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Research Article

Comparison of Safety and Action of Salmeterol and Formoterol in Combination with Fluticasone Propionate in Asthma Patients

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Abstract: The Objective of the presented study was to investigate the effects of age, gender, body mass index on the occurrence of asthma and to compare safety of Salmeterol/fluticasone and formoterol/fluticasone by observing adverse drug reactions. Moreover to compare the action of salmeterol/fluticasone, formoterol/fluticasone by observing heart rate, respiratory rate, $FEV_{1,}$ PEFR. Prospective, Observational methods were followed. It was a 12 week study with participation of 76 patients with asthma. The prospective, observational study was conducted from January 6th to august 6th 2011patients were advised to visit the hospital 4 times visit; 1: for baseline screening, visit2: in second week from baseline screening date, visit 3: 6th week from baseline screening date, visit 4: 12th week from baseline screening date. Patients with cardiac problems and childerns are excluded from study. Formoterol fumarate along with fluticasone propionate shows more improvement in the changes of FEV1, PEFR, heart rate, respiratory rate than salmeterol xinophoate along with fluticasone propionate.
Keywords: Asthma, Maxiflo, Seroflo, FEV1, PEFR

INTRODUCTION

Asthma is a chronic inflammatory disease in which the airways become sensitive to allergens. Several things happen to the airways when a person is exposed to certain triggers such as the lining of the airways become swollen and inflamed, the muscles that surround the airways tighten, the production of mucus is increased leading to mucus plugs, all of these factors will cause the airways to narrow thus making it difficult for air to go in and out of your lungs causing the symptoms of asthma [1, 2]. Asthma results from a combination of multiple factors, those play the important role in the development of this disease are broncho constriction, airway edema, airway hyper-responsiveness, airway remodeling [3].

Asthma is Diagnosed by Lung function tests (also known as pulmonary function tests, PFTs) measure the size of your lungs, how much air you can breathe in and out, how fast you can breathe air out, and how well your lungs deliver oxygen to your blood [4]. These tests also are called pulmonary function tests, breathing tests most often used are Spirometry: This test measures how much air you can breathe in and out. It also measures how fast you can blow air out [5]. Peak flow meter: This meter is a small, hand-held device that's sometimes used by people who have asthma. The meter helps track their breathing [6]. Lung volume measurement: This test, in addition to spirometry, measures how much air you have left in your lungs after you breathe out completely [7]. Lung diffusing capacity: This test measures how well oxygen passes from your lungs to your bloodstream [8].

Jones *et al.* [9], presented randomized, Open label, parallel Multicenter Formoterol vs. salmeterol (n=482) 6 months Reversible obstructive airway disease Currently receiving ICS and on demand SABA. Formoterol 12mcg bid via Aerolizer vs. salmeterol 50mcg bid via Diskus results change in scores for each section (symptoms, activity, impacts) improved from baseline in both groups; no significant difference between groups. Total score change from baseline – formoterol 8.9; salmeterol 8.1.

The main objectives of this study were to investigate the effects of age, gender, bodymass index on the occurance of asthma. To compare safety of Salmeterol/fluticasone, formoterol/fluticasone by observing adverse drug reactions. To compare action of salmeterol/fluticasone, formoterol/fluticasone by observing heart rate, respiratory rate, $FEV_{1,}$ PEFR. The main purpose of this study is to evaluate the safety and action of Salmeterol and Formeterol in combination with Fluticasone propionate in the form of inhaler in Asthma patients. Parameters observed are Forced Expiratory Volume in One Second (FEV1) means the volume of air that can be forced out in one second after taking a deep breath, an important measure of pulmonary function. Peak Expiratory Flow Rate (PEFR) means how quickly you can exhale air out of the lungs, Heart rate and Respiratory rate

EXPERIMENTAL SECTION

The work is being carried out at hospital in Pulmonology Department.

