Assessing the acceptability of a novel dry powder inhaler
A multicentre study in adult asthmatic patients using routine bronchodilator therapy

M Allen, P Anderson, N Barnes, J Campbell, G Laszlo, A Millar, A Morice, M Peake, T Rogers, M Stern, J Stradling, M Ward, and J Wiggin

ABSTRACT

Objective To assess patient acceptability of a novel dry powder inhaler (DPI), Clickhale ® (Innovata Biomed Ltd., the Respiratory Division of M&L Laboratories PLC) in routine clinical use as first-line bronchodilator treatment

Design In a multicentre open label study, asthma patients taking bronchodilators via a metered dose inhaler (MDI) or DPI (Turbohale ®) were given salbutamol via the Clickhale ® as. Questionnaires before and after four weeks of treatment were used to assess the clinicians' and patients' opinions of the device.

Subjects 184 asthma patients aged ≥18 years showing a good DPI technique

Results Of the 175 patients completing the study 121 found the Clickhale ® as easy (30%) or easier (39%) to use than their pre-study inhaler and 88 patients (50%) liked the Clickhale ® as much as (15%) or more than (35%) their pre-study inhaler. Investigators considered it more suitable (26%) / as suitable (39%) as the pre-study device for 65% of patients. Correct technique was easy to teach and was maintained by 98% of the patients after four weeks

Conclusion The Clickhale ® is a easy to operate and well accepted by adult asthma patients

INTRODUCTION

Inhaled therapies are essential to asthma management and compliance with long-term treatment is influenced by patients' acceptance of inhalers [1]. Poor compliance results in drug wastage and increased morbidity. Therefore, it is important that inhalers are easy to use correctly [2,3]. The MDI is popular yet surveys indicate widespread misuse, due to problems in co-ordinating MDI actuation with drug inhalation. This misuse is greatly underestimated in general practice [4,5].

The phased ban on environmentally harmful chlorofluorocarbons (CFCs) has renewed interest in breath-actuated DPIs and has led to the development of chlorine-free MDI propellants such as hydrofluoroalkanes (HFAs) [6,7]. HFA formulations alter lung delivery of some drugs such as corticosteroids by increasing alveolar deposition and total dose. Therefore, data cannot always be extrapolated from one formulation/device to another [8]. DPIs have perceived disadvantages of reliance of drug delivery on an inspiratory flow rate (IFR) which may be beyond the capability of some asthma patients [8,9]. However, general practice audits have shown switching routine asthma treatment to DPIs to be cost effective for overall healthcare, resulting in reduced morbidity and enabling stepping-down of inhaled corticosteroid dose [9]. Furthermore, although clinical effectiveness of older DPIs is known to depend on IFR [8] studies in adult patients have shown that the efficacy of salbutamol via the Clickhale ® is independent of IFR (15-60 L/min) [10]. Children with asthma have achieved IFRs over 30 L/min through the device [11].

The Clickhale ® is a multi-dose DPI that has been designed to retain device familiarity and handling, but without the problems of co-ordination. In double blind, clinical trials conducted for up to 12-week periods with salbutamol or beclomethasone dipropionate, Clickhale ® has proved as effective as conventional MDI plus spacer, and well-accepted by paediatric and adult asthma patients [12,13].

This study was intended specifically to assess acceptability of the salbutamol Clickhale ® in routine clinical use among adult asthma patients.

METHOD

Subjects

Asthma patients (≥18 years of age) who required bronchodilator therapy via a generic salbutamol or Ventolin ® MDI (Allen & Hanburys Ltd), or a terbutaline Turbohale ® (Bricanyl ® Turbohale ®, AstraPharmaceuticals Ltd.), were recruited from 12 hospital out-patient clinics. In addition, patients were eligible to enter the study if they could be trained to use the Clickhale ® correctly, in accordance with the instruction sheet. All patients gave written informed consent. Patients were excluded if they were pregnant, of childbearing age and not using adequate contraception, sensitive to salbutamol or lactose, had coexistent diseases likely to affect the outcome of the study or were involved in other trials. Each centre participating in the study received local ethical approval.

Procedure

Patients attended the clinic on two occasions. At the first visit, demographic details, duration of use, and frequency of use of bronchodilators in the previous four weeks, and concomitant medications were recorded. Patients were instructed on how to use the salbutamol Clickhale ® (100 mcg per actuation) as their first line bronchodilator and to record acceptability, adverse effects and the number of doses used on daily diary card. Finally the patient completed a questionnaire on device acceptability (Figure 1).

