

SHORT REPORT

Alcohol-based pressurised metered-dose inhalers for use in asthma: a descriptive study

Maryam Alrasbi^a, *Aziz Sheikh^b

^a Hon. Clinical Research Assistant, Allergy & Respiratory Research Group, Division of Community Health Sciences: GP Section, University of Edinburgh, Scotland, UK

^b Professor of Primary Care Research & Development, Allergy & Respiratory Research Group, Division of Community Health Sciences: GP Section, University of Edinburgh

Received 18th November 2007; revised version received 4th February 2008; accepted 9th February 2008

Abstract

Background: Chlorofluorocarbons (CFCs) have historically served as the propellants of choice in pressurised metered-dose asthma inhalers, but concern has been raised in recent decades regarding their damaging effect on the ozone layer. Among the alternative propellants being considered is alcohol, which can be used as a co-solvent in asthma inhalers. Healthcare professionals need to be aware of alcohol-containing inhalers, since certain populations may have religious and/or cultural concerns regarding the use of such preparations.

Objectives: To identify pressurised metered-dose asthma inhalers which contain alcohol-based propellants.

Methods: We searched the British National Formulary to identify companies that manufacture asthma treatments and wrote to them to enquire about which of their products contained alcohol and if so in what percentage. These direct contacts were supplemented by searching medical databases and the Internet for additional information.

Results: We identified 11 manufacturers of asthma inhalers, seven of which produced pressurised metered-dose inhalers; of these, six were willing to disclose the requested information, and information on the seventh product was obtained from an alternative valid source of information. Most CFC preparations contain alcohol, but CFC- and alcohol-free preparations do exist.

Conclusions: Clinicians need to be aware that the majority of CFC-free inhalers contain alcohol. Alcohol-free, and CFC- and alcohol-free, preparations are available for the delivery of both rescue and preventative treatment and these should be considered for use in those patients who may have concern about alcohol-based treatments.

© 2008 General Practice Airways Group. All rights reserved.

M Alrasbi and A Sheikh. *Prim Care Resp J* 2008; **17**(2): 111-113.

doi:10.3132/pcrj.2008.00020

Keywords inhalers, alcohol, metered-dose inhaler, CFC, concordance

Introduction

Asthma is a serious global health problem that affects people of all ages throughout the world. Poorly controlled asthma can place severe limits on daily life, can result in considerable morbidity, and may in some cases prove fatal. Added to this personal burden, asthma also poses a significant cost to the economy through absence from school or work, lost productivity and treatment costs. Fortunately, however, asthma is a manageable condition for the vast majority of sufferers, given the increasing array of effective treatments that are now available.¹

Drugs for asthma can be administered orally, parenterally, or by inhalation, with inhaled preparations being the mainstay of treatment. With inhaled preparations, the drug is delivered directly to the bronchial tract. Pressurised metered-dose inhalers are an effective, convenient and very widely used means of delivering these inhaled treatments.²

Chlorofluorocarbons (CFCs) have historically served as the propellant of choice for use in asthma inhalers.³ However, as noted by the 1987 *Montreal Protocol on Substances that Deplete the Ozone Layer*, such propellants pose a considerable threat to the earth's ozone layer, contributing to

* Corresponding author: 20 West Richmond St, Edinburgh, Scotland, UK, EH8 9DX.

Tel: +44 (0)131 651 4151 Fax: +44 (0)131 650 9119 E-mail: aziz.sheikh@ed.ac.uk

the phenomenon of global warming.⁴ The search has since been underway for alternative propellants which have comparable personal safety and delivery profiles to replace CFCs.

We conducted this study to determine the extent to which alcohol-based propellants are being used in asthma inhalers and also to identify which products contain alcohol. This information is important clinically, since, for religious and/or cultural reasons, some people may object to using alcohol-containing treatments and may prefer to use non-alcohol containing products if suitable alternatives exist.⁵ This concern may apply to medication taken orally, and also to treatments

taken through other routes such as by inhalation or through the skin.⁶

Methods

We searched the British National Formulary (BNF) to identify inhaled treatments for use in asthma, and then identified the manufacturers of these products.⁷ The BNF was scrutinised for details about which inhalers contained CFCs and which were CFC-free. Manufacturers of all relevant companies were contacted by email or post; we asked whether or not they produced pressurised metered-dose inhalers, and if so, which

Table 1. CFC and alcohol use in asthma inhalers.

Company	Products	CFC-containing (yes/no)	Response from company regarding alcohol (ethanol) content/electronic Medicines Compendium
Altana- a Nycomed Company	Alvesco aerosol inhaler	No	Company declined to provide any information; electronic Medicines Consortium describes this as containing ethanol
AstraZeneca	Pulmicort aerosol inhalers	Yes	Does not contain ethanol
Boehringer-Ingelheim	Atrovent aerosol inhaler	No	Contains 8.4mg 100% ethanol per puff (50ul of the product).
	Combivent aerosol inhaler	Yes	Does not contain ethanol
GlaxoSmithKline(GSK) Allen and Hanburys Ltd	Ventolin Evohaler	No	None of these products contain ethanol
	Serevent Evohaler Flixotide Evohaler Seretide Evohalers		
	Becotide Aerosol	Yes	
	Becloforte Aerosol		
Teva UK Limited (IVAX)	Airomir Autohaler 100mcg, Airomir MDI 100mcg	No	Contains 166.49mg/ml ethanol
	Beclazone Easi-Breathe, Beclazone MDI Aerobec autohalers	Yes	None of these products contain ethanol.
	Qvar Autohaler 50mcg, Qvar Autohaler 100mcg	No	Contains 1.67g ethanol per 200 dose canister
	Qvar Easi-Breathe 50mcg		
	Qvar Easi-Breathe 100mcg		
	Qvar MDI 50mcg		
	Qvar MDI 100mcg		
	Salamol Easi-Breathe 100mcg	No	Contains 0.971g ethanol per 200 dose canister
Salamol CFC Free 100mcg			
Sanofi-Aventis	Intal aerosol inhaler	Yes	Do not contain ethanol as an excipient.
	Tilade CFC-free inhaler	No	
Trinity Chiesi	Atimos modulite aerosol inhaler	No details in BNF	Contains 9mg of ethanol per actuation, equivalent to an actual volume of ethanol of 0.011 ml.
	Clenil modulite aerosol inhaler	No	