Inclusion Criteria

Males and Females: 18-65years of age
Patients with symptoms of airflow obstruction
Non smokers

Exclusion Criteria

Patients with cardiac problems
Children

Study Site

The study was conducted in both outpatients and inpatients in the department of pulmonology in Anurag chest hospital, Rajahmundry.

Study Design

This study is a prospective, comparative12 week study consisting of 76 patients with asthma.

Study Period

The study was conducted from January 6th to August 6th 2011.

The patients are advised to visit the hospital in 4
Visit-1 for baseline screening (day 1)
Visit-2 in second week from baseline screening date
Visit-3 in 6th week from baseline screening date
Visit-4 in 12th week from baseline screening date

Parameters observed

Forced Expiratory Volume in One Second (FEV1)
Peak Expiratory Flow Rate (PEFR)
Heart rate
Respiratory rate

RESULTS

Table1: Gender Distribution of Study Population

Gender	Number of Patients	Percentage
Males	32	42.10%
Females	44	57.89%
Total	76	100%

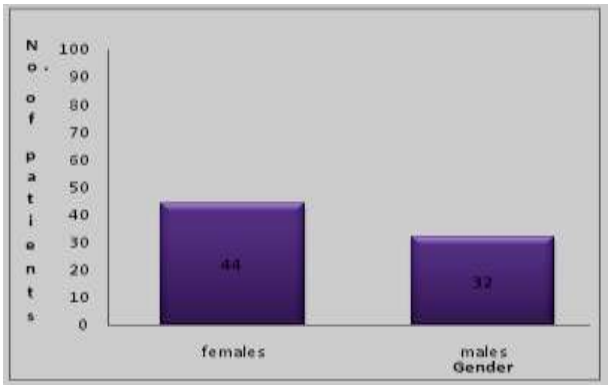

Fig. 1: Gender Distribution of Study Population

Interpretation: By the above observations out of 76 patients in the study 32 were males (42.10%) and 44 were females (57.89%)

Table 2: Age Distribution of Study Population

Age group	Number of patients	Percentage
20-30	8	10.52%
30-40	18	23.68%
40-50	22	28.94%
50-60	15	19.73%
60-70	13	17.10%
Total	76	100%

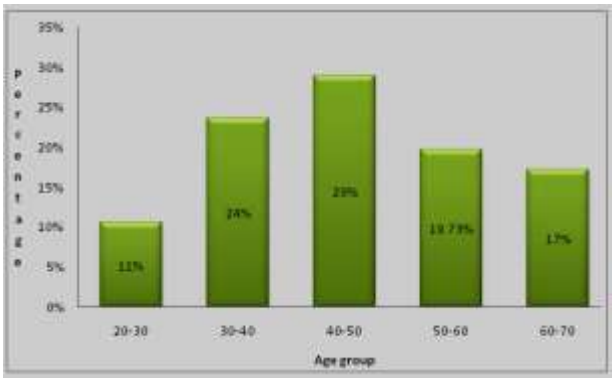

Fig. 2: Age Distribution of Study Population

Interpretation: By the above observations patients at the age of 40-50 were more suffering with asthma compared to other age groups.

Table 3: BMI of Asthma Patients

Body mass index	Number of patients	Percentage
Normal Weight(18.5-24.9)	18	23.68%
Over Weight (25.0-29.9)	28	36.84%
Obesity (>30)	30	39.47%

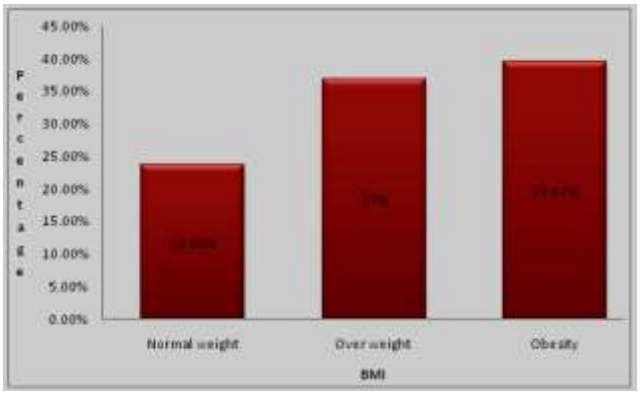

Fig. 3: Mass Index of Asthma Patients

Interpretation: By the above observations Asthma is more common in obesity patients compared to overweight and normal weight persons

