

1. NAME OF THE MEDICINAL PRODUCT

Oxaliplatin "Ebewe", 5mg/ml, powder for solution for infusion, 50mg / 100mg

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

One vial with lyophilised powder contains 50mg or 100mg oxaliplatin.
One ml of reconstituted solution contains 5mg oxaliplatin as active ingredient.
For excipients, see 6.1.

3. PHARMACEUTICAL FORM

White to off-white cake or powder for solution for infusion.

4. CLINICAL PARTICULARS

4.1. Therapeutic indications

Oxaliplatin in combination with 5-fluorouracil (5-FU) and folinic acid (FA) is indicated for:

- Adjuvant treatment of stage III (Duke's C) colon cancer after complete resection of primary tumor
- Treatment of metastatic colorectal cancer.

4.2. Posology and method of administration

Posology

FOR ADULTS ONLY

The recommended dose for oxaliplatin in adjuvant setting is 85mg/m² intravenously repeated every two weeks for 12 cycles (6 months).

The recommended dose for oxaliplatin in treatment of metastatic colorectal cancer is 85mg/m² intravenously repeated every 2 weeks.

Dosage given should be adjusted according to tolerability (see 4.4 "Special warnings and precautions for use")

Oxaliplatin should always be administered before fluoropyrimidines.

Oxaliplatin is administered as a 2- to 6-hour intravenous infusion in 250 to 500ml of 5% glucose solution.

Oxaliplatin was mainly used in combination with continuous infusion 5-fluorouracil based regimens. For the two-weekly treatment schedule 5-fluorouracil regimens combining bolus and continuous infusion were used.

- Special Populations

- Renal impairment:

Oxaliplatin has not been studied in patients with severe renal impairment (See 4.3 "Contra-indications").

In patients with moderate renal impairment, treatment may be initiated at the normally recommended dose (see 4.4 "Special warnings and precautions for use"). There is no need for dose adjustment in patients with mild renal dysfunction.

- Hepatic insufficiency:

Oxaliplatin has not sufficiently been studied in patients with severe hepatic impairment. No increase in oxaliplatin acute toxicities was observed in the subset of patients with abnormal liver function tests at baseline. No specific dose adjustment for patients with abnormal liver function tests was performed during clinical development.

- Elderly patients :

No increase in severe toxicities was observed when oxaliplatin was used as a single agent or in combination with 5-fluorouracil in patients over the age of 65. In consequence no specific dose adaptation is required for elderly patients.

Method of administration

Oxaliplatin is administered by intravenous infusion.

The administration of oxaliplatin does not require hyperhydration.

~~Oxaliplatin diluted in 250 to 500ml of 5% glucose solution to give a concentration not less than 0.2mg/ml must be infused via a central venous line or peripheral vein over 2 to 6 hours. Oxaliplatin infusion should always precede that of 5-fluorouracil.~~

In the event of extravasation, administration must be discontinued immediately.

Instructions for use:

Oxaliplatin must be reconstituted and further diluted before use. Only the recommended diluents should be used to reconstitute and then dilute the freeze-dried product. (See section 6.6 "Instructions for use / handling and disposal").

4.3. Contraindications

Oxaliplatin is contra-indicated in patients who

- have a known history of hypersensitivity to oxaliplatin,
- are breast feeding,
- have myelosuppression prior to starting first course, as evidenced by baseline neutrophils
- < 2 x 10⁹/l and/or platelet count of < 100 x 10⁹/l.
- have a peripheral sensitive neuropathy with functional impairment prior to first course.
- have a severely impaired renal function (creatinine clearance less than 30ml/min).

4.4. Special warnings and special precautions for use

Oxaliplatin should only be used in specialised departments of oncology and should be administered under the supervision of an experienced oncologist.

For use in pregnant women see section 4.6.

Due to limited information on safety in patients with moderately impaired renal function, administration should only be considered after suitable appraisal of the benefit/risk for the patient.

In this situation, renal function should be closely monitored and dose adjusted according to toxicity.

Patients with a history of allergic reaction to platinum compounds should be monitored for allergic symptoms. In case of an anaphylactic-like reaction to oxaliplatin, the infusion should be immediately discontinued and appropriate symptomatic treatment initiated. Oxaliplatin rechallenge is contra-indicated.

In case of oxaliplatin extravasation, the infusion must be stopped immediately and usual local symptomatic treatment initiated.

