QUALITY OF LIFE IN GRAVES’ OPHTALMOPATHY

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The methods of Graves’ disease treatment have been modified during latest twenty years. The main symptom which determined specific emotional reaction was orbitopathy. The negative effect of orbitopathy seems to be the most important problem influencing the health-related quality of life (HRQL) in Graves’ patients. The notion “quality of life” which appeared in scientific publication in 80-th is described as great influence of disease and treatment on patients life.

The aim of our study was exploration of some psychological functions and their role in ophthalmopathic patients’ quality of life. We examined 48 women with Graves’ ophthalmopathy (GO) aged from 32 to 64 yr., average 43.3D = 8.17. All women were actively working until the hospitalisation. They were asked to complete the experimental questionnaire based on London’s St. George Hospital (in our modification). We used also: Temperament Inventory (EAS-D) in addition for adults, estimating: emotionality-distress, emotionality-fear, emotionality-anger, activity, and sociability, STAI Questionnaire (State-Trait Anxiety Inventory) and the Depression Scale for DSM III-R. The questionnaire contains 146 items on various aspects: social life, physical health, personal appearance, mental state, work, communication and loneliness. The patients were asked to indicate how often a given statement described them by using a 4-point Likert scale.


Conclusions: Our results indicated that some psychosocial functions of ophthalmopathic patients are decreased comparing with healthy women. The decrease of subjective depression, anxiety tendency and decreased sociality are the most important for ophthalmopathic patients. The other functions are not so important.

EARLY EFFICACY OF ABLATION WITH FRACTIONATED RADIOIODINE IN PATIENTS WITH DIFFERENTIATED THYROID CARCINOMA

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Introduction: Treatment of differentiated thyroid carcinoma (DTC) includes ablation with radioiodine under endogenous TSH stimulation. According to the guidelines, patients without lymph nodes or distant metastases are treated with 60 mCi (2.2 GBq) of 131-I. Current regulations accept treatment with such high activities only in the conditions of specialized hospitalization basis. In patients with high TSH levels or with increased Tg levels, the activities up to 370 mCi (13.5 GBq) are approved. TSH-stimulation is used in the management of DTC in the development age. Aim of the study was to evaluate the early efficacy of radioiodine treatment in children from 1999 to 2000.

Material and methods: Up to now, 37 children with DTC were treated with radioiodine in our department. 4.6% of patients had occult metastases. The mean age of patients was 16 years old (mean 15.3 ± 2.2 years) at the time of the first ablation treatment. Histologically, papillary carcinoma was diagnosed in 27 children (75.0%). follicular variant in 8 children (21.6%), follicular carcinoma — in 9 children (24.3%) and oxyphilic carcinoma — in 1 case (2.7%). In 8 children multifocal form of carcinoma was diagnosed. In 5 children (13.5%) cervical lymph node metastases were found. In two of these children additional distant DTC metastases were diagnosed. The radioiodine whole body scan was performed during endogenous stimulation of TSH. TSH concentration was from 32 to 310 mU/l (mean 127 ± 54; median 106). Concentration of thyroglobulin was from 0.26 to 302 ng/ml (mean 22 ± 65; median 36). Volume of radioiodine thyroglobulin end products (radioiodine thyroglobulin, end products under ultrasonic and HPLC) was measured from 0.05 to 2.37 ml. All children were treated with ablation doses of radioiodine under end products 150 – 300 mCi (mean 64 ± 11).

Results: Until now, 30 children (81.1%) were subjected to radioiodine diagnostics again, ca. 6 months after ablation treatment. In 20 of them (66.7%) complete remission was diagnosed and in these children no further radioiodine treatment was required. Indications for the second radioiodine treatment were present in the remaining 10 children (33.3%) who received radioiodine with activity from 60 to 150 mCi depending on individual standing. Eight out of these children have been already referred to us for the third radioiodine whole body scan. In all of them complete remission was observed. They are now followed up in the outpatient clinic according to the management guidelines.

Conclusions: Radioiodine treatment is an effective method in children with DTC — in 2/3 of patients effective ablation was achieved after the first radioiodine treatment, in the remaining 1/3 — after the second course of radioiodine treatment.

Tg (ng/ml) | U24 (%) | V (ml) |
---|---|---|
Group 1 | 29 ± 55.2 | 0.8 | 1.7 ± 1.8 | 0.9 | 0.17 ± 0.33 | 0.06 |
Group 2 | 71 ± 66.8 | 0.6 | 1.4 ± 1.7 | 0.9 | 0.19 ± 0.61 | 0.02 |

Complete remission was achieved in 43 patients from group 1 and in 177 patients from group 2 (SR 55.8% v. 61.1%, p = 0.8). As soon as the adequate hospital ward with a decontamination system was organized and the regulations of ambulatory treatment were modified, therapy with fractionated doses of radioiodine was abandoned. Conclusion: Treatment with fractionated doses of radioiodine did not significantly influence the early efficacy of ablation in patients with DTC.
INFLUENCE OF PREVIOUS HYPERTHYROIDISM ON ABLATIVE RADIODETHION TREATMENT OF DIFFERENTIATED THYROID CARCINOMA
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Introduction: In some patients with hyperthyroidism, differentiated thyroid carcinoma (DTC) is diagnosed after surgery. As all patients with DTC, they are then subjected to thyroid ablation with radioactive iodine. Preoperatively, previous hyperthyroidism influencing iodine metabolism may decrease the effective dose of radioactive iodine and thus limit the efficacy of ablation. Aim of this study was a retrospective analysis of efficacy of radioactive iodine treatment in patients with DTC who had been treated for hyperthyroidism.

Material and methods: A total of 879 patients with DTC were treated in our department between 1999 and 2009 and who had been subjected to at least one control radioactive iodine treatment diagnostics 6–8 months after ablation, patients who had been diagnosed and treated for hyperthyroidism before surgery were retrospectively selected, constituting Group H. The remaining patients in whom hyperthyroidism had never been diagnosed were included in the control group (Group C). Ablation success rate (SR) as assessed in the first control diagnostics 6–8 months after ablation in both groups was compared.

Results: 69 patients (11.9%) aged 11–76 years (median 52 yrs) were qualified to Group H. The Group C consisted of 510 patients (88.1%) aged 12–94 yrs (median 59 yrs). Papillary thyroid carcinoma was relatively more frequent in Group H than in Group C (97 vs. 99.2%, p < 0.05), follicular thyroid carcinoma—slightly more frequent in Group C (10.1% vs. 8.4%, p < 0.05). In Group H, the post-stress increase in the left ventricular ES volume grows stronger between 1st and 3rd hr after termination of exercise.

Conclusion: Previous hyperthyroidism did not significantly influence the early effect of radioactive iodine ablation in patients with DTC.

EVIDENCE FOR EXTRAVASATION OF INTRACORONARY ADMINISTERED BONE-MARROW DERIVED CD34+ STEM CELLS IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION
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Aim: The purpose of the study was to evaluate the extravasation and tissue migration after intracoronary administration in patients with acute myocardial infarction (AMI).

Material and methods: 20 patients with significant aortic stenosis and 21 patients with chronic mitral regurgitation were included in the study. In all patients, at day 2–6 after AMI onset, low-dose exercise, 30 min of bone marrow aspirate was obtained by sternal puncture and CD34+ cells were isolated from bone marrow aspirate by magnetic cell sorting using the Dynal® CD34 Progenitor Cell Selection System. This kit contains Dynabeads® for the positive isolation of the CD34+ cells plus DETACHaBEAD® for the release of the captured cells (from the beads). Cells were subsequently labeled with 0.4–0.8 nCi (15–30MBq) of 111-Indium-oxinate (Mallinckrodt). Cell suspension was administered sub-selectively intracoronary into the infarct-related artery at the time of a brief coronary flow decrease. An over-the-wall balloon was inflated for 120 seconds and cells were delivered via the internal catheter lumen. Whole-body scans using a double-head Varicam gamma camera were performed in each patient 24 hours after administration.

Results: Main regions of uptake were detected over liver, spleen and heart. Based on evaluation of activity in the regions of interest, we estimated that 11–11% of injected activity was concentrated in the heart, whereas uptake in the spleen and the liver was 3–17% and 12–45% of total injected activity, respectively.

Conclusion: Our preliminary data provide evidence for stem cell extravasation and tissue migration after intracoronary administration in patients with AMI. Detailed studies evaluating possible correlations of stem cell tissue migration with cell administration protocol data, including the time of primary PTCA after AMI onset and timing of cell administration, are needed.

APPLICATION OF DIPYRIDAMOLE STRESS TC-99MIBI SPECT IN PATIENTS WITH SIGNIFICANT AORTIC STENOSIS
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Material and methods: The study comprised 20 patients with significant aortic stenosis who were compared with 20 patients with CAD designated as CCS III and IV. All patients underwent a 5-minute dipyridamole infusion (1.5 μg/kg body weight) protocol stress technetium-99m sestamibi SPECT. Visual 17-segment SPECT analysis used a standard five-point scoring system ranging from 0 (normal tracer uptake) to 4 (absent uptake). The SPECT results were considered abnormal if more than two segments had a stress score 3. Two normal results were compared to the same number of patients diagnosed with CAD. All patients also underwent coronary angiography procedure. The results in the groups were subsequently compared using the U-Mann-Whitney test and Pearson’s correlation nonparametric test.

Results: Sensitivity of gated SPECT study was calculated at the level of 83% in the studied group vs. 100% in the controls, with positive predictive value at 88% vs. 90%, respectively. Hemodynamic responses during dipyridamole stress testing demonstrated no significant differences in the net change in systolic blood pressure (30% vs. 25%, patients with aortic stenosis vs. controls), heart rate (20% vs. 20%), dyspnea (20% vs. 30%) or incidence of chest pain (30% vs. 30%). Conclusions: Dipyradiomol Tc99m MIBI SPECT study was established to be well tolerated, safe and diagnostically accurate in patients with significant aortic stenosis and suspected CAD.
Diagnosis: The venous insufficiency (VI) of lower limbs is the most widespread disease and its frequency still increase. The earlier stage of VI can be non-symptomatic. The Doppler ultrasound technique is the most common diagnosis methods used in recognizing disorders of venous circulation of the lower limbs. Other useful method can be radioisotope technique as phlebography, which allows for functional evaluation of disorders of venous circulation of the lower limbs. This method has a very important sense in questionable results of standard diagnosis examination.

Aim of the study: The purpose of this study was utility evaluation of radioisotope phlebography using in vivo labeled red blood cells in the venous insufficiency of the lower limbs diagnosis.

Material and methods: Analysis included 26 patients (17 women, 9 men, mean age 51 years). Each patient received intravenous 5 ml methylenediphosphonate (Amersham). Than after 15 minutes (apply pressure above ankles) each patient was injected subcutaneous (in web space of the both feet) 99m-technetium with activity 150–200 MBq. Static acquisition with the use of X-Ring gamma camera (from feet to pelvis, move 10 cm/min) has been started after 3 minutes post injection of the isotope and next acquisition with decompression was performed.

Results: In all patients good quality functional images of the venous vessels of the lower limbs was visualized. There was no case of any local or general undesirable symptoms post injection of the radiotracer. In 8 patients normal functional image of venous vessels were observed, whereas in 18 cases disorders in venous circulation (block in deep veins outflow and insufficiency of perforating veins) were shown. Results of radioisotope phlebography confirmed in 25 cases with results of ultrasound examination. Only in one case radioisotope phlebography was shown disorders of venous circulation of the legs despite normal ultrasound investigation.

Conclusions: Relatively long-time subsists of the tracer in the intravenous space and good layout of the radioactivity in venous vessels include significant advantages of this method. Radioisotope phlebography using in vivo labeled red blood cells can be technique with choice in cases of difficulty in intraoperative injection of the radiohormonals due to edema.

Conclusions: [ 123I]FP-CIT (DaTSCAN) is the radiofarmaceutic which enables in vivo inspection of dopaminergic neurons in the nigrostriatal system and is of diagnostic value in differentiation between Parkinson's disease and essential tremor. In the case of multiple system atrophy the imaging revealed significant alteration of the presynaptic dopaminergic system in patients with Parkinson’s disease and parkinsonian syndromes: multiple system atrophy was set. Imaging of the brain with [ 123I]FP-CIT (DaTSCAN) and MRI were performed. The radiopharmaceutic DaTSCAN was administered intravenously in the dose 145–148 MBq. SPET images were reconstructed by filtered backprojection with the use of Butterworth filter. The images were inspected visually. Images from SPET and MRI were superimposed by means of the workstation Hermes (Nuclear Diagnostics) with designated regions of interest (ROI) in the striatum and occipital cortex in order to assess semi-quantitatively the binding of dopamine transporter. Results: from the group of 8 patients evaluated with the use of DaTSCAN four had normal results, and four — abnormal. The preliminary diagnosis was sustained in 3/8 of patients (including Parkinson's disease in two patients and multiple system atrophy in one patient). In the remaining 5 patients the preliminary diagnosis was changed, namely: in 2 cases the essential tremor was diagnosed, in 1 case — Parkinson’s disease, in 1 case — orthostatic hypotonia Shy-Drager, and in 1 case — despite the tremor of the upper limbs results were normal. In all 8 patients the tracer proved to be useful in the confirmation of clinical diagnosis, especially in the differentiation between the essential tremor and Parkinson's disease. In the case of multiple system atrophy the imaging revealed significant alteration of the presynaptic dopaminergic system in patients with Parkinson’s disease and parkinsonian syndromes: multiple system atrophy was set. In 8 subjects the result was equivocal due to presence of post surgery and radiation effects.

Conclusions: That pilot study group investigated of 8 patients in which either preliminary diagnosis or suspicion of Parkinson's disease, parkinsonian syndrome or multiple system atrophy was set. Imaging of the brain with SPET (dual head detector Varian Elscint) and MRI were performed. The radiopharmaceutic DaTSCAN was administered intravenously in the dose 145–148 MBq. Static acquisition with the use of X-Ring gamma camera (from feet to pelvis, move 10 cm/min) has been started after 3 minutes post injection of the isotope and next acquisition with decompression was performed.

Results: In all patients good quality functional images of the venous vessels of the lower limbs was visualized. There was no case of any local or general undesirable symptoms post injection of the radiotracer. In 8 patients normal functional image of venous vessels were observed, whereas in 18 cases disorders in venous circulation (block in deep veins outflow and insufficiency of perforating veins) were shown. Results of radioisotope phlebography confirmed in 25 cases with results of ultrasound examination. Only in one case radioisotope phlebography was shown disorders of venous circulation of the legs despite normal ultrasound investigation.

Conclusions: Relatively long-time subsists of the tracer in the intravenous space and good layout of the radioactivity in venous vessels include significant advantages of this method. Radioisotope phlebography using in vivo labeled red blood cells can be technique with choice in cases of difficulty in intraoperative injection of the radiohormonals due to edema.

Abstracts
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ONCOLOGY

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NEUROANATOMICAL CORRELATES OF POST-STROKE APHASIAS ASSESSED BY rCBF SPECT
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Aims and background: There is no common consent, how the particular speech functions are correlated by particular brain structures. The aim of the study was to study neuroanatomical correlates of chosen post-stroke aphasia.

Material and methods: The study involved 50 patients with left-hemisphere stroke and mild to moderate aphasia. To assess the degree of aphasia Boston Diagnostic Aphasia Examination (BDAE) was applied. rCBF SPECT scanning was performed using 99mTc-HMPAO (Amersham, UK) and a triple-head gamma-camera MS-3 (Siemens, Erlangen, Germany). Analysed were intercerebral blood flow asymmetries and regional cerebral blood flow normalised to cerebellar perfusion.

Results: In Broca’s aphasia dominated changes in frontal and — to lesser extent — parietal lobe and striatum, whereas in Wernicke’s aphasia changes were seen mostly in temporal and parietal cortex. In global aphasia SPECT showed an extensive perfusion deficit in perisylvian area and thalamus.

Conclusions: 1. Those results indicate the need of reconsideration of neuroanatomical correlates in aphasia, particularly the role of subcortical lesions; 2. In particular types of aphasia the patterns of CBF changes differ; 3. rCBF SPECT scanning should play a major role in aphasiological studies.

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rCBF SPECT SCANNING IN PATIENTS WITH PARKINSON’S DISEASE AND DEMENIA
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Background and aim of the study: Dementia in Parkinson’s disease (PD) is 2-6-fold more frequent than in the rest of population. It presents numerous diagnostic difficulties due to lack of uniform diagnostic criteria, specificity of PD itself, including bradyphrenia and motor slowing disorders, and comorbidity with other causes, which may mimic dementia. Psychological testing may be difficult. The aim of the study was the evaluation of the usefulness of rCBF SPECT scanning in this group of patients.

Material and methods: 44 PD patients were enrolled in the study. PD non-demented (11 patients), PD with mild, selective cognitive impairment (20 patients), PD overt-demented patients (13 subjects); control group were 20 healthy volunteers. rCBF SPECT has been performed using 99mTc-HMPAO (Amersham, UK) and a triple-head gamma-camera MS-3 (Siemens, Germany). Interhemispheric CBF changes were assessed using an asymmetry index; regional CBF changes by cerebellar normalization. MRI scanning has been performed using 0.5 T device Gyroscan (Philips, Hilversum, Countries). White matter changes assessed in ARWMC scale.

Results: when compared with controls, PD patients had significantly lower CBF in all cerebral regions except the thalamus and basal ganglia. In demented PD patients this hypoperfusion was more pronounced in temporal and occipital lobes. The number of focal perfusion deficits in demented PD patients was significantly higher for whole cerebellum and left, but not right hemisphere. MRI findings as measure by ARWMC white matter changes scale were non-contributory.

Conclusions: those results suggest mixed vascular/neurodegenerative pathomechanism of cognitive impairment in PD. rCBF SPECT scanning may play an important role in differential diagnosis of cognitive impairment in Parkinson’s disease.

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THE CONNECTED PALLIATIVE THERAPY OF PAINFUL OSTEOBLASTIC-OSTEOLYTIC BREAST CANCER BONE METASTASES USING RADIOISOTOPE AND BISPHOSPHONATE
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Aims of the study: (1) to evaluate the efficacy of the connected therapy (radioisotope and bisphosphonate) in the treatment of painful osteolytic metastases of breast cancer, (2) to assess the clinical and laboratory response in patients treated with bisphosphonate, but without good results. Each patient received a standard dose of strontium-89 (Metastron) or samarium-153 (Quadramet) combined with intravenous infusion of bisphosphonate, but without good results. No pathological adverse reactions were observed. For assessment of therapy effectiveness; pain relief (VAS scale), a reduction in analgesic requirements and motor activity (ECOG and Karnofsky scale) were evaluated.

Results: during follow-up, 4 and 8 weeks after the radioisotope therapy a statistically significant pain relief effect (VAS scale) from 7 to 4 (p < 0.05) was observed. Analgesic requirements decreased to 30% of dose on average. The motor activity of the points evaluated according to ECOG scale increased from 3 to 2 and from 40 to 60 in Karnofsky scale. No pathological fractures, hypercalcaemia, but 2 serious cases of pancytopenia with clinical manifestation of pancytopenia were better than in the group treated with bisphosphonates or radioisotope only.

Conclusions: the connected therapy of pain with radioisotope and bisphosphonate is better tolerated in the group treated with bisphosphonates or radioisotope only.
**MENTS IN TREATMENT OF PATIENT WITH MELANOMA AMELANOTICUM OF THE PENIS — THE CASE REPORT**

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Malignant melanoma of the penis is a rare neoplasm. In most cases, the neoplasm is locally advanced on presentation. Management of primary tumor as well as of regional lymph nodes is of a crucial importance. In many cases regional lymph nodes are not palpable. Sentinel node biopsy allows the early detection of metastases in lymph nodes. We present the patient who underwent partial amputation of penis due to giant penis tumor. Postoperative histopathology revealed melanoma amelanoticum. Prior to sentinel node biopsy the patient had lymphoscintigraphy with 99mTc on an albumin carrier administered into the penis stump (Nano- collo, 72 MBq in 0.5 ml, given in 4 sites). The examination revealed lymphatic flow into the inguinal lymph nodes on both sides. Two sentinel nodes in the group of region- al inguinal nodes on the left side, and one on the right side were identified. Sentinel nodes biopsy was done about 24 hours after lymphoscintigraphy. Fifteen minutes prior to biopsy 1 ml of dye Patentblau V was given. Intraoperatively radiation was measured with hand-held gamma radiation detector. Two sentinel nodes were identified in the left inguinal area, and one on the right side. The nodes dyed blue and the radiation level was almost 20-fold higher than in surrounding tissue. The course of lymphoscintigraphy and operation was documented by photography. Histopa- thology (H&E) and immunohistochemistry (HMB 45) revealed the presence of microme- tastasis in one of the sentinel nodes in the left groin. The patient underwent left diagonal lymphadenectomy. Examination of material obtained during operation revealed in one of the nodes the presence of metastasis 2 mm in diameter. The postoperative course after sentinel node biopsy and lymphadenectomy was un- eventful. The patient received adjuvant treatment (DDP + DTIC). During 5 month postoperative observation there was no progression of the disease. Conclusions: Sentinel node biopsy allowed for early detection of metastases and early selective lymphadenectomy with adjuvant therapy.

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**THE PRE-OPERATIVE LYMPHOSCINTIGRAPHY IS A NECESSARY PART OF SENTINEL LYMPH NODE BIOPSY IN PATIENTS WITH SKIN MELANOMA OF THE TRUNK**

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Background: In Poland sentinel lymph node biopsy in skin melanoma patients is a standard procedure in third level reference centers. The method requires the spe- cial equipment. Therefore, the availability of the method is limited. Objectives: To assess whether it is possible not to perform a pre-operative lymphoscin- tography in patients with skin melanoma of the trunk, undergoing a sentinel node biopsy. Material and methods: From 1.12.1999 to 31.12.2003 in the Department of Surgi- cal Oncology, Medical University of Łódź, in 120 patients with trunk skin melanoma sentinel node biopsy was performed. There were 50 women (42%) and 70 men (58%) in the studied group. Age ranged from 32 to 87 years. In all of them pre- operative lymphoscintigraphy (Nanoocol — 2 mCi, 0.5 ml) in the Department of Nuclear Medicine, Medical University of Łódź, intra-operative blue dye mapping and intra-operative detection of gamma radiation were performed. Results: Pre-operative lymphoscintigraphy allowed for the detection of sentinel node(s) in all studied patients (100%). In 77 of them (64%) the tracer flew to one group of regional lymph nodes. In the remaining 43 patients (36%) the tracer flew to two or three different lymph nodes groups. Sentinel node(s) was found intra-operatively in 91 patients (98.3%). In all these patients sentinel nodes were identi- fied using intra-operative detection of gamma radiation. Pigmentation of sentinel node(s) was found intra-operatively in 90 patients (70%). The difference between intra-operative detection rate of sentinel node using gamma-probe (98.3%) and using blue-dye technique (75%) was statistically significant (p<0.05). Conclusions: The pre-operative lymphoscintigraphy is a necessary part of sentinel lymph node biopsy in patients with melanoma of the trunk. It shows the directions of lymph flow from the site of primary tumor, the site of sentinel lymph node(s) in one or more groups of regional lymph nodes. The intraoperative assessment of radia- tion is a main measure of sentinel lymph nodes identification; the use of blue dye is less important.

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**RADIATION RISK DURING BREAST CANCER SURGICAL TREATMENT WITH THE USE OF INTRAOPERATIVE HAND-HELD GAMMA-PROBE FOR IDENTIFICATION A SENTINEL-NODE**

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Introduction: Intraoperative hand-held gamma-probe identification of a sentinel- node is a standard procedure in third level reference centers. The method require the special equipment. Therefore, the availability of the method is limited. Materials and methods: We studied the absorbed radiation doses of 28 persons involved in intraoperative hand-held gamma-probe identification of a sentinel-node in breast cancer patients: a physician who administered the radiotracers, surgeons, assisting nurses, pathologists. Sentinel node identification was done following intra- operative application of 99mTc-nanocolloid (Amersham, England) of 0.5–1 mCi activity. For the assessment of absorbed doses skin thermoluminescence dose- meters (LL, Cracow, Poland) worn on right-hand fingers were applied. Dose meters sensitivity threshold was 0.05 mSv. Results: in 27/28 staff persons no exceeding of sensitivity threshold was showed; in 1 nurse hand-absorbed-dose was 0.05 mSv. Conclusions: Intraoperative hand-held gamma-probe identification of a sentinel-node is safe for the personnel performing and assisting the operation.
**SENTINEL NODE IDENTIFICATION IN BREAST CANCER PATIENTS**

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**Introduction:** regional lymph nodes removal is a standard element of surgical breast cancer management. An important issue is then the identification of sentinel node (SN), i.e. the first node in the lymph drainage from tumour’s area. The aim of the study was to compare radionuclide and blue dye techniques of sentinel node identification and to assess the influence of clinical modalities on the result of the study.

**Material and methods:** 196 patients with breast cancer were enrolled in the study divided into three groups: group I (51 pts.), where combined — blue dye/radiouclide SN identification has been performed; radionuclide administered around the tumour, group II (72 pts.), where only blue dye technique was employed, group III (72 pts.), where blue dye and radiocolloid was administered periareolary. We used 111In-labeled nanocolloid (Amersham, UK), pre-operative scintigraphy using a single-head gamma camera Diacam (Siemens), intra-operative SN identification using hand-held probe NeoProbe.

**Results:** sensitivity, specificity, positive and negative predictive value were respectively: in group I 92%, 100%, 96%, in group II 72%, 100%, 81%, in group III 91%, 100%, 95%. An efficiency of sentinel node identification depended on experience of surgeon, did not depend on age, the size of the tumour, percentage of fatty tissue in the breast, histopathology of the tumour.

**Conclusions:** combined radionuclide/blue dye technique shows higher sensitivity, specificity, positive and negative predictive in comparison to blue dye technique applied alone.

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**RESULTS OF 131-I MIBG THERAPY IN MEDULLARY THYROID CANCER**


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**Material and methods:** a retrospective review of 62 cycles of 131-I MIBG therapy in 35 patients was performed. 1 cycle of treatment was performed in 21 patients. In 14 patients 2–5 cycles were performed. Patients received 92–200 mCi 131-I MIBG per cycle at 3–6 monthly intervals. The cumulative dose was 92–700 mCi (median 155 mCi). The median follow up was 24 months (0–62) from the first diagnosis of MTC.

**Results:** sensitivity, specificity, positive and negative predictive value were respectively: in group I 92%, 100%, 96%, in group II 72%, 100%, 81%, in group III 91%, 100%, 95%. An efficiency of sentinel node identification depended on experience of surgeon, did not depend on age, the size of the tumour, percentage of fatty tissue in the breast, histopathology of the tumour.

**Conclusions:** combined radionuclide/blue dye technique shows higher sensitivity, specificity, positive and negative predictive in comparison to blue dye technique applied alone.

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**LYMPHOSCINTIGRAPHY IN CERVICAL CANCER PATIENTS**

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**Background:** Regional lymph node surgical management is an integral part of cervical cancer therapy. In gynaecological oncology, recent studies have confirmed the utility of the sentinel node concept in vulvar and cervical cancer. The method of marker’s administration is considered to play an important role in sentinel node detection.

**Material and methods:** 60 patients with cervical cancer (stage IB-IIA underwent) sentinel node detection using raditional abdominal hysterectomy. The patients were randomly divided into two groups, the first of 30 patients with 0.5–1cm deep marker injection, the second with sub-epithelial marker injection. Gamma-camera scanning, as well as hand-held probe detection was applied.

**Results:** SN detection using lymphoscintigraphy were “hot” when using the hand-held gamma probe. Deep marker injection revealed the sentinel node in 27 patients (90%) on both sides, in 3 patients (10%) only on one side. Only 40 (67%) sentinel nodes were blue-stained. Sub-epithelial marker administration revealed the sentinel node on both sides in all 30 patients (100%). In 28 patients (93,3%) the sentinel nodes were radioactive and blue-stained, in one case not blue stained on both sides, in one case blue stained only on one side.

**Conclusions:** The sentinel node detection rate in cervical cancer is relatively high and depends on the applied technique. The superficial administration of radiocolloid and the blue dye into the cervix provides a higher sentinel node detection rate than deep administration in cervical cancer patients.

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**USE OF THE 111I-LABELED MONOCLONAL ANTI-V~a~5 ANTIBODY FOR VISUALIZATION OF TUMOR NEOANGIOGENESIS**

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**Introduction:** Anti-angiogenic treatment is recently drawing more and more attention. Consequently, diagnostic methods for estimation of the efficacy of such a therapy need to be developed. Among potential candidates which could serve as a specific benchmark is a monoclonal antibody (MoAb) directed against the β3 sub-integ of integrin (CD61; BD Bioscience). Conjugating this MoAb with the gamma-ray-emitting short-lived isotopes might allow for imaging of radiopharmaceutical deposition using the gamma-camera-type detectors.

**Material and methods:** For estimation of the applicability of the anti-CD61 MoAb to visualize tumor blood vessels in vivo, the antibody was conjugated with iodine (111) by the standard chloramine T method (radiochemical purity of the MoAb-111I conjugate at 1 hour after the iodination exceeded 99%). Distribution of the conjugates in the transplanted syngeneic tumors (as murine models of angiogenesis) was carried out utilizing visualization techniques used in nuclear medicine. Biodistribution of the conjugate in the murine body was evaluated using the same model of angiogenesis as in the imaging studies. Results are expressed as percent of the injected dose per gram of tissue (%ID/g), each value representing mean and SD obtained from three animals.

**Results:** The intravenously applied MoAb anti β3 sub-integ accumulates in the tumor in a high (3/1) tumor/muscle ratio. Additionally, the biodistribution reveals predominantly hepatobiliary excretion resulting in low activity in the muscles (1.16 %ID/g). A high (3/1) tumor/muscle ratio. Additionally, the biodistribution reveals predominantly hepatobiliary excretion resulting in low activity in the muscles (1.16 %ID/g). These data were confirmed by the results of the scintigraphic studies showing a good visualization of neangiogenesis in the tumor-bearing mice.

**Conclusion:** Using MoAb anti-CD61 as a radionuclide could form a basis for elaboration of a non-invasive diagnostic method allowing for visualization of tumor neovascularization in vivo, a method useful for monitoring tumor growth and evaluation of the efficacy of the anti-angiogenic therapy in early and later stages of the disease.
**RADIOPHARMACY**

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**Aim of the study:** Radiopharmaceutical 188Re perrhenate is produced in the production system consisting of cation exchanger AG1-X2, on which the sodium ions were adsorbed and anionic column Sep-Pak Accel Plus GMA Light, on which the perrhenate ions were concentrated. Sodium perrhenate-188Re was dissolved in the desired hot-cells, forming a complete production line in compliance to GMP requirements and according to ISO 9001:2000 standard.

**Results:** The developed method enabled preparation of the carrier-free solution of sodium perrhenate-188Re with activity up to 180 GBq in 1 to 3 ml volume. Radiochemical purity of 188Re perrhenate-188Re has been installed in the destined hot-cells, forming a complete production line adjacent organs. The gamma photon can be used to monitor biodistribution and estimate the location of the radiopharmaceutical in vivo. Because of the great interest of nuclear medicine in 188Re applications, the technology of its manufacturing in the form of isotonic and sterile solution of sodium perrhenate-188Re has been developed at the Radiosotope Centre POLATOM. The methods used for quality control of Y-90 enable the determination of carrier-free Y-90 in a standardized ionization chamber. The biological investigations including internalisation and receptor affinity were carried out on AR42J cells. The methods used for quality control of Y-90 enable the determination of biological molecule may affect its receptor affinity. The goal of this work was to establish the laboratory conditions for the radiolabelling of somatostatin analogues, which are used for receptor mediated radiotherapy as well as for brachytherapy in the treatment of coronary vessels was growing rapidly.

**Conclusions:** 188Re could be efficiently used for labelling of HEDP (hydroxyethylidene diphosphonate), radiopharmaceutical applied for palliative therapy of bone metastases. The aim of our preliminary studies was to prepare tracer for radiolabelling of somatostatin analogues, which are used for receptor mediated radiotherapy as well as for brachytherapy in the treatment of coronary vessels was growing rapidly.

**QUALITY CONTROL OF ITRUM-90, MANUFACTURED AT OBRI POLATOM**

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Radiosotope Centre OBRI POLATOM, Otwock-Świerk, Poland

**Aim of the study:** Irum-90 is widely used in nuclear medicine mostly in the form of colloids and microspheres for the treatment of thyroid cancer. In recent years the carrier-free Irum-90 was employed to radioimaging of somatostatin analogues, which are used for receptor mediated radiotherapy. The complex of DOTATATE with 90Y, with activity up to 180 GBq/mL, was developed at the Radioisotope Centre POLATOM. The methods used for quality control of Y-90 enable the determination of Y-90 in a standardized ionization chamber. The biological investigations including internalisation and receptor affinity were carried out on AR42J cells. The methods used for quality control of Y-90 enable the determination of biological molecule may affect its receptor affinity. The goal of this work was to establish the laboratory conditions for the radiolabelling of somatostatin analogues, which are used for receptor mediated radiotherapy as well as for brachytherapy in the treatment of coronary vessels was growing rapidly.

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**PRECLINICAL IN-VITRO INVESTIGATION OF DOTATATE LABELLED WITH 90Y OR 177Lu, POTENTIAL RADIOPHARMACEUTICAL FOR RECEPTOR MEDIATED RADIOTHERAPY**

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**Abstracts**

**Aim of the study:** Conjugates of 90Y-DOTATATE and 177Lu-DOTATATE showed high radiochemical purity and good in vitro stability in serum. The retention of radioactivity in thyroid gives the evidence that affinity to specific receptors is not affected by the radiolabelling process. That makes the technetium-99m labelled 90Y the promising candidate for future studies. Experiments in the tumour bearing animals are planned in order to verify the receptor affinity of this new tracer and is potential as the radiopharmaceutical for diagnosis and follow up of DTC.

**Results:** The complexes of DOTATATE with 90Y and 177Lu were obtained with high radiochemical purity, over 98%. Good agreement of the results obtained using HPLC, TLC and SepPack separation. Human serum stability was tested at 37°C over the period of 24 hours after labelling. The binding determination was performed using Minkus 65-80 column. The biological investigations including internalisation of radiolabelled peptides were carried out on AR42J cells at temperature 37°C during 100 minutes. For the determination of non-specific binding the somatostatin receptor expressing cells were incubated with non-radioactive tracer. The receptor internalisation of radiolabelled peptides was measured using LSC method and in vitro stability in buffer and in human serum (37°C) was studied using chromatography in 0.9% NaCl. Preliminary pharmacokinetic studies were performed in healthy Swiss mice.

**Conclusions:** After labelling with technetium-99m the obtained 90Y complexes presented high radiochemical purity and good in vitro stability in serum. The retention of radioactivity in thyroid gives the evidence that affinity to specific receptors is not affected by the radiolabelling process. That makes the technetium-99m labelled 90Y the promising candidate for future studies. Experiments in the tumour bearing animals are planned in order to verify the receptor affinity of this new tracer and is potential as the radiopharmaceutical for diagnosis and follow up of DTC.

**RECOMBINANT HTSH RADIOLABELLED WITH TECHNETIUM-99m, A NEW PROMISING RADIOPHARMACEUTICAL FOR MEDICAL DIAGNOSIS OF METASTASES IN DIFFERENTIATED THYROID CANCER --- PRELIMINARY STUDIES**

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Radiosotope Centre POLATOM, Otwock-Świerk, Poland

**Aim of the study:** The follow-up of differentiated thyroid cancer (DTC) (after ablation by iodine 131 therapy) is currently performed by whole body scan (WBS) with iodine 131. This technique of imaging is very often characterized by poor sensitivity because of loss of iodine uptake capacity as the result of loss of sodium iodide symporter receptor gene expression (NIS) in 30% of DTC. In such cases alternative method --- imaging of TSH receptors (which are active) using radiolabelled TSH (rTSH) might be useful. The aim of our preliminary studies was to prepare tracer --- HTSH labelled with technetium 99m with high specific activity, good radiochemical purity and stability.

**Results:** The methods used for quality control of Y-90 enable the determination of carrier-free Y-90 in a standardized ionization chamber. The biological investigations including internalisation and receptor affinity were carried out on AR42J cells. The methods used for quality control of Y-90 enable the determination of biological molecule may affect its receptor affinity. The goal of this work was to establish the laboratory conditions for the radiolabelling of somatostatin analogues, which are used for receptor mediated radiotherapy as well as for brachytherapy in the treatment of coronary vessels was growing rapidly.

**Conclusions:** 188Re could be efficiently used for labelling of HEDP (hydroxyethylidene diphosphonate), radiopharmaceutical applied for palliative therapy of bone metastases. The aim of our preliminary studies was to prepare tracer for radiolabelling of somatostatin analogues, which are used for receptor mediated radiotherapy as well as for brachytherapy in the treatment of coronary vessels was growing rapidly.

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OBJECTIVE EVALUATION OF VALUE RENAL OUTFLOW (OUTPUT EFFICIENCY) FOR 99mTc-EC COMPLEX A. Stepień1, J. Pawłusz1, M. Wasilewska-Radwanska1, O. Kraft1, V. Ullmann1  
15th Clinical Military Hospital, Department of Nuclear Medicine Cracow, Poland, 2Department of Infectious Diseases, Medical University, Łódź, Poland.

Introduction: For objective evaluation of disorders renal function were applied a lot of quantitative parameters. Save for common using, deconvolution analysis of renal transit times of the radiotracer and analysis times of decrease in activity (T1/2), more interest causes indicator outflow the tracer from kidney (Output Efficiency — OE).

Aim: The purpose of this study was determination of cutoff level norm for renal outflow indicator for 99mTc-EC during 30 minutes.

