ORIGINAL ARTICLE

Survey of Anaphylaxis Management by General Practitioners in Scotland

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Abstract

Aim

To obtain a snapshot of how patients with potentially life-threatening allergies are managed within a Primary Care setting.

Methodology

A questionnaire-based survey sent to all General Practitioners in Scotland.

Results

Six hundred and thirteen replies were suitable for analysis. Ninety percent of respondents had prescribed adrenaline auto-injector pens, almost exclusively the EpiPen device. Less than half were personally confident in their use and only 17% had access to a dummy trainer pen for demonstration purposes. Twenty seven percent would prescribe one auto-injector only. Six percent reported accidental mis-firing of adrenaline pens, although with no serious sequelae. Refusal of pens by patients was noted by 1%.

In the event of an anaphylactic emergency, 90% of respondents would use adrenaline as first-line treatment, although only half would use the UK Resuscitation Council recommended adult dose of 0.5mg by the intramuscular route (or 0.3mg by auto-injector). Eleven percent would give adrenaline by the slower subcutaneous route and 3% by the intravenous route. Thirty six percent had themselves treated such a case outside of hospital.

Sixty two percent of respondents would seek specialist investigation of anaphylaxis, although only 31% felt that ready access was available. Frequent concerns were raised about current provision of care for patients with allergic disease and their own ability to deal with this.

Conclusion

Investment is required, both to provide basic training and ongoing support for Primary healthcare staff in the management of allergic disease, and also for necessary accompanying specialist support.

Key words

General Practitioner, anaphylaxis, adrenaline

Introduction

Anaphylaxis, a life-threatening allergic reaction, has an annual incidence in the UK of 8.4/100,000.[1] Admission rates to hospitals in England for anaphylaxis rose seven-fold from 1990/1 – 2003/4.[2] In recent years self-administered adrenaline auto-injector pens have become commonly prescribed for patients thought to be at risk of severe allergic reactions (41,519 dispensed in Scotland 2006/07[3] – Epipen 27,811, Epipen Junior 12,656, Anapen 633, Anapen Junior 419).

At present, there is no consensus on criteria for prescribing rescue medication[4] and some think adrenaline pens are over-prescribed.[5] Deficiencies in patients' and carers' knowledge about adrenaline pens and in their ability to use them properly are well-documented.[6,7]

A survey in 2004 of 240 UK General Practitioners (GPs)[8] showed that most rated their confidence in managing anaphylaxis highly. However, in an earlier 2003 survey of 50 GPs in the South of England[7] who had all prescribed auto-injecting devices, only one GP knew how to use an unloaded training pen, 80% relied on the practice nurse to provide advice on auto-injector use, 20% made no provision for training, and 52% did not think that immediate attendance at hospital was necessary following adrenaline use for anaphylaxis. Furthermore, a postal questionnaire in 2002 to 107 parents of children prescribed auto-injector pens in the North East of England showed wide variation in prescribing practices for auto-injectors and referral to specialists.[9]

Education of GPs in allergy and anaphylaxis was one of a number of key recommendations in a Scottish Medical and Scientific Advisory Committee report published in 2000 on 'Immunology and Allergy Services in Scotland'. An information leaflet drawn up by The Anaphylaxis Campaign on key messages for GPs about anaphylaxis was distributed in 2003

via Primary Care Medical Directors in Scotland. We set out the following year to survey the practice of Scottish GPs in the management and referral of patients with potentially life-threatening allergies.

Methods

A questionnaire was devised in order to ascertain knowledge and prescribing practice of adrenaline auto-injector pens, emergency treatment of anaphylaxis and ease of access to specialist care for investigation or advice about anaphylaxis care.

The questionnaire was sent electronically in 2004 to each Health Board area (n=15) in Scotland for onward transmission to all Practice Managers; one of these areas required postal delivery. Each questionnaire was accompanied by a covering letter explaining the nature and purpose of the survey, and these were distributed to an estimated 3,845 GPs.

