

Overuse of Steroid Drugs Methylprednisolone and Dexamethasone (Oral) Causes a Diabetic Patient to Become Infected with the Black Fungus in the Corona Virus

Ramprasad Prajapat

Received: 8 June 2021 Accepted: 30 June 2021 Published: 15 July 2021

Abstract

Background: Overuse of both methylprednisolone and dexamethasone drug on a corona patient can result in serious side effects and new infections may appear during their use. Infection with any pathogen, including viral, bacterial, fungal, protozoan, or helminthic infections at any site of the body, may be associated with the use of methylprednisolone or dexamethasone in combination with other immunosuppressive agents that increase cellular immunity, humoral immunity, or Suppress neutrophils. The function they affect. These infections can be mild, but can be serious and sometimes fatal. With increasing doses of methylprednisolone and dexamethasone, the rate of occurrence of infectious complications increases. When methylprednisolone and dexamethasone are used, there may be reduced resistance and inability to localize the infection.

Index terms— methylprednisolone, dexamethasone, side effect, drug interaction, diabetes patients, black fungus, eye diseases etc.

Abstract-Background: Overuse of both methylprednisolone and dexamethasone drug on a corona patient can result in serious side effects and new infections may appear during their use. Infection with any pathogen, including viral, bacterial, fungal, protozoan, or helminthic infections at any site of the body, may be associated with the use of methylprednisolone or dexamethasone in combination with other immunosuppressive agents that increase cellular immunity, humoral immunity, or Suppress neutrophils. The function they affect.

These infections can be mild, but can be serious and sometimes fatal. With increasing doses of methylprednisolone and dexamethasone, the rate of occurrence of infectious complications increases. When methylprednisolone and dexamethasone are used, there may be reduced resistance and inability to localize the infection. Prolonged use of methylprednisolone and dexamethasone may produce posterior subcapsular glaucoma, glaucoma with potential damage to the optic nerves, and may accelerate the establishment of secondary ocular infections caused by fungi or viruses. It has also been observed that more methylprednisolone and dexamethasone drug increases the level of glucose in the body, leading to normal corona patients who do not have any disease and diabetes after recovering from excessive consumption of methylprednisolone and dexamethasone drug. **Materials and Methods:** A cross sectional study was conducted among 50 COVID doctors from the department's outpatient pool of COVID patients, distributing questionnaires to all subjects of different age groups. The questionnaire included information related to the name, age, gender and various factors that affect the doctor's choice of methylprednisolone and dexamethasone.

Result and Discussion: A total of 50 doctors and some medical stores from across India were included in the survey. Doctors prescribed more methylprednisolone and dexamethasone medicine than steroid medicines to corona patients. In our research, most side effects were observed for corona patients taking methylprednisolone and dexamethasone drug.

Conclusion: This research had shown that overdose of methylprednisolone and dexamethasone drug take diabetes patient he has serious eye effect and cause black fungus.

1 a) Introduction

ethylprednisolone (Depo-Medrol, Medrol, Solu-Medrol) is a synthetic glucocorticoid, primarily prescribed for its anti-inflammatory and immunosuppressive effects. [1] , [2] , [3] It is either used at low doses for chronic illnesses or used concomitantly at high doses during acute flares. Methylprednisolone and its derivatives can be administered orally or parenterally. [4] Regardless of route of administration, methylprednisolone integrates systemically as exhibited by its effectiveness to quickly reduce inflammation during acute flares. [5] It is associated with many adverse reactions that require tapering off the drug as soon as the disease is under control. [6] Serious side effects include iatrogenic Cushing's syndrome, hypertension, osteoporosis, diabetes, infection, and skin atrophy. [6] Chemically, methylprednisolone is a synthetic pregnane steroid hormone derived from hydrocortisone and prednisolone. It belongs to a class of synthetic glucocorticoids and more generally, corticosteroids. It acts as a mineralocorticoid and glucocorticoid receptor agonist. In comparison to other exogenous glucocorticoids, methylprednisolone has a higher affinity to glucocorticoid receptors than to mineralocorticoid receptors.

