3,3 mm; half-life: 26,9 hours; particle size: 0,6-2 µm **Study objectives:** Examination of anti-inflammatory effect of 166-Holmium-phytate injection. **Methods:** Phases III, prospectiv study. 30 patients suffering from chronic synovitis, rheumatoid arthritis were examined. The protocol commenced with screening. The patients were selected according to inclusion and exclusion criteria. **Holmium phytate injectable suspension marked by 600 MBq ^{166}Holmium phytate injectable suspension,** and 40 mg of 1 ml triamcinolone acetonide and 1 ml of lidocaine 1 %. There were 60 month follow-up period after the administration of the isotope. Inflammatory activity of the affected knee-joint was tested prior to treatment, and the 3th and 3, 6, 9, 12, 24, 36, 48 and 60 months after the treatment. Evaulation was based on the criteria as described by Müller, Rau and Scütte the score system was developed by the authors. **Results:** During the study period, inflammation decreased. In the first five years excellent and good results were recorded in 93.3%. Five years after radiosynoviorthesis 93.3% of patients did not need another punction. Administration of Holmium-166 phytate is a safe procedure. We did not detect any symptoms of radiation sickness. We found no deviations in either haematological or chemical parameters during the study period. **Conclusion:** Holmium-166 phytate isotope is an effective radiopharmacy treating synovitis. Due to its physical parameters it is optimal to treat large joints (knee) and medium size joints (hips, shoulder, elbow, wrist, ankle). Effective dosage is 555-925 MBq. **References:** Szentesi M.,[1] Környei J.,[2] Antalffy M.,[2] Törko J.[2] Tóth Gy.,[2] Jánoki Gy.,[3] Balogh L.,[3]: Study of intraarticular application of 166-Holmium IHPP in rabbits. World Journal of Nucl. Med. 1. Suppl. 2. S243. September, 2002. Szentesi M.,[1] Takács S.,[1] Farbaky Zs.,[1] Nagy E.,[1] Környei J.,[2] Antalffy M.,[2] Törko J.,[2] Tóth Gy.,[2] Jánoki Gy.,[3] Balogh L.[3] Géher P.,[1] Comparitive study of applying increasing doses of ^{166}Ho-phytate injectable suspension in chronic synovitis. (Comparative, randomized, single-blind, placebo-controlled study with increasing dosage) Eur. J. Nucl. Med. Suppl. 2. 498. 2003. Szentesi M.,[1] Takács S.,[1] Farbaki Zs.,[1] Nagy E.,[1]-Környei J.,[2] Antalffy M.,[2] Törko J.[2] Tóth Gy.,[2] Jánoki Gy.,[3] Balogh L.[3], Géher P. [1],: Radiosynoviorthesis with ^{166}Ho-phytate - First clinical results Phase I-IIa, randomized, increasing dosage, single-blind, placebo-controlled comparative study Eur. J. Nucl. Med. Suppl. 2. 500. 2003.

P732

BIOLOGICAL HAZARDS OF RADIATION SYNOVECTOMY II. LEAKAGE ^{166}Holmium-phytate-radiosynoviorthesis in rheumatoid arthritis. Phase III prospectiv study

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Isotopes traditionally used cause whole body radiation of 10 Rad. 60 % leakage was found after using 198-Au for 24 hours by Oka and Topp. 10 % leakage was measured by Stewenson following administration of 5-15 mCi of 198-Au or Y-90. Specialists working with radiosynovectomy have aspired to produce an isotope incurring lower radiation loads. 166-Holmium-phytate produced by us: radiation type beta energy maximum: 1,84 MeV; radiation type gamma energy maximum: 0,66 MeV; soft tissue penetration: maximum 8,4 mm; average: 3,3 mm; half-life: 26,9 hours; particle size: 0,6-2 µm **Study objectives:** Examination of the pharmacokinetics and leakage of ^{166}-Ho phytate injection into the joint, its tolerability, local irradiation and anti-inflammatory effect to the joint. **Methods:** Phases III, prospectiv study. 30 patients suffering from chronic synovitis, rheumatoid arthritis were examined. The protocol commenced with screening. The patients were selected according to inclusion and exclusion criteria. **Patients:** Gender (male/female): 7-23; Age: 57,13 (37-77) Stage of knee joint x-ray (I / II): 7/23; Duration of synovitis (years): 7,38 (0,5-27), Duration of disease (years): 9,1 (1-27); Number of punctures before the Ho-166 treatment: 12,8; Number of steroid injections before the treatment: 12.9 **Holmium phytate injectable suspension marked by 600 MBq ^{166}Holmium phytate injectable suspension,** and 40 mg of 1 ml triamcinolone acetonide and 1 ml of lidocaine 1 %. **Results:** 1. 98% of 166-Ho applied intraarticularly can be measured back in the treated knee joints; 2. Leakage tests established that less than 0,5% of injected activity appears in the liver and less than 1% in the regional lymphatic glands; 3. We did not found any radioactivity nor in the serum and neither in the urine; 4. We did not detect any general or local symptoms of radiation sickness; 5. Inflammation decreased significantly; 6. We did not find any abnormalities in the bone marrow (or no radiotoxical effect) function; 7. Hepatic or renal functions did not show any abnormalities after 166-Ho injection. The applied doses caused neither hematological nor renal damage. **Conclusion:** Ho-166 isotope is an effective radiopharmacy treating synovitis. Due to its physical parameters it is optimal to treat large joints (knee) and medium size joints (hips, shoulder, elbow, wrist, ankle). Effective dosage is 600 MBq. Bibliography: Szentesi M.,[1] Környei J.,[2] Antalffy M.,[2] Törk ő J.[2] Tóth Gy.,[2] Jánoki Gy.,[3] Balogh L.,[3]: Study of intraarticular application of 166-Holmium IHPP in rabbits. World Journal of Nucl. Med. 1. Suppl. 2. S243. September, 2002.

