

Risk and Benefit Profile of Steroids in Copd Patients

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Abstract:- Chronic obstructive pulmonary disease (COPD) is characterised by chronic airflow limitation that is slowly progressive and not fully reversible. Steroid-based therapy is widely used in the treatment of different diseases especially in disease such as COPD. The pharmacological treatment of chronic obstructive pulmonary disease (COPD) has evolved largely from the drugs used to treat asthma. The therapeutic benefits of inhaled corticosteroids (ICS) that are evident in asthma are less clear-cut in COPD. There is some evidence of a preventive effect of ICS on exacerbations in patients with COPD, but there is little evidence for an effect on mortality or lung function decline. As a result, treatment guidelines recommend the use of ICS in patients with severe or very severe disease (forced expiratory volume in 1 second <50% predicted) and repeated exacerbations. Their relative lack of efficacy in COPD and the risk of side-effects have led to recommendations for their use to be restricted to patients with more severe disease and repeated exacerbations.

Keywords:- Copd, Inhaled Corticosteroids(Ics), Acute Exacerbation of Copd (Aecopd), Oesophageal Candidiasis.

I. INTRODUCTION

Chronic obstructive pulmonary disease(COPD)is a progressive disorder characterized in part by chronic inflammation of the airways of the lungs, punctuated with acute inflammatory exacerbations, which are often infectious. This is often accompanied by episodes of inflammation associated with infection termed as acute exacerbation of COPD. Depending upon the part of lung involved the infectious process can be categorised into Emphysema and Chronic bronchitis.¹

On average, COPD patients experience 2 AECOPDs each year, lab examination in COPD reveals a high neutrophil count and sometimes elevated eosinophils which may lead to false diagnosis. High neutrophil count shows infective exacerbation because of bacterial etiology. The lung recovery from these exacerbations can take several weeks, but it may take many more months for the patient to return to baseline lung function.

Hence management of COPD is quite complicated because of the side effects associated with the drug therapy. Treatment options are often limited to reducing rate of exacerbations, and hospitalizations and improving lung function.

There are no medications that reverse the natural history of COPD since the inhaled agonists and anti

cholinergic are the mainstay of a COPD treatment regimen, corticosteroids can also play an important role. (AECOPD) Recommendation of steroid use in COPD varies substantially based on severity of disease and lung function.²

Inhaled corticosteroids, Systemic steroids and Oral corticosteroids play an important role in coped even though ICS is mostly preferred than other categories. They can reduce airway hyper responsiveness and can improve lung function.

Indication for steroid in COPD is that they can control the rate of exacerbations but in contrast there are some adverse effects associated with steroid use. The study done by Joachim Reidl et al (2015) show that steroids promote an increased persistence of H. influenza treated with beclomethasone, with enhanced bacterial load in the lungs of treated mice. To characterize the steroid response of bacteria, the impact of beclomethasone was determined at the transcriptase level of H. influenza. Subsequently, bacterial genes were identified as significantly deregulated due to the presence of glucocorticosteroids. Among such genes were factors involved in virulence-associated functions such as iron uptake, bio film formation, stress response, antimicrobial resistance and adherence. ³There are some evidences that, in patients with long term therapy, steroids is a cause of exacerbation ,nevertheless there is immune suppression by the use of steroids and study shows there is persistence of bacteria which may contribute to infective exacerbations. Laboratory investigation of these patients shows reduced lymphocyte count which explains suppression of immune system by the use of steroids.

II. OBJECTIVE

The Objective of the study was to assess the risks and benefits associated with steroid therapy in COPD patients.

III. METHODOLOGY

The study was a prospective observational study carried out in the General Medicine Department of Karuna Medical College Hospital, Palakkad District, Kerala, India. A total of 150 Subjects were included in the study. The patients were selected on the basis of inclusion and exclusion criteria.

A. Study criteria:

➤ Inclusion criteria:

- Patients greater than 60 year old.
- Patient visiting Outpatient and Inpatient Department of General Medicine with Obstructive Airway Disease.
- Patients willing to participate.

B. Exclusion criteria:

- Patients with TB and on treatment with immunosuppressant's.
- Patients unwilling to participate.

IV. RESULTS

A total of 150 patients were enrolled in the study diagnosed with infective exacerbation of COPD. Past medication history of COPD patients showed that about 57 % were on steroids and 43% on non steroid therapy.

