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Research Article

REVIEW ARTICLE ON VILENTROL AND FLUTICASONE FURATE

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ABSTRACT

The aim to present this study to highlight the therapeutic activity of vilentrole and fluticasone furate with dry powder inhaler device.

Dry Powder Inhalers (Dpis)

DPI are the drug–device combination products where the complexity of the formulation, its interaction with the device, and input from users play important roles in the drug delivery. As the landscape of DPI products advances with new powder formulations and novel device designs, understanding how these advancements impact performance can aid in developing generics that are therapeutically equivalent to the reference listed drug (RLD) products. This review details the current understanding of the formulation Fluticasone furate and vilenterole (FF/VI) and device related principles driving DPI performance, past and present research efforts to characterize these performance factors, and the implications that advances in formulation and device design may present for evaluating bioequivalence (BE) for generic development.

INTRODUCTION

The Pharmacological profile of ultra LABA /ICS compared to other treatment. Asthma treatment is based on a never-ending cycle of assessment treatment and evaluation of the patients response it must consider the patients phenotype, concerns and practical issues (inhaler technique adherence medication access) inhaled corticosteroids improve symptom control and lung function and reduce asthma exacerbation and mortality guideline developed by global initiative for asthma (GINA) recommend ICS for long term treatment of patient with persistent asthma. Earlier initiation of low dose ICS in asthmatic patient leads to a more significant improvement in lung function. In patient whose symptoms are not controlled by ICS alone, guideline recommends the additional of a long acting beta 2 agonist (LABA) to treatment regimen

The ones daily long acting beta 2 agonist is also called ultra LABA is used for the treatment of asthma and Chronic Obstructive Pulmonary disease (COPD) ultra LABA could be used alone or in combination with once daily long acting muscarinic antagonist

According to [*Cazolla et a.,2011]*, the beta 2 adrenoceptore agonist remain the most effective bronchodilators available for immediate relief of asthma symptoms as they dilate the airways and reduce air trapping leading to improve lung functions an d exercise tolerance for patient . Adding a beta adrenoceptore agonist decrease the release of acetylcholine ACH through the modulation of cholinergic neurotransmission by prejuntional beta 2 adrenoceptores and thereby amplifies the bronchial smooth muscle relaxation induced by the muscarinic antagonist

There may be discordance between response for symptom control and exacerbation with other treatment option including ICS-LABA or ICS formoterol maintainer and reliever therapy. thus in severely uncontrolled asthma or an asthmatic exacerbation medium or high dose ICS LABA with as needed SABA (short acting beta agonist) in recommended by GINA 2022 as its adherence is better when compared to high dose ICS-SABA

Studies suggest that with a signal inhaler containing an ICS plus LABA for asthmatic patient in clinical practices experience fever asthma exacerbation than similar patient treatment with ICS LABA alone.

Important Pharmacological Characterstics of the Four Ultra Laba Molicule Show That

Indacaterole

has high intrinsic activity at human beta 2 adrenergic receptors (ARs) in vitro and can induces the rapid onset of action and long term bronchodilator (>24h)

Vilentrole

has beta 2 adrenergic receptor selectivity and elicits very long bronchoprotection effect and has high selectivity for beta 1 and beta 2 ARs

Studies involving indacaterole performed both in-vitro and in-vivo studies have documented that it offer a quick onset of action and 24 h broncodialating effect. The duration of action ranking result in human lung tissue being

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Indacterol>Salmetrol>Formoterol>Salbutamol

Dramographics

Women are more susceptible to COPD progression than men with greater hyper responsiveness to methacholine more death and greater annual decline in FEV_1 If persistent smoking
The effect on sex on response to fluticasone and salmetrole in the TRISTAN (Trial of inhaled steroids and long acting beta 2 agonist) studies suggest that when compared with placebo

1. Combination therapy improved pre-treatment FEV_1 (Forced expiratory volume in 1 second) by 152 ml min Women and 127ml in Men.
2. Reduced exacerbation rates by 31% in women and by 23% in Men
3. Improved health issues changing the St. George s respiratory questionnaires score by 2.3 points in women verses 2 point in men In a study by [Benfante *et al.,* 2016] in the elderly the ICS/LABA combination showed an increased risk of undesirable local effect which are primarily due to the lack of coordination between activation of the devices and inhalation and systemic adverse events caused by the greater amount of active drug that is available because of the age associated changes in organ function as well as drug to drug and drug to concomitant disease interaction