Neurological toxicity of oxaliplatin should be carefully monitored, especially if co-administered with other medications with specific neurological toxicity. A neurological examination should be performed before each administration and periodically thereafter.

For patients who develop acute laryngopharyngeal dysaesthesia (see 4.8 "Undesirable effects"), during or within the hours following the 2-hour infusion, the next oxaliplatin infusion should be administered over 6 hours.

If neurological symptoms (paraesthesia, dysaesthesia) occur, the following recommended oxaliplatin dosage adjustment should be based on the duration and severity of these symptoms:

- If symptoms last longer than seven days and are troublesome, the subsequent oxaliplatin dose should be reduced from 85 to 65mg/m² (metastatic setting) or 75mg/m² (adjuvant setting).
- If paraesthesia without functional impairment persists until the next cycle, the subsequent oxaliplatin dose should be reduced from 85 to 65mg/m² (metastatic setting) or 75mg/m² (adjuvant setting).
- If paraesthesia with functional impairment persists until the next cycle, oxaliplatin should be discontinued.
- If these symptoms improve following discontinuation of oxaliplatin therapy, resumption of therapy may be considered.

Patients should be informed of the possibility of persistent symptoms of peripheral sensory neuropathy after the end of the treatment. Localised moderate paraesthesias or paraesthesias that may interfere with functional activities can persist after up to 3 years following treatment cessation in the adjuvant setting.

Gastrointestinal toxicity, which manifests as nausea and vomiting, warrants prophylactic and/or therapeutic anti-emetic therapy (see 4.8. "Undesirable effects").

Dehydration, paralytic ileus, intestinal obstruction, hypokalemia, metabolic acidosis and renal impairment may be caused by severe diarrhoea/ emesis particularly when combining oxaliplatin with 5-fluorouracil. In single cases pancreatitis is reported.

If haematological toxicity occurs (neutrophils < 1.5 x 10⁹/l or platelets < 50 x 10⁹/l), administration of the next course of therapy should be postponed until haematological values return to acceptable levels. A full blood count with white cell differential should be performed prior to start of therapy and before each subsequent course.

Patients must be adequately informed of the risk of diarrhoea/ emesis, mucositis/ stomatitis and neutropenia after oxaliplatin and 5-fluorouracil administration so that they can urgently contact their treating physician for appropriate management.

If mucositis/ stomatitis occurs with or without neutropenia, the next treatment should be delayed until recovery from mucositis/ stomatitis to grade 1 or less and/ or until the neutrophil count is 1.5 x 10⁹/l.

For oxaliplatin combined with 5-fluorouracil (with or without folinic acid), the usual dose adjustments for 5-fluorouracil associated toxicities should apply.

In the case of unexplained respiratory symptoms such as non-productive cough, dyspnoea, crackles or radiological pulmonary infiltrates, oxaliplatin should be discontinued until further pulmonary investigations exclude an interstitial lung disease (see section 4.8 "Undesirable effects").

4.5. Interactions with other medicaments and other forms of interaction

In patients who have received a single dose of 85mg/m² of oxaliplatin, immediately before administration of 5-fluorouracil, no change in the level of exposure to 5-fluorouracil has been observed.

In vitro, no significant displacement of oxaliplatin binding to plasma proteins has been observed with the following agents: erythromycin, salicylates, granisetron, paclitaxel, and sodium valproate.

4.6. Pregnancy and lactation

To date there is no available information on safety of use in pregnant women. Based on pre-clinical findings, oxaliplatin is likely to be lethal and/or teratogenic to the human foetus at the recommended therapeutic dose, and is consequently not recommended during pregnancy and should only be considered after suitably appraising the patient of the risk to the foetus and with the patient's consent.

Excretion in breast milk has not been studied. Breast-feeding is contra-indicated during oxaliplatin therapy.

4.7. Effects on ability to drive and use machines

No data available.

4.8. Undesirable effects

The most frequent adverse events of oxaliplatin in combination with 5-fluorouracil/folinic acid (5-FU/FA) were gastrointestinal (diarrhea, nausea, vomiting and mucositis), haematological (neutropenia, thrombocytopenia) and neurological (acute and dose cumulative peripheral sensory neuropathy). Overall, these adverse events were more frequent and severe with oxaliplatin and 5-FU/FA combination than with 5-FU/FA alone.

The frequencies reported in the table below are derived from clinical trials in the metastatic and adjuvant settings (having included 416 and 1108 patients respectively in the oxaliplatin + 5-FU/FA treatment arms) and from post marketing experience.

Frequencies in this table are defined using the following convention: very common (> 1/10) common (> 1/100, ≤ 1/10), uncommon (> 1/1000, ≤ 1/100), rare (> 1/10000, ≤ 1/1000), very rare (≤ 1/10000) including isolated report.

Further details are given after the table.

Table 1: Adverse effects by system organ class

System Organ Class	Very common	Common	Uncommon	Rare
Application site disorders*	Injection site reaction+			
Autonomic nervous system disorders		Flushing		
Body as a whole - general disorders *	Fever+++; fatigue, allergy/allergic reaction++, asthenia, pain, weight increase (adjuvant setting)	Chest pain, weight decrease (metastatic setting)		Immunoallergic thrombocytopenia, haemolytic anemia
Central and peripheral nervous system disorders *	Peripheral sensory neuropathy, headache Sensory disturbance	Dizziness, Neuritis motor, Meningism		Dysarthria
Gastrointestinal system disorders *	Diarrhea, nausea, vomiting, stomatitis / mucositis, abdominal pain, constipation, anorexia	Dyspepsia, gastroesophageal reflux, hiccup	Ileus, intestinal obstruction	Colitis including Clostridium difficile diarrhea
Metabolic and nutritional disorders		Dehydration	Metabolic acidosis	
Musculo-skeletal system disorders	Back pain	Arthralgia Skeletal pain		
Platelets, bleeding and clotting disorders	Epistaxis	Haemorrhage nos, haematuria, thrombophlebitis deep, embolism pulmonary, haemorrhage rectum		
Psychiatric disorders		Depression, insomnia	Nervousness	
Resistance mechanism disorders	Infection			
Respiratory system disorders	Dyspnoea, coughing	Rhinitis, upper respiratory tract infection		Interstitial lung disease, pulmonary fibrosis**
Skin and appendage disorders	Skin disorder, alopecia	Skin exfoliation (i.e. hand and foot syndrome), rash erythematous, rash, sweating increased, nail disorder		
Special senses, other disorders	Taste perversion		Ototoxicity	Deafness
Urinary system disorders		Dysuria, micturition frequency abnormal		
Vision disorders		Conjunctivitis, vision abnormal		Transient fall in visual acuity, visual field disturbances, optic neuritis
Laboratory Abnormalities	Hematological * Anemia, neutropenia, thrombocytopenia leukopenia, lymphopenia Chemistry Alkaline phosphatase increase, bilirubin increase, glycemia abnormalities, LDH increase, hypokalaemia, hepatic enzymes (SGPT/ALAT, SGOT/ASAT) increase, natriaemia abnormalities	Hematological * Febrile neutropenia / neutropenic sepsis (i.e. neutropenia grade 3,4 and documented infections) Chemistry Creatinine increase		

+ Extravasation may result in local pain and inflammation which may be severe and lead to complications, especially when oxaliplatin is infused through a peripheral vein (see 4.4 "Special Warnings and Precautions for Use").

++ Common allergic reactions such as skin rash (particularly urticaria), conjunctivitis, rhinitis.
Common anaphylactic reactions, including bronchospasm, angioedema, hypotension and anaphylactic shock.

+++ Very common fever, either from infection (with or without febrile neutropenia) or isolated fever from immunological mechanism.

* See detailed section below

** See section 4.4 "Special warning and precaution for use"

Haematological toxicity

Table 2: Incidence by patient (%), by grade

Oxaliplatin and 5-FU/FA 85mg/m ² every 2 weeks	Metastatic Setting			Adjuvant Setting		
	All grades	Gr 3	Gr 4	All grades	Gr 3	Gr 4
Anemia	82.2	3	< 1	75.6	0.7	0.1
Neutropenia	71.4	28	14	78.9	28.8	12.3
Thrombocytopenia	71.6	4	< 1	77.4	1.5	0.2
Febrile neutropenia	5.0	3.6	1.4	0.7	0.7	0.0
Neutropenic sepsis	1.1	0.7	0.4	1.1	0.6	0.4

Digestive toxicity

Table 3: Incidence by patient (%), by grade

Oxaliplatin and 5-FU/FA 85mg/m ² every 2 weeks	Metastatic Setting			Adjuvant Setting		
	All grades	Gr 3	Gr 4	All grades	Gr 3	Gr 4

Table 3: Incidence by patient (%), by grade

Oxaliplatin and 5-FU/FA 85mg/m ² every 2 weeks	Metastatic Setting			Adjuvant Setting		
	All grades	Gr 3	Gr 4	All grades	Gr 3	Gr 4
Nausea	69.9	8	< 1	73.7	4.8	0.3
Diarrhoea	60.8	9	2	56.3	8.3	2.5
Vomiting	49.0	6	1	47.2	5.3	0.5
Mucositis / Stomatitis	39.9	4	< 1	42.1	2.8	0.1

Prophylaxis and/or treatment with potent antiemetic agents is indicated.

