15 Annex - Energy

81. RULEBOOK ON APPLICATION OF IONISING RADIATION SOURCES IN MEDICINE

RULEBOOK

ON APPLICATION OF IONISING RADIATION SOURCES IN MEDICINE

(Official Gazette of the Federal Republic of Yugoslavia 32/98 and 33/98 - corr.)

I BASIC PROVISIONS

Article 1

This Rulebook shall prescribe measures that shall be applied while using ionising radiation sources in medicine.

Article 2

The procedure that includes use of Ionising radiation sources may be administered on a patient only when prescribed and approved by a person with adequate professional qualifications in medicine.

Application of ionising radiation sources in medicine may be prescribed by:

1) A medical doctor – the diagnostic procedure in X-ray-diagnostic and in nuclear medicine;
2) a specialist in radiology or by a specialist in adequate branch of medicine within his/her scope of specialty – the radio-therapeutic procedure;
3) a specialist in nuclear medicine or by the specialist in adequate branch of medicine within his/her scope of specialty – the therapeutic procedure in nuclear medicine;
4) a dentist – the diagnostic procedure in dentistry.

Application of ionising radiation sources in medicine may be approved by:

1) a specialist in radiology - X-ray diagnostic and radio-therapeutic procedure;
2) a specialist in nuclear medicine or by a specialist in adequate branch of medicine who has been working in the area of nuclear medicine for more than five years – the diagnostic and therapeutic procedure in nuclear medicine;
3) a dentist - the diagnostic procedure in dentistry.

Notwithstanding the above said, a specialist in adequate branch of medicine may approve the X-ray diagnostic procedure within his his/her scope of specialty in emergency cases.

Article 3

The person who approves a diagnostic or therapeutic procedure that includes usage of a ionising radiation source shall chose the means and methods of the diagnostic or therapeutic procedure so that:

1) irradiation of the patient as a result of the applied procedure is medically reasonable in terms of obtaining some diagnostic information or achieving a therapeutic effect which could not be achieved in another way with less risk;
2) the procedure is carried out with the least possible irradiation of the patient, while obtaining quality data for diagnostics, or achieving the desired therapeutic effects;
3) any medically unjustified irradiation of the patient is prevented.

Article 4

The ionising radiation sources, the devices applied along with them and the procedures operated in X-ray diagnostics, radiotherapy and nuclear medicine must comply with the prescribed standards.

Article 5

Application of ionising radiation sources in medicine shall be carried out under supervision of the person who, by virtue of his/her respective entitlement, has given his/her approval for the diagnostic or therapeutic procedure.

Article 6

The person who is authorised to give approvals for application of ionising radiation sources shall, in the course of preparations and implementation of the diagnostic or therapeutic procedure, ensure that safety measures for protection of a patient from unnecessary exposure to ionising radiation are applied.

Article 7

The person who is authorised to prescribe and approve application of ionising radiation sources shall use the results of previous examinations carried out by means of application of ionising radiation sources.

Repetition of the same procedure that involves application of ionising radiation sources may exceptionally be approved only if supported by a written explanation of medical necessity for such procedure.

Article 8

The person who performs diagnostic or therapeutic procedure shall register the data on the performed procedure regarding diagnostics or therapy in the patient's medical card on application of radiation sources in medicine; the template of the said medical card accompanies this Rulebook and forms an integral part hereof.

Article 9

No other persons apart from the patient subjected to radiation procedure, the persons performing the medical procedure and the persons assisting the execution of the medical procedure, may be present in the room with the ionising radiation source at the time of execution of the diagnostic or therapeutic procedure.

Article 10

Patients may not take off their clothes in rooms where X-ray diagnostic or radio-therapeutic procedure is executed; instead, they may do so in special protected cubicles or changing rooms.

Article 11

Implementation of procedures involving application of ionising radiation sources in medicine require use of protection means for patients, persons executing the medical procedure and persons helping with execution of the medical procedure, unless application of such means interferes with proper examination or treatment.