PAST MEDICAL HISTORY OF THE STUDY POPULATION

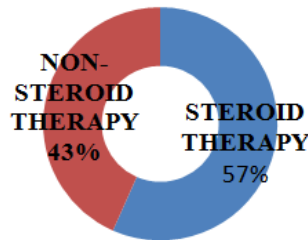


Fig 1:- Past medical history of the study population

The current treatment of study population shows 73% of patients were treated with steroids and only 27 % with non steroid therapy.

CURRENT TREATMENT



Fig 2:- Current treatment given to the patients

Figure 3 describes the benefits of steroid use in COPD exacerbations. it was observed that, lung function was improved to 97% due to steroid therapy compared to 88% with non steroid therapy.

AVERAGE SPO2 LEVEL

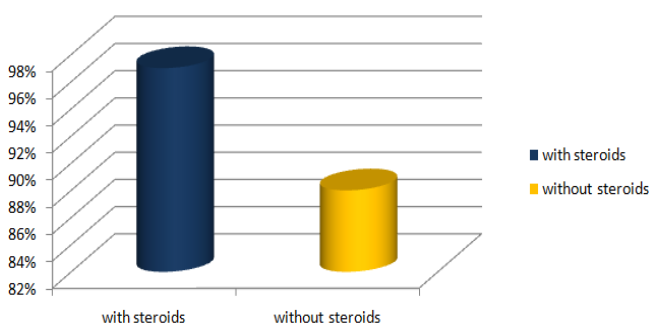


Fig 3:- Average SPO2 levels with and without steroid therapy

The comparison of length of stay of patients who received steroid therapy during hospitalization and patients who did not receive steroid shows that there was a decrease in length of stay up to 3-4 days .Average LOS in steroid treated patients was decreased upto 4 days compared to 9 days for those without therapy

AVERAGE LOS WITH STEROID AND NON STEROID THERAPY

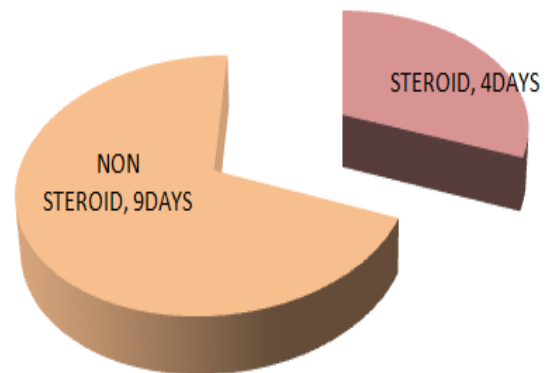


Fig 4:- Average length of stay with steroid and non steroid therapy

Table 1 shows the different routes of administration (ROA) of steroid drugs in patients. Most patients received inhalational steroids (57). Budesonide was the steroid given via inhalational route. Only 10 patients received oral route which includes dexamethasone and prednisolone. Hydrocortisone was given via IV route to almost 43 patients

ROUTE OF STEROID THERAPY	STEROID DRUG GIVEN	NO OF PATIENTS
INHALATIONAL	BUDESONIDE	57
ORAL	DEXAMETHASONE	7
ORAL	PREDNISOLONE	3
IV	HYDROCORTISONE	43