Results

Six hundred and thirty seven (est 16.6%) replies were received. Twenty four were discounted as they were incomplete or undecipherable. Of the 613 questionnaires suitable for evaluation, 159 came from GPs in Lothian, 94 Greater Glasgow, 45 Ayrshire and Arran, 44 Grampian, 41 Argyll, 40 Lanarkshire, 37 Tayside, 30 Forth Valley, 25 Dumfries and Galloway, 25 Borders, 25 Fife, 24 Highland, 11 Western Isles, three Shetland, two Orkney and eight uncertain location.

Table I: GP knowledge and use of adrenaline auto-injector pens. n=613

Have you prescribed adrenaline for self-injection? - Yes	549	90%
Yes - Epipen only	530	86%
Are you aware that EpiPen and AnaPen have different firing mechanisms?	63	10%
How many adrenaline pens would you prescribe for an adult?		
1 pen	166	27%
2 pens	429	70%
> 2 pens	10	2%
Are you aware of potential contraindications or situations where adrenaline dose should be reduced?		
beta blocker	67	11%
tricyclic antidepressant	92	15%
monoamine oxidase inhibitor	7	1%
cocaine	1	
Are you confident how to use adrenaline pens yourself?	299	49%
Have you come across injection of finger with adrenaline by mistake?	39	6%
Have any of your patients refused or returned an adrenaline pen?	9	1%

Table I shows GP knowledge and use of adrenaline auto-injector pens. Ninety percent of respondents had prescribed these, almost all the EpiPen device exclusively. Ten had prescribed both EpiPen and AnaPen, one AnaPen, three generic and five were not specified. Sixty three (10%) knew that EpiPen and AnaPen have different firing mechanisms, including four of the 11 Anapen prescribers. A similar small minority of GPs commented on potential drug interactions. Twenty seven percent would prescribe only one adrenaline pen. Less than half of GPs were personally confident in their use.

Thirty nine (6%) reported inadvertent firing of adrenaline pens, usually into members of healthcare staff. Several attended Accident and Emergency departments and one lost a nail, but there were no reports of serious sequelae. Nine (1%) reported patients who had refused adrenaline pens – three of these had needle phobia/dislike, two did not feel they were necessary, two did not want to use them, one felt too much responsibility, and one decided against after discussion with a specialist.

Table II shows the normal practice of the 549 GPs who had prescribed adrenaline auto-injector pens. Ninety six percent would remind the patient to carry adrenaline at all times and 90% would ensure optimal preventative treatment of asthma, but only 17% would arrange demonstration of when and how to use adrenaline with a trainer pen, and repeat demonstration on pen renewal was offered by just 6%. Eighteen percent would not routinely inform patients of the need to seek immediate medical attention in the event of having to use a pen, and a similar number would not remind the patient of the need for pen

Table II: Routine practice for GPs who have prescribed adrenaline auto-injector pens. n=549

Arrange demonstration of when and how to use	359	65%
trainer pen available	93	17%
trainer pen not available	266	48%
Repeat demonstration when pen renewed	32	6%
Offer to arrange training of family / friends	237	43%
Advise immediate hospital care if pen used	448	82%
Remind patient to carry at all times	528	96%
Remind patient of expiry date and need for renewal	445	81%
Ensure optimal preventative treatment of asthma	495	90%
Refer to specialist for investigation / advice	339	62%
Supply written information about anaphylaxis	90	16%
Suggest joining Anaphylaxis Campaign	76	14%

Table III: 'If you had to treat an anaphylactic emergency in your surgery, which would you use ***first***?' n=613

	Total
Adrenaline IM	**289 47%** 173 - 0.5mg 72 - 1mg 44 other or unknown dose
Epipen / Anapen	**136 22%**
Adrenaline SC	**65 11%** 17 - 0.5mg 24 - 1mg 24 other or unknown dose
Adrenaline IV	**20 3%**
Adrenaline ?route	**42 7%**
Parenteral Chlorpheniramine	**21 3%**
Parenteral Hydrocortisone	**23 4%**
Chlorpheniramine and Hydrocortisone	**9 1%**
No answer	**8 1%**
'Have you ever had to treat a case outside of hospital?'	**218 36%**

renewal on reaching expiry date. Sixty two percent would seek specialist investigation, if available, but only 15% would offer written information about anaphylaxis or advise joining a support group.