At the second visit, four weeks later, the diary card were reviewed with the patient who also completed two further questionnaires, one comparing the

M Allen
City General Hospital, Stoke on Trent

P Anderson
Northern General Hospital, Sheffield

N Barnes
London Chest Hospital, London

Correspondence to MB Allen MB, ChB, Department of Respiratory Medicine, City General Hospital, Newcastle Road, Stoke-on-Trent, Staffs ST4 6Q

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Figure 1. Patient acceptability questionnaire (visit 2 version). Each patient was asked to complete the questionnaire with specific reference to the Clickhale ®. Values are percentage of patients answering each question. * indicates questions asked at visit 1

*? How easy was the inhaler to use	2 very eas	5 easy	3 difficult	1 ver difficul
* How do you rate the inhaler?	33 very goo	39 good	23 poor	5 ver poor
* How did you find removing and replacing the mouthpiece cover?	48 very eas	42 easy	9 difficult	1 ver difficul
How did you find detaching the mouthpiece to clean it? *(Complete only if applicable*	31 very easy	55 easy	11 difficult	3 ver difficult
* How did you find pressing the button?	61 very easy	39 easy	1 difficult	0 ver difficult
* How comfortable did you find the mouthpiece in your mouth?	45 ver comfortable	46 comfortable	8 uncomfortable	1 ver uncomfortable
How strongly did you feel you had to inhale to get the medication and get relief of your symptoms?	27 ver strong	59 strong	14 weak	0 ver wea
* Did you feel you had taken the dose?	50 yes	50 no		
* *If no, did this bother you*	54 yes	46 no		
How good was the inhaler at relieving your symptoms?	30 ver good	44 good	18 poor	8 ver poor
How good was the inhaler (or would it be) in an asthma attack?	22 ver good	43 good	23 poor	12 ver poor
How useful did you find the counter?	49 ver usefu	34 useful	1 not useful	
* How comfortable was the inhaler to hold?	3 ver comfortable	53 comfortable	9 uncomfortable	1 ver uncomfortabl
How convenient was the inhaler to carry around with you?	20 ver convenien	39 convenient	30 inconvenient	11 very inconvenient
How clear was the instruction sheet?	64 very clear	34 clear	1 unclear	1 ver unclear
How useful was the instruction sheet?	46 ver useful	52 useful	2 no useful	

Clickhale ® with the pre-study inhaler (Figure 2) and the second to assess the general acceptability of the Clickhale ® (Figure 1). Investigators were also asked to assess the Clickhale ® compared to the patients' standard inhaler

RESULTS

Study population

Of 184 patients (92 female), mean age 52 years (range 18-80), that entered the study, 175 patients completed both study visits. This included four who had withdrawn during treatment (two due to cough, one with streaming eyes and nose and itchy throat, and one asthma exacerbation). In addition there were nine withdrawals: seven were lost to follow up and the remaining two were due to a chest infection and patient's wish. The data of all patients were included in the analysis as far as possible. There were no treatment related adverse effects. The majority (92%) had used their pre-study bronchodilator treatmen

Figure 2. Patient comparative questionnaire (visit 2). Patients were asked to compare the Clickhale® DPI with their pre-study inhaler for bronchodilator therapy (salbutamol MDI, (n =160 patients) or terbutaline Turbohale®, (15 patients). Values are percentage of patients answering each question

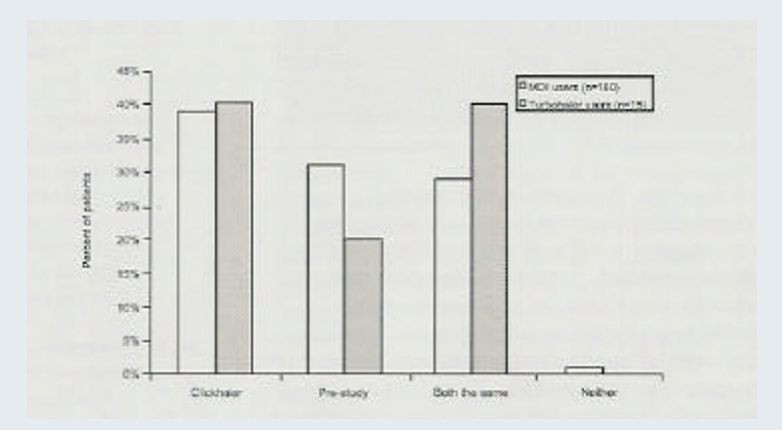
	Clickhale®	Pre-study	Both the sam	Neithe
Which inhaler was the easiest to use?	39	30	30	1
Which inhaler did you like the best?	35	48	15	2
Which inhaler gave you the best relief of your asthma symptoms?	22	36	40	2
Which inhaler was the easiest to hold?	34	41	25	0
Which inhaler was the easiest to get ready for use?	34	28	38	1
From which inhaler did you find it easier to inhale?	46	31	23	0
Which inhaler made you cough or caused irritation?	21	18	7	5
Which inhaler had an unpleasant taste?	13	21	2	6
Which inhaler gave you the best relief of your symptoms?	20	35	43	3
Which inhaler would be most useful during an asthma attack?	22	49	26	2

device for more than one year, with 80% requirin three or more actuations per day. There were 16 patients (91%) using salbutamol MDI and 16 (9% using terbutaline Turbohale®). All patients (184 showed a good Clickhale® technique (ie in accordanc with the instruction sheet) at visit 1 and 169 of 17 (98% of those who completed) at visit 2

Acceptability questionnaire

Overall data from the patient acceptability questionnaires showed that Clickhale® was foun easy/very easy to use by 98% (34%:64%) of patient at visit 1 and 97% (45%: 52%) at visit 2 (Figure 1)

Figure 3. Patient's response to "Which inhaler was the easiest to use?" expressed as a percentage of MDI users (n = 160) or percentage of Turbohale© users (n = 15)



On these same occasions, the Clickhale® was rate good/very good by 98% (50%:48%) and 72 (39%:33%) of patients. At Visit 2, 128 of 172 (74% of all patients experienced good (44%) or very goo (30%) relief of symptoms, 87 (50%) did not feel the had taken the dose, yet this bothered only about hal (and none who use the Turbohale®).