Dehydration, paralytic ileus, intestinal obstruction, hypokalemia, metabolic acidosis and renal impairment may be caused by severe diarrhoea/emesis particularly when combining oxaliplatin with 5-fluorouracil (see 4.4 "Special warnings and precautions for use"). In single cases pancreatitis is reported.

Nervous system:

The dose limiting toxicity of oxaliplatin is neurological. It involves a sensory peripheral neuropathy characterised by dysaesthesia and/or paraesthesia of the extremities with or without cramps, often triggered by the cold. These symptoms occur in up to 95% of patients treated. The duration of these symptoms, which usually regress between courses of treatment, increases with the number of treatment cycles.

The onset of pain and/or a functional disorder are indications, depending on the duration of the symptoms, for dose adjustment, or even treatment discontinuation (see 4.4 "Special warnings and precautions for use").

This functional disorder includes difficulties in executing delicate movements and is a possible consequence of sensory impairment. The risk of occurrence of persistent symptoms for a cumulative dose of 850mg/m² (10 cycles) is approximately 10% and 20% for a cumulative dose of 1020mg/m² (12 cycles).

In the majority of the cases, the neurological signs and symptoms improve or totally recover when treatment is discontinued. In the adjuvant setting of colon cancer 6 months after treatment cessation 87% of patients had no neurological symptoms. After up to 3 years of follow up, about 3% of patients presented either with persisting localised paraesthesias of moderate intensity (2.3%) or with paraesthesias that may interfere with functional activities (0.5%).

Acute neurosensory manifestations (see 5.3. "Preclinical safety data") have been reported. They start within hours of administration and often occur on exposure to cold. They may present as transient paraesthesia, dysaesthesia and hypoesthesia or as an acute syndrome of pharyngolaryngeal dysaesthesia. This acute syndrome of pharyngolaryngeal dysaesthesia, with an incidence estimated between 1% and 2%, is characterised by subjective sensations of dysphagia or dyspnoea, without any objective evidence of respiratory distress (no cyanosis or hypoxia) or of laryngospasm or bronchospasm (no stridor or wheezing); jaw spasm, abnormal tongue sensation, dysarthria and a feeling of chest pressure have also been observed. Although antihistamines and bronchodilators have been administered in such cases, the symptoms are rapidly reversible even in the absence of treatment. Prolongation of the infusion helps to reduce the incidence of this syndrome (see 4.4 "Special warnings and precautions for use").

Other neurological symptoms such as dysarthria, loss of deep tendon reflex and Lhermitte's sign were reported during treatment with oxaliplatin. Isolated cases of optic neuritis have been reported.

Allergic reactions:

Table 4: Incidence by patient (%), by grade

Oxaliplatin and 5-FU/FA 85mg/m ² every 2 weeks	Metastatic Setting			Adjuvant Setting		
	All grades	Gr 3	Gr 4	All grades	Gr 3	Gr 4
Allergic reactions / Allergy	9.1	1	< 1	10.3	2.3	0.6

4.9. Overdosage

There is no known antidote to oxaliplatin. In cases of overdose, exacerbation of adverse events can be expected. Monitoring of haematological parameters should be initiated and symptomatic treatment given.

5. PHARMACOLOGICAL PROPERTIES

Therapeutic classification: ATC-Code: L01XA03 CYTOSTATIC AGENT (L: antineoplastic and immunomodulating agents-platinum compounds)

5.1 Pharmacodynamic properties

Oxaliplatin is an antineoplastic drug belonging to a new class of platinum-based compounds in which the platinum atom is complexed with 1,2-diaminocyclohexane ("DACH") and an oxalate group.

Oxaliplatin is a single enantiomer, the Cis-[oxalato]trans-[1,2-DACH]platinum.

Oxaliplatin exhibits a wide spectrum of both in vitro cytotoxicity and in vivo antitumour activity in a variety of tumour model systems including human colorectal cancer models. Oxaliplatin also demonstrates in vitro and in vivo activity in various cisplatin resistant models.

A synergistic cytotoxic action has been observed in combination with 5-fluorouracil both in vitro and in vivo.

Studies on the mechanism of action of oxaliplatin, although not completely elucidated, show that the aqua-derivatives resulting from the biotransformation of oxaliplatin, interact with DNA to form both inter and intra-strand cross-links, resulting in the disruption of DNA synthesis leading to cytotoxic and antitumour effects.

In patients with metastatic colorectal cancer, the efficacy of oxaliplatin (85mg/m² repeated every two weeks) combined with 5-fluorouracil/folinic acid (5-FU/FA) is reported in three clinical studies:

- In front-line treatment, a 2-arm comparative phase III study (de Gramont, A et al., 2000) randomised 420 patients either to 5-FU/FA alone (LV5FU2, N=210) or the combination of oxaliplatin with 5-FU/FA (FOLFOX4, N=210).
- In pretreated patients, a comparative three arms phase III study (Rothenberg, ML et al., 2003) randomised 821 patients refractory to an irinotecan (CPT-11) + 5-FU/FA combination either to 5-FU/FA alone (LV5FU2, N=275), oxaliplatin single agent (N=275), or combination of oxaliplatin with 5-FU/FA (FOLFOX4, N=271).
- Finally, an uncontrolled phase II study (André, T et al., 1999) included patients refractory to 5-FU/FA alone, that were treated with the oxaliplatin and 5-FU/FA combination (FOLFOX4, N=57)

The two randomised clinical trials in front-line therapy (de Gramont, A et al.) and in pretreated patients (Rothenberg ML et al.), demonstrated a significantly higher response rate and a prolonged progression free survival (PFS) / time to progression (TTP) as compared to treatment with 5-FU/FA alone. In the study of Rothenberg et al. performed in refractory pretreated patients, the difference in median overall survival (OS) between the combination of oxaliplatin and 5-FU/FA versus 5-FU/FA did not reach statistical significance.

Table 5: Response rate under FOLFOX4 versus LV5FU2

Response rate, % (95% CI) independent radiological review ITT analysis	LV5FU2	FOLFOX4	Oxaliplatin Single agent
Front-line treatment (de Gramont, A et al., 2000) Response assessment every 8 weeks	22 (16-27)	49 (42-46)	NA*
P value = 0.0001			
Pretreated patients (Rothenberg, ML et al., 2003) (refractory to CPT-11 + 5-FU/FA) Response assessment every 6 weeks	0.7 (0.0-2.7)	11.1 (7.6-15.5)	1.1 (0.2-3.2)
P value = 0.0001			
Pretreated patients (André, T et al., 1999) (refractory to 5-FU/FA) Response assessment every 12 weeks	NA*	23 (13-36)	NA*

* NA: Not applicable.

Table 6: Median Progression Free Survival (PFS) / Median Time to Progression (TTP)
FOLFOX4 versus LV5FU2

Median PFS/TTP, Months (95% CI) independent radiological review ITT analysis	LV5FU2	FOLFOX4	Oxaliplatin Single agent
Front-line treatment (de Gramont, A et al., 2000) (PFS)	6.0 (5.5-6.5)	8.2 (7.2-8.8)	NA*
Log-rank P value = 0.0003			
Pretreated patients (Rothenberg, ML et al., 2003) (TTP) (refractory to CPT-11 + 5-FU/FA)	2.6 (1.8-2.9)	5.3 (4.7-6.1)	2.1 (1.6-2.7)
Log-rank P value = 0.0001			
Pretreated patients (André, T et al., 1999) (refractory to 5-FU/FA)	NA*	5.1 (3.1-5.7)	NA*

* NA: Not applicable.

Table 7: Median Overall Survival (OS) under FOLFOX4 versus LV5FU2

Median OS, months (95% CI) ITT analysis	LV5FU2	FOLFOX4	Oxaliplatin Single agent
Front-line treatment (de Gramont, A et al., 2000)	14.7 (13.0–18.2)	16.2 (14.7–18.2)	NA*
	Log-rank P value = 0.12		
Pretreated patients (Rothenberg, ML et al., 2003) (TTP) (refractory to CPT-11 + 5-FU/FA)	8.8 (7.3–9.3)	9.9 (9.1–10.5)	8.1 (7.2–8.7)
	Log-rank P value = 0.09		
Pretreated patients (André, T et al., 1999) (refractory to 5-FU/FA)	NA*	10.8 (9.3–12.8)	NA*

* NA: Not applicable.