All protection means must have on them data of their protective power in accordance with the prescribed standard.

II APPLICATION OF IONISING RADIATION SOURCES IN X-RAY DIAGNOSTICS

Article 12

While executing an X-ray diagnostic procedure in medicine it is necessary to provide that

1) irradiation of the patient is the least possible, considering the standards for acceptable quality of image and the relevant reference levels for medical exposure;
2) radiation is, as much as possible, limited to the part of the body subject to examination;
3) the levels of the exposure to the ionising radiation beyond the examined part of the body are kept as low as possible;

4) the radiation field within the examined part of the body is as uniform as possible, which should be numerically declared;

5) values applied while irradiating the patient (high voltage, filtration, position and size of the focus, distance between the radiation source and image receiver, size of the field and strength of the anode current and exposure time or their product expressed in mAs) are indicated on controllers desks.

6) there are mechanisms for radiation beam control and power ON/OFF indicator

7) there are devices for automatic interruption of irradiation of the patient after expiry of a specified period of time or after reaching a specified dose, i.e. the value of the multiplying product of the anode current and the exposure time.

Article 13

X-ray devices in multi-pulse circuit shall be used for application of ionising radiation sources in X-ray diagnostics.

By way of exception, x-ray devices in mono-pulse circuit may be used only for teeth imaging, for imaging in patients' rooms and surgery rooms, as well as under emergency circumstances.

Article 14

Portable x-ray devices may be used for illumination and imaging of patients, provided that adequate protection is provided for the operator and for the patient, only in case when it is not possible to use stationary x-ray devices or if moving the patient and transporting him to such devices is contraindicated.

Portable x-ray devices may be used only for imaging of patients in patients' and surgery rooms.

Illumination of the patients by means of portable x-ray devices may be done only if those devices are equipped with an electronic image amplifier or a television system.

Article 15

Patient's jaw condition may only be imaged by x-ray devices designed for this type of imaging.

Article 16

A preventive systematic lung examination shall be done exclusively by means of x-ray imaging and may be conducted only with certain groups of the population under risk or persons of specific occupation.

Systematic examinations referred to in paragraph 1 of this Article shall be done by means of stationary x-ray devices in multi-pulse circuit or by means of x-ray devices in bi-pulse circuit installed in special vehicles.

Article 17

The value of the input dose at the patient's skin surface for each X-ray diagnostic procedure may not be more than 20% higher than the reference values specified in Tables 1-4 that accompany this Rulebook and form an integral part hereof.

Protective measures and means in Roentgen diagnostics

Article 18

Persons who conduct Roentgen diagnostic procedure may not be exposed to Roentgen radiation beam, hold the persons being illuminated or imaged nor hold the cassettes with film during the imaging process.

The persons who, in the course of imaging, hold immobile patients and old persons shall use protective means whose protective power is at least 0.5 mm of lead thickness.

The persons who, in the course of imaging, hold children shall use special protective screens equipped as to enable fixing of the child. The protective power of this screen must be at least 1 mm of lead thickness.

Article 19

Professionally exposed persons in Roentgen diagnostics shall use suitable protective means in the course of application of an ionising radiation source (aprons, gloves, collars for thyroid gland protection and glasses).

Protective apron must be of such shape as to cover the body from the collarbone to the middle of the lower leg, covering the hips, overlapping at the back; during imaging it must protect the thyroid gland, the sternum and the reproductive organs.

Protective gloves must have a separate space for each finger and must reach the elbows.

Protective power of the protective means referred to in paragraph 1 of this Article must be at least 0.5 mm of lead thickness.

Article 20

While performing a Roentgen imaging or illumination, special protection shall be provided specially for the thyroid gland, thymus, ovaries, testicles and blood producing organs of the patient.

While performing a Roentgen imaging of the children's hips, their ovaries or testicles shall be protected with protective covers whose protective power must not be less than 0.5 mm of lead thickness.

