

<b>CISPLATIN</b>
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1 mg/mL (50 mg/50 mL) Solution for IV Infusion



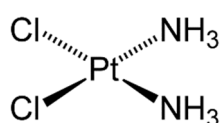
## 1.0 PHARMACOLOGIC CATEGORY

Antineoplastic

## 2.0 DESCRIPTION

Cisplatin Solution for IV Infusion is a clear, colorless to pale yellow sterile solution of cisplatin 1 mg/mL, mannitol 1 mg/mL and sodium chloride 9 mg/mL in water for injections. The solution does not contain any preservative.

Chemical structure:



CAS Registry No.: 15663-27-1.

## 3.0 FORMULATION/COMPOSITION

Each 50 mL vial contains sterile solution of 50 mg Cisplatin. Contains no antimicrobial preservative.

## 4.0 CLINICAL PARTICULARS

### 4.1 Therapeutic Indications

Cisplatin is indicated for the palliative treatment of metastatic non-seminomatous germ cell carcinoma, advanced-stage refractory ovarian carcinoma, advanced-stage refractory bladder carcinoma and refractory squamous cell carcinoma of the head and neck. It may be used as a single agent or in combination with other chemotherapeutic agents. It may be employed, in appropriate circumstances, in addition to other modalities, e.g. radiotherapy or surgery.

### 4.2 Dosage and Method of Administration

#### Dosage

A variety of doses and schedules are used. To obtain optimum therapeutic results with minimum adverse effects, the dosage of cisplatin must be based on the clinical, renal and hematologic status of the patient.

The usual dose in adults and children when used as single agent therapy is 50-100 mg/m<sup>2</sup> as a single IV infusion every 3-4 weeks, or 15-20 mg/m<sup>2</sup> as a daily IV infusion for 5 days every 3-4 weeks.

#### Dosage adjustment

Dosage should be reduced in patients with depressed bone marrow function.

### ***Subsequent Treatment with Cisplatin***

A repeat course of cisplatin should not be given until:

- the serum creatinine is below 140 micromol/L and/or the plasma urea is below 9 mmol/L and
- circulating blood elements are at an acceptable level (platelets at least 100,000/mm<sup>3</sup>, WBC at least 4000/mm<sup>3</sup>).

A base line audiogram should be taken and the patient monitored periodically for auditory deterioration (see section **4.4 Special Warnings and Precautions for Use**).

### ***Hepatic impairment***

Human studies show a high uptake of cisplatin in the liver. An elevated aspartate aminotransferase (AST) and alkaline phosphatase with clinical signs of liver toxicity has been reported in some cases. The adult dosage should be used with caution in patients with pre-existing hepatic dysfunction.

### ***Renal impairment***

Cisplatin displays high tissue uptake in the kidneys, exhibits dose related and cumulative nephrotoxicity, and is excreted mainly in the urine. In addition, the plasma elimination half-life of cisplatin is prolonged in renal failure.

Caution should be exercised in patients with pre-existing renal dysfunction. Cisplatin is contraindicated in patients with serum creatinine levels greater than 0.2 mmol/L. Repeat courses are not advised until serum creatinine is below 0.14 mmol/L and/or blood urea below 9 mmol/L.

## **Administration**

### **(a) Pretreatment hydration:**

Patients should be adequately hydrated before and for 24 hours after administration of cisplatin to ensure good urinary output and minimize nephrotoxicity. Hydration may be achieved by IV infusion of 2 liters of either sodium chloride IV infusion 0.9% or glucose-saline (e.g. glucose 4% in one-fifth sodium chloride IV infusion 0.9%) over a 2-hour period. During the last 30 minutes of the pretreatment hydration or after the hydration, 375 mL of 10% mannitol injection may be administered via a side-arm drip.

### **(b) Preparation of Cisplatin infusion:**

Cisplatin should be added to 1 liter of sodium chloride IV infusion 0.9%.

Aluminium containing equipment should not be used for administration of cisplatin (see section **6.6 Incompatibilities**).