Glucocorticoid's name was derived after the discovery of their involvement in regulating carbohydrate metabolism. [6] The cellular functions of glucocorticoids, such as methylprednisolone, are now understood to regulate homeostasis, metabolism, development, cognition, and inflammation. [6] They play a critical role in adapting and responding to environmental, physical and emotional stress. [6] Methylprednisolone was first synthesized and manufactured by The Upjohn Company (now Pfizer) and FDA approved in the United States on October 2, 1957. [7] In 2018, it was the 153rd most commonly M prescribed medication in the United States, with more than 4 million prescriptions. [8][9] Methylprednisolone has been a prescribed therapy amidst the COVID-19 pandemic, but there is no evidence it is either safe or effective for this purpose. [10] , [11] Dexamethasone is a glucocorticoid medication [12] used to treat rheumatic problems, a number of skin diseases, severe allergies, asthma, chronic obstructive lung disease, croup, brain swelling, eye pain following eye surgery, and along with antibiotics in tuberculosis . [12] In adrenocortical insufficiency, it may be used in combination with a mineralocorticoid medication such as fludrocortisone. [12] In preterm labor, it may be used to improve outcomes in the baby. [12] It may be given by mouth, as an injection into a muscle, as an injection into a vein, as a topical cream or ointment for the skin or as a topical ophthalmic solution to the eye. [12] The effects of dexamethasone are frequently seen within a day and last for about three days. [12] The long-term use of dexamethasone may result in thrush, bone loss, cataracts, easy bruising, or muscle weakness. [12] It is in pregnancy category C in the United States, meaning that it should only be used when the benefits are predicted to be greater than the risks. [13] In Australia, the oral use is category A, meaning it has been frequently used in pregnancy and not been found to cause problems to the baby. [14] It should not be taken when breastfeeding. [12] Dexamethasone has anti-inflammatory and immunosuppressant effects. [12] Dexamethasone was first synthesized in 1957 by Philip Showalter Hench and was approved for medical use in 1961. [15],[16], [17] It is on the World Health Organization's List of Essential Medicines. [18] In 2017, it was the 321st most commonly prescribed medication in the United States, with more than one million prescriptions. [19] Aim: To study the factors that influence doctor's choice of methylprednisolone and dexamethasone and to understand the most preferred options in selection with respect to the methylprednisolone and dexamethasone.

2 II.

3 Materials and Methods

A cross sectional study was conducted among 50 covid doctor from the outpatient pool of Department of covid patients were briefed about the study and informed consent was obtained from them and ethical committee approval was obtained from the University. Questionnaires were distributed to all subjects of various age groups. The questionnaire included information related to the covid patient's name, age, gender and various factors that influence a doctor's choice of methylprednisolone and dexamethasone. Posterior subcapsular cataracts, Increased intraocular pressure, Glaucoma, Exophthalmos.

4 ? Metabolic Negative nitrogen balance due to protein catabolism

The following additional reactions have been reported following oral as well as parenteral therapy: Urticaria and other allergic, anaphylactic or hypersensitivity reactions. [2]

5 c) Side Effects of Dexamethasone

The the potential benefit justifies the potential risk to the fetus or infant. Infants may suffer adrenal suppression if their mothers use this drug during pregnancy. In special instances (for example, leukemia and nephrotic syndrome), Decadron has been used in pediatric patients. Such use should be done in most patients in conjunction with a pediatric specialist. MEDROL may interact with aspirin (taken on a daily basis or at high doses), diuretics (water pills), blood thinner, cyclosporine, insulin or oral diabetes medications, ketoconazole, rifampin, seizure medications, or "live" vaccines. Tell your doctor all medications and supplements you use and all vaccines you recently received. [4] Corticosteroids may mask some signs of infection, and new infections may appear during

their use. Infections with any pathogen including viral, bacterial, fungal, protozoan or helminthic infections, in any location of the body, may be associated with the use of corticosteroids alone or in combination with other immunosuppressive agents that affect cellular immunity, humoral immunity, or neutrophil function. These infections may be mild, but can be severe and at times fatal. With increasing doses of corticosteroids, the rate of occurrence of infectious complications increases. there may be decreased resistance and inability to localize infection when corticosteroids are used.

Prolonged use of corticosteroids may produce posterior subcapsular cataracts, glaucoma with possible damage to the optic nerves, and may enhance the establishment of secondary ocular infections due to fungi or viruses.