Protective means used in Roentgen diagnostic must have protective power of at least 0.5 mm of lead thickness.

Article 21

When imaging lungs and other organs in standing position, portable protective curtains shall be used for hiding the parts of the body that are not to be imaged, and their protective power must not be less than 0.5 mm of the lead's thickness.

Article 22

While performing Roentgen imaging of the teeth, the patients must be protected with protective aprons or covers whose protective power is not less than 0.25 mm of lead thickness. Aprons and covers must be of such shape and size as to protect patient's thyroid gland, sternum and gonads during the imaging.

Article 23

The distance between the focus and the patient's skin (or between the focus and the patient's prop) in the conditions of illumination and imaging must be in accordance with the current standard.

When using x-ray devices for panoramic imaging of the jaw, the distance between the focus and the patient's skin must not be less than 150 mm.

Article 24

When performing illumination by means of portable x-ray devices, one must use image amplifier.

If needed, some additional tubules shall be placed on the appliance radiator, which shall limit the radiation beam.

Article 25

During illumination, a professionally exposed person shall use a protective cathedra with a chair that must have protective power of at least 0.5 mm of lead thickness.

If an x-ray device is being used in the illuminating mode for special diagnostic procedures when a professionally exposed person cannot use a protective cathedra with a chair, additional tubules

which must reach the patient's skin surface, or an additional protective barrier reaching the patient's prop, shall be places onto the radiator,.

The additional protective barriers referred to in paragraph 2 of this Article must have protective power of at least 0.5 mm of lead thickness.

Article 26

When performing serial imaging by x-ray devices that have automatic film transport, contrast media must be injected with suitable devices for automatic injection of contrast.

Article 27

Persons who handle portable x-ray devices for illumination which are used in surgery rooms shall use proper protection means under sterile clothes for protection of the sternum and ovaries or testicles.

Article 28

Roentgen imaging of breasts and imaging in paediatrics shall be performed with the use of amplifying foils based on thin soils and films of adequate quality.

Article 29

The diagnostic procedure with use of ionising radiation for women in the reproductive period of life, if the radiation beam would irradiate the pelvic area, may be conducted within the period of 10 days from the first day of menstrual cycle, except in exceptional cases when there are vital indications requiring implementation of this procedure.

III APPLICATION OF IONISING RADIATION SOURCES IN NUCLEAR MEDICINE

Article 30

When performing a diagnostic or therapeutic procedure in nuclear medicine with application of open ionising radiation sources (hereinafter referred to as the "radiopharmaceutical preparations") the following shall be provided:

1) selection of the most favourable radiopharmaceutical preparation and its activity;
2) adequate preparation of the patient and use of methods for blocking unnecessary uptake of radiopharmaceutical preparation in organs that are not the subject of examination and for enhanced excretion of radiopharmaceutical, whenever it is possible;
3) usage of suitable systems for acquisition and processing of diagnostic information.

Article 31

The patients waiting for an examination or therapy that includes use of radiopharmaceutical preparations shall be seated in a waiting room separate from patients who have already been administered a radiopharmaceutic.

Article 32

After application of radiopharmaceutical preparations, the patient shall receive a written instruction on measures that he/she must follow in order to minimise the risk of contamination and unnecessary irradiation of other persons, as well as on the period of delay of any planned conception for the following three months.

Article 33

Radiopharmaceutical preparations in case of women during their pregnancy may be administered exceptionally in case of vital indications, accompanied by all available protection measures for embryo or foetus.

When administering a radiopharmaceutical preparation to purposes referred to in paragraph 1 of this Article, the radiation dose for the embryo and foetus shall be evaluated and the patient shall be informed about the risk of further pregnancy.