### **(c) Treatment:**

Following prehydration, administer the cisplatin infusion over 1-2 hours. It has been proposed that a longer infusion time of 6-8 hours may decrease gastrointestinal and renal toxicities.

The IV flask should be covered to preclude light.

**(d) Post-treatment hydration:**

Adequate hydration and urinary output must be maintained during the 24 hours following infusion. It has been suggested that IV hydration continue after treatment with the aim to administer 2 liters of sodium chloride IV infusion 0.9% or glucose-saline over a period of 6-12 hours.

The product and its admixtures contain no antimicrobial agent. In order to reduce microbiological hazards it is recommended that further dilution be effected immediately prior to use and infusion commenced as soon as practicable after preparation of the admixture. Infusion should be completed within 24 hours of preparation and the residue discarded.

### **Handling Precautions**

As with all antineoplastic agents, trained personnel should prepare Cisplatin Solution for IV Infusion. This should be performed in a designated area (preferably a cytotoxic laminar flow cabinet). Care should be taken to prevent inhaling particles and exposing the skin to cisplatin. Protective gown, mask, gloves and appropriate eye protection should be worn while handling cisplatin. In the event of contact with the eyes, wash with water or saline; where solution accidentally contacts skin or mucosa, the affected area should be immediately washed thoroughly with soap and water and in both cases seek medical advice. Seek immediate medical attention if the drug is ingested or inhaled. It is recommended that pregnant personnel not handle cytotoxic agents such as cisplatin.

Luer-Lock fitting syringes and giving sets to avoid leakage are recommended. Large bore needles are recommended to minimize pressure and possible formation of aerosols. Aerosols may also be reduced by using a venting needle during preparation.

Items used to prepare cisplatin, or articles associated with body waste should be disposed of by placing in a double sealed polythene bag, and incinerating at 1100°C.

### **Spills and Disposal**

If spills occur, restrict access to the affected area. Wear two pairs of gloves (latex rubber), a respirator mask, a protective gown and safety glasses. Limit the spread of the spill by covering with a suitable material such as absorbent towel or adsorbent granules. Spills may also be treated with 5% sodium hypochlorite. Collect up absorbent/adsorbent material and other debris from spill and place in a leak proof plastic container and label accordingly.

Cleanse the remaining spill area with copious amounts of water.

## **4.3 Contraindications**

Use of cisplatin is contraindicated in the following conditions:

- Renal impairment (refer to section **4.2 Dosage and Method of Administration**)
- Hearing disorders (refer to section **4.4 Special Warnings and Precautions for Use, Ototoxicity**)
- Bone marrow depression
- Generalized infections
- During pregnancy or lactation

- In patients with a history of hypersensitivity to cisplatin or platinum-containing compounds.

#### **4.4 Special Warnings and Precautions for Use**

Cisplatin is a highly toxic drug with a relatively narrow therapeutic index, and a therapeutic effect is unlikely to occur without some evidence of toxicity. Cisplatin should be administered only under constant supervision by physicians experienced in therapy with cytotoxic agents and only when potential benefits of cisplatin therapy outweigh the possible risks. Appropriate facilities should be available for adequate management of complications should they arise.

To minimize the risk of nephrotoxicity, hydrate before, during and after therapy (see section **4.2 Dosage and Method of Administration**). Prior to initial therapy, then before subsequent doses, the following parameters should be monitored: renal function including Glomerular Filtration Rate (GFR), Blood Urea Nitrogen (BUN), serum creatinine and creatinine clearance; electrolytes (magnesium, sodium, potassium and calcium) to detect hypomagnesemia or hypocalcemia; auditory function; red blood cells, white blood cells and platelets; liver function and neurological status.

##### **Ototoxicity**

Ototoxicity is cumulative and occurs mainly with high dose regimes. Tinnitus or occasional decreased ability to hear normal conversation are indications of ototoxicity, which have been frequently observed. Abnormalities of audiometric testing are more common and hearing loss can be unilateral or bilateral; frequency and severity increase with repeated doses, and may not be reversible, but mostly occur in the 4,000 - 8,000 Hz range.