6 Result and Discussion

A total of 50 doctors and some medical stores from across India were included in the survey. Doctors prescribed more methylprednisolone and dexamethasone drug medicine than steroid medicines to corona patients.

In our research, most side effects were observed for corona patients taking methylprednisolone and dexamethasone drug.

Due to over-prescription of doctors, we came to know from other studies that diabetics who were cured of taking methylprednisolone and dexamethasone medicine when they had corona, got a disease called black fungus after some time. And more deaths from black fungus disease were seen in diabetic patients.

We also found in our survey that Methylprednisolone drug is prescribed more by the doctor in corona patients. Compared to methylprednisolone, doctor prescribed dexamethasone drug is less given in corona patients.

7 Conclusion

This research had shown that overdose of methylprednisolone and dexamethasone take diabetes patient he has serious eye effect and cause black fungus.

It has been found from research that three things have been detected by giving high amount of steroid drugs to corona patients. 1) Patients who have been cured of corona, who did not have any disease before corona, after recovering from corona in their body, after going home, they have diabetes. 2) Those corona patients who already have diabetes, after being cured by giving more steroid medicine, they got a complaint of black fungus disease. 3) These two things have shown that more steroids are being given to corona patients than giving more side effects because giving more steroids reduces immunity in the body, due to which the black fungus present in the environment is easily found in patients with low immunity. It goes away and the infection increases in the patient's eyes, if the patient does not take treatment on time, then his life is also lost.

However very less work has been on this drug & there is further more scope of scientific investigation. ^{1 2}

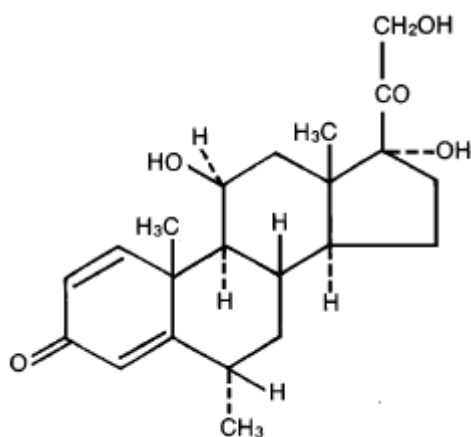


Figure 1:

¹© 2021 Global Journals

²B© 2021 Global Journals

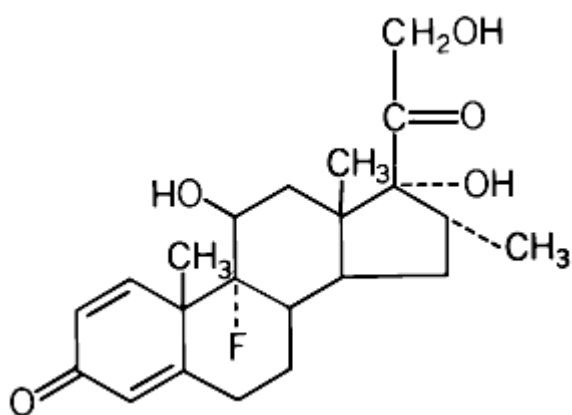
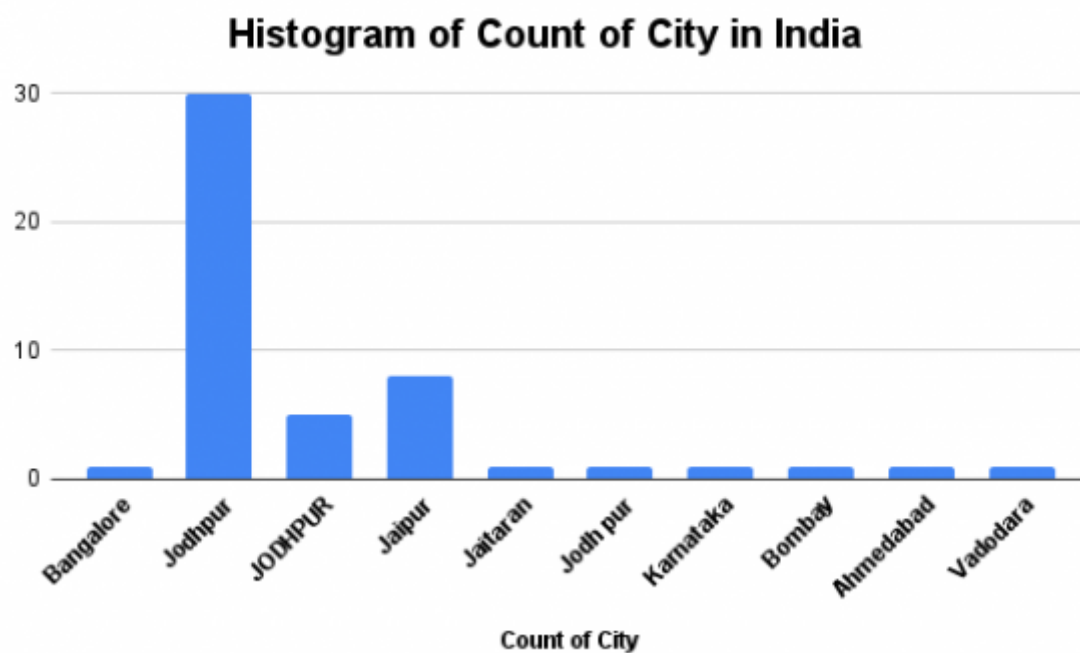
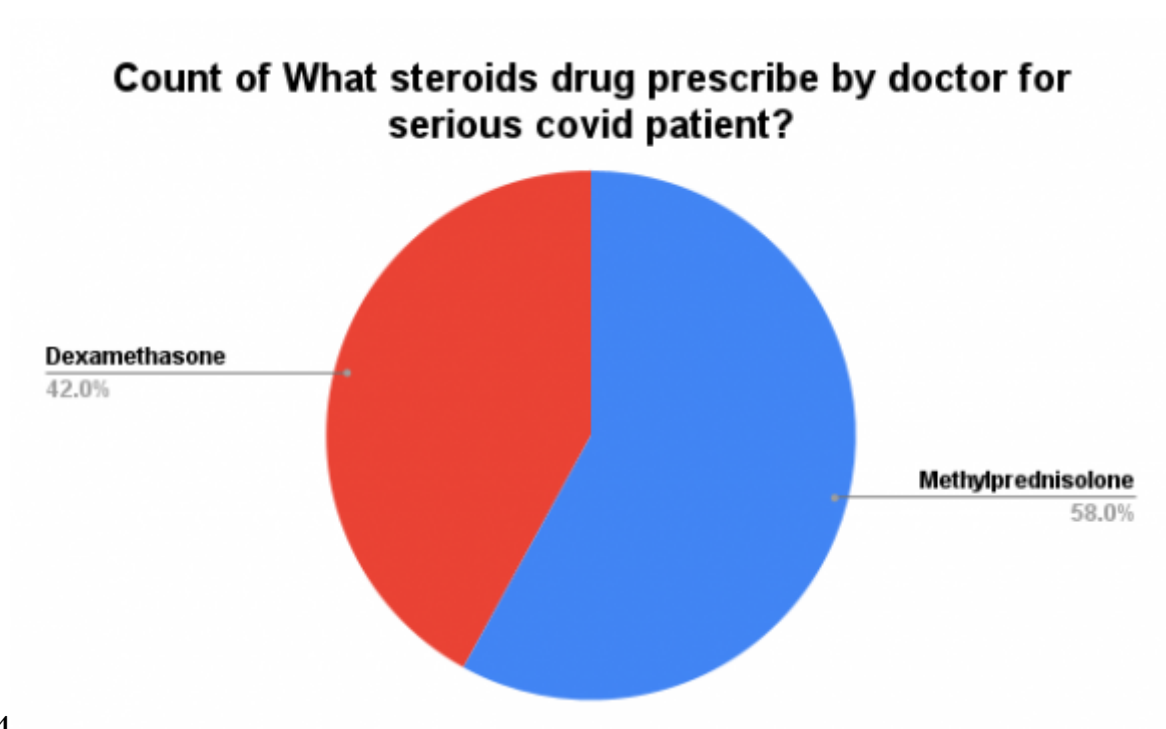


Figure 2:



3

Figure 3: Figure 3 :