Population Pharmacokinetics

On the pharmacokinetics of vilenterole (VI) in subjects with COPD age body weight sex and smoking were significant covariates. The only covariate identified to affect the pharmacokinetics of FLUTICASONBE FURATE (FF) was the population grouping defined as race significant demographic predictors identified to affect the pharmacokinetics of VI were age body weight sex and smoking (on V_1/F) However COPD progression is seen faster in women but at the same time studies have shown that women have a better response rate to the given treatment when compared to men. in addition as age progresses the susceptibility to develop adverse effect increase . However, ICS/LABA increased overall medicinal adherence due to daily dosing simplifying its usage in daily practices [Siederer *et al.* 2016]

Ultra Laba Ics with od Dose Advantage V/S Bid Dose of Conventional Ics Laba in Asthma And Copd

Uncontrolled asthma is often associated with poor medication adherence or suboptimal therapy resulting in an increased risk of exacerbation and higher association medical costs LABAs Rather than short acting beta 2 adrenoceptors agonist SABA can potentially improved the mucociliary component of COPD According to [Cazzola *et al*., 2011] significant improvement in protection against 5-Hydroxytryptamine-induced bronco-protection and reducing the frequency of COPD exacerbation have been documented after 5 days dosing of indacaterol and formetrol compared with a single treatment regime. A long duration of action is an essential characteristic of ultra LABA ICS therapy thus proving an advantage over twice daily regimen

Administering once daily LABA Improved compliance and conveniences control airflow over a complete 24 h period and allow the combination with other classes of drug such as antimuscarinic agent and ICSs

Efficacy

In patient approved for ultra LABA /ICS therapy the use of FF combination with VI is the only approved fixed dose combination (FDC) For the treatment of asthma
In addition it is well tolerated in patient with persistent asthma , reduces the risk of severe asthma exacerbation enhance the measure of asthma – related quality of life (QOL) improved asthma control lung function peak expiratory flow and forced expiratory volume in 1 sec [Woodcock *et al*., 2017]

The Salford Lung Study (Sls) a Pioneering Comparative Effectiveness Approach to Copd and Asthma

SLS is the world's largest pragmatic RCT. it's a practical community based, randomised open label pragmatic study on the efficacy and safety of FF/VI combination compared with existing maintenances therapy in a large real –world population of patients with COPD in condition of routine care. The study is being conducted in and around Salford. UK.

The dry powder once-daily inhaler of FF/VI combined with enhanced –affinity glucocoticoid receptor agonist and potent anti inflammatory effect with a LABA. The rate of moderate or severe COPD Exacerbation was 1.74 per year for the FF/VI group and 1.90 per year for the usual care group. an 8.4% reduction in exacerbation was seen in FF/VI group compared to 6% of usual care group result suggest that ICS combined with LABA are more effective than the individual component in managing stable COPD , reducing exacerbation and improving lung function and health status [Bakerly *et al*., 2019]

The submitt study

Study to understand mortality and morbidity trial was an international, multicenter trial of patient with COPD and either a history of CVD or high risk for CVD in which our primary outcome was a composite CVD outcome that include cardiovascular death, myocardial infarction, stroke, unstable angina and transient attack.

Among 16485 participants in summit during follow-up 4704 participant experienced at least one AECOPD and 688 had at least one adjunctive CVD event
A combination FF 100 ug provide a protective mortality benefit compared with placebo as this combination has been associated with a broad spectrum of anti- inflammatory effect in patient with COPD [kunisaki *et al*., 2018]

Ultra LABA ensure that potential cardiac effect are minimise especially taking into account that mainly COPD patient are often older and may have cardiovascular co morbidities [covelli *et al*., 2015]

CONCLUSION

1. VILENTROL have 21.8 hr half life which allow to once daily dosing compared to twice daily formoterol budesonide combination .Fluticason furate have high lung retention time that is 24-36 hr which offer 100% bronchoprotoction and beta selectivity is 2400 as compared to other treatment which show that safe in cardiac comorbid patient also aslo have have faster onset of action 3.5 min only directly act on site ICS /ultra LABA Fluticasone furate / vilentrol is the best

combination for asthmatic and COPD paitent with convinient dosing . vilentrol 25 mcg fluticasone furate 100/200 mcg