Audiometric testing should be performed, if possible, prior to initiation of therapy and at regular intervals thereafter, particularly if the clinical symptoms of tinnitus or hearing impairment occur. Radiotherapy may enhance ototoxicity. Clinically important deterioration of auditive function may require dosage modifications or discontinuation of therapy.

##### **Myelosuppression**

This may occur in patients treated with cisplatin. Hematological toxicity is dose-related and cumulative. The nadirs in circulating platelets and leucocytes generally occur between days 18 - 23 (range 7.3 - 45) with most patients recovering by day 39 (range 13 - 62). Leukopenia and thrombocytopenia are more pronounced at doses greater than 50 mg/m<sup>2</sup>.

Peripheral blood counts should be monitored frequently in patients receiving cisplatin. Although the hematologic toxicity is usually moderate and reversible, severe thrombocytopenia and leucopenia may occur. In patients who develop thrombocytopenia special precautions are recommended: care in performing invasive procedures; search for signs of bleeding or bruising; test of urine, stools and emesis for occult blood; avoiding aspirin and other NSAIDs. Patients who develop leucopenia should be observed carefully for signs of infection and might require antibiotic support and blood product transfusions.

Subsequent courses of cisplatin should not be instituted until platelets are present at levels greater than 100,000/mm<sup>3</sup> and white cells greater than 4,000/mm<sup>3</sup>.

##### **Anemia**

Anemia (decrease of greater than 2g/dL hemoglobin) occurs in a significant number of patients, usually after several courses of treatment. Anemia occurs at approximately the same frequency but generally with a later onset than leucopenia and thrombocytopenia. Transfusions of packed red cells may be necessary in severe cases.

Rarely, the drug has caused hemolytic anemia; Coombs-positive results have been reported in a few of these cases. Further courses with cisplatin in sensitized individuals may cause increased hemolysis.

A high incidence of severe anemia requiring transfusion of packed red cells has been observed in patients receiving combination chemotherapy including cisplatin.

### **Nausea and vomiting**

Marked nausea and vomiting occur in almost all patients treated with cisplatin and are occasionally so severe that dosage reduction or discontinuance of treatment is necessary.

### **Anaphylaxis**

Reactions, secondary to cisplatin therapy, have been occasionally reported in patients who were previously exposed to cisplatin. Patients who are at particular risk are those with a prior history or family history of atopy. Facial edema, wheezing, tachycardia, hypotension and skin rashes of urticarial non-specific maculopapular type can occur within a few minutes of administration. Serious reactions seem to be controlled by IV adrenaline, corticosteroids or antihistamines.

Patients receiving cisplatin should be observed carefully for possible anaphylactic-like reactions and the necessary supportive equipment and medication should be readily available to treat such reactions.

### **Cardiovascular toxicity**

Cisplatin has been found to be associated with cardiovascular toxicity (see section **4.8. Undesirable Effects**). Patients may experience clinically heterogeneous venous thromboembolic events, myocardial infarction, cerebrovascular accidents, thrombotic microangiopathy and cerebral arteritis. Cases of pulmonary embolism (including fatalities) have been reported (see section **4.8. Undesirable Effects**).

### **Hypomagnesemia and hypocalcemia**

Hypomagnesemia occurs quite frequently with cisplatin administration, while hypocalcemia occurs less frequently. The loss of magnesium seems to be associated with renal tubular damage which prevents resorption of this cation. Where both electrolytes are deficient, tetany may result. It does not appear to be dose related. Monitoring of electrolytes is necessary.

### **Neurotoxicity and seizures**

Cisplatin is known to induce neurotoxicity; therefore, neurologic examination is warranted in patients receiving a cisplatin-containing treatment. Peripheral neuropathy, postural hypotension, myasthenic syndromes, seizures and visual loss may occur with cisplatin treatment. This appears to be more common after prolonged treatment. Since neurotoxicity may result in irreversible damage, the development of clinically significant symptoms should

generally contraindicate further cisplatin usage.