4

Figure 4: Figure 4 :

iii. Dermatologic

Acne, allergic dermatitis, scaly skin,

ecchymoses and petechiae, erythema, impaired wound

healing, increased sweating, rash, striae, suppression of reactions to skin tests, thin fragile skin, thinning scalp hair, urticaria etc.

iv. Endocrine

Decrease carbohydrate and glucose tolerance, development of cushingoid state, hyperglycemia, glycosuria, requirements for insulin or oral hypoglycemic agents in diabetes, manifestations of latent diabetes mellitus, menstrual irregularities, secondary adrenocortical and pituitary unresponsiveness (particularly in times of stress, as in trauma, surgery, or illness), suppression of growth in pediatric patients.

v. Fluid and Electrolyte Disturbances

Congestive heart failure in susceptible patient's fluid retention, hypokalemic alkalosis, potassium loss, sodium retention etc.

vi. Gastrointestinal

Abdominal distention, elevation in serum liver enzyme levels (usually reversible upon discontinuation), hepatomegaly, increased appetite, nausea, pancreatitis, peptic ulcer with possible perforation and hemorrhage, perforation of the small and large intestine (particularly in patients with inflammatory bowel disease), ulcerative esophagitis.

vii. Metabolic

Negative nitrogen balance due to protein catabolism. viii. Musculoskeletal

Aseptic necrosis of femoral and humeral heads, loss of muscle mass, muscle weakness, osteoporosis, and pathologic fracture of long bones, steroid myopathy, tendon rupture, and vertebral compression fractures.

ix. Neurological/Psychiatric

Convulsions, depression, emotional instability, euphoria, headache, increased intracranial pressure with papilledema (pseudotumor cerebri) usually following discontinuation of treatment, insomnia, mood swings, neuritis, neuropathy, paresthesia, personality changes, psychic disorders, vertigo etc.

contraceptives,
bar-
bi-
tu-
rates,
pheny-
toin,
car-
ba-
mazepine,

rifampin,
ketoconazole,
aspirin or other
nonsteroidal
anti-
inflammatory
drugs (

hirsutism, trichosis, increased

i. Black Fungus Causes

? ? Black fungus (mucormycosis) primarily affects people who have health problems or who take medications that reduce the body's ability to fight germs and illness. The person's immunity is low after covid treatment, which makes them vulnerable to black fungus infection. People with diabetes and COVID-19 patients are at greater risk of developing an infection. 27

e) Black Fungus Infection (Mucormycosis)

? Black fungus, also known as Mucormycosis, is a rare but dangerous infection. Black fungus is caused by getting into contact with fungus spores in the environment. It can also form in the skin after the fungus enters through a cut, scrape, burn, or another type of skin trauma.

? Fungi live in the environment, particularly in soil and decaying organic matter such as leaves, compost piles, rotten wood, and so on. This fungal infection is caused by a type of mould known as 'mucromycetes'. It should be noted that this rare fungal infection affects persons who have health issues or who use drugs that weaken the body's ability to fight the infections. 27

[Note: ii. Black Fungus Risks ? People who fall into the following categories are more likely to develop black fungus: ? Uncontrolled diabetes, diabetic ketoacidosis, and diabetics taking steroids or tocilizumab. ? Patients taking immunosuppressant's or receiving anticancer treatment, as well as those suffering from a chronic debilitating illness ? Patients taking high doses of steroids or tocilizumab for an extended period? 27III.]

Figure 6:

.1 Acknowledgment

We grateful thanks to all the sincere and extremely helping jai narain vyas university ratanada students for their support and help for the completion of work. Last but not the least, we thankful to all those who cooperated and helped us directly or indirectly to carry out this work.

[Ocejo and Correa ()], A Ocejo, R Correa. 31335060. *Methylprednisolone*. StatPearls. Treasure Island 2020. StatPearls Publishing. p. .

[Jump; H Timmermans et al. ()] 'A General Introduction to Glucocorticoid Biology'. ^Jump; H Timmermans, S Souffriau, J Libert, C. 10.3389/fimmu.2019.01545.PMC6621919. 31333672. *Frontiers in Immunology* 2019. 10 p. 1545.