2. Once daily treatment of FF/VI was superior to usual care (optimised by the patients general practitioner) in controlling asthma consistently over 12 month as assessed by the ACT (Asthma control test) without significant increasing the risk of serious adverse event
3. Administering beta 2 adrenoceptor against on daily bases is an advantage because it improve convenience and compliance ,control airflow over a complete 24 h period and allow the combination with other classes of drug such as anti-muscarinic agent and ICSs that are fundamental for treating asthma and / COPD and now are Administered on the once – daily basis
4. FF/VI is the once daily FDC ICS/LABA treatment and well tolerated .improved lung function and sustained bronchoprotection after 24 week and 52 week of treatment for COPD When once daily treatment with FF/VI for 12 week was compared with twice daily fluticasone propionate / salmeterol 250/50 for COPD

Reference

1. Albertson, T. E., Richards, J. R., & Zeki, A. A. (2016). The combination of fluticasone furate and vilanterol trifenate in the management of asthma: clinical trial evidence and experience. *Therapeutic Advances in Respiratory Disease*, *10*(1), 43-56.
2. Bakerly, N. D., Woodcock, A., Collier, S., *et al*. (2019). Benefit and safety of fluticasone furate/vilanterol in the Salford lung study in chronic obstructive pulmonary disease (SLS COPD) according to baseline patient characteristics and treatment subgroup. *Respiratory Medicine*, *147*, 58-65.
3. Barnes, P. J. (2002). Scientific rationale for inhaled combination therapy with long-acting beta 2-agonist and corticosteroids. *European Respiratory Journal*, *19*(1), 182-191.
4. Benfante, A., Basile, M., Battaglia, S., *et al*. (2016). Use of ICS/LABA (extra fine and none extra fine) in elderly asthmatic patients. *Therapeutics and Clinical Risk Management*, *12*, 1553-1562.
5. Averell, C. M., Stanford, R. H., Laliberte, F., Wu, J. W., Germain, G., & Duh, M. S. (2021). Medication adherence in patients with asthma using once-daily versus twice-daily ICS/LABAs. *Journal of Asthma*, *58*(1), 102-111.
6. Covelli, H., Pek, B., Schenkenberger, I., *et al*. (2015). Efficacy and safety of fluticasone furate/vilanterol or tiotropium in subjects with COPD at cardiovascular risk. *International Journal of Chronic Obstructive Pulmonary Disease*, *11*, 1-12.
7. Cazzola, M., Calzetta, L., & Matera, M. G. (2011). Beta (2) adrenoceptor agonists: current and future directions. *British Journal of Pharmacology*, *163*(1), 4-17.
8. Kerwin, E., Barnes, N., Gibbs, M., *et al*. (n.d.). Fluticasone furate/vilanterol once daily improves nighttime awakening in asthma patients with night symptoms: post hoc analyses of three randomized controlled trials. *Journal of Asthma, 55*(8), 890-897.
9. Global Initiative for Chronic Obstructive Lung Disease. (2022). Global strategy for the diagnosis, management, and prevention of Chronic Obstructive Pulmonary Disease. Retrieved from https:// goldcopd.org/2 022-gold-report-2/
10. Global Initiative for Asthma. (2022). Global strategy for asthma management and prevention. Retrieved from https://goldcopd.org/2022-gold-report-2/
11. Kunisaki, K. M., Dransfield, M. T., Anderson, J. A., *et al*. (2018). Exacerbation of chronic obstructive pulmonary disease and cardiac events: a post hoc cohort analysis from the SUMMIT randomized clinical trials. *American Journal of Respiratory and Critical Care Medicine*, *198*(1), 51-57.
12. Siederer, S., Allen, A., & Yang, S. (2016). Population pharmacokinetics of inhaled fluticasone furate and vilanterol in subjects with chronic obstructive pulmonary disease. *European Journal of Drug Metabolism and Pharmacokinetics*, *41*(6), 743-758.
13. Woodcock, A., Vestbo, J., Bakerly, N. D., *et al*. (2017). Salford Lung Study Investigators. Effectiveness of fluticasone furate plus vilanterol on asthma control in clinical practice: an open-label, parallel group, randomized controlled trial. *The Lancet*, *390*(10109), 2247-2255.

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