

- ▶ Vomiting.
- ▶ High blood pressure (Hypertension).
- ▶ Abnormal lipid profile (Dyslipidemia).
- ▶ High blood sugar (Hyperglycemia).
- ▶ Stomach ulcers.
- ▶ Abnormal distribution of fat (Lipodystrophy).
- ▶ Rounded appearance of face (Moon face).
- ▶ Liver and kidney injury.

### 8. How are immunosuppressants available and how are they prescribed?

- ▶ Immunosuppressant drugs are available as tablets, capsules, liquids and injections and they are available only by prescription from the doctor. The treating doctor decides which is the best drug form and treatment regimen for the patient. The goal of therapy is to find the treatment plan that will suppress the immune system but cause the fewest and least harmful side effects. Sometimes a combination of drugs is given. The drugs must be taken exactly as prescribed. If immunosuppressants are given for autoimmune disorder, a regimen change can cause a flare-up of the condition. The doctor may adjust the dosage based on how the condition responds to the medication. If one is an organ recipient, even the slightest change from the medication regimen can trigger an organ rejection. If a dose is missed, doctor should be informed immediately.

### 9. How to monitor patients on immunosuppressants?

- ▶ During treatment with immunosuppressant drugs, regular blood tests have to be done, as tests help the doctor monitor how effective the drugs are, whether dosage changes are needed and whether the drugs are causing side effects. Blood tests to monitor blood cells (white cells, red cells and platelets) are done to check that numbers are not getting too low. Blood tests are also done to check whether the medication is affecting liver or kidney function. The time to do blood tests may vary over time and will depend on the drug given. For example when methotrexate is given, blood tests are required initially every two weeks, later monthly.

### 10. Pregnancy and breastfeeding

- ▶ Some drugs can cause birth defects, while others have milder risks during pregnancy and breastfeeding. In any case, if pregnancy is planned, it has to be informed to the doctor, who will tell about the risks of the specific drug.

### 11. What care patient should take while on immunosuppressants?

- ▶ While on immunosuppressants, one should take care to avoid catching an infection which can be done by maintaining good hygiene (e.g. regular hand washing, eating healthy, drinking plenty of fluids and taking adequate rest). Also one should avoid close contact with people having infections.

Family members should not receive live vaccines as it can result in passing of organisms to the patient. At the development of first signs of infection like fever, swelling and redness, the doctor should be contacted.

#### Disclaimer:

This leaflet is only for general patient information and is not intended for self-medication. There is no legal liability of IADVL arising out of any adverse consequences to the patient subsequent to its use for self-treatment of the disease. Images are just for the depiction of the condition and are not to be used for any other purpose.

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# Patient Information Sheet

An Initiative of



## INDIAN ASSOCIATION OF DERMATOLOGISTS, VENEREOLOGISTS AND LEPROLOGISTS

### USE OF SYSTEMIC IMMUNOSUPPRESSANTS (OTHER THAN ORAL STEROIDS)

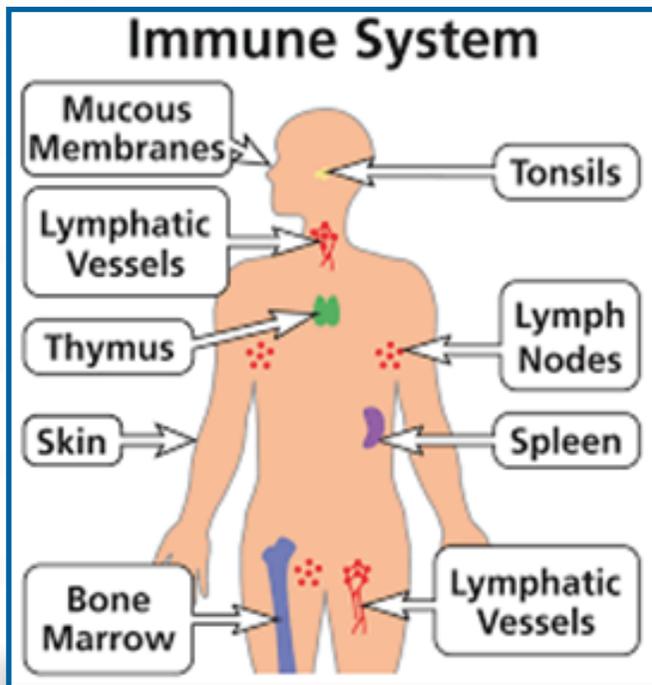
- ▶ What is immune system?
- ▶ What is immune suppression?
- ▶ What are the causes of immunosuppression?
- ▶ What are immunosuppressive drugs?
- ▶ Which specific medicines cause immune suppression?
- ▶ What are the indications of immunosuppressive drugs?
- ▶ What are the side effects of immunosuppressants?
- ▶ How are immunosuppressants available and how are they prescribed?
- ▶ How to monitor patients on immunosuppressants?
- ▶ Pregnancy and breastfeeding
- ▶ What care patient should take while on immunosuppressants?