Table 4: Comparison of Adverse Drug Reactions of Two Inhalers

Adverse drug reactions	Maxiflo inhaler (n=38)	Seroflo inhaler (n=38)	Percentage	
			Maxiflo	Seroflo
Headache	5	8	13.8	21.05
Tremor	4	2	11.1	5.2
Palpitations	3	0	8.3	0
Tachycardia	4	5	11.1	13.1

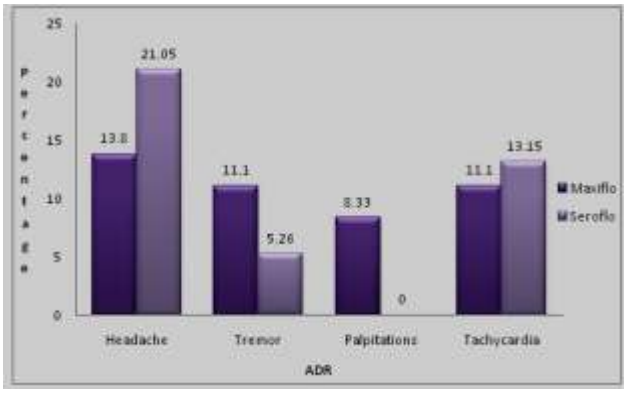

Fig. 4: Comparision of Adverse Drug Reactions of Two Inhalers

Interpretation: By the above observations adverse drug reactions are same with maxiflo inhaler as well as seroflo inhaler.

Table 5: Comparision of Heart Rate with Two Inhalers

Heart Rate	MAXIFLO N=38	SEROFLO N=38
Baseline		
Before Inhalation	110.78	110.78
Aafter Inhalation	110.11	110.14
After 2 Weeks		
Before Inhalation	102.22	104.47
After Inhalation	94.35	97.23
After 6 Weeks		
Before Inhalation	93.56	96.23
After Inhalation	90.74	91.34
After 12 Weeks		
Before Inhalation	85.32	88.93
After Inhalation	82.56	82.45

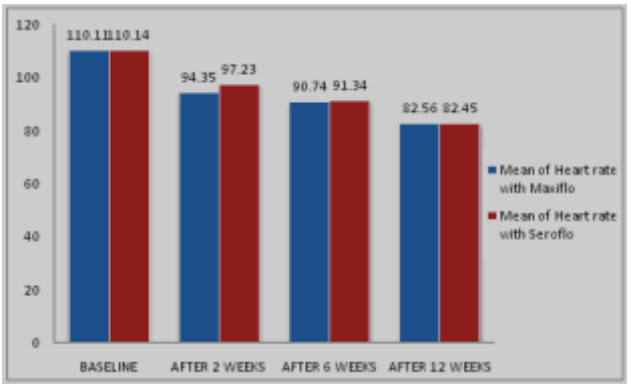

Fig. 5: Comparision of Heart Rate with Two Inhalers

Interpretation: By the above observations mean of Heart rate after inhalation reduced in visit 1,2,3 and 4 compared to Seroflo inhaler decrasing of Heart rate is faster with Maxiflo inhaler.

