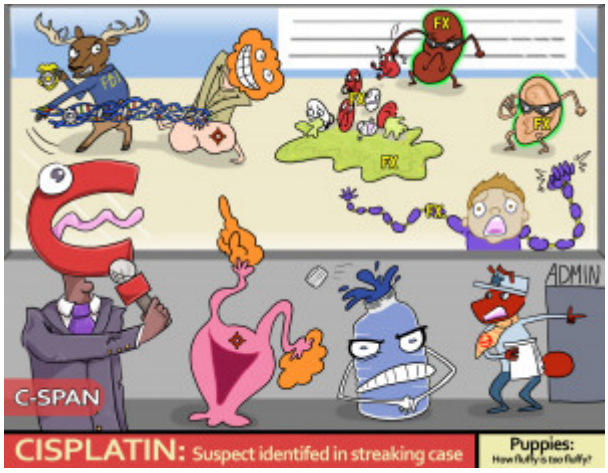
Cisplatin (Platinol)

Cisplatin (Platinol) is a platinum-containing anticancer drug that works by destroying DNA and preventing cellular replication. Although the medication is indicated for testicular, ovarian, and bladder cancer, cisplatin is sometimes used to lung, head, and neck cancers. Since the drug cannot differentiate between normal cells and cancerous cells, side effects are caused by damage to normal cells and include nausea, vomiting, myelosuppression, peripheral neuropathy, nephrotoxicity, and ototoxicity. The administration of antiemetics before cisplatin may help minimize nausea and vomiting. To minimize renal damage, aggressive hydration should be done before and after drug administration.



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Mechanism

Alkylating Agent
Elk Agent
Alkylating agents prevent cancer cells from reproducing by attaching an alkyl group to DNA. The medications inhibit DNA transcription into RNA to prevent protein synthesis and stop cell growth. The drugs form covalent bonds in DNA and cause cross-linking.

Cross-Links DNA
Linked DNA
The drug binds to cell and forms cross-links within strands of DNA to prevent DNA replication and lead to cell death. By inhibiting protein synthesis, alkylating agents such as cisplatin trigger apoptosis in rapidly dividing tumor cells. Although the drug primarily affect rapidly proliferating tumor cells, cisplatin will also affect cells of the gastrointestinal tract and bone marrow.

Indications

Testicular Cancer
Testicle Tumor-guy
Cisplatin is indicated to help treat metastatic testicular cancer. To increase the effectiveness of chemotherapy, cisplatin may be administered with other chemotherapy drugs for the treatment of testicular cancer.

Ovarian Cancer
Ovary Tumor-girl
This medication is indicated to help treat metastatic ovarian cancer and advanced bladder cancer. The drug also has an off-label use for lung, head, and neck cancers.

Side Effects

Nausea and Vomiting
Vomiting
Cisplatin may cause intractable nausea and vomiting characterized by repeated vomiting relief from anti-emetic medications. The patient may experience symptoms within 1 hour of administration. The continuous vomiting leads to anorexia, headaches, and electrolyte imbalances. Ensure the patient maintains adequate hydration and assess electrolyte levels.

Myelosuppression
Red and White Blood cells Suppressed
Cisplatin may cause profound bone marrow suppression known as myelosuppression. Since the bone marrow is unable to make enough red blood cells, white blood cells, and platelets, monitoring the patient's blood counts is critical during drug therapy. Symptoms of anemia include fatigue, chest pain, shortness of breath, and dizziness. A decrease of white blood cells increases the patient's risk of infection while a low platelet count increases the risk of bleeding.

Nephrotoxicity

Kidney with Toxic-green-glow

A dose-limiting factor, renal damage may occur within 2 weeks of using cisplatin. Administering the medication with other nephrotoxic drugs will potentiate the effects of kidney damage. To minimize nephrotoxicity, ensure the patient is well hydrated while undergoing diuretic therapy. Monitor the patient's urine output and specific gravity to assess kidney function. The dose of cisplatin may be decreased if the patient has reduced creatinine clearance.

Ototoxicity

Ear with Toxic-green-glow

Ototoxicity is a neurological, dose-dependent side effect of cisplatin that may happen soon after initiating treatment. The drug inhibits a certain transporter found on cochlear hair cells that receive input for the auditory system. Damage to these cells lead to high frequency hearing loss and tinnitus. Since loop diuretics may also induce ototoxicity, concurrent administration of cisplatin with furosemide (Lasix) may potentiate the effects of hearing damage.

Peripheral Neuropathy

Purple-wavy Neuron-extremities

A side effect of Cisplatin is peripheral neuropathy caused by the inhibition of certain ion transporters found on cells of the peripheral nervous system. Symptoms include numbness, tingling, burning, or pain in the hands or feet. Since the side effect is dose-dependent, high doses and long-term use increases the likelihood of developing peripheral neuropathy.

Considerations

Antiemetics Before Administration

Ant-tie-medic

Cisplatin is administered by IV infusion. Before administering cisplatin, antiemetics may be given to decrease nausea and vomiting caused by damage to cells of the gastrointestinal tract. Severe nausea and vomiting may occur within 1 hour of administration and may last up to 5 days.

Aggressive Hydration

Aggressive Water-bottle

To minimize the risk of renal damage, aggressive hydration is done before and after the administration of cisplatin. Oral fluids are encouraged and additional IV hydration and electrolyte supplementation may be administered. Increasing the patient's fluid intake also helps decrease the risk of dehydration caused by repeated vomiting.