In pretreated patients (Rothenberg, ML et al., 2003), who were symptomatic at baseline, a higher proportion of those treated with oxaliplatin and 5-FU/FA experienced a significant improvement of their disease-related symptoms compared to those treated with 5-FU/FA alone (27.7% vs 14.6%, $p = 0.0033$).

In non pretreated patients (de Gramont, A et al., 2000), no statistically significant difference between the two treatment groups was found for any of the quality of life dimensions. However, the quality of life scores were generally better in the control arm for measurement of global health status and pain and worse in the oxaliplatin arm for nausea and vomiting.

In the adjuvant setting, the MOSAIC comparative phase III study randomised 2246 patients (899 stage II / Duke's B2 and 1347 stage III / Duke's C) further to complete resection of the primary tumor of colon cancer either to 5-FU/FA alone (LV5FU2, N=1123 (B2 / C = 441 / 675) or to combination of oxaliplatin and 5-FU/FA (FOLFOX4, N=1123 (B2 / C) = 451 / 672).

Table 8: MOSAIC-3-year disease free survival (ITT analysis)* for the overall population

Treatment arm	LV5FU2	FOLFOX4
Percent 3-year disease free survival (95% CI)	73.3 (70.6–75.6)	78.7 (76.2–81.1)
Hazard ratio (95% CI)	0.76 (0.64–0.89)	
Stratified log rank test	P = 0.0008	

* median follow up 44.2 months (all patients followed for at least 3 years)

The study demonstrated an overall significant advantage in 3-year disease free survival for the oxaliplatin and 5-FU/FA combination (FOLFOX4) over 5-FU/FA alone (LV5FU2).

Table 9: MOSAIC-3-year Disease Free Survival (ITT analysis)* according to Stage of Disease

Patient stage	Stage II (Duke's B2)		Stage III (Duke's C)	
	LV5FU2	FOLFOX4	LV5FU2	FOLFOX4
Percent 3-year disease free survival (95% CI)	84.3 (80.9–87.7)	87.4 (84.3–90.5)	65.8 (62.1–69.5)	72.8 (69.4–76.2)
Hazard ratio (95% CI)	0.79 (0.57–1.09)		0.75 (0.62–0.90)	
Stratified log rank test	P = 0.151		P = 0.002	

* median follow up 44.2 months (all patients followed for at least 3 years)

Overall Survival (ITT analysis):

A time of the analysis of the 3-year disease free survival, which was the primary endpoint of the MOSAIC trial, 85.1% of the patients were still alive in the FOLFOX4 arm versus 83.8% in the LV5FU2 arm. This translated into an overall reduction in mortality risk of 10% in favour of FOLFOX4 not reaching statistical significance (hazard ratio = 0.90). The figures were 92.2% versus 92.4% in the stage II (Duke's B2) sub-population (hazard ratio = 1.01) and 80.4% versus 78.1% in the stage III (Duke's C) sub-population (hazard ratio = 0.87), for FOLFOX4 and LV5FU2, respectively.

5.2. Pharmacokinetic properties

The pharmacokinetics of individual active compounds have not been determined. The pharmacokinetics of ultrafiltrable platinum, representing a mixture of all unbound, active and inactive platinum species, following a two-hour infusion of oxaliplatin at 130mg/m² every three weeks for 1 to 5 cycles and oxaliplatin at 85mg/m² every two weeks for 1 to 3 cycles are as follows:

Table 10: Summary of Platinum Pharmacokinetic Parameter Estimates in Ultrafiltrate following Multiple Doses of Oxaliplatin at 85mg/m² Every Two Weeks or at 130mg/m² Every Three Weeks

Dose	C _{max}	AUC ₀₋₄₈	AUC	t _{1/2α}	t _{1/2β}	t _{1/2γ}	V _{ss}	CL
	µg/ml	µg · h / ml	µg · h / ml	h	h	h	l	l / h
85mg/m²								
Mean	0.814	4.19	4.68	0.43	16.8	391	440	17.4
SD	0.193	0.647	1.40	0.35	5.74	406	199	6.35
130mg/m²								
Mean	1.21	8.20	11.9	0.28	16.3	273	582	10.1
SD	0.10	2.40	4.60	0.06	2.90	19.0	261	3.07

Mean AUC₀₋₂₄ and C_{max} values were determined on Cycle 3 (85mg/m²) or cycle 5 (130mg/m²).

Mean AUC, V_{ss}, CL, and CL₀₋₄₈ values were determined on Cycle 1.

C_{0-1h}, C_{0-4h}, AUC, AUC_{0-24h}, V_{ss} and CL values were determined by non-compartmental analysis.

t_{1/2α}, t_{1/2β}, t_{1/2γ} were determined by compartmental analysis (Cycles 1–3 combined).

At the end of a 2-hour infusion, 15% of the administered platinum is present in the systemic circulation, the remaining 85% being rapidly distributed into tissues or eliminated in the urine. Irreversible binding to red blood cells and plasma, results in half-lives in these matrices that are close to the natural turnover of red blood cells and serum albumin. No accumulation was observed in plasma ultrafiltrate following 85mg/m² every two weeks or 130mg/m² every three weeks and steady state was attained by cycle one in this matrix. Inter- and intra-subject variability is generally low.

Biotransformation in vitro is considered to be the result of non-enzymatic degradation and there is no evidence of cytochrome P450-mediated metabolism of the diaminocyclohexane (DACH) ring.

Oxaliplatin undergoes extensive biotransformation in patients, and no intact drug was detectable in plasma ultrafiltrate at the end of a 2h-infusion. Several cytotoxic biotransformation products including the monochloro-, dichloro- and diaquo-DACH platinum species have been identified in the systemic circulation together with a number of inactive conjugates at later time points.

Platinum is predominantly excreted in urine, with clearance mainly in the 48 hours following administration.

By day 5, approximately 54% of the total dose was recovered in the urine and < 3% in the faeces.

A significant decrease in clearance from 17.6 ± 2.18 l/h to 9.95 ± 1.91 l/h in renal impairment was observed together with a statistically significant decrease in distribution volume from 330 ± 40.9 to 241 ± 36.1 l. The effect of severe renal impairment on platinum clearance has not been evaluated.

5.3. Preclinical safety data

The target organs identified in preclinical species (mice, rats, dogs, and/or monkeys) in single- and multiple-dose studies included the bone marrow, the gastrointestinal system, the kidney, the testes, the nervous system, and the heart. The target organ toxicities observed in animals are consistent with those produced by other platinum-containing drugs and DNA-damaging, cytotoxic drugs used in the treatment of human cancers with the exception of the effects produced on the heart. Effects on the heart were observed only in the dog and included electrophysiological disturbances with lethal ventricular fibrillation. Cardiotoxicity is considered specific to the dog not only because it was observed in the dog alone but also because doses similar to those producing lethal cardiotoxicity in dogs (150mg/m²) were well-tolerated by humans. Preclinical studies using rat sensory neurons suggest that the acute neurosensory symptoms related to Oxaliplatin may involve an interaction with voltage-gated Na⁺ channels.

Oxaliplatin was mutagenic and clastogenic in mammalian test systems and produced embryo-fetal toxicity in rats. Oxaliplatin is considered a probable carcinogen, although carcinogenic studies have not been conducted.

6. PHARMACEUTICAL PARTICULARS

6.1. List of excipients

Lactose monohydrate.

6.2. Incompatibilities

- DO NOT use in association with alkaline drugs or solutions (in particular 5-fluorouracil, basic solutions, trometamol and folic acid products containing trometamol as an excipient).
- DO NOT reconstitute or dilute for infusion with saline solution.
- DO NOT mix with other drugs in the same infusion bag or infusion line (see Section 6.6 for instructions concerning simultaneous administration with folic acid).
- DO NOT use injection equipment containing aluminium.

6.3. Shelf-life

Medicinal product as packaged for sale: 3 years

Reconstituted solution in the original vial:

From a microbiological and chemical point of view, the reconstituted solution should be diluted immediately.

Infusion preparation:

Chemical and physical in-use stability has been demonstrated for 24 hours at 2°C to 8°C.

From a microbiological point of view, the infusion preparation should be used immediately.

If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2°C to 8°C unless dilution has taken place in controlled and validated aseptic conditions.

6.4. Special precautions for storage

Medicinal product as packaged for sale: no special storage conditions are required

Reconstituted solution: should be diluted immediately.