In the comparative questionnaire 69% of patient (121/175) found the Clickhale® as easy (30%) o easier (39%) to use than their pre-study inhaler (Figur 2). These included 109 (68%) of the 160 who were accustomed to an MDI with 29% and 39% respectively finding the Clickhale® as easy or easie to use than their pre-study inhaler (Figure 3). Of th 15 patients using the Turbohale® as their pre stud inhaler, 12 (80%) found the Clickhale® as easy (40% or easier (40%) to use (Figure 3) When asked whic inhaler they liked best, 15% (26/175) of patients ha no preference whilst 35% (61) chose the Clickhale® (Figure 2). Of these, 53 (33%) and 8 (53%) patient whose pre-study inhaler was the MDI or Turbohale®, respectively selected the Clickhale® as better tha their pre-study inhaler (Figure 2).

Compared with the pre-study inhaler, the investigator considered the Clickhale® technique as easy (56%) o easier (44%) to teach to all patients (Figure 4) Neither MDI nor Turbohale® was selected as th easiest to teach to any patient. The Clickhale® wa thought by investigators to be as suitable (39%) o more suitable (26%) than the pre-study inhaler fo 65% of patients (Figure 4). Half of the patients whos

pre- study inhaler was an MDI preferred their MDI t the Clickhale ® but the investigators agreed in onl one-third of cases, considering the Clickhale ® to b more suitable for 27% of the MDI patients and equall suitable for 37%

DISCUSSION

Current medication provides excellent long-term control of asthma, providing that patients comply wit treatment. This study assessed patient response to new type of inhaler device, the salbutamol Clickhale ®. The majority of patients found the Clickhale ® easy t use and most found it easier or as easy as their pre-study inhaler. The overall rating for Clickhale ® was that half the patients found it as good or bette than their pre-study inhaler. This high acceptabilit was evident despite the majority of patients havin used their pre-study inhaler for at least a year.

Fifty percent of patients did not feel they had taken th dose, yet this bothered only half (and none of th Turbohaler users). The greater concern in the MD users is more an issue of education as patients ofte equate the impact of the cold aerosol in the upper ai - way with the false belief that drug is also reaching th lungs[4].

The patients' preference for a device did not necessarily coincide with the investigator's opinion o which device was more suitable for them. Of the MD users, half preferred their MDI to Clickhale ® but th investigators agreed in only a third of these cases The differences of opinion could be due to the criteri used by the two groups to assess the device. The investigator's clinical judgement of suitability woul be based on different principles from the patient's subjective preference, which may itself have bee influenced by the investigator's encouragement to us a new device. However, the patients were more likel to make a definite choice and 33% of MDI users an 53% of Turbohaler users opted for the Clickhale ®s A this study was not controlled any benefits or preferences seen could be due to improved instructio and/or the novelty of a new inhaler. Nevertheless considerable number of patients (one half of the stud population) liked the Clickhale ® as much as, or mor than their customary device

Clinical efficacy was not examined in this study bu previous work has demonstrated similar bronchodilator responses in asthmatic patients give salbutamol by either an MDI or the Clickhale ®.[3,11] This study demonstrates a useful role for the salbutamol Clickhale ® among inhalers of the future affording an acceptable alternative to the MDI. ■

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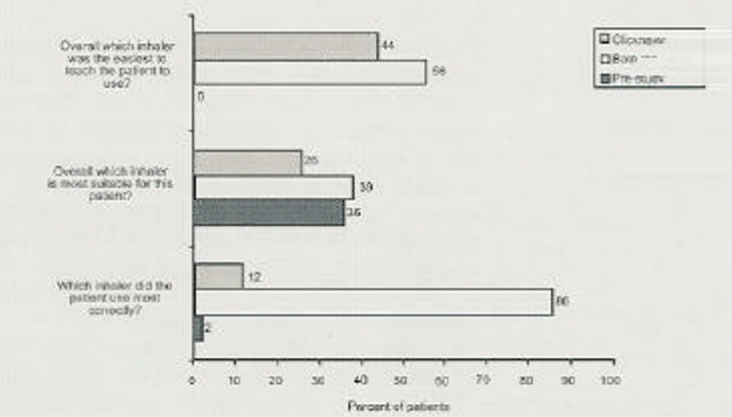
Figure 4. Investigator questionnaire (visit 2). Investigators were asked to assess the Clickhale ® compared with the patient's pre-study inhaler for bronchodilator therapy. Values are expressed as percentage of patients



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