Article 34

Administration of radiopharmaceutical preparations to breastfeeding women may be approved only in case of vital indications. The written instructions that the patient shall receive after such intervention must specify, apart from other information on protection measures, the duration of temporary pause in breastfeeding as prescribed in Table 5 that accompanies this Rulebook and forms an integral part hereof.

Article 35

Administration of radiopharmaceutical preparations to children must be strictly medically indicated. Activity of the radiopharmaceutical preparation shall be adjusted to the body mass and the child's body surface, as well as to other medically relevant characteristics.

Article 36

A nuclear medicine specialist and a medical physicist shall prescribe the activity of the radiopharmaceutical preparation in the diagnostic procedure.

Only a person who fulfils the prescribed conditions for preparing the source of ionising radiation in nuclear medicine may carry out preparation of the radiopharmaceutical preparation referred to in paragraph 1 of this Article and admeasure the prescribed activity.

The activity of the radiopharmaceutical preparation may not be higher than the reference values given in Table 6 that accompanies this Rulebook and forms an integral part hereof.

Article 37

Devices used in diagnostic procedures must have such characteristics as to obtain reliable diagnostic information at the prescribed activities of radiopharmaceutical preparations.

Article 38

Activity of a radiopharmaceutical preparation used for therapy shall be determined on the basis of calculation of the required therapeutic dose of radiation and on the basis of measurement of activity.

Article 39

The radiopharmaceutical activity measurement error may not be greater than 20%.

Article 40

The therapeutic procedure with application of a radiopharmaceutical preparation shall be performed under supervision of a nuclear medicine specialist and a medical physicist, who shall determine a suitable radiopharmaceutical preparation for therapeutic application, determine and measure the required activity of the applied radiopharmaceutical preparation and carry out the necessary measures for protection of patients, staff and population.

Article 41

A nuclear medicine specialist and a medical physicist shall calculate the equivalent radiation dose for the organ or tissue under treatment, the equivalent dose for the most exposed organ or tissue that is not under treatment and the effective doses.

Article 42

Therapeutic application of radiopharmaceutical preparations shall be carried out in a dispensary or a hospital.

If the activity of the applied radiopharmaceutical preparation is higher than 400 MBq 131 I, the therapy shall be performed in a hospital, in special premises designed for a controlled radiation zone.

The patient may be released from the hospital when the activity of the radiopharmaceutical preparation referred to in paragraph 2 of this Article drops below 400 MBq.

Article 43

Post mortem examination and cremation of the deceased persons who were administered radiopharmaceutical preparations in therapeutic purposes during their life may be done only when activity of the applied radionuclides in the body has dropped below the values given in Table 7 that accompanies this Rulebook and forms an integral part hereof.

By way of exception, when there are justified reasons, post mortem examination of persons, referred to in paragraph 1 of this Article may be performed even when the activity of radiopharmaceutics is higher than the prescribed values, however with application of protective means and other measures following the instructions of the person in charge of implementation of measures for protection from radiation.

IV APPLICATION OF CLOSED SOURCES AND GENERATORS OF IONISING RADIATION IN RADIOTHERAPY

Article 44

When performing a therapeutic procedure by means of closed sources and generators of ionising radiation in medicine (hereinafter referred to as the "radiotherapy"), the following shall be ensured:

1) parameters of quality of the therapeutic beam shall be established for each radiotherapeutic source of ionising radiation prior to commencement of its application for treatment of a patient;

2) gauges of doses and fields of radiation of therapeutic sources are properly calibrated;

3) irradiation of the healthy tissue shall be kept at a minimum;

4) prior to commencement of radiotherapy, the patient shall be informed of conditions of irradiation and threatening manifestations and risks.

Article 45

Radiotherapy may be performed only in accordance with the determined treatment programme (hereinafter referred to as the “radiotherapy plan”) and with provided radiation dosimetry.

Article 46

The radiotherapy plan of irradiation also comprises selection and description of a irradiation technique and records of data on conditions of irradiation for reconstruction of the radiotherapy plan, including the necessary clinical radiotherapeutic requirements and physical and technical elements.