### **Immunosuppressant Effects/Increased Susceptibility to Infections**

Administration of live or live-attenuated vaccines in patients immunocompromised by chemotherapeutic agents including cisplatin, may result in serious or fatal infections. Extreme caution should be used where patients have recently been exposed to infections, particularly chicken pox and herpes zoster. Vaccination with a live vaccine should be avoided in patients receiving cisplatin. Killed or inactivated vaccines may be administered; however, the response to such vaccines may be diminished.

### **Dental**

The bone marrow depressant effects of cisplatin may result in an increased incidence of microbial infection, delayed healing and gingival bleeding. Dental work should be avoided during cisplatin therapy.

### **Other**

As patients undergoing treatment with cisplatin are at an increased risk of bleeding, bruising and infection, it is recommended that extreme care be used when performing necessary invasive procedures.

Alcohol and aspirin should be avoided because of the risk of gastrointestinal bleeding.

### **Use in hepatic impairment**

Liver function should be monitored periodically.

### **Use in renal impairment**

Cisplatin is contraindicated in patients with renal impairment (see section **4.3 Contraindications**).

Cumulative and dose-related renal insufficiency is the major dose-limiting toxicity of cisplatin. The most commonly observed change in renal function has been a fall in glomerular filtration rate reflected by a rise in serum creatinine and a reduction in effective renal plasma flow.

Pre and post treatment hydration may reduce nephrotoxicity (see section **4.2 Dosage and Method of Administration**).

Renal function must return to normal before further doses are given (see section **4.2 Dosage and Method of Administration**).

Special care has to be taken when cisplatin-treated patients are given concomitant therapies with other potentially nephrotoxic drugs (see section **4.5 Interaction with Other medicinal Products and Other Forms of Interaction**).

### **Use in the elderly**

No data available.

## **Pediatric use**

Cisplatin can also be used in children. Cases of delayed-onset hearing loss have been reported in the pediatric population. Long term follow-up in this population is recommended.

## **Effects on laboratory tests**

No data available.

## **4.5 Interaction with Other Medicinal Products and Other Forms of Interaction**

Cisplatin is mostly used in combination with antineoplastic drugs having similar cytotoxic effects. In these circumstances additive toxicity is likely to occur.

Other known drug interactions are reported below.

### **Nephrotoxic drugs**

Potentially nephrotoxic medicines, e.g., aminoglycoside antibiotics and loop diuretics when given concurrently or within 1-2 weeks after cisplatin administration, may potentiate the nephrotoxic effects of cisplatin. Concomitant use of other potentially nephrotoxic drugs (e.g. amphotericin B) is not recommended during cisplatin therapy.

The renal toxicity of ifosfamide may be greater when used with cisplatin or in patients who have previously been given cisplatin.

### **Ototoxic drugs**

Concurrent and/or sequential administration of potentially ototoxic medicines, e.g., aminoglycoside antibiotics and loop diuretics, may potentiate the ototoxic effects of cisplatin, especially in the presence of renal impairment.

Ifosfamide may increase hearing loss due to cisplatin.

### **Renally excreted drugs**

Literature data suggest that cisplatin may alter the renal elimination of bleomycin and methotrexate (possibly as a result of cisplatin-induced nephrotoxicity) and enhance their toxicity. Reduction of the lithium blood levels was noticed in a few cases after treatment with cisplatin combined with bleomycin and etoposide. It is therefore recommended to monitor the lithium values.

### **Antigout agents**

Cisplatin may raise the concentration of blood uric acid. Thus, in patients concurrently receiving antigout agents such as allopurinol, colchicine, probenecid or sulfinpyrazone, dosage adjustment of these drugs may be necessary to control hyperuricemia and gout.

### **Anticonvulsant agents**

Plasma levels of anticonvulsant agents may become subtherapeutic during cisplatin therapy. In patients receiving cisplatin and phenytoin, serum concentrations of the latter may be decreased, possibly as a result of decreased absorption and/or increased metabolism. In these patients, serum levels of antiepileptics should be monitored and dosage adjustments made as necessary.