Material and methods: Analysis included 54 patients (mean age 49 years) with different disorders of excretory function of kidneys. Each patient received intrave- nous, as a bolus, technetium-99m-labeled ethylene diester (99mTc-EC) (FAM Lodz) with activity 80-100 MBq. Dynamic acquisition with using Nuclite AP gamma camera (mediscan) was started within 60 min. after intravenous injection of the tracer. The total time of the examination was 30 minutes (60 exposures of 1 second each then 87 exposures of 20 seconds each). The kidneys were classified into three groups using results of deconvolution analysis: group I with normal excretion (maximal transit time (MTT) < 300 s), group II with dilatation of renal calyx-pelvis system (MTT = 300-600 s) and group III with blocked emptying (MTT > 600 s). Evaluation was carried out on the excretion coefficient obtained with use of Ostrucine software (Czech Republic).

Results:

<table>
<thead>
<tr>
<th>Output Efficiency (OE)</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean OE (%)</td>
<td>76.23</td>
<td>60.74</td>
<td>24.5</td>
</tr>
<tr>
<td>S.D. (%)</td>
<td>5.14</td>
<td>10.13</td>
<td>13.11</td>
</tr>
<tr>
<td>Min value OE (%)</td>
<td>71</td>
<td>28</td>
<td>15</td>
</tr>
<tr>
<td>Max value OE (%)</td>
<td>93</td>
<td>78</td>
<td>40</td>
</tr>
<tr>
<td>Number of kidneys</td>
<td>50</td>
<td>37</td>
<td>21</td>
</tr>
</tbody>
</table>

Conclusions: We shown that cutoff value of norm for indicator renal outflow 99mTc-EC complex should be set 71 %. This parameter can be used for objective assessment of extent of disorders outflow of the radiotracer from kidneys.

UTILITY EVALUATION OF 99mTc-IgG COMPLEX IN LYMPHOSCINTIGRAPHY OF LOWER LIMBS A. Stepień1, J. Pawłusz1, M. Dzekiewicz2, J. Sroga3  
1Department of Nuclear Medicine, 25th Clinical Military Hospital, Cracow, Poland, 2Department of Nuclear Medicine, Medical University, Łódź, Poland, 3Department of General, Oncological and Vascular Surgery, Military Institute of Medicine of Ministry of Defense, Warsaw, Poland, 4Clinical of General Surgery, 5Clinical of Nuclear Medicine Hospital, Cracow, Poland.

Introduction: Lymphoscintigraphy is a very important examination in lymphoede- ma diagnosis. This method allows evaluate of lymphatic system function on the base of output efficiency of the tracer from site of injection, degree of its uptake in regional lymph nodes and presence of dermal backflow. In this method found application some radiotracer. In last years were appeared the premises that one of these tracers can be labeled 99mTc-lumhettoinum (99mTc-IgG) human polyclonal immuno- globulin G (IgG).

Aim of the study: The purpose of this study was to evaluate of lymphatic system function of the base of output efficiency of the tracer from site of injection, degree of its uptake in regional lymph nodes and presence of dermal backflow.

Material and methods: Eighteen patients (mean age 54 years) suspected of lymphoedema of lower limbs were examined. Each patient received, in the second week, 60 MBq 99mTc-IgG complex (FAM Lodz). In all patients the radiotracer outflow from the site of injection (differentially in rate flow) was noticed. It allows obtained functional image of lymphatic system lower limbs. In static phase clearly accumulation of the radiotracer in lymph nodes of pelvis was observed. In all patients clearly asymmetry in retention of the tracer in lymphatic system was observed. In two cases unilateral popliteal nodes were visualized. In static phase all scintigrams clearly tissue background were shown with characteristic bio- distribution in the plane of chest and abdominal cavity like observed post intravene- nous injection 99mTc-IgG complex.

Conclusion: Subcutaneous injection of 99mTc-IgG complex allows dynamic and static imaging functional lymphatic system of lower limbs. Scintigraphic traits of lymphatic system insufficiency after subcutaneous administration of 99mTc-IgG complex are similar to results obtained with common using the radioisotopes in lymphoscintigraphy.
Each examination was evaluated by two independent researchers. On these images the regions of local disturbances or lack of clearance function was performed. The results of examination underwent computer analysis according to observed in both kidneys in 3 individuals and in one kidney in 3 persons. The scars in 7 individuals, and in one kidney in 5 patients. In the control group scars were — 15.8%, p < 0.05). In the diabetic patients the scars were noticed in both kidneys in 12/30 patients with diabetes — 40% vs in 6/38 control group (12/30 patients with diabetes — 40% vs in 6/38 control group.

Aim of the study: To estimate the frequency of the incidence of renal scars in type 1 diabetic adolescents.

Research group and methods: 80 patients (15 male, 15 female) at the age 19.2 ± 4.2 years were included in the study. Duration of diabetes was 12.1 ± 5.2 years. 38 healthy individuals (18 male, 20 female) at the age 19.5 ± 1.3 without any history of kidney disease were the control group. Renal scintigraphy using 99mTc-EC was performed. The results of examination underwent computer analysis according to an own program to obtain renographic curves and parametric clearance images. On these images the regions of local disturbances or lack of clearance function were recognized as scars. They were mainly localized in peripheral parts of kidneys. Each examination was evaluated by two independent researchers.

Results: The renal scars were found more frequent in patients with diabetes than in control group (12/30 patients with diabetes — 40% vs in 6/38 control group — 15.8%, p < 0.05). In the diabetic patients the scars were noticed in both kidneys in 7 individuals, and in one kidney in 5 patients. In the control group scars were observed in both kidneys in 3 individuals and in one kidney in 3 patients. The scars were mainly found in the upper pole and lower region of the kidneys.

Conclusion: In the diabetic patients the renal scars occurred more frequently than in the control group. This observation need further investigation based on larger study group.

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