Article 47

Clinical radiotherapeutic requirements include diagnostics of a disease, localisation and size of tumour, maximum therapeutic dose, equivalent dose for the treated organ, manner of fractionising, localisation of the neighbouring radiosensitive organs and the minimum limit dose, equivalent dose of the most exposed organ or tissue, irradiation method, type and energy of ionising radiation and the size of the radiation field.

Article 48

Radiological-physical elements of the radiotherapy plan include the defined conditions for realisation of a radiotherapy requirement, as follows: selection of an irradiation technique, preparation of an isodose plan, calculation of irradiation conditions for assigning of the planned therapeutic dose, selection of the mode of operation of the therapeutic device, modification of the radiation field, manner of modification of a radiation beam or the manner of immobilisation of a patient, conditions for positioning of a patient and of the radiation field, conditions for control dosimetric measurements during the treatment.

A medical physicist shall define radiological-physical elements of the radiotherapy plan referred to in paragraph 1 of this Article.

Article 49

Simulation of the radiotherapy plan shall be performed through teamwork by means of a modified Roentgen device - simulator.

Article 50

A radiology technician shall implement the specified elements of the radiotherapy plan and keeps records thereof in the radiation chart.

Presence of the person who approves the therapeutic procedure and of a medical physicist to the first positioning of the patient is mandatory; also, the said persons shall supervise the treatment.

Article 51

Therapeutic dose shall be determined with a measuring uncertainty lesser than 5% and it shall be homogenously applied to the tumour volume.

Article 52

Therapeutic radiation dose must be previously dosimetricaly verified, in accordance with the relevant metrological regulations, in a measuring phantom under conditions that simulate irradiation of the patient.

Article 53

Preparation and application of closed sources of ionising radiation (applicators) for interstitial, intracavital and superficial radiotherapy shall be carried out in special premises intended for these purposes, with compulsory use of portable protective screens, manipulators, protective containers, etc.

Irradiation of patients with ionising radiation sources referred to in paragraph 1 hereof shall be done in special premises and protective cabins. Visits shall not be allowed during a patient's radiation period. A patient's bed must have a sign "RADIATION DANGER" during the radiation period.

A dosimetric control shall be performed after irradiation of the patient in order to make sure that the radiation source has not remained inside the patient.

V FINAL PROVISIONS

Article 54

The Rulebook on Conditions for Application of Ionising Radiation Sources in Medicine (Official Gazette of the Socialist Federal Republic of Yugoslavia 40/86) shall be repealed on the day of entry into force of this Rulebook.

Article 55

This Rulebook shall enter into force on the eighth day following that of its publication in the Official Gazette of the Federal Republic of Yugoslavia.

Template 1

Date Procedure Signature and facsimile

MEDICAL CARD CONTAINING DATA ON APPLICATION OF RADIATION SOURCES IN MEDICINE

NAME:

_____

SURNAME:

_____

PERSONAL NUMBER:

_____

STREET:

_____

CITY/TOWN:

_____

Date: date of application of an ionising radiation source

Procedure: name of the performed procedure with application of an ionising radiation source

Signature and facsimile: signature and facsimile of the person who issued approval for the procedure with application of an ionising radiation source

Table 1

Referent values of doses for the most common Roentgen diagnostic procedures for a typical adult patient

Name of the diagnostic procedure		Input dose at the skin surface per one image [mGy]
Imaging of the lumbar part of the vertebral column		
	A-P	10
	LAT	30
	LSJ	40
Imaging of the abdomen, intravenous urography, cholecystography	A-P	10
Imaging of the pelvic area	A-P	10
Imaging of the hip(s)	A-P	10
Imaging of the lungs		
	P-A	0,4
	LAT	1,5
Imaging of the thoracic part of the vertebral column		
	A-P	7
	LAT	20

Imaging of the teeth		
	Extra-oral	7
	Intra-oral	5
imaging of the skull	orthopantomographic	10
	P-A	5
	LAT	3

Note:

PA – posterior-anterior projection

LAT – lateral projection

LSJ - projection on the lumbosacral iliac joint

AP – anterior-posterior (front - rear) projection

a) Value of the dose given in the air with calculated dispersion. These values refer to conventional combinations of film-amplifying foils with relative sensibility at the level of 200. For relatively sensitive combinations of film-amplifying foils (400-600), these values shall be reduced for the factor 2 to 3.