P733

Effects of radiation synovectomy in the hemophilic joints as evidenced by MRI

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Aim: Hemophilic arthropathy most commonly and severely affects the knee, followed by the elbow and ankle. The aim of this study was to evaluate the effects of radiosynovectomy (RS) in the hemophilic joints by using Magnetic Resonance Imaging (MRI). **Materials & Methods:** A total of 20 hemophilic patients ranging in age 6-18 years underwent RS due to recurrent bleedings in 26 joints (knee; n:14, elbow; n:9, ankle; n:3). RS of the knee was performed using Y-90 (4-4.5 mCi), all other joints were treated with Re-186 (2-2.5 mCi). In order to detect the effects of RS in the hemophilic joints, MRI was performed before and after treatment. Mean follow-up period after the RS was 21 months (range: 7 months to 30 months). For MRI evaluation of hemophilic arthropathy, joints were scored using 'Denver' scoring scheme both prior to and following RS. Denver MRI scale includes joint effusion, haemarthrosis, synovial hypertrophy, haemosiderin deposition, erosions, cysts and cartilage loss. **Results:** After a mean observation period of 21 months, there were no any joints with worsened Denver score. MRI showed that joint effusion, haemarthrosis, synovial hypertrophy, haemosiderin deposition and mean Denver score improved significantly after RS ($P<0.05$). However, the findings of erosions, cysts and cartilage loss were not change to a significant extent. **Conclusion:** This study suggest that RS with Y-90 and Re-186 is effective in terms of improving the findings of hemophilic arthropathy as shown by MRI.

P734

Effectiveness and Safety of Radiosynovectomy in Patients with Hemophilia - Initial Experience

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BACKGROUND: Haemophilia is characterized by hemarthrosis and hemorrhage into muscles, other tissues and cavities. Hemarthrosis results in debilitating chronic hemophilic arthopathy. Intra-articular injection of radioisotopes (radiosynovectomy - RS) in hemophilic patients with "joint target" (3 or more recurrent joint bleedings in a period of 6 months) could prevent joint destruction and reduce bleeding episodes. In the acute phase of hemarthrosis, treatment consists mainly of clotting factor replacement. OBJECTIVES: To prospectively evaluate the efficiency and safety of RS with ^{90}Y-hydroxyapatite (^{90}Y-HA), ^{90}Y-colloid and ^{153}Sm-Hydroxiapatite (^{153}Sm-HA). METHODS: Inclusion criteria consisted of hemophilic patients with "joint target" and chronic synovitis (defined by clinical criteria and diagnostic imaging). Efficiency was determined by comparing the frequency of hemarthrosis before and after RS. Safety of RS was assessed by the frequency of adverse effects such as transient sinovitis, bleeding and infection. The occurrence of radiopharmaceutical articular extravasation, was assessed by acquiring images after 72 hours of injection. RESULTS: Thirty-eight joints were submitted to RS (26 knees, 5 ankles and 7 elbows) in 34 patients (4-37 years of age, mean age 14 years). All knees and 2 ankles were treated with either ^{90}Y-colloid or ^{90}Y-HA, and 3 ankles and all elbows with ^{153}Sm-HA. After 6 months of RS, the mean monthly frequency of hemarthrosis was reduced from 1.42 ± 0.21 to 0.54 ± 0.19 ($p < 0.001$) in the whole group, from 1.08 ± 0.39 to 0.31 ± 0.28 ($p = 0,0025$) in the subgroup of patients treated with ^{153}Sm-HA and from 1.54 ± 0.25 to 0.62 ± 0.25 among patients treated with ^{90}Y-HA/^{90}Y-colloid ($p < 0.001$). Transient synovitis occurred in the first few weeks after RS in 17% of patients treated with ^{90}Y (^{90}Y-HA in 2 patients and ^{90}Y-colloid in 3 patients - 3 knees and 2 ankles). No patient treated with ^{153}Sm-HA presented synovitis. Extra-articular leakage occurred in 10% of patients among them 2 ankles (1 with ^{90}Y-colloid and 1 with ^{153}Sm-HA) and 2 elbows (with ^{153}Sm-HA). The reduction in hemarthrosis episodes in the whole group would potentially result in a reduction of approximately US$ 190.000 cost with clotting factor consumption during this 6-month period. CONCLUSIONS: In this preliminary analysis, RS was effective in decreasing hemarthrosis episodes in hemophilic patients and may significantly reduce clotting factor consumption.

P735

Biological hazards of radiation synovectomy I. Chromosomal analysis of periferial lymphocytes of patients before and after radiation synovectomy with 166-Holmium-Phytate

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Background: Radiation synovectomy may be indicated for the treatment of chronic synovitis. A number of factors may affect its current use, including availability, limited evidense for its efficacy compared to intra- glucocorticoid, and concerns regarding the potential long term effects of radiation exposure, particularly in younger patients. Specific chromosome-type abnormalities in peripherial lymphocytes can be useful indicators of whole-body radiation exposure. The frequency of these aberrations has been shown to increase in patients who