Table 6: Comparision of Respiratory Rate with Two Inhalers

Respiratory Rate	MAXIFLO N=38	SEROFLO N=38
Baseline		
Before Inhalation	32.85	32.67
Aafter Inhalation	30.23	30.21
After 2 Weeks		
Before Inhalation	28.57	29.57
After Inhalation	26.54	28.87
After 6 Weeks		
Before Inhalation	25.26	28.04
After Inhalation	24.75	27.34
After 12 Weeks		
Before Inhalation	23.17	24.67
After Inhalation	22.89	23.98

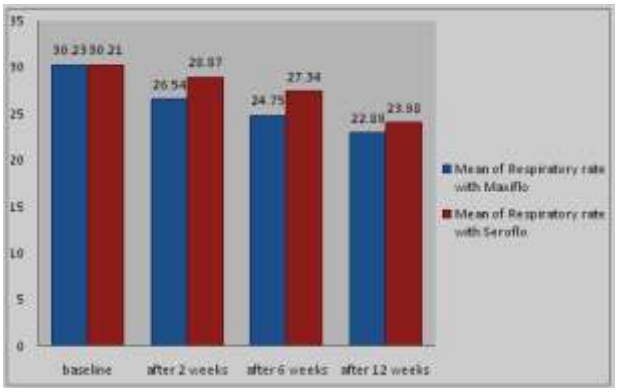

Fig. 6: Comparision of Respiratory Rate with Two Inhalers

Interpretation:By the above observations mean of Respiratory rate after inhalation reduced in visit 1,2,3,and 4,compared to Seroflo inhaler decreasing of Respiratory rate is faster with Maxiflo inhaler.

Table 7: Comparision of Forced Expiratory Volume in One Second Values with Two Inhalers

FEV_1	MAXIFLO N=38	SEROFLO N=38
Baseline		
Before Inhalation	2.68	2.68
After Inhalation	3.05	2.86
After 2 Weeks		
Before Inhalation	2.86	2.82
After Inhalation	3.22	3.13
After 6 Weeks		
Before Inhalation	3.16	3.12
After Inhalation	3.57	3.42
After 12 Weeks		
Before Inhalation	3.13	3.12
After Inhalation	3.61	3.40

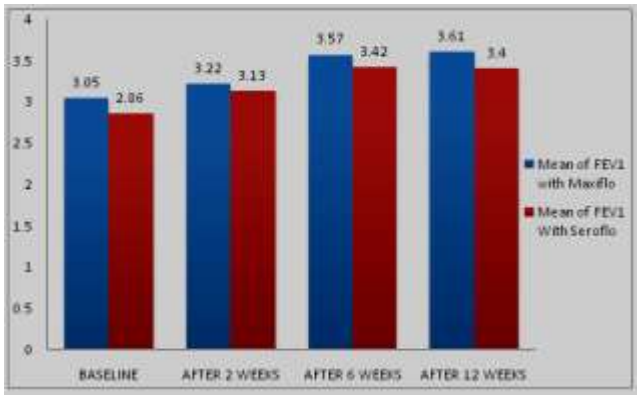

Fig. 7: Comparision of FEV_1 Values with Two Inhalers

Interpretation: By the above observations Forced Expiratory Volume in 1 Second increased after inhalation in visit1, 2, 3 and 4 compared to Seroflo inhaler increased in FEV_1 faster with Maxiflo inhaler.

Table 8: Comparision of Peak Expiratory Flow Rate values with Two Inhalers

PEFR	MAXIFLO N=38	SEROFLO N=38
Baseline		
Before Inhalation	384.57	384.54
After Inhalation	387.32	386.89
After 2 Weeks		
Before Inhalation	400.34	392.76
After Inhalation	409.48	400.76
After 6 Weeks		
Before Inhalation	403.32	400.28
After Inhalation	408.34	406.76
After 12 Weeks		
Before Inhalation	404.67	398.97
After Inhalation	410.47	408.76