Table 2

Reference levels of the dose for computerised tomography (CT) for a typical adult patient

EXAMINATION	Mean value of the dose for multiple scanning [mGy]
CT of the head	50
CT of the lumbar part of the vertebral column	35
CT of the abdomen	25

Table 3

Reference levels of the dose for imaging of the breast of average volume

	Mean dose per single projection from the direction of the head towards the vertebral column [mGy]
With a grid	3
Without a grid	1

Table 4

Reference levels of the intensity of dose for Roentgenoscopy for an average adult patient

Mode of operation	Intensity of the input dose at the skin surface [mGy/min]
Standard	25

Table 5

Period of a temporary breastfeeding pause in case of application of radiopharmaceuticals to breastfeeding women

Names of the radionuclides	Period
131I	3 weeks
201Tl	3 weeks
67Ga	3 weeks
111In	3 weeks
123I	2 days

99mTc	12 hours

Table 6

Reference activity levels for the most common diagnostic procedures in nuclear medicine for a typical adult patient

Diagnostic procedure	Radionuclide	Chemical form	Maximum activity per procedure (MBq)
1	2	3	4
Bones			
Skeleton Sc	99mTc	Phosphonate and phosphate compounds	600
Bones Sc SPECT	99mTc	Phosphonate and phosphate compounds	800
Bone marrow Sc	52Fe	Transferin	7
Bone marrow Sc	111In	Transferin	74
Bone marrow Sc	99mTc	Colloid	400
Brain			
Dynamic Sc of the brain	99mTc		900
Static Sc of the brain	99mTc	TcO4-	500
	99mTc	DTPA, gluconate and glucoheptonate	500
Brain Sc SPECT	99mTc	TcO4-	800
	99mTc	DTPA, gluconate and glucoheptonate	800
Brain bloodstream	133Xe	isotonic solution	400
	99mTc	HM-PAO	800
Cisternography	111In	DTPA,	40
Lachrymal gland			
Lachrymal gland drainage	99mTc	TcO4-	4
	99mTc	Colloid	4
Thyroid gland			
Thyroid gland Sc	99mTc	TcO4-	111
	123I	I-	20
Thyroid gland post removal metastases	131I	I-	400

Parathyroid gland Sc	99mTc		74
Parathyroid gland Sc	201Tl	T1+, chloride	37
Lungs			
Lungs ventilation Sc	81mKr	Gas	6000
	99mTc	DTPA, -aerosol	80
Ventilation examinations of the lungs	133Xe	Gas	400
	127Xe	Gas	200
Perfusion Sc of the lungs	81mKr	Water solution	6000
	99mTc	albumin (macro-aggregate and micro-sphere)	100
Perfusion Sc of the lungs with venography	99mTc	albumin (macro-aggregate and micro-sphere)	160
Perfusion examinations of the lungs	133Xe	isotonic solution	200
	127Xe	Isotonic chloride solution	200
Lungs Sc SPECT	99mTc	MAA	200
Liver and spleen			
Liver and spleen Sc	99mTc	colloid	160
Functional billiary system Sc	99mTc	iminodiacetates and adequate agents	150
Blood pool in liver examination SPECT	99mTc	TcO4-	800
Blood pool in liver examination	99mTc	TcO4-	800
Liver blood flow examination	99mTc	TcO4-	800
Liver blood flow examination	99mTc	S-colloid	200
Liver blood flow examination	99mTc	EHIDA	200
Spleen Sc	99mTc	marked damaged erythrocytes	100
Liver Sc SPECT	99mTc	colloid	200
Cardiovascular system			
First blood passage examination	99mTc	TcO4-	800
	99mTc	DTPA,	800
	99mTc	MAG3	400