## 1. What is immune system?

- ▶ Immune system is the body's defense against disease-causing microbes (pathogens).

### Immune system is divided into:

- ▶ First line of defense - Skin, saliva, mucous membrane lining nose, acidic stomach juices etc.
- ▶ Specially adapted white blood cells (WBC) called lymphocytes and other types of WBCs.
- ▶ Lymphatic system - A network of tubes and glands - lymph nodes or glands - which carry a fluid called lymph containing cells called lymphocytes.



## 2. What is immune suppression?

- ▶ Immune suppression is also known as immunocompromise and it means that one's immune system is not working properly (can include any or all of the defenses that make up the immune system including WBCs, spleen and lymph nodes).

## 3. What are the causes of immunosuppression?

- ▶ Long term diseases, medications, surgery, age or genetics are the causes of immunosuppression.
- ▶ Age-As one ages, the immune system becomes less effective.
- ▶ Due to certain long term illness (Severe chronic kidney disease, chronic liver disease, diabetes mellitus, etc.), the immune systems tend to become less effective.
- ▶ Malnutrition.
- ▶ Medications given for illness caused by the immune system attacking itself (autoimmune conditions like rheumatoid arthritis and Crohn's disease).
- ▶ Oral steroids for conditions which result in inflammation and where treatment is needed to reduce inflammation.
- ▶ Medicines taken to prevent rejection in individuals who have undergone organ or bone marrow transplant.
- ▶ Chemotherapy or radiotherapy treatment for cancer.
- ▶ Cancers - Certain cancers like lymphomas, leukemias and myeloma can cause immune suppression.
- ▶ Absence or removal of spleen or having a spleen which does not function well (this can occur due to conditions like sickle cell anaemia, thalassaemia major or lymphoma, or after radiotherapy).
- ▶ HIV and AIDS.
- ▶ Rare genetic conditions that result in loss of immune function e.g severe combined immunodeficiency syndrome.

## 4. What are immunosuppressive drugs?

- ▶ These drugs are also known as immunosuppressive agents, immunosuppressants and antirejection medications. They are a class of drugs that suppress, or reduce the strength of body's immune system.

## 5. Which specific medicines cause immune suppression?

- ▶ Oral steroids.

- ▶ Cyclosporine, tacrolimus (Calcineurin inhibitors).
- ▶ Sirolimus, everolimus (mTOR inhibitors).
- ▶ Azathioprine, leflunomide, mycophenolate (IMDH inhibitors).
- ▶ Methotrexate, mercaptopurine (Antimetabolites).
- ▶ Cyclophosphamide (Alkylating agents).
- ▶ Etanercept, infliximab, adalimumab, certolizumab and golimumab (Anti-TNF drugs).
- ▶ Bevacizumab, rituximab (Monoclonal antibodies).
- ▶ Tofacitinib (Janus kinase inhibitor).
- ▶ Dactinomycin, bleomycin (Cytotoxic antibiotics) leflunomide.

## 6. What are the indications of immunosuppressive drugs?

- ▶ Cancers such as lymphoma or leukemia.
- ▶ Rheumatoid arthritis.
- ▶ Lupus erythematosus.
- ▶ Crohn's disease.
- ▶ Ulcerative colitis.
- ▶ Organ transplants.
- ▶ Severe psoriasis and psoriatic arthritis.
- ▶ Multiple sclerosis.
- ▶ Autoimmune bullous diseases.
- ▶ Severe eczema.

## 7. What are the side effects of immunosuppressants?

- ▶ Diarrhea.
- ▶ Higher susceptibility to infection.