

SUMMARY OF PRODUCT CHARACTERISTICS

1 NAME OF THE MEDICINAL PRODUCT

Iomeron 150, solution for injection

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Contains 30.62% w/v of concentration of iomeprol equivalent to 15% iodine or 150mg iodine/ml.

For excipients see, 6.1.

3. PHARMACEUTICAL FORM

Solution for injection.

4. CLINICAL PARTICULARS

4.1. Therapeutic indications

X-ray contrast medium used for:
digital subtraction angiography
computed tomography enhancement
urography
cavernosography

4.2 Posology and method of administration

digital subtraction angiography

Intra arterial

cerebral

adults

6 - 10ml per artery*

visceral

adults

2 - 20ml per artery*

aorta 25-50ml*

both 250ml max

peripheral

adults

5 - 10ml per artery*

max 250ml

computed tomography

brain

adults

50 - 150

children

* *

body	adults	40 - 150ml max 250ml
	children	* *
urography (infusion)	adults	250ml
cavernosography	adults	40 - 250ml

* Repeat as necessary

* * According to body size and age

In elderly patients the lowest effective dose should be used.

Unless otherwise instructed by the doctor, a normal diet may be maintained on the day of the examination.

X-ray can be taken up to 60 minutes following injection.

4.3 Contraindications

Hypersensitivity to the active substance or any of the excipients.

4.4 **Special warnings and special precautions for use**

In consideration of possible complications, the patient should be kept under observation for at least 30 minutes after the examination.

Extreme caution during injection of contrast media is necessary to avoid extravasation.

Hydration

Patients must be well hydrated, and any relevant abnormalities of fluid or electrolyte balance should be corrected prior to and following contrast media injection. Especially patients with diabetes mellitus, polyuria, oligouria, hyperuricaemia, infants, small children, and elderly patients, should not be exposed to dehydration. Also patients with severely compromised hepatic and renal impairment are more at risk. Caution should be exercised in hydrating patients with underlying conditions that may be worsened by fluid overload, including congestive heart failure.

Rehydration prior to use of iomeprol is recommended in patients with sickle cell disease.

Special population

Hypersensitivity to iodinated contrast media, allergic predisposition

A positive history of allergy, asthma or untoward reaction during previous similar investigations indicates a need for extra caution since, as with other contrast media, this product may provoke anaphylaxis or other manifestations of allergy with nausea, vomiting, dyspnoea, erythema, urticaria and hypotension. The benefits should clearly outweigh the risks in such patients and appropriate resuscitative measures should be immediately available. The primary treatments are as follows:

Effect	Major Symptoms	Primary Treatment
Vasomotor effect	warmth nausea/vomiting	reassurance
Cutaneous	scattered hives severe urticaria	H ₁ -antihistamines H ₂ -antihistamines

Bronchospastic	wheezing	oxygen Beta-2-agonist inhalers
Anaphylactoid reaction	angioedema urticaria bronchospasm hypotension	oxygen iv fluids adrenergics (iv epinephrine) Inhaled beta-2-adrenergics antihistamines (H ₁ -and H ₂ - blockers) corticosteroids
Hypotensive	hypotension	iv fluids
Vagal reaction	hypotension bradycardia	iv fluids iv atropine

From: Bush WH; The Contrast Media Manual; Katzburg RW Ed.; Williams and Wilkins; Baltimore 1992; Chapter 2 p 23

The risk of bronchospasm-inducing reactions in asthmatic patients is higher after contrast media administration, especially in patients taking beta-blockers.

Hypersensitivity testing

In patients with suspected or known hypersensitivity to contrast media, sensitivity test doses are not recommended, as severe or fatal reactions to contrast media are not predictable from sensitivity test.

Myelomatosis or paraproteinaemias are conditions predisposing to renal impairment following CM administration. The benefits of the use of a contrast-enhanced procedure should be carefully weighted against the possible risk. Adequate hydration and monitoring of renal function are recommended after CM administration.