Bloodstream Sc	99mTc	albumin complex	40
Radionuclide ventriculography	99mTc	marked normal erythrocytes	800
Acute myocardial infarction Sc	99mTc	phosphonate and phosphate compounds	600
Planar myocardial Sc	99mTc	isonitriles	800
Planar/SPECT myocardial Sc	99mTc	isonitriles	300
	99mTc	isonitriles	600
	201Tl	Tl+chloride	100
	99mTc	phosphonate and phosphate compositions	800
Stomach, gastrointestinal tract			
Stomach Sc – mucus glands	99mTc	TcO4-	40
Examination of the esophageal passage	99mTc	S colloid/Sn colloid	5,5
Meckel diverticulum Sc	99mTc	TcO4-	400
Gastrointestinal bleeding	99mTc	colloid	400
	99mTc	marked normal erythrocytes	400
Stomach discharge	99mTc	non-absorbing compounds	12
	111In	non-absorbing compositions	12
	113mIn	non-absorbing compositions	12
Kidneys, urinary system and suprarenal gland			
Kidneys Sc	99mTc	DMSA	120
GFR measurement of glomerular filtration rate	99mTc	DTPA	370
ERPF measurement of effective renal plasma flow	131I	hippuran	12
Kidney Sc and radiorenography	99mTc	DTPA, gluconates and glucoheptonates	350
	99mTc	MAG3	100
	123I	hippuran	20
	131I	hippuran	2
TER measurement of tubular extraction rate	99mTc	MAG3	185
Sc of suprarenal gland medulla	131I	bensilguandine	30

Sc of suprarenal gland cortex	75Se	selenium-cholesterol	8
Other			
Tumour and abscess Sc	67Ga	citrate	300
	201Tl	chloride	100
Tumour Sc	99mTc	DMSA	550
Lymphatic nodes Sc	99mTc	colloid	80
Abscess Sc	99mTc	exametazime of marked leucocytes	400
	111In	marked leukocytes	20
Schilling test	57Co	cyanocobalamin	4
Central protein loss	51Cr	chrome chloride	3
Ferrokinetics	57Fe	ferrocitrate	0,37
Ferrokinetics	59Fe	ferrocitrate	0,8
Thromb Sc	111In	marked thrombocytes	20
Lifetime and place of trombocytes sequestration	111In	oxinate	18
Lifetime and place of erythrocytes' sequestration	51Cr	chromate	1,5
Erythrocytes' lifetime determination	51Cr	sodium-chromate	3
Blood/erythrocytes volume	51Cr	chromate	0,8
Vitamin B12 absorption test	57Co	vitamin B12	0,02
Vitamin B12 absorption test	58Co	vitamin B12	0,03
Immunoscintigraphy	99mTc	immunoglobulins	1000
Immunoscintigraphy SPECT	99mTc	immunoglobulins	800
Immunoscintigraphy SPECT	111In	immunoglobulins	1000
Inflammatory change detection	111In	immunoglobulins	200
Inflammatory change detection	99mTc	leucocytes	1200
Inflammatory change detection SPECT	111In	immunoglobulins	200
Inflammatory change detection SPECT	99mTc	leucocytes	1200
Scrotum Sc	99mTc	erythrocytes	220

Table 7

Maximum activities of radionuclides applied during life in a deceased's body for post mortem examination and cremation without application of special protective measures

Name of radionuclide	Limit activity for post mortem examination [MBq]	Limit activity for cremation [MBq]
1	2	3
131I	10	400
125I	40	4000
90Y	200	70
198Au	400	100
32P	100	30
89Sr	50	20