[^fischer and Ganellin()] *Analogue-based Drug Discovery*, J ^fischer, C R Ganellin. 2006. John Wiley & Sons. 9783527607495 p. 485.

[Kosaka et al. (2021)] 'Corticosteroids as adjunctive therapy in the treatment of coronavirus disease 2019: A report of two cases and literature review'. M Kosaka, Y Yamazaki, T Maruno, K Sakaguchi, S Sawaki. 10.1016/j.jiac.2020.09.007.PMC7480527. 32988730. *Journal of Infection and Chemotherapy* January 2021. 27 (1) p. 98.

[Yousefifard et al. ()] 'Corticosteroids on the Management of Coronavirus Disease 2019 (COVID-19): A Systemic Review and Meta-Analysis'. M Yousefifard, Mohamed Ali, K Aghaei, A Zali, A Madani Neishaboori, A Zarghi, A. 10.18502/ijph.v49i8.3863.PMC7554375. 33083317. *Dexamethasone Use During Pregnancy*, August 2020. August 2017. 29 July 2015. 13. The American Society of Health-System Pharmacists. 49 p. 1421. (Dexamethasone)

[Dexamethasone -Drug Usage Statistics (2020)] *Dexamethasone -Drug Usage Statistics*, 11 April 2020.

[Dexamethasone is only recommended for use during pregnancy when there are no alternatives and benefit outweighs risk Drugs] 'Dexamethasone is only recommended for use during pregnancy when there are no alternatives and benefit outweighs risk'. *Drugs* May 2016. June 2016. 17 (9) .

[Rankovic et al. (2012)] 'Drug discovery and medicinal chemistry for psychiatric disorders'. Z Rankovic, R Hargreaves, M Bingham. ISBN 9781849733656, (Cambridge) June 2020. 2012. March 2016. Royal Society of Chemistry. 17 p. 286. (Dexamethasone)

[Jump; H I J Xavier et al. ()] 'Gene Expression Control by Glucocorticoid Receptors during Innate Immune Responses'. ^Jump; H I J Xavier, A M Anunciato, A K Rosenstock, T R Glezer, I. 10.3389/fendo.2016.00031.PMC4835445. MID 27148162. *Frontiers in Endocrinology* 2016. 7 p. 31.

[Fekety ()] 'Infections associated with corticosteroids and immunosuppressive therapy'. R Fekety. *Infectious Diseases*. Philadelphia: WBSaunders Company Gorbach SL, Bartlett JG, Blacklow NR (ed.) 1992. p. .

[Jump up to: a b "Drugs@FDA: FDA-Approved Drugs] *Jump up to: a b "Drugs@FDA: FDA-Approved Drugs*, www.accessdata.fda.gov.Retrieved2020-12-05

[Katzung et al. ()] B G Katzung, S B Masters, A J Trevor. *Basic & clinical pharmacology*, (New York) 2012. McGraw-Hill Medical. 76137 p. 8641. (12th ed.)

[Methylprednisolone -Drug Usage Statistics (2021)] *Methylprednisolone -Drug Usage Statistics*, 18 February 2021.

[Stuck et al.] 'Risk of infectious complications in patients taking glucocorticoids'. A E Stuck, C E Minder, F J Frey. *Rev Infect Dis* 1989 (6) p. .

[Habib (2009)] 'Systemic effects of intraarticular corticosteroids'. G S Habib. 10.1007/s10067-009-1135-x. 19252817. S2CID 5645348. *Clinical Rheumatology* July 2009. 28 (7) p. .

[The Top 300 of ClinCalc (2021)] *The Top 300 of ClinCalc*, 18 February 2021.

[Jump; T Paragliola et al. (2017)] 'Treatment with Synthetic Glucocorticoids and the Hypothalamus-Pituitary-Adrenal Axis'. ^Jump; T Paragliola, R M Papi, G Pontecorvi, A Corsello, SM. 10.3390/ijms18102201.PMC5666882. 29053578. *International Journal of Molecular Sciences* October 2017. 18 (10) p. 2201.

[World Health Organization model list of essential medicines: 21st list 2019. Geneva: World Health Organization ()] *World Health Organization model list of essential medicines: 21st list 2019. Geneva: World Health Organization*, hdl:10665/325771.WHO/MVP/EMP/ 2019.