Cardiovascular diseases

Care should be taken in severe cardiac disease particularly heart failure and coronary artery disease. Reactions may include pulmonary oedema, haemodynamic changes, ischaemic ECG changes and arrhythmias. In severe, chronic hypertension the risk of renal damage following administration of a contrast medium is increased. In these cases the risks associated with the catheterization procedure are increased.

Thyroid function and thyroid function tests

The small amount of free inorganic iodide that may be present in contrast media might have some effects on thyroid function. These effects appear more evident in patients with latent or overt hyperthyroidism or goitre. Hyperthyroidism or even thyroid storms have been reported following administration of iodinated contrast media.

The administration of iodinated contrast media may aggravate myasthenia signs and symptoms.

CNS Disorders

Particular care is needed in patients with acute cerebral infarction, acute intracranial haemorrhage and any conditions involving damage to the blood brain barrier, brain oedema or acute demyelination. Convulsive seizures are more likely in patients with intracranial tumours or metastases or with a history of epilepsy.

Neurological symptoms related to cerebrovascular diseases, intracranial tumours/metastases or degenerative or inflammatory pathologies may be exacerbated.

There is an increased risk of transient neurological complications in patients with symptomatic cerebrovascular disease eg stroke, transient ischaemic attacks. Cerebral ischaemic phenomena may be caused by intravascular injection.

Anticonvulsant therapy should not be discontinued

Contrast induced encephalopathy

Encephalopathy has been reported with the use of iomeprol (see section 4.8). Contrast encephalopathy may manifest with symptoms and signs of neurological dysfunction such as headache, visual disturbance, cortical blindness, confusion, seizures, loss of coordination, hemiparesis, aphasia, unconsciousness, coma and cerebral oedema within minutes to hours after administration of iomeprol, and generally resolves within days. The product should be used with caution in patients with conditions that disrupt the integrity of the blood brain barrier (BBB), potentially leading to increased permeability of contrast media across the BBB and increasing the risk of encephalopathy. If contrast encephalopathy is suspected, administration of iomeprol should be discontinued and appropriate medical management should be initiated.

In acute and chronic alcoholism the increase in blood brain barrier permeability facilitates the passage of the contrast medium into cerebral tissue possibly leading to CNS disorders. There is a possibility of a reduced seizure threshold in alcoholics.

In patients with a drug addiction there is also the possibility of a reduced seizure threshold.

Severe cutaneous adverse reactions

Severe cutaneous reactions (SCARs) including Steven-Johnson (SJS), toxic epidermal necrolysis (TEN), acute generalized exanthematous pustulosis (AGEP) and drug reaction with eosinophilia and systemic symptoms (DRESS), which can be life-threatening or fatal, have been reported in association with the intravascular administration of iodinated contrast agents (see Section 4.8). At the time of administration patients should be advised of the signs and symptoms and monitored closely for skin reactions. If signs and symptoms suggestive of these reactions appear Iomeron should be stopped immediately. If the patient has developed a serious reaction such as SJS, TEN, AGEP or DRESS with the use of Iomeron, administration of Iomeron must not be restarted to this patient at any time.

Patients with pheochromocytoma may develop severe, occasionally uncontrollable hypertensive crises during intra-arterial administration. Premedication with an alpha and beta receptor blocker is recommended in these patients. Pronounced excitement, anxiety and pain can cause side effects or intensify reaction to the contrast medium. A sedative may be given.

Renal impairment

In patients with moderate to severe impairment of renal function, attention should be paid to renal function parameters before re-examining the patient with a contrast media.

Preventive measures include:

- identification of high-risk patients;
- ensuring adequate hydration before CM administration, preferably by maintaining i.v. infusion before and during the procedure and until the CM has been cleared by the kidneys;
- avoiding whenever possible, the administration of nephrotoxic drugs or major surgery or procedure such as renal angioplasty, until the CM has been cleared;

A combination of severe hepatic and renal impairment delays excretion of the contrast medium therefore such patients should not be examined unless absolutely necessary.