ones used alcohol-based propellants and in what concentration. Non-responders were followed-up with a reminder email. In the case of those companies unwilling to provide the requested information, we searched the electronic Medicines Compendium to obtain data on excipients.⁸ All searches were conducted in the period June 2007 – January 2008.

Results

Through searching the BNF, we identified 11 companies manufacturing asthma inhalers. All 11 companies responded to our request for information, three indicating that they did not produce pressurised metered-dose inhalers. Of the eight relevant companies, one no longer marketed pressurised metered-dose inhalers, leaving seven eligible companies. Six of these seven companies were willing to provide the requested information; additional information on the excipients for the inhaler made by the seventh company was available from the electronic Medicines Compendium. Table 1 details the inhaler products that are available in the UK, together with information on whether or not they contain CFCs, and companies' responses regarding alcohol use in their preparations.

Discussion

We have identified a number of pressurised metered-dose inhaled reliever and prophylaxis preparations for use in asthma that are either CFC- or alcohol-free. There is, in addition, a limited choice of preparations that are both CFC- and alcohol-free. Faced with patients who may have concerns about possible alcohol-based preparations, clinicians and patients therefore have options available to them that they may hitherto have been unaware of.

The main limitations of this work are that one of the seven relevant companies declined to provide the requested information – albeit that we were able to obtain relevant data on this company's product through another valid route – and that we focused on preparations available in the UK. Not all of these preparations may be available in other parts of the world and there may in addition be other preparations available outside of the UK which we have failed to consider.

However, this is, as far as we are aware, the first such study of its kind and we hope that its findings will help clinicians and patients to choose preparations in a way that will facilitate mutual trust and concordance. This is particularly relevant considering the fact that the Muslim community – for whom this information is most likely to be of greatest relevance – has the poorest overall health outcomes in the UK and is one of the groups of people who

are at particularly high risk of experiencing poor outcomes from asthma – facts which, to an extent, reflect the lack of confidence in the treatments that they are issued.^{9,10} What is particularly important to note in this respect is that many of those who have such concerns about alcohol-containing products will subscribe to the rule of Islamic law which dictates that 'whatever is prohibited in large amounts is also prohibited in small amounts'.¹¹

The BNF should consider making information of this kind available to clinicians in order to facilitate informed choice in important clinical decision-making.

Acknowledgements

We are grateful to the companies for sharing this information with us.

Funding

None.

Contributorship

MR undertook data collection and led the writing of the paper. AS conceived this study, oversaw data collection and commented on several drafts of the paper.

Conflict of interest declaration

AS chairs the National Clinical Assessment Service's Equality and Diversity Group and is a former chair of the Research and Documentation Committee of the Muslim Council of Britain. AS is an Assistant Editor of the *PCRJ*, but was not involved in the editorial review of, nor the decision to publish, this article.

References

1. Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention, 2006. Available from: <http://www.ginasthma.org/> (last accessed 18 October 2007)
2. BTS/SIGN. British guideline on the management of asthma, 2007 update. Available from: <http://www.sign.ac.uk/guidelines/fulltext/63/index.html> (last accessed 18 October 2007)
3. Sciarra JJ. The next generation of metered dose inhalers. Available from: http://www.uspharmacist.com/oldformat.asp?url=newlook/files/Feat/ACF2F19.cfm&pub_id=8&article_id=50 (last accessed 18 October 2007)
4. United Nations Environment Programme. Montreal protocol on substances that deplete the ozone layer. Available from: <http://ozone.unep.org/pdfs/Montreal-Protocol2000.pdf> (last accessed 18 October 2007)
5. Gatrad AR, Mynors G, Hunt P, Sheikh A. Patient choice in medicine taking: religious sensitivities must be respected. *Arch Dis Child* 2005;**90**:983-4.
6. Ahmed QA, Memish ZA, Allegranzi B, Pittet D; WHO Global Patient Safety Challenge. Muslim health-care workers and alcohol-based handrubs. *Lancet* 2006;**367**:1025-7.
7. British Medical Association and Royal Pharmaceutical Society of Great Britain. British National Formulary, 2007.
8. electronic Medicines Compendium. Available from: <http://emc.medicines.org.uk/> (last accessed 27 January 2008).
9. Sheikh A. Should Muslims have faith based health services? *BMJ* 2007;**334**:74.
10. Netuveli G, Hurwitz B, Levy M, Fletcher M, Barnes G, Durham SR, Sheikh A. Ethnic variations in UK asthma frequency, morbidity, and health-service use: a systematic review and meta-analysis. *Lancet* 2005;**365**:312-17.
11. Gatrad AR, Sheikh A. Medical ethics and Islam: principles and practice. *Arch Dis Child* 2001;**84**:72-5.

Available online at <http://www.thepcrj.org>