### **Anticoagulants**

It is advisable to check the international normalized ratio (INR) when oral anticoagulants such as coumarins/warfarin are used simultaneously with cisplatin.

### **Paclitaxel**

Administration of cisplatin prior to an infusion with paclitaxel may reduce the clearance of paclitaxel by 33% and can therefore intensify neurotoxicity.

## **4.6 Fertility, Pregnancy and Lactation**

### **Effects on fertility**

#### *Female*

Based on non-clinical and clinical findings, female fertility may be compromised by treatment with cisplatin. Use of cisplatin has been associated with cumulative dose-dependent ovarian failure, premature menopause and reduced fertility. Non-clinical findings in mice treated with cisplatin (5 mg/kg intraperitoneally) showed that cisplatin caused direct damage to primordial follicle oocytes, leading to apoptosis, and ovarian depletion.

#### *Male*

Cisplatin can affect male fertility. Impairment of spermatogenesis and azoospermia have been reported (see section **4.8 Undesirable effects**). Cisplatin caused testis damage and decreased sperm counts in mice, primarily through effects on differentiated spermatogonia. Although the impairment of spermatogenesis can be reversible, males undergoing cisplatin treatment should be warned about the possible adverse effects on male fertility.

Both men and women should seek advice on fertility preservation before treatment.

### **Use in pregnancy (Category D<sup>††</sup>)**

The safety of cisplatin in pregnancy has not been established. Cisplatin can cross the placental barrier. In mice and rats, cisplatin is teratogenic and embryotoxic. Studies in rodents have shown that exposure during pregnancy can cause tumors in adult offspring. Cisplatin may be toxic to the fetal urogenital tract. Therefore, cisplatin is considered to be potentially harmful to the fetus when administered to a pregnant woman and its use in pregnant women is not recommended. Patients should be advised to avoid becoming pregnant.

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<sup>††</sup> Category D: Drugs which have caused, are suspected to cause or be expected to cause, an increased incidence of human fetal malformations or irreversible damage. These drugs may also have adverse pharmacological effects.



If the patient becomes pregnant whilst receiving the drug she should be advised of the hazard to the fetus. Cisplatin should only be used if the potential benefits outweigh the risk of therapy.

Women of childbearing potential should use effective contraception during treatment with cisplatin and for at least 26 weeks following the last dose. Men with female partners of childbearing potential should be advised to use effective contraception during treatment with cisplatin and for at least 14 weeks after the last dose.

For patients with end-stage renal disease, the washout period of cisplatin will be longer (up to 7 weeks); effective contraception for men is advised for at least 19 weeks and for female patients, for at least 31 weeks after the last dose.

### **Use in lactation**

Limited data from published literature report presence of cisplatin in human milk. Advise pregnant women not to breastfeed during treatment with cisplatin.

### **4.7 Effects on Ability to Drive and Use Machines**

Information not available.

### **4.8 Undesirable Effects**

#### **Ear and labyrinth disorders**

Unilateral or bilateral tinnitus and/or high frequency hearing loss ( $>4000\text{Hz}$ ) has been observed in up to 31% of patients treated with cisplatin and is usually reversible. The damage to the hearing system appears to be dose related and cumulative, and it is reported more frequently in very young or very old patients. Auditory function should be monitored more closely during treatment.

#### **Eye disorders**

Retinal toxicity manifests as blurred vision and altered color perception. Optic neuritis, papilledema and cortical blindness have been reported rarely following the administration of cisplatin. These events are usually reversible after drug withdrawal. Retinal pigmentation has also been reported.

#### **Infections and infestations**

Infection (infectious complications have led to death), sepsis.

#### **Blood and lymphatic system disorders**

Thrombotic microangiopathy (hemolytic uremic syndrome), bone marrow failure, neutropenia, Coombs positive hemolytic anemia.