Diabetes mellitus

Care should be taken in renal impairment and diabetes. In these patients it is important to maintain hydration in order to minimise deterioration in renal function.

The presence of renal damage in diabetic patients is one of the factors predisposing to renal impairment following contrast media administration. This may precipitate lactic acidosis in

patients who are taking metformin (see section 4.5 - Interaction with medicaments and other forms of interaction)..

Paediatric population

Infants up to 1 year, especially the new-born, are particularly susceptible to electrolyte imbalance and haemodynamic alterations. Care should be taken regarding the dosage used. Hypothyroidism or transient thyroid suppression may be observed after exposure to iodinated contrast media.

Special attention should be paid to paediatric patients below 3 years of age because an incident underactive thyroid during early life may be harmful for motor, hearing, and cognitive development and may require transient T4 replacement therapy. The incidence of hypothyroidism in patients younger than 3 years of age exposed to iodinated contrast media has been reported between 1.3% and 15% depending on the age of the subjects and the dose of the iodinated contrast agent and is more commonly observed in neonates and premature infants. Thyroid function should be evaluated in all paediatric patients younger than 3 years of age following exposure to iodinated contrast media. If hypothyroidism is detected, the need for treatment should be considered and thyroid function should be monitored until normalized.

Elderly

There is special risk of reactions involving the circulatory system such that myocardial ischaemia, major arrhythmias and extrasystoles are more likely to occur. A combination of neurological disturbances and vascular pathologies present a serious complication. The probability of acute renal insufficiencies is higher in these people.

Precautions for dedicated exams

Angiography

Non ionic contrast media have less anticoagulant activity in vitro than ionic media. Meticulous attention should therefore be paid to angiographic technique. Non ionic media should not be allowed to remain in contact with blood in a syringe, and intravascular catheters should be flushed frequently to minimise the risk of clotting which, rarely, has led to serious thromboembolic complications.

Intravascular administration should be performed if possible with the patient lying down. The patient should be kept in this position and closely observed for at least 30 minutes after the procedure since the majority of severe incidents occur with this time.

Venography

Special care is required when venography is performed in patients with thrombosis, phlebitis, severe ischaemic disease, local infection or a totally obstructed artero-venous system.

4.5 Interaction with other medicaments and other forms of interaction

Use of the product may interfere with tests for thyroid function. Vasopressor agents should not be administered prior to iomeprol.

Treatment with drugs that lower the seizure threshold such as certain neuroleptics (MAO inhibitors, tricyclic antidepressants), analeptics, and anti-emetics and phenothiazine derivatives should be discontinued 48 hours before the examination. Treatment should not be resumed until 24 hours post-procedure.

It has been reported that cardiac and/or hypertensive patients under treatment with diuretics, ACE-inhibitors, and/or beta blocking agents are at higher risk of adverse reactions when administered iodinated contrast media.

Beta-blockers may impair the response to treatment of bronchospasm induced by contrast medium.

Patients with normal renal function can continue to take metformin normally. In diabetic patients with diabetic nephropathy, under treatment with metformin and with moderate renal impairment, metformin should be stopped at the time of, or prior to the procedure and withheld for 48 hours subsequent to the procedure and reinstated only after renal function has been re-evaluated and found to be normal. In emergency patients in whom renal function is either impaired or unknown, the physician shall weigh out risk and benefit of an examination with a contrast medium and take precautions. Metformin should be stopped from time of contrast medium administration. After the procedure the patient should be monitored for signs of lactic acidosis. Metformin should be restarted 48 hours after contrast medium if serum creatinine/eGFR is unchanged from the pre-imaging level.

Allergy-like reactions to contrast media are more frequent and may manifest as delayed reactions in patients treated with immuno-modulators, like Interleukin-2 (IL-2).