Infusion preparation: store at 2°C to 8°C for not longer than 24 hours.

Inspect visually prior to use. Only clear solutions without particles should be used.

The medicinal product is for single use only. Any unused solution should be discarded.

6.5. Nature and contents of container

Glass vials with stoppers of chlorobutyl elastomer.

6.6. Instructions for use/handling

As with other potentially toxic compounds, caution should be exercised when handling and preparing oxaliplatin solutions.

Instructions for Handling

The handling of this cytotoxic agent by nursing or medical personnel requires every precaution to guarantee the protection of the handler and his surroundings.

The preparation of injectable solutions of cytotoxic agents must be carried out by trained specialist personnel with knowledge of the medicines used, in conditions that guarantee the protection of the environment and in particular the protection of the person handling the medicines. It requires a preparation area reserved for this purpose. It is forbidden to smoke, eat or drink in this area.

Personnel must be provided with appropriate handling materials, notably long sleeved gowns, protection masks, caps, protective goggles, sterile single-use gloves, protective covers for the work area, containers and collection bags for waste.

Excreta and vomit must be handled with care.

Pregnant women must be warned to avoid handling cytotoxic agents.

Any broken container must be treated with the same precautions and considered as contaminated waste. Contaminated waste should be incinerated in suitably labelled rigid containers. See below section "Disposal".

If oxaliplatin concentrate, reconstituted solution or infusion solution, should come into contact with skin, wash immediately and thoroughly with water.

If oxaliplatin concentrate, premix solution or infusion solution, should come into contact with mucous membranes, wash immediately and thoroughly with water.

Special precautions for administration

- DO NOT use injection material containing aluminium.
- DO NOT administer undiluted.
- DO NOT reconstitute or dilute for infusion with saline solution.
- DO NOT mix with any other medication in the same infusion bag or administer simultaneously by the same infusion line (in particular 5-fluorouracil, basic solutions, trometamol and folic acid products containing trometamol as an excipient)

Oxaliplatin can be co-administered with folic acid infusion using a Y-line placed immediately before the site of injection. The drugs should not be combined in the same infusion bag. Folic acid must be diluted using isotonic infusion solutions such as 5% glucose solution but NOT sodium chloride solutions or alkaline solutions.

Flush the line after oxaliplatin administration.

- USE ONLY the recommended solvents (see below).
- Any reconstituted solution that shows evidence of precipitation should not be used and should be destroyed with due regard to legal requirements for disposal of hazardous waste (see below).

Reconstitution of the solution

- Water for injections or 5% glucose solution should be used to reconstitute the solution.
- For a vial of 50mg: add 10ml of solvent to obtain a concentration of 5mg oxaliplatin/ml.
- For a vial of 100mg: add 20ml of solvent to obtain a concentration of 5mg oxaliplatin/ml.

From a microbiological and chemical point of view, the reconstituted solution should be diluted immediately with 5% glucose solution.

Inspect visually prior to use. Only clear solutions without particles should be used.

The medicinal product is for single use only. Any unused solution should be discarded.

Dilution before infusion

Withdraw the required amount of reconstituted solution from the vial(s) and then dilute with 250ml to 500ml of a 5% glucose solution to give an oxaliplatin concentration not less than 0.2mg/ml.

Administer by IV infusion.

Chemical and physical in-use stability has been demonstrated for 24 hours at 2°C to 8°C.

From a microbiological point of view, this infusion preparation should be used immediately.

If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2°C to 8°C unless dilution has taken place in controlled and validated aseptic conditions.

Inspect visually prior to use. Only clear solutions without particles should be used.

The medicinal product is for single use only. Any unused solution should be discarded.

NEVER use sodium chloride solution for either reconstitution or dilution.

Infusion

The administration of oxaliplatin does not require prehydration.

Oxaliplatin diluted in 250 to 500ml of a 5% glucose solution to give a concentration not less than 0.2mg/ml must be infused either by peripheral vein or central venous line over 2 to 6 hours. When oxaliplatin is administered with 5-fluorouracil, the oxaliplatin infusion should precede that of 5-fluorouracil.

Disposal

Remnants of the medicinal product as well as all materials that have been used for reconstitution, for dilution and administration must be destroyed according to hospital standard procedures applicable to cytotoxic agents with due regard to current laws related to the disposal of hazardous waste.

7. MANUFACTURER

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8. DATE OF (PARTIAL) REVISION OF THE TEXT

March 2005