Asian Journal of Hospital Pharmacy
[An International Peer Reviewed Journal]

Open Access **Review Article**

Rational use of corticosteroids in covid-19-a review

V.N. Vamsi Krishna*, Siva Ramesh Chikkala
Department of Pharmacy, Aditya College of Pharmacy, ADB Road, Surampalem, East Godavari district, Andhra Pradesh, India

Article History
Received on: 12-07-2021
Accepted on : 20-08-2021
Published on : 30-09-2021

Keywords
Corticosteroid, Covid-19, Lung injury.

***Corresponding Author**
V.N. Vamsi Krishna
Email:vamsi.vasabhakthula@gmail.com

Abstract

The novel coronavirus has spread globally and affected many people and health care systems equally. W.H.O recommends steroid therapy for 7-10 days only in patients with severe disease. Lung injury in covid-19 is due to the systematic immune response of the patient, which leads to an increase in the severity of the condition. Evidence has shown that the use of corticosteroids is an easily accessible and beneficial treatment option in overcoming ARDS and hyper inflammation conditions. The main aim of this review is to provide an overview of the rational use of corticosteroids in the management of covid-19.

Introduction

The novel corona virus has spread globally and affected many people and health care systems equally. Among patients with positive swab test, majority were asymptomatic and results in mild disease condition [1]. The progression of the disease and increase in viral load were seen in severe disease condition. Corticosteroids were recommended only in severe cases. Lung injury in covid-19 is due to systematic immune response of the patient, which leads to increase the severity of the condition. Acute respiratory distress syndrome (ARDS) is the most commonly occurring complication in patients with long covid syndrome [2]. Evidence has shown that use of corticosteroids is easily accessible and beneficial treatment option in overcoming ARDS and hyper inflammation conditions. The Randomised Controlled Open Label evaluation of covid-19 therapy (Recovery) trial was conducted in U.K to evaluate the beneficial effects of corticosteroids along with anti viral agents [3]. W.H.O recommends steroid therapy for 7-10 days only in patients with severe disease (SPO_2: <90% and RR: >33 bpm). However, prolong use of corticosteroids tends to increase clotting factors and precipitate thrombosis. The main aim of this review is to provide an overview of rational use of corticosteroids in management of covid-19.

Steroid Therapy

The excess activation of neutrophils leads to stimulation of toxic reactive oxygen free radicals and in turn damages the capillary endothelium. The cytokine storm leads to increase in the serum concentration of IL-1, IL-6, IL-8 and TNF causes hyper inflammation and respiratory failure [4]. Thus, facilitating inflammatory response. The effect of steroid therapy is to reduce stimulation of inflammatory mediators and promote anti-inflammatory actions. Corticosteroids act as direct agonists to gluco-corticoid and mineralo-corticoid receptors [4]. Stimulation of these receptors not only tends to reduce inflammatory response but also suppress the immune system. Excess stimulation of gluco-corticoid and mineralo-corticoid receptors leads to hyper glycaemia and hyper natremia.

Dexamethasone

Dexamethasone is a long acting pure gluco-corticoid. The recommended dose is 6 mg/day, oral or I/V for 10 days. Evidence suggests that dexamethasone shows desirable anti-inflammatory effects without excess stimulation of mineralo-corticoids. A multicentre, Recovery trial showed that reduced inflammatory mediators among patients who were received Dexamethasone than the patients received other standard therapy [5].

Methyl Prednisolone

Methyl prednisolone is an intermediate acting drug. The recommended dose is 2 mg/kg/day, I/V for 6-10 days. It has minimum mineralo-corticoid activity with potent gluco-corticoid action. In case of severe covid infection early administration of low dose Methyl prednisolone lowers the risk of death by 71%. It improves the pulmonary function [6].

Pulse Therapy

Pulse therapy has been reported successful in patients with severe disease. The continuous administration of low dose Methyl prednisolone (5-20 mg/kg/day) usually 1-5 days reduces the stimulation of inflammatory mediators.

However, pulse therapy could be efficient only at the pulmonary phase [6].

Hydrocortisone

WHO Rapid Evidence Appraisal for Covid Therapy (React) working group suggests that hydrocortisone could be used as an alternative to Dexamethasone. The recommended dose is 50 mg, q8hr or 100 mg, q12hr. It is commonly used to reduce the occurrence of septic shock in patients with severe covid illness. Using the fixed dose 50 mg of hydrocortisone, QID for 7 days has better outcome and greater chance of survival [7].

Conclusion

Corticosteroid therapy is not recommended in patients who were not in respiratory support. Further investigation has to be done to generalize the benefit of Dexamethasone. Hence, use of corticosteroid in covid therapy is a double edged sword and should be given by considering the benefits over its risk.

References

1. Moore J, June C. Cytokine release syndrome in severe COVID19: lessons from arthritis and cell therapy in cancer patient point to therapy for severe disease. Science. 2020:368(6490);473-474. doi:10.1126/science.abb8925.
2. Siddiqi HK, Mehra MR. COVID-19 illness in native and immune suppressed states: a clinical-therapeutic staging proposal. J Heart Lung Transplant. 2020;39(5):405.
3. Horby P, Lim WS, et al. Dexamethasone in hospitalized patients with Covid-19-preliminary report. RECOVERY Collaborative Group N Engl J Med. 2020. doi: 10.1056/NEJMoa2021436
4. ClinicalTrials.gov. Accessed September 21, 2020. https://clinical trials.gov
5. Brotman DJ, Girod JP, Posch A, et al. Effects of short-term glucocorticoids on hemostatic factors in healthy volunteers. Thromb Res 2006; 118: 247–52.
6. Villar J, Confalonieri M, Pastores SM, Meduri GU. Rationale for prolonged corticosteroid treatment in the acute respiratory distress syndrome caused by coronavirus disease 2019. Crit Care Explor 2020; 2: e0111.
7. The WHO Rapid Evidence Appraisal for COVID-19 Therapies (REACT) Working Group. Association between administration of systemic corticosteroids and mortality among critically ill patients with COVID-19: a meta-analysis. JAMA. 2020. doi:10.10001/jama.2020.17023.