4.6 Fertility, pregnancy and lactation

Women of childbearing potential

Appropriate investigations and measures should be taken when exposing women of child-bearing potential to any X-ray examination, whether with or without contrast medium.

Pregnancy

Animal studies have not indicated any harmful effects with respect to the course of pregnancy or on the health of the unborn or neonate. The safety of iomeprol in human pregnancy however has not been established. Therefore avoid in pregnancy unless there is no safer alternative.

Since, wherever possible, exposure to radiation should be avoided during pregnancy, the benefits of any X-ray examination, whether with or without contrast material, should for this reason alone be carefully weighed against the possible risk.

In neonates who have been exposed to iomeprol in utero, it is recommended to monitor thyroid function (see section 4.4).

Breastfeeding

No human data exist concerning the excretion of iomeprol in breast milk. Animal studies have demonstrated that the excretion of iomeprol in breast milk is similar to that of other contrast agents and that these compounds are only minimally absorbed by the gastrointestinal tract of the young. Adverse effects on the nursing infant are therefore unlikely to occur.

Stopping breastfeeding is unnecessary.

4.7 Effects on ability to drive and use machines

There is no known effect on the ability to drive and operate machines.

4.8 Undesirable effects

General

The use of iodinated contrast media may cause untoward side effects. They are usually mild to moderate and transient in nature. However, severe and life-threatening reactions sometimes leading to death have been reported. In most cases, reactions occur within minutes of dosing but at times reactions may occur at later time.

Anaphylaxis (anaphylactoid/hypersensitivity reactions) may manifest with various symptoms, and rarely does any one patient develop all the symptoms. Typically, in 1 to 15 min (but rarely after as long as 2 h), the patient complains of feeling abnormal, agitation, flushing, feeling hot, sweating increased, dizziness, increased lacrimation, rhinitis, palpitations, paresthesia, pruritus, sore throat and throat tightness, dysphagia, cough, sneezing, urticaria, erythema, mild localised oedema, angioneurotic oedema and dyspnoea due to glottic/laryngeal/pharyngeal oedema and/or spasm manifesting with wheezing, and bronchospasm.

Nausea, vomiting, abdominal pain, and diarrhoea are also reported.

These reactions, which can occur independently of the dose administered or the route of administration, may represent the first signs of circulatory collapse.

Administration of the contrast medium must be discontinued immediately and, if needed, appropriate specific treatment urgently initiated via venous access.

Severe reactions involving the cardiovascular system, such as vasodilatation, with pronounced hypotension, tachycardia, dyspnoea, agitation, cyanosis and loss of consciousness progressing to respiratory and/or cardiac arrest may result in death. These events can occur rapidly and require full and aggressive cardio-pulmonary resuscitation.

Primary circulatory collapse can occur as the only and/or initial presentation without respiratory symptoms or without other signs or symptoms outlined above.

The adverse reactions reported in clinical trials among 4,903 adult patients and from post-marketing surveillance are represented in the tables below by frequency and classified by MedDRA system organ class.

Within each frequency grouping, adverse reactions are presented in order of decreasing seriousness.

4.8.1 Intravascular administration

Adult patients involved in clinical trials with intravascular administration of Iomeprol were 4,739.

Adults

System Organ Class	Adverse Reactions			
	Clinical Trials			Post-marketing Surveillance
	Common (≥1/100 to <1/10)	Uncommon (≥1/1000 to <1/100)	Rare (≥1/10,000 to <1/1000)	Frequency unknown*
Blood and lymphatic system disorders				Thrombocytopenia Haemolytic anaemia
Immune system disorders				Anaphylactoid reaction
Endocrine disorders				Hyperthyroidism
Psychiatric disorders				Anxiety Confusional state
Nervous system disorders		Headache Dizziness	Presyncope	Coma Transient ischaemic attack Paralysis Syncope Convulsion

