Endoxan is a medicine that contains active substance called cyclophosphamide. It belongs to the group of antineoplastic agents (used in the treatment of cancer). Endoxan dosage forms include:

1. Endoxan injections 500 mg,
2. Endoxan injections 1000 mg,
3. and Endoxan tablets.

It is used to treat following conditions:

- Hodkgin's lymphoma and non-Hodgkin's lymphoma
- Acute lymphoblastic leukemia (ALL) and chronic lymphocytic leukemia (CLL)
- Breast cancer
- Ovarian cancer
- Osteosarcoma
- Neuroblastoma
- Wegener's granulomatosis
- Small cell lung cancer (SCLC)
- Multiple sclerosis
- Systemic lupus

**Precautions**

Endoxan should be avoided in the following conditions:
In patients who have bone marrow disorders.
In patients with active infections.
In patients who are allergic to the active substance cyclophosphamide.
In patients who have damage to the bladder and urinary retention.

This medicine can cause bladder cancer. There were three reported cases of bladder cancer in patients who have used this medicine for treating neuroblastoma and Wegener's granulomatosis. This medicine should be used at the lowest effective dose, in order to avoid bladder cancer. Endoxan can cause damage to the bladder which results in bleeding (also called hemorrhagic cystitis). Immediately contact your doctor if you are experiencing blood in the urine!

This medicine can cause cardiotoxic especially taken in large doses. If you are experiencing arrhythmias (irregular heartbeat), contact your doctor immediately.

It can cause azoospermia in men (no sperm count) or amenorrhea in women (absence of menstrual period in a women for at least 6 months). Considering possible Endoxan-induced genotoxicity, men who plan to father a child are advised to store sperm before treatment. Otherwise, men are advised to wait at least 6 months after the completion of therapy. This medicine can damage lung tissue, and it is necessary to immediately contact your doctor if you are experiencing shortness of breath or coughing up blood.

Endoxan can cause the decrease in leukocyte count (leukopenia), which weakens your immune system and significantly decrease the body’s ability to fight infections which increase the risk of infections that can be fatal. Contact your doctor immediately if you are experiencing flu-like symptoms, such as: cough, sore throat or fever, because these symptoms may be a sign of leukopenia.

This medicine can cause decrease in platelets count (thrombocytopenia), which increases your risk of bleeding. Because of your low platelets count you will bleed more easily, therefore you need to avoid activities that could cause injury and bleeding.

Endoxan can cause decrease in the number of red blood cells (anemia).

This medicine can cause liver damage, so you need to inform your doctor immediately if you are experiencing any of symptoms of liver damage, such as: pain in the right upper abdomen, nausea, vomiting and jaundice.

Use of Endoxan during pregnancy and breastfeeding

Endoxan can be used during pregnancy only if the benefit to the mother outweighs the risk to the child. This medicine may be harmful to the fetus, but several cases have been reported that the baby was born healthy, when this medicine was used during the first three months of pregnancy.

Avoid breastfeeding while using this medicine because it may harm your baby.

How to use

The dosage depends on many factors and must be determined by your doctor. Therefore, your doctor will prescribe the dosing schedule that is best for you.

Endoxan dosage forms include: tablets and injections. Injections can only be administered by
Use with other medicines (Interactions)

Endoxan should be avoided in combination with the following medicines:

- Medicines used to treat depression, such as:
  - bupropion. Concomitant use with this can decrease the efficacy of Endoxan.
- Antibiotics, such as: chloramphenicol. Concomitant use with this medicine results in prolonged Endoxan half-life, increasing the risk of side effects.
- Medications used in the treatment of fungal infections, such as:
  - fluconazole,
  - itraconazole,
  - ketoconazole and others.
- Allopurinol, a medication used to treat gout. Concomitant use of Endoxan with this medicine increases the concentration of Endoxan in the blood, increasing the risk of side effects.
- Disulfiram, a medicine used for treating alcohol dependence. Concomitant use of Endoxan with this medicine increases the concentration of Endoxan in the blood, increasing the risk of side effects.
- Medications used in the treatment of heart diseases, the so-called ACE-inhibitors, such as:
  - ramipril,
  - enalapril,
  - lisinopril,
  - katopril,
  - fosinopril, and others. Concomitant use of Endoxan with these medications increases the risk of leukopenia (low white blood cell count).
- Diuretics (also known as water pills), such as:
  - hydrochlorothiazide. Concomitant use of Endoxan with this medication increases the risk of leukopenia.
- Amiodarone, a medicine used in the treatment of arrhythmias (irregular heartbeat). Concomitant use with this medicine, increases the risk of damage to the lung tissue.

This list is not complete. Many other medications may also interact with Endoxan, therefore you need to inform your doctor about all medications and herbal products you are taking.

Side effects

Endoxan may cause the following side effects:

1. leukopenia (low white blood cell count),
2. low platelet count (thrombocytopenia),
3. decrease in the number of red blood cells (anemia),
4. nausea,
5. vomiting,
6. diarrhea,
7. constipation,
8. abdominal pain,
9. bleeding in the stomach,
10. damage to the bladder which results in bleeding (blood in the urine),
11. azoospermia (no sperm count),
12. amenorrhea (absence of menstrual period in a women for at least 6 months),
13. liver damage, irregular heartbeat (*arrhythmia*),
14. inflammation of the myocardium accompanied with bleeding (*i.e.* *hemorrhagic myocarditis*),
15. heart attack,
16. bladder cancer,
17. alopecia (*hair loss*),
18. inflammation of the pancreas (*pancreatitis*),
19. low concentration of sodium in the blood (*hyponatremia*),
20. allergy and others.

Tell your doctor if you are experiencing any side effects.

### References: