

SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE MEDICINAL PRODUCT

Iodosol Sodium iodide (¹³¹I) 37-740 MBq/ml solution for injection

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Sodium Iodide (¹³¹I) Injection is a clear, colourless solution containing sodium [¹³¹I] iodide: 37-7400 MBq/vial (37 – 740 MBq/mL) at the activity reference date.

Iodine-131 is produced by fission of uranium-235 or by neutron bombardment of stable tellurium in a nuclear reactor. Iodine-131 has a half-life of 8.02 days.

It decays by emission of gamma radiations of 365 keV (81.7 %), 637 keV (7.2 %) and 284 keV (6.1 %) and beta radiations of maximal energy of 606 keV to stable xenon-131.

The sodium content of this product is in the range from 1.22 to 1.35 mg/ml.

For a full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Solution for injection, clear, colorless solution.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

The medicinal product is both for diagnostic and therapeutic use.

Diagnostic indications

Sodium iodide may be given as a “tracer” dose to study radioiodine kinetics. An estimation of the thyroid uptake and effective half-life obtained with a tracer dose can be used to calculate the activity required for radioiodine therapy.

In the management of thyroid carcinoma, sodium [¹³¹I] iodide is used to identify thyroid remnant and metastases (after ablation).

Thyroid scanning for benign conditions with sodium [¹³¹I] iodide can be performed but only where circumstances do not allow for radiopharmaceuticals with more favorable dosimetry to be used.

Therapeutic indications

Radioiodide thyroid therapy is indicated for:

- treatment of Graves’ disease, toxic multinodular goitre or autonomous nodules
- treatment of papillary and follicular thyroid carcinoma including metastatic disease.

Sodium [¹³¹I] iodide therapy is often combined with surgical intervention and with antithyroid medications.

4.2 Posology and method of administration

Diagnostic use

The recommended activities for an adult patient (70 kg) are as follows:

1. For the thyroid uptake studies: 0.2-3.7 MBq.
2. For post thyroid ablation (for metastases and thyroid remnant): a maximum dose of 400 MBq.
3. For thyroid imaging: 7.4-11 MBq.

Scans are usually performed at 4 hours, and then again at 18-24 hours (for scintigraphy also at 72 hours).

The diagnostic activity to be administered to a child and adolescent should be a fraction of the adult dose calculated from the body weight/surface area methods or according to the following equations:

Paediatric dose (MBq) = Adult dose (MBq) x child weight (kg) / 70 kg

$$\text{Paediatric dose (MBq)} = \text{Adult dose (MBq)} \times \text{child surface (m}^2\text{)} / 1.73 \text{ m}^2$$

Correction factors given for guidance are proposed below:

Fraction of adult dose		
3kg = 0.10	22kg = 0.50	42kg = 0.78
4kg = 0.14	24kg = 0.53	44kg = 0.80
6kg = 0.19	26kg = 0.56	46kg = 0.82
8kg = 0.23	28kg = 0.58	48kg = 0.85
10kg = 0.27	30kg = 0.62	50kg = 0.88
12kg = 0.32	32kg = 0.65	52-54kg = 0.90
14kg = 0.36	34kg = 0.68	56-58kg = 0.92
16kg = 0.40	36kg = 0.71	60-62kg = 0.96
18kg = 0.44	38kg = 0.73	64-66kg = 0.98
20kg = 0.46	40kg = 0.76	68kg = 0.99

(Paediatric Task Group, European Association of Nuclear Medicines (EANM))

Therapeutic use

The activity administered is a matter for clinical judgement. The therapeutic effect is only achieved after several months.

- For the treatment of hyperthyroidism

The activity administered is usually in the range of 200-800 MBq but repeated treatment may be necessary, with cumulative activities of up to 5000 MBq.

The dose required depends on the diagnosis, the size of the gland, thyroid uptake and iodine clearance. Patients should be rendered euthyroid medically whenever possible before giving radioiodine treatment for hyperthyroidism.

- For thyroid ablation and treatment of metastases

The administered activities following total or subtotal thyroidectomy to ablate remaining thyroid tissue are in the range of 1850-3700 MBq. It depends on the remnant size and radioiodine uptake. In subsequent treatment for metastases, administered activity is in the range 3700-11100 MBq.

After high doses used, e.g. for the treatment of thyroid carcinoma, patients should be encouraged to increase oral fluids to have frequent bladder emptying to reduce bladder radiation.

The therapeutic activity to be administered to a child over 10 years and adolescent should be a fraction of the adult dose, calculated from body weight or surface area.

4.3 Contraindications

Sodium Iodide Na¹³¹I solution for injection must not be used in the following cases:

- Hypersensitivity to the active substance or to any of the excipients
- Pregnancy
- For diagnostic purposes in children under 10 years of age.
- Thyroid scanning except in the follow-up of malignant disease or when iodine 123 or technetium-99m is not available.

4.4 Special warnings and precautions for use

The possibility of hypersensitivity including anaphylactic / anaphylactoid reactions should always be considered. Advanced life support facilities should be readily available.

The administration of high dose radioiodine may result in significant environmental hazard. Suitable precautions should be taken concerning the activity eliminated by the patients in order to avoid any contamination.

The therapeutic administration of sodium ^[131I] iodide in patients with significant renal impairment requires special attention with regards to administered activity. Sperm banking should be considered for young men who have extensive disease and therefore may need high radioiodine therapeutic doses.

Contraception for 6 months (for patients with benign thyroid conditions) or 12 months (for patients with thyroid cancer) is recommended for both sexes after therapeutic administration of sodium ^[131I] iodide.

For each patient, exposure to ionising radiation must be justifiable on the basis of likely benefit. The activity administered must be such that the resulting radiation dose is as low as reasonable achievable bearing in mind the need to obtain the intended diagnostic or therapeutic result.

4.5 Interaction with other medicinal products and other forms of interaction

A full drug history should be taken and relevant medication including the ones mentioned below should be withheld prior to the administration of sodium ¹³¹I iodide.

Active substances	Withdrawal period prior to administration of sodium iodide [¹³¹ I].
Antithyroid agents (e.g. carbimazole, methimazole, propyluracil), perchlorate	2 – 5 days before until several days after administration.
Salicylates, steroids, sodium nitroprusside, sodium sulfobromophthalein,-anticoagulants, antihistamines, antiparasitics, penicillins, sulphonamides, tolbutamide, thiopental	1 week
Phenylbutazone	1 - 2 weeks
iodine-containing expectorants and vitamins	Approx. 2 weeks
Thyroid hormone preparations	2-6 weeks
Amiodarone*, benzodiazepines, lithium	Approx. 4 weeks
iodine-containing preparations for topical use	1 - 9 months
iodine-containing contrast media	Up to 1 year

* Due to the long half-life of amiodarone, iodine uptake in the thyroid tissue can be decreased for several months.

4.6 Pregnancy and lactation

Pregnancy

Sodium iodide [¹³¹I] is contraindicated during established or suspected pregnancy or when pregnancy has not been excluded. The absorbed dose to the uterus is likely to be in the range 11-511 mGy, and the foetal thyroid gland avidly concentrates iodine during the second and third trimesters.

Breastfeeding

Breast feeding should be discontinued after sodium ¹³¹I iodide administration.

For radioprotection reasons following therapeutic doses, it is recommended to avoid close contact between mother and child for at least one week.

4.7 Effects on ability to drive and use machines

No studies on the effect on the ability to drive or use machines have been performed.

4.8. Undesirable effects

The following undesirable effects are recognised for sodium ¹³¹I iodide:

Blood and the lymphatic system disorders

Bone marrow depression

Eye disorders

Sicca syndrome, endocrine ophthalmopathy, acquired dacryostenosis

Gastrointestinal disorders

Nausea, vomiting

Endocrine disorders

Hypothyroidism, aggravated hyperthyroidism, Basedow's (Graves') disease, hyperparathyroidism

Infections and infestations

Sialoadenitis

Neoplasms benign, malignant and unspecified (including cysts and polyps)

Gastric cancer, leukaemia, bladder and breast cancer

Immune system disorders

Hypersensitivity

Injury, poisoning and procedural complications

Radiation thyroiditis

Reproductive system and breast disorders

Impairment of fertility in man and woman

Congenital, familial and genetic disorders

Congenital thyroid disorders.

4.9. Overdose

High radiation exposure through overdose can be reduced by means of administration of thyroid blocking agent, such as potassium perchlorate, the use of emetics and promoting a diuresis with frequent voiding of urine.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: various thyroid diagnostic radiopharmaceuticals, sodium iodide [¹³¹I] ATC Code: V09FX03

Pharmacotherapeutic group: therapeutic radiopharmaceuticals, Iodine [¹³¹I] compounds
ATC code: V 10X A01

Iodide, in the amount used for diagnostic and therapeutic indications, is not known to have any pharmacological effect. More than 90 % of the radiation effects result from beta radiation which has a mean range of 0.5 mm.

5.2 Pharmacokinetic properties

Following injection, about 20 % of blood iodide is extracted in a single passage through the thyroid gland. Peak thyroid accumulation occurs within 24 - 48 hours of dosing with about 50 % of the maximum at 5 hours. This kinetic profile provides the rationale for the diagnostics procedures at 24 and 72 hours after dosing.

The effective half-life of radioiodine in plasma is in the order of 12 hours whereas that for radioiodine taken by the thyroid gland is about 6 days.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Sodium carbonate
Sodium hydrogen carbonate
Sodium thiosulphate pentahydrate
Sodium chloride
Water for injections

6.2 Incompatibilities

In the absence of compatibility studies, this medicinal product must not be mixed with other medicinal products.

6.3 Shelf life

28 days from the production date

6.4 Special precautions for storage

Store below 30°C.

Store in original lead shielding container.

Storage of radiopharmaceuticals should be in accordance with national regulations on radioactive materials.

Sodium Iodide Injection should be kept free from contact with metals.

This product is for single use only. Use immediately once it's opened and discard the remaining.

6.5 Nature and contents of container

The 10 ml glass vial (type I) closed with a rubber stopper and aluminum cap and placed in a shielding lead container.

6.6 Special precautions for disposal

Radiopharmaceuticals should be received, used and administered only by authorized persons in designated clinical settings. Their receipt, storage, use, transfer and disposal are subject to the regulations and/or appropriate licenses of the competent official organization. Radiopharmaceuticals should be prepared in a manner which satisfies both radiation safety and pharmaceutical quality requirements. Appropriate aseptic precautions should be taken. The administration of radiopharmaceuticals creates risks for other persons from external radiation or contamination from spill of urine, vomiting, etc. Radiation protection precautions in accordance with national regulations must therefore be taken.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

7. PRODUCT REGISTRATION HOLDER

MEDI RADIO MALAYSIA Sdn Bhd.

Plaza Mont Kiara,

E-13A-9, No 2. Jalan Kiara,

Mont Kiara, 50480 Kuala Lumpur

Manufacturer:

Narodowe Centrum Badań Jądrowych

Ul. Andrzeja Sołtana 7

05-400 Otwock, Poland

8. MARKETING AUTHORISATION NUMBER

MALxxxxxxxxAZ

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

10. DATE OF REVISION OF THE TEXT

1-Oct-2023

11. DOSIMETRY

The ICRP model refers to intravenous administration. Since absorption of radioiodide is rapid and complete, this model is applicable in case of oral administration also but there is a further radiation dose to the stomach wall in addition to that due to gastric and salivary excretion. Assuming that the mean residence time in the stomach is 0.5 hr, the absorbed dose to the stomach wall increases by about 30 % for iodine-131.

Radiation dose to specific organs, which may not be the target organ of therapy, can be influenced significantly by pathophysiological changes induced by the disease process.

As part of the risk-benefit assessment it is advised that the effective dose equivalent (EDE) and likely radiation doses to individual target organ(s) be calculated prior to administration. The activity might then be adjusted according to thyroid mass, biological half-life and the “re-cycling” factor which takes into account the physiological status of the patient (including iodine depletion) and the underlying pathology.

The tables below show the dosimetry as calculated according to the Publication 53 of the ICRP (International Commission on Radiological Protection, Radiation Dose to Patients from Radiopharmaceuticals, Pergamon Press 1987).

Thyroid blocked, uptake 0 %

Organ	Absorbed dose per unit activity administered (mGy/MBq)				
	Adult	15 years	10 years	5 years	1 year
Adrenals	0.037	0.042	0.067	0.110	0.200
Bladder wall	0.610	0.750	1.100	1.800	3.400
Bone surfaces	0.032	0.038	0.061	0.097	0.190
Breast	0.033	0.033	0.052	0.085	0.170
GI-tract					
Stomach wall	0.034	0.040	0.064	0.100	0.190
Small intest	0.038	0.047	0.075	0.120	0.220
ULI wall	0.037	0.045	0.070	0.120	0.210
LLI wall	0.043	0.052	0.082	0.130	0.230
Kidneys	0.065	0.080	0.120	0.170	0.310
Liver	0.033	0.040	0.065	0.100	0.200
Lungs	0.031	0.038	0.060	0.096	0.190
Ovaries	0.042	0.054	0.084	0.130	0.240
Pancreas	0.035	0.043	0.069	0.110	0.210
Red marrow	0.035	0.042	0.065	0.100	0.190
Spleen	0.034	0.040	0.065	0.100	0.200
Testes	0.037	0.045	0.075	0.120	0.230
Thyroid	0.029	0.038	0.063	0.100	0.200
Uterus	0.054	0.067	0.110	0.170	0.300
Other tissue	0.032	0.039	0.062	0.100	0.190
Effective dose (mSv/MBq)	0.072	0.088	0.140	0.210	0.400
Bladder wall contributes to 50.8 % of the effective dose.					
Incomplete blockage:					
Effective dose (mSv/MBq) at small uptake in the thyroid					
uptake 0.5 %	0.300	0.450	0.690	1.500	2.800
uptake 1.0 %	0.520	0.810	1.200	2.700	5.300
uptake 2.0 %	0.970	1.500	2.400	5.300	10.00

Thyroid blocked, uptake 15 %

Organ	Absorbed dose per unit activity administered (mGy/MBq)				
	Adult	15 years	10 years	5 years	1 year
Adrenals	0.036	0.043	0.071	0.110	0.220
Bladder wall	0.520	0.640	0.980	1.500	2.900
Bone surfaces	0.047	0.067	0.094	0.140	0.240
Breast	0.043	0.043	0.081	0.130	0.250
GI tract					
Stomach wall	0.460	0.580	0.840	1.500	2.900
Small intest	0.280	0.350	0.620	1.000	2.000

ULI wall	0.059	0.065	0.100	0.160	0.280
LLI wall	0.042	0.053	0.082	0.130	0.230
Kidneys	0.060	0.075	0.110	0.170	0.290
Liver	0.032	0.041	0.068	0.110	0.220
Lungs	0.053	0.071	0.120	0.190	0.330
Ovaries	0.043	0.059	0.092	0.140	0.260
Pancreas	0.052	0.062	0.100	0.150	0.270
Red marrow	0.054	0.074	0.099	0.140	0.240
Spleen	0.042	0.051	0.081	0.120	0.230
Testes	0.028	0.035	0.058	0.094	0.180
Thyroid	210.0	340.0	510.0	1100.0	2000.0
Uterus	0.054	0.068	0.110	0.170	0.310
Other tissue	0.065	0.089	0.140	0.220	0.400
Effective Dose (mSv/MBq)	6.600	10.00	15.00	34.00	62.00