Table 1. Route of administration of different steroid drugs

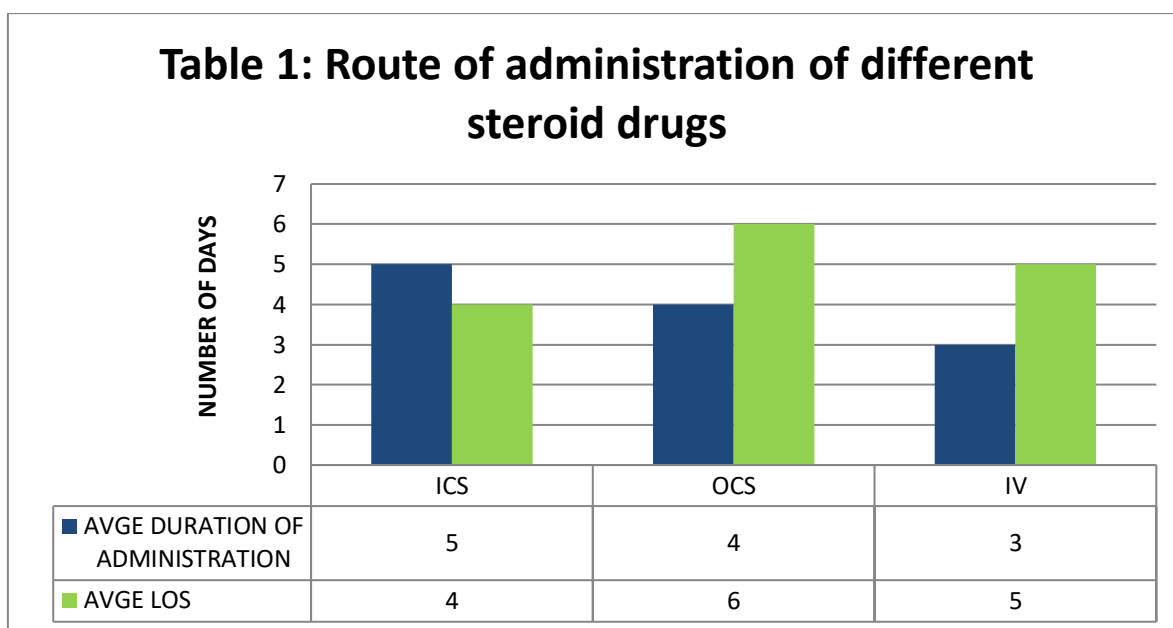


Fig 5:- ROA of different steroid drugs

Average LOS with different routes of steroid administration Focusing on ROA, most of the patients received inhaled steroids 57 (51.8%) and it showed best onset of action which decreased LOS to 3 days compared to

other routes of steroids. Systemic steroids were prescribed for 43 patients (39%) and had a LOS to 5 days compared to 6 days for oral steroids 10 (9.09%).

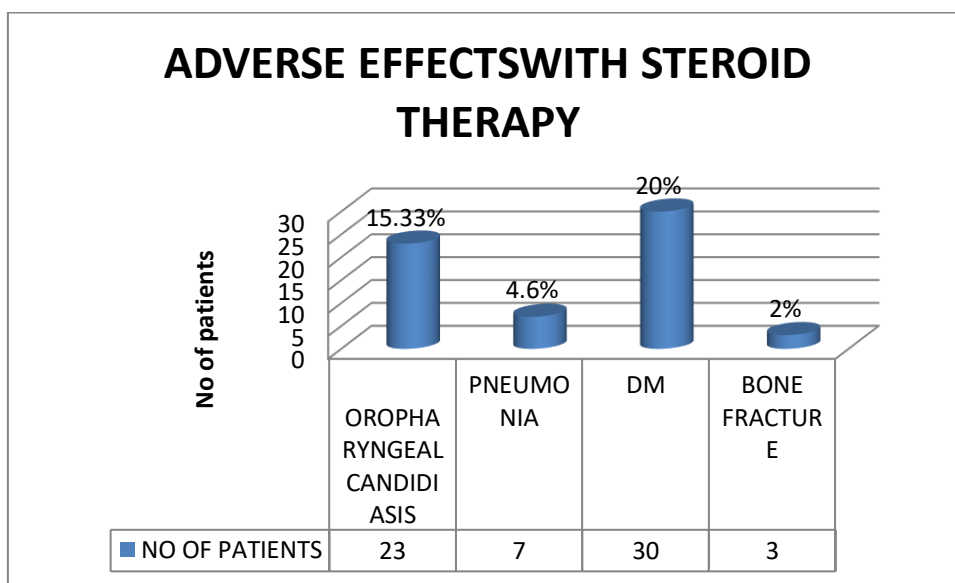


Fig 6:- Adverse effects associated with steroid use

Steroid use is not only confined to benefits there are some adverse effects associated with steroid therapy. Fig 6 shows that oropharyngeal candida as is was the most encountered

ADR during therapy in 43 patients (28.66%), impaired glucose level in 30 patients (20%) pneumonia 7 (4.6%) patients and bone fracture.