GPs were asked what medication they would use ***first*** if they had to treat an anaphylactic emergency in their surgery and responses are shown in table III. Five hundred and fifty two (90%) would use adrenaline, 49 of these in conjunction with parenteral chlorpheniramine and /or hydrocortisone. Three hundred and nine (50%) would use the UK Resuscitation Council recommended adult dose of adrenaline 0.5mg intramuscularly (or 0.3mg by auto-injector.)[10] Sixty five (11%) would use adrenaline subcutaneously and 20 (3%) intravenously. Fifty three (9%) would not use adrenaline as initial treatment. Two hundred and eighteen (36%) had treated at least one such case outside of hospital.

One hundred and ninety two (31%) GPs stated that they had ready access to Secondary Care for investigation or advice about anaphylaxis, and a further 106 (17%) had access but with long waiting times; for 24 of these respondents access was for paediatric cases only. Two hundred and forty three (40%) felt they did not have ready access available and 71 (12%) did not answer this question. Hospital departments referred to were Immunology/Allergy (96), Dermatology (83), General Medicine (56), Paediatrics (28), Respiratory (23), ENT (8) and Haematology (2).

Open comments were invited on anaphylaxis and provision of allergy care. Nineteen stated that allergy was under-recognised or resourced, 23 that it is becoming commoner, 61 thought provision of care was poor, 153 emphasised the need for specialist advice/clinics, 50 felt ill-prepared and required training, and 17 found this area scary and stressful. Five hundred and twenty five (86%) would welcome guidelines on anaphylaxis management.

Discussion

Although the response rate to this survey was less than 20%, it has nevertheless revealed a number of inconsistencies in approach to prescribing of adrenaline auto-injector pens within NHS Scotland Primary Care. The overwhelming majority of responding GPs have prescribed these (one practice reported that 23 of their patients had been issued with adrenaline pens), in almost all cases the EpiPen device. However, few are aware that this has a different firing mechanism from the AnaPen device, including just 3/10 who had prescribed both devices. Similarly, only a small minority noted potential interactions with beta blockers, tricyclic antidepressants, monoamine oxidase inhibitors (should receive half the dose of adrenaline)[10] and cocaine (adrenaline contraindicated).[10] It is concerning that 18% would not normally advise patients to seek immediate hospital or medical care if the auto-injector is used, suggesting lack of awareness of biphasic reactions. A similar number would not remind the patient of the injector expiry date.

Instruction by a physician who is familiar with adrenaline auto-injectors along with regular review of technique and reinforcement of the issues surrounding their use is vital for patients who have been prescribed these devices.[11] However, in this survey, less than half of the GPs felt confident in their use and only 359 (65%) of those who have prescribed adrenaline pens would arrange demonstration of when and how to use them. Furthermore, only 93 (17%) had access to a trainer pen, and a meagre 6% would repeat demonstration on auto-injector renewal. As Davies has commented, doctors have a responsibility to ensure that patients know how and when to take any prescribed medication, and it is plainly inadequate to prescribe a dangerous drug with no demonstration on how to use it.[12]

Most respondents in this survey would prescribe two auto-injectors for an adult, but 27% of respondents would only supply one. A survey of Anaphylaxis Campaign members has shown that 4/22 who received one dose of adrenaline for food-induced allergic reactions also received a second dose,[13] and a five year review of an immunotherapy clinic in California showed that 64/9,592 patients required adrenaline for systemic reactions, 10 of these requiring more than one dose.[14] National guidance is awaited on this issue, but these reports together with occasional inadvertent firing (one GP in this survey commented that 'in the heat of the moment it is very easy to discharge the EpiPen too early') would seem to make a strong case for prescribing a minimum of two devices for each patient.