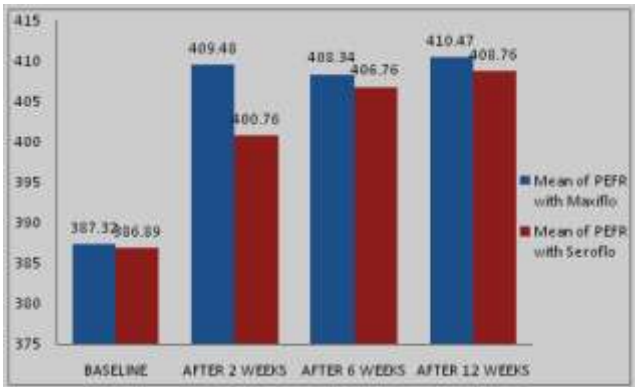

Fig. 8: Comparision of PEFR Values with Two Inhalers

Interpretation: By the above observations Peak Expiratory Flow Rate increased after inhalation in visit1,2,3,and 4 compared to Seroflo inhaler increased in PEFR is faster with Maxiflo onhaler.

DISCUSSION

Fluticasone propionate is a synthetic, trifluorinated glucocorticoid with potent antiinflammatory activity [10]. Formoterol is a very potent long-acting adrenoceptor β_2-agonist with a high intrinsic activity and a rapid onset of action [11]. Salmeterol is a long-acting β_2-adrenergic agonist.

The study was prospective open labeled 12 week study. This study was conducted in Anurag Chest hospital, Rajahmundry.

The major parameters to assess the action of drug combinations are Forced expiratory volume in one second and peak expiratory flow rate ,heart rate and respiratory rate in 12 weeks.

The safety variables include adverse reactions that were documented based on spontaneous reporting and patient interview.

Drug Profile

Maxiflo Inhaler [12-16]

Maxiflo-125 Inhaler
Each actuation delivers:
Formoterol fumarate……...6 mcg
Fluticasone Propionate BP……...125 mcg
Suspended in propellant HFA 227 ……..q.s.

Maxiflo-250 Inhaler
Each actuation delivers:
Formoterol fumarate……..…..6 mcg
Fluticasone Propionate BP……....250 mcg
Suspended in propellant HFA 227 ……...q.s.

Maxiflo Inhaler **(**Inhalation aerosol) s a combination of Fluticasone propionate a synthetic corticosteroid and formoterol; a selective long acting β_2-agonist. Fluticasone propionate is a synthetic, trifluorinated glucocorticoid with potent anti-inflammatory activity. Formoterol is a very potent long-acting adrenoreceptor β_2-agonist with a high intrinsic activity and a rapid onset of action.

Dosage and Administration
Asthma*:* Adults and Adolescents (12 years and older)
Maxiflo -125: 1-2 inhalations twice daily
Maxiflo -250: 1-2 inhalations twice daily

Seroflo Inhaler [18-20]
Seroflo-50 Inhaler
Each actuation delivers:
Salmeterol xinafoate…….....25 mcg
Fluticasone propionate BP…….50 mcg
Suspended in propellant HFA 227……...q.s.

Seroflo-125 Inhaler
Each actuation delivers:
Salmeterol xinafoate…….....25 mcg
Fluticasone propionate BP……....125 mcg
Suspended in propellant HFA 227……q.s.

It is an inhalation aerosol that combination of fluticasone propionate, a synthetic corticosteroid, and salmeterol, a selective, long-acting β_2-agonist. Fluticasone propionate is a synthetic, trifluorinated glucocorticoid with potent anti-inflammatory activity. Salmeterol is a selective, long-acting β_2-adrenoceptor agonist with duration of action of at least 12 hours.

Dosage and Administration
Adults and Adolescents (12 years and older)
Seroflo-50 Inhaler: Two Inhalations twice daily
Seroflo-125 Inhaler: Two inhalations twice daily
Seroflo-250 Inhaler: Two inhalations twice daily

Fig. 9: Observing Spirometry results

Fig. 10: Patient exhaling in to Spirometer

CONCLUSION

The results of the present study suggest that the fluticasone/formeterol combination will offer patients a treatment option that is as effective as fluticasone/salmeterol but with more rapid action.

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