System Organ Class	Adverse Reactions			
	Clinical Trials			Post-marketing Surveillance
	Common (≥1/100 to <1/10)	Uncommon (≥1/1000 to <1/100)	Rare (≥1/10,000 to <1/1000)	Frequency unknown*
				Loss of consciousness Dysarthria Paraesthesia Amnesia Somnolence Taste abnormality Contrast induced encephalopathy***
Eye disorders				Blindness transient Visual disturbance Conjunctivitis Lacrimation increased Photopsia
Cardiac disorders			Bradycardia Tachycardia Extrasystoles	Cardiac arrest Myocardial infarction Cardiac failure Angina pectoris Arrhythmia Ventricular or atrial fibrillation Atrioventricular block Palpitations
Vascular disorders		Hypertension	Hypotension	Circulatory collapse or shock Hot flush Flushing Pallor Cyanosis Coronary artery thrombosis Coronary artery embolism Vasospasm**** Ischemia****
Respiratory, thoracic and mediastinal disorders		Dyspnoea		Respiratory arrest Acute respiratory distress syndrome (ARDS) Pulmonary oedema Laryngeal oedema Pharyngeal oedema Bronchospasm Asthma Cough

System Organ Class	Adverse Reactions			
	Clinical Trials			Post-marketing Surveillance
	Common ($\geq 1/100$ to <1/10)	Uncommon ($\geq 1/1000$ to <1/100)	Rare ($\geq 1/10,000$ to <1/1000)	Frequency unknown*
				Hyperventilation Pharynx discomfort Laryngeal discomfort Rhinitis Dysphonia
Gastrointestinal disorders		Nausea Vomiting		Diarrhoea Abdominal pain Salivary hypersecretion Dysphagia Salivary gland enlargement
Skin and subcutaneous tissue disorders		Erythema Urticaria Pruritus	Rash	Acute generalized exanthematous pustulosis Angioedema Cold sweat Sweating increased Stevens-Johnson's syndrome Toxic epidermal necrolysis Erythema multiforme Drug Reaction with Eosinophilia and Systemic Symptoms
Musculoskeletal and connective tissue disorder			Back pain	Arthralgia
Renal and urinary disorders				Renal failure*****
General disorders and administration site conditions	Feeling hot	Chest pain Injection site warmth and pain	Asthenia Rigors Pyrexia	Injection site reaction** Coldness local Fatigue Malaise Thirst
Investigations			Blood creatinine increased	Electrocardiogram ST segment elevation Electrocardiogram abnormal

* Since the reactions were not observed during clinical trials with 4,739 patients, best estimate is that their relative occurrence is rare ($\geq 1/10,000$ to <1/1000).

The most appropriate MedDRA term is used to describe a certain reaction and its symptoms and related conditions.

** Injection site reactions comprise injection site pain and swelling. In the majority of cases they are due to extravasation of contrast medium. These reactions are usually transient and result in recovery without sequelae. Cases of extravasation with inflammation, skin necrosis and even development of compartment syndrome have been reported.

*** Encephalopathy may manifest with symptoms and signs of neurological dysfunction such as headache, visual disturbance, cortical blindness, confusion, seizures, loss of coordination, hemiparesis, aphasia, unconsciousness, coma, brain oedema.

****Vasospasm and consequent ischaemia have been observed during intra-arterial injections of contrast medium, in particular after coronary and cerebral angiography often procedurally related and possibly triggered by the tip of the catheter or excess catheter pressure

*****Transient renal failure with oliguria, proteinuria and an increase in serum creatinine may develop, particularly in patients with impaired renal function. In case of extravasal injection a tissue reaction may develop in rare cases.

Paediatric patients

There is limited experience with paediatric patients. The clinical trial paediatric safety database comprises 184 patients. The Iomeprol safety profile is similar in children and adults. Transient hypothyroidism may occur in neonates, especially in preterm or low birth weight neonates, and children (0-3 years), when exposed to iomeprol.