Thyroid blocked, uptake 35 %

Organ	Absorbed dose per unit activity administered (mGy/MBq)				
	Adult	15 years	10 years	5 years	1 year
Adrenals	0.042	0.050	0.087	0.140	0.280
Bladder wall	0.400	0.500	0.760	1.200	2.300
Bone surfaces	0.076	0.120	0.160	0.230	0.350
Breast	0.067	0.066	0.130	0.220	0.400
GI tract					
Stomach wall	0.460	0.590	0.850	1.500	3.000
Small intest	0.280	0.350	0.620	1.000	2.000
ULI wall	0.058	0.065	0.100	0.170	0.300
LLI wall	0.040	0.051	0.080	0.130	0.240
Kidneys	0.056	0.072	0.110	0.170	0.290
Liver	0.037	0.049	0.082	0.140	0.270
Lungs	0.090	0.120	0.210	0.330	0.560
Ovaries	0.042	0.057	0.090	0.140	0.270
Pancreas	0.054	0.069	0.110	0.180	0.320
Red marrow	0.086	0.120	0.160	0.220	0.350
Spleen	0.046	0.059	0.096	0.150	0.280
Testes	0.026	0.032	0.054	0.089	0.180
Thyroid	500.0	790.0	1200.0	2600.0	4700.0
Uterus	0.050	0.063	0.100	0.160	0.300
Other tissue	0.110	0.160	0.260	0.410	0.710
Effective Dose (mSv/MBq)	15.00	24.00	36.00	78.00	140.00

Thyroid blocked, uptake 55 %

Organ	Absorbed dose per unit activity administered (mGy/MBq)				
	Adult	15 years	10 years	5 years	1 year
Adrenals	0.049	0.058	0.110	0.170	0.340
Bladder wall	0.290	0.360	0.540	0.850	1.600
Bone surfaces	0.110	0.170	0.220	0.320	0.480
Breast	0.091	0.089	0.190	0.310	0.560
GI tract					
Stomach wall	0.460	0.590	0.860	1.500	3.000
Small intest	0.280	0.350	0.620	1.000	2.000
ULI wall	0.058	0.067	0.110	0.180	0.320
LLI wall	0.039	0.049	0.078	0.130	0.240
Kidneys	0.051	0.068	0.100	0.170	0.290
Liver	0.043	0.058	0.097	0.170	0.330
Lungs	0.130	0.180	0.300	0.480	0.800
Ovaries	0.041	0.056	0.090	0.150	0.270
Pancreas	0.058	0.076	0.130	0.210	0.380
Red marrow	0.120	0.180	0.220	0.290	0.460

Spleen	0.051	0.068	0.110	0.170	0.330
Testes	0.026	0.031	0.052	0.087	0.170
Thyroid	790.0	1200.0	1900.0	4100.0	7400.0
Uterus	0.046	0.060	0.099	0.160	0.300
Other tissue	0.160	0.240	0.370	0.590	1.000
Effective Dose (mSv/MBq)	24.00	37.00	56.00	120.00	220.00

12. INSTRUCTIONS FOR PREPARATION OF RADIOPHARMACEUTICALS

This product is supplied as a ready to use solution of known radioactivity.

This radiopharmaceutical may be received, used and administered only by authorised persons, in designated clinical settings. Their receipt, storage, use, transfer and disposal are subject to the regulations and/or appropriate licences of the local competent official organisation

The administration of radiopharmaceuticals creates risks for other persons from external radiation or contamination from spills of urine, vomiting, etc. Radiation protection precautions in accordance with national regulations must therefore be taken.

Radiopharmaceuticals should be prepared in a manner which satisfies both radiation safety and pharmaceutical quality requirements. Appropriate aseptic precautions should be taken.

The vials must not be opened before disinfecting the stopper, the solution should be withdrawn via the stopper using a single dose syringe fitted with suitable protective shielding and a disposable sterile needle or using an authorized automated application system.

If the integrity of this vial is compromised, the product should not be used.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.