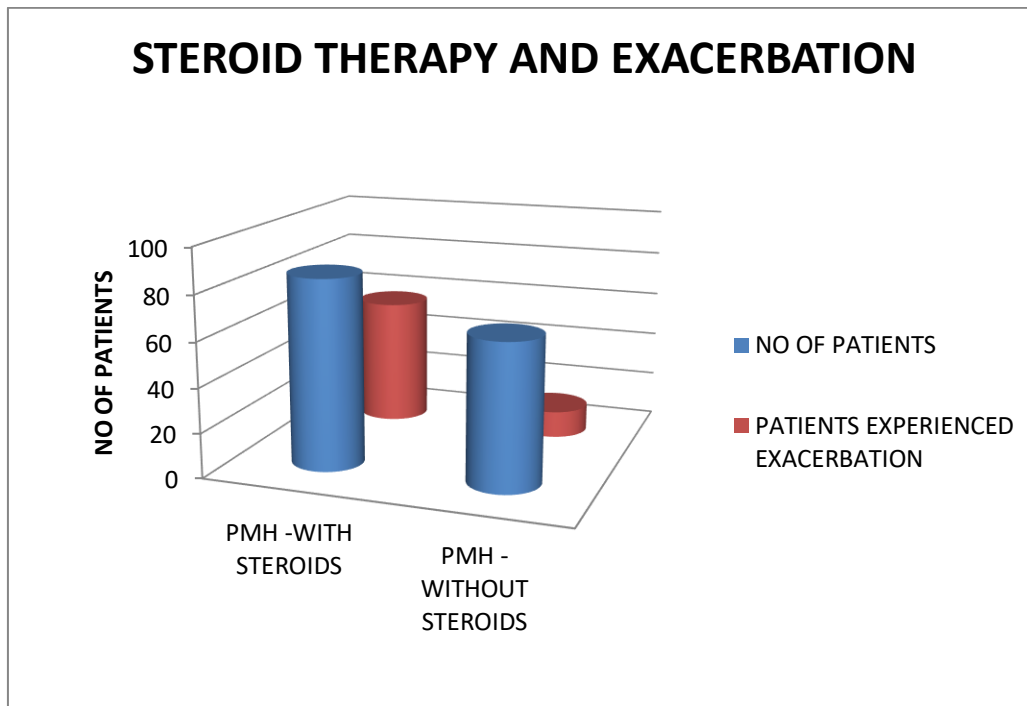


Fig 7:- & Table 2. Relation Between Steroid Therapy And Exacerbation

	PMH WITH STEROIDS	PMH WITHOUT STEROIDS	P-VALUE
NO OF PATIENTS	85	65	0.001
PATIENTS EXPERIENCED EXACERBATION	57	12	

Figure 7 and Table 2 showing long term steroid use and infective exacerbation of COPD. P-value was obtained using Chi-square test, which shows high level of significance. Out of 87 steroid treated patients 57 experienced infective exacerbation when compared with patients without steroid therapy in the past.

V. DISCUSSION

Based on the results from this study, steroid use is associated with benefits and adverse effects. In moderate to severe exacerbation of COPD steroids plays important role. They can improve lung function by reducing inflammation and shortens the length of stay in hospital. At the same time steroid use should be advocated in certain conditions only for stable COPD the ATS/ERS guidelines recommend ICS use with patients whose FEV1 is 50% of predicted and who have AECOPDS more than once a year. Adverse effects are not less when comparing to other medications. Common adverse effects we found in this study was Oropharyngeal candida as is DM, and Bone fracture.

In this study a link was observed between long term steroid use and infective exacerbations. We found that patients with steroid therapy have very low lymphocyte count which indicate immune suppression. These patients were on steroids for COPD. Their lab test show high neutrophil count with very low lymphocyte count. A study conducted by Joachim Reidl found that there is a persistence of bacteria in patients treated with steroids and because of bio film formation which lead to infection under favourable circumstances. Hence we found that there is a relation between long term steroid use and infective exacerbation.

VI. CONCLUSION

The appropriateness of steroid use in COPD patients were evaluated and found that there is benefits and risks with steroid therapy. Lung function can be improved and LOS can be shortened by appropriate use of steroids. At the same time long time therapy can lead to exacerbations and infections because of immune suppression. Steroid use should be recommended in mod to severe exacerbation. Careful use is mandatory in current health care setting.

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