4.8.2 Administration to body cavities

After injection of an iodinated contrast media in body cavities, contrast media are slowly absorbed from the area of administration into the systemic circulation and subsequently cleared by renal elimination.

Blood amylase increased is common following ERCP. Very rare cases of pancreatitis have been described.

The reactions reported in cases of arthrography and fistulography usually represent irritative manifestations superimposed on pre-existing conditions of tissue inflammation.

Hypersensitivity reactions are rare, generally mild and in the form of skin reactions. However, the possibility of severe anaphylactoid reactions cannot be excluded.

As with other iodinated contrast media, pelvic pain and malaise may occur after hysterosalpingography.

Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the Yellow Card Scheme

Website: www.mhra.gov.uk/yellowcard or search for MHRA Yellow Card in the Google Play or Apple App Store

4.9. Overdose

The effects of overdose on the pulmonary and cardiovascular systems may become life-threatening. Treatment consists of support of the vital functions and prompt use of symptomatic therapy. Iomeprol does not bind to plasma or serum proteins and is therefore dialyzable.

5. PHARMACOLOGICAL PROPERTIES

5.1. Pharmacodynamic properties

Iomeprol is a low osmolality, non-ionic organic molecule with radio-opacity conferred by an iodine content of 49% of the molecular weight. It is formulated for use as an intravascular/intracavitary contrast medium in concentrations of up to 400mg iodine per ml. Even at this concentration the low viscosity allows delivery of high doses through thin catheters.

5.2. Pharmacokinetic properties

The pharmacokinetics of intravascularly administered iomeprol are similar to those of other iodinated contrast media and conform to a two-compartment model with a rapid distribution and a slower elimination phase. In healthy subjects, the mean distribution and elimination half-lives of iomeprol were 0.37 hours and 1.83 hours respectively.

Distribution volume is similar to that of extra cellular fluid. There is no significant serum protein binding and iomeprol is not metabolized.

Elimination is almost exclusively through the kidneys (90% of the dose recovered in the urine within 96 hours of its administration) and is rapid (50% of an intravascularly administered dose within 2 hours).

5.3. Preclinical safety data

There are no pre-clinical data of relevance which are additional to those included in other sections of the SPC.

6. PHARMACEUTICAL PARTICULARS

6.1. List of excipients

trometamol
hydrochloric acid

water for injection

6.2. Incompatibilities

No other drug should be mixed with the contrast medium.

6.3. Shelf life

Five years

Solutions not used in one examination session must be discarded.

6.4. Special precautions for storage

Store below 30°C

Protect from light

6.5 Nature and contents of containers

Colourless Type I or Type II glass bottles with rubber/aluminium cap.

Quantities of 20, 30, 50, 75, 100, 150, 200 or 250 ml of solution.

6.6. Instructions for use/handling

Bottles containing contrast media solution are not intended for the withdrawal of multiple doses. The rubber stopper should never be pierced more than once. The use of proper withdrawal cannulas for piercing the stopper and drawing up the contrast medium is recommended.

Before use, examine the product to assure that the container and closure have not been damaged. Do not use this solution if it is discoloured or particulate matter is present.

The contrast medium should be drawn into the syringe until immediately before use. Withdrawal of contrast agents from their containers should be accomplished under aseptic conditions with sterile syringes. Sterile techniques must be used with any spinal puncture or intravascular injection, and with catheters and guidewires. If non-disposable equipment is used, scrupulous care should be taken to prevent residual contamination with traces of cleansing agents.

It is desirable that solutions of contrast media for intravascular and intrathecal use should be at body temperature when injected.

Any residue of contrast medium in the syringe must be discarded. Solutions not used in one examination session or waste material, such as the connecting tubes, should be disposed in accordance with local requirements.

7. MARKETING AUTHORISATION HOLDER

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Oxford, OX4 4GA
United Kingdom

8. MARKETING AUTHORISATION NUMBER(S)

PL 18920/0001

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