Adrenaline is a useful adjunct to local anaesthetic agents to minimize bleeding during minor surgical procedures, but because of its potent vasoconstrictor properties, it is contraindicated for injection into end-artery structures such as digits, and inadvertent firing of an adrenaline auto-injector into such areas carries a risk of harmful ischaemia.[15] Such cases have been treated with warm water immersion, topical nitroglycerin paste, topical administration of the short-acting α blocker phentolamine,[16] Iloprost® infusion and stellate ganglion block.[17] Remarkably, in this survey, there were 39 reports of accidental firing of auto-injector pens, which suggests that this may occur with greater frequency than has thus far been reported. Victims of mis-firing incidents included doctors, practice nurses, a head teacher, a pharmacist and the mother of a child having an acute reaction (fortunately another EpiPen was available for the child). Settings included mistaken use of live rather than trainer pen, stocking up medical bag, working out how to use the device and panic during a reaction. Some attended Accident and Emergency departments, but others did not seek medical attention. Treatments mentioned by respondents were watchful waiting, heat, nifedipine and glyceryl trinitrate spray. Some noted white fingers and one a loss of nail, but there were no reports of serious sequelae. Again, the need for improved training of staff and use of dummy trainers for demonstration seem all too obvious.

In the event of an anaphylactic emergency (and these are not rare as 36% of respondents in this survey had treated at least one such episode outside of hospital), 90% would correctly use adrenaline as first line treatment,[10] but only 50% would use the UK Resuscitation Council recommended adult dose of 0.5mg intramuscularly (or 0.3mg by auto-injector).[10] Eleven percent would use the subcutaneous route, although intramuscular

injection into children has been shown to achieve much faster maximum plasma adrenaline concentrations (8mins cf 34mins) making this the recommended route of administration.[18] Three percent would give adrenaline intravenously, despite the UK Resuscitation Council's guidelines (partly aimed at GPs) cautioning that this route is hazardous, must be reserved for patients with profound shock that is immediately life-threatening, and that the adrenaline should be given in a dilution of at least 1:10,000 as slowly as seems reasonable while monitoring heart rate and electrocardiogram.[10] Nine percent would use parenteral chlorpheniramine and/or hydrocortisone as first line treatment; both of these have an important role in the overall management of anaphylaxis, but antihistamine use is unlikely to be life-saving on its own in an emergency, and corticosteroids take 4-6 hours to have an effect.[10] A recent survey of 95 junior doctors in England and Wales also showed that although 94% would administer adrenaline as the life-saving drug of choice in a case of anaphylactic shock in an adult patient, only 16.8% would administer it as recommended by the UK Resuscitation Council Guideline, and the authors called for strategies to improve education.[19]

Sixty two percent of respondents would seek specialist advice for anaphylaxis management, although more often than not ready access is not available. Furthermore, a variety of hospital departments are used for referral, most of these being viewed as 'weaknesses' in a recent House of Commons Inquiry into Provision of Allergy Services.[20] A high profile campaign to raise awareness of lack of allergy services has thus far failed to generate further training numbers for allergy as a single speciality, and Ryan et al have proposed the development of specialist community allergy services with expanded roles for pharmacists, doctors and nurses.[21] However, as our survey has shown considerable practice variation and unease among Scottish GPs when it comes to treating serious allergic disease, significant investment would be required to train Primary healthcare staff in basic allergy recognition and management, and also to provide the necessary specialist support that this survey has so clearly identified.

Since this article was submitted for publication, the UK Resuscitation Council has issued revised guidance on 'Emergency treatment of anaphylactic reactions; Guidelines for healthcare providers'. (January 2008).

The full text of the revised guidance is available at http://www.resus.org.uk/pages/reaction.pdf

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http://www.anaphylaxis.org.uk/index.shtml

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