Myelosuppression often occurs during cisplatin therapy. Mild bone marrow toxicity may occur with both leucopenia and thrombocytopenia. These effects are usually reversible after ceasing treatment. Cisplatin may also induce anemia: this is not clearly dose related and is occasionally caused by hemolysis. Leucopenia and thrombocytopenia are dose-related and more pronounced

at doses greater than 50 mg/m<sup>2</sup>. Leukocyte and platelet nadirs generally occur between days 18 and 23 of treatment, with recovery in most patients by day 39. Anemia occurs at approximately the same frequency.

There have been rare reports of acute myelogenous leukemias and myelodysplastic syndromes arising in patients who have been treated with cisplatin, mostly when given in combination with other potentially leukemogenic agents.

### **Immune system disorders**

Anaphylactic and anaphylactic-like reactions, consisting principally of flushing, facial edema, wheezing, tachycardia and hypotension have been reported in patients previously exposed to cisplatin. The reactions usually occur within a few minutes of cisplatin administration and may be controlled by IV adrenaline, corticosteroids and/or antihistamines.

### **Metabolism and nutritional disorders**

Cisplatin may cause dehydration in patients. Cisplatin may also cause serious electrolyte disturbances, mainly represented by hypomagnesemia, hypocalcemia, and hypokalemia, and associated with renal tubular dysfunction. Hypomagnesemia and/or hypocalcemia may become symptomatic, with muscle irritability or cramps, clonus, tremor, carpopedal spasm, and/or tetany. Hypomagnesemia and hypocalcemia may develop during cisplatin therapy or following discontinuance of the drug. Other reported toxicities are hyperuricemia, hyponatremia, hypophosphatemia and syndrome of inappropriate antidiuretic hormone (SIADH). Hyperuricemia may occur in patients receiving cisplatin, principally as a result of drug-induced nephrotoxicity. Hyperuricemia is more pronounced with doses greater than 50 mg/m<sup>2</sup>, with peak levels occurring between 3-5 days after administration of the drug. Allopurinol may be used to reduce serum uric acid levels. Regular monitoring of serum electrolyte levels and replacement where necessary are advisable.

### **Nervous system disorders**

Convulsion, leukoencephalopathy, reversible posterior leukoencephalopathy syndrome, hemorrhagic stroke, ischemic stroke, ageusia, cerebral arteritis, myelopathy.

Peripheral neuropathies occur infrequently with usual doses of the drug. They are generally sensory in nature (e.g. paresthesia of the upper and lower extremities), but can also include motor difficulties, reduced or absent reflexes and leg weakness. Autonomic neuropathy, seizures, slurred speech, loss of taste and memory loss have also been reported. These neuropathies usually appear after prolonged therapy, but have also developed after a single drug dose. Areflexia and loss of proprioception and vibratory sensation may be seen, especially if cisplatin is given at higher doses or more frequently than recommended. In some patients they may be irreversible however, they have been partially or completely reversible in others following discontinuance of cisplatin therapy. Cerebrovascular accident has been reported in patients treated with cisplatin. Lhermitte's sign has been reported.

### **Cardiac disorders**

Cardiovascular abnormalities (coronary disease, congestive heart failure, postural hypotension, thrombotic microangiopathy, arrhythmia, bradycardia, tachycardia, cardiac arrest, cardiac disorder etc.)

## **Vascular disorders**

Raynaud's phenomenon.

Venous thromboembolism.

A significant increase in the risk of venous thromboembolic events has been reported in patients with advanced solid tumors and treated with cisplatin compared with non-cisplatin-based chemotherapy.

Vascular toxicity coincident with the use of cisplatin in combination with other antineoplastic agents have been reported rarely. The events are clinically heterogeneous and may include myocardial infarction, cerebrovascular accident (hemorrhagic and ischemic stroke), thrombotic microangiopathy (hemolytic uremic syndrome) or cerebral arteritis. Various mechanisms have been proposed for these vascular complications.

## **Respiratory, thoracic and mediastinal disorders**

Pulmonary embolism.

Pulmonary toxicity has been reported in patients treated with cisplatin in combination with bleomycin or 5-fluorouracil.

## **Gastrointestinal disorders**

Stomatitis, vomiting, nausea, anorexia, hiccups, diarrhea.

Cisplatin induces severe nausea and vomiting in almost all patients. Severe nausea and vomiting usually begin within 1-4 hours after treatment and may persist for up to a week after treatment. These side effects are only partially relieved by standard antiemetics. The severity of these symptoms may be reduced by dividing the total dose per cycle into smaller doses given once daily for five days. Reported toxicity includes gingival platinum line.

## **Hepatobiliary disorders**

Mild and transient elevations of serum AST and ALT levels may occur infrequently. Liver damage has also been infrequently reported.

## **Skin and subcutaneous tissue disorders**

Mild alopecia. Rarely, urticarial or maculopapular skin rashes have also been observed.

## **Musculoskeletal and connective tissue disorders**

Myalgia, muscle spasms.

## **Renal and urinary disorders**

Acute renal toxicity, which was highly frequent in the past and represented the major dose-limiting toxicity of cisplatin, has been greatly reduced by the use of 6 to 8-hour infusions as well as by concomitant intravenous hydration and forced diuresis. Cumulative toxicity, however, remains a problem and may be severe. Renal impairment, which is associated with tubular damage, may be first noted during the second week after a dose and is manifested by an increase in serum creatinine, BUN, serum uric acid and/or a decrease in creatinine clearance. Renal insufficiency is generally mild to moderate and reversible at the usual doses of the drug (recovery occurring as a rule within 2-4 weeks); however, high or repeated cisplatin doses can increase the severity and duration of renal impairment and may produce irreversible renal insufficiency (sometimes fatal). Renal failure has been reported also following intraperitoneal instillation of the drug.

### **Reproductive system and breast disorders**

Impairment of spermatogenesis and azoospermia have been reported (see section **4.6 Fertility, Pregnancy and Lactation**).

### **General disorders and administration site conditions**

Pyrexia, asthenia, malaise. Local effects such as pain, edema, erythema, phlebitis, tissue cellulitis, fibrosis, and skin necrosis (following extravasation of the drug) may also occur. Extravasation may result from infusion of solutions greater than 0.5 mg/mL cisplatin.

## **4.9 Overdose and Treatment**

Acute overdosage with cisplatin may result in an enhancement of its expected toxic effects (eg kidney failure, severe myelosuppression, intractable nausea and vomiting, severe neurosensorial toxicities, liver failure etc.). Death may also occur. No proven antidotes are known for cisplatin overdosage. Hemodialysis is only effective, even then partially, up to 3 hours after administration because of the rapid and extensive binding of platinum to plasma proteins. Signs and symptoms of overdosage should be managed with supportive measures. Patients should be monitored for 3 to 4 weeks in case of delayed toxicity. See section **4.8. Undesirable Effects** for possible complications.

In case of an overdose, immediately seek medical help.

## **5.0 PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic Properties**

#### **Class**

Antineoplastic agent.

#### **Mechanism of action**

Cisplatin is a platinum compound of which only the cis-isomer is active and has biochemical properties similar to those of bifunctional alkylating agents. The drug inhibits DNA synthesis by producing intrastrand and interstrand crosslinks in DNA. Protein and RNA synthesis are also inhibited to a lesser extent. Cisplatin does not appear to be cell-cycle specific.

## **Clinical trials**

No data available.

## **5.2 Pharmacokinetic Properties**

### **Distribution**

There is good uptake of cisplatin by the kidneys, liver and intestine.

More than 90% of platinum containing species remaining in the blood are bound (possibly irreversibly) to plasma proteins.

The clearance of total platinum from plasma is rapid during the first four hours after intravenous administration, but then proceeds more slowly because of covalent binding to serum proteins. Levels of unbound platinum fall with a half-life of 20 minutes to 1 hour depending on the rate of drug infusion.

### **Excretion**

The elimination of intact drug and various platinum-containing biotransformation products is via the urine. About 15 - 25% of administered platinum is rapidly excreted in the first 2 – 4 hours after administration of cisplatin. This early excretion is mostly of intact cisplatin. In the first 24 hours after administration, 20 - 80% is excreted, the remainder representing drug bound to tissues or plasma protein.

## **5.3 Preclinical Safety Data**

### **Genotoxicity**

Cisplatin has been shown to be genotoxic *in vitro*, in bacterial gene mutation assays, gene mutation assays in yeast (*Saccharomyces cerevisiae* D7) and mammalian cells (mouse lymphoma cells and Chinese hamster cells), *in vitro* chromosome aberration assays (in Chinese hamster cells and in human lymphocytes), *in vitro* DNA repair assays (*Saccharomyces cerevisiae* D7 and v79 Chinese hamster cells) and *in vivo* in a chromosome aberration assay in mouse bone marrow cells. Based on these studies, cisplatin is considered to present a genotoxic risk to humans.

### **Carcinogenicity**

No formal carcinogenicity studies were performed. In a transplacental carcinogenicity study, a single IP injection of cisplatin (7.5 mg/kg) to pregnant mice on day 17 of gestation initiated and/or induced thymic lymphomas, lung tumors and proliferative kidney lesions in offsprings at week 25. In another transplacental carcinogenicity study, pregnant rats were given a single IP injection of cisplatin (5 mg/kg) on day 18 of gestation resulted in significantly higher incidences (20/82 in treatment vs 3/75 in control) of hepatocellular adenoma in offspring rats at 79 weeks. Therefore, cisplatin has a high carcinogenic potential in mice and rats.

## **6.0 PHARMACEUTICAL PARTICULARS**

## **6.1 List of Excipients**

Sodium Chloride  
Mannitol  
Water for Injection  
Hydrochloric Acid  
Sodium Hydroxide  
Nitrogen

## **6.2 Shelf-Life**

24 Months.

Please see outer package for the expiry date.

## **6.3 Storage Conditions**

Store between 15°C - 25°C. Do not refrigerate. Do not freeze. Protect from light.

## **6.4 Availability**

USP Type I Amber glass vial x 50 mL (Box of 1's).

## **6.5 Special Precautions for Disposal and Other Handling**

Cisplatin 0.15 mg/mL in sodium chloride IV infusion 0.9% is chemically stable for 24 hours when stored at room temperature and protected from light. The solution does not contain any antimicrobial preservatives and to avoid microbial contamination hazards, infusion should be commenced as soon as practicable after preparation. Infusion should be completed within 24 hours of preparation and any residue discarded.

## **6.6 Incompatibilities**

Cisplatin may interact with aluminium to form a black precipitate. Needles, syringes, catheters or IV administration sets that contain aluminium parts which may come in contact with cisplatin should not be used for preparation or administration of the drug. The stability of cisplatin is adversely affected by the presence of bisulphite, metabisulphite, sodium bicarbonate and fluorouracil.

## **7.0 FDA REGISTRATION NUMBER**

1 mg/mL (50 mg/50 mL) Solution for IV Infusion: DR-XY2787

## **8.0 DATE OF FIRST AUTHORIZATION/RENEWAL OF THE AUTHORIZATION**

1 mg/mL (50 mg/50 mL) Solution for IV Infusion: 14-Jun-1994

Keep out of reach of children.

**For suspected adverse drug reaction, report to the FDA: [www.fda.gov.ph](http://www.fda.gov.ph)**

**Seek medical attention immediately at the first sign of any adverse drug reaction.**

**CAUTION:** Foods, Drugs, Devices and Cosmetics Act prohibits dispensing without prescription.

**Manufactured by:**

Hospira Australia Pty. Ltd.  
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Mulgrave, VIC 3170, Australia

**Marketing Authorization Holder:**

Pfizer, Inc.  
19F – 20F, 8 Rockwell Building,  
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Makati City 1210 Metro Manila, Philippines

Revision No.: 6.0 Revision Date: 17 October 2024 Reference: AUS PI pfpcisdi10123 + pfpcisdi11022 Reference Date: 27 January 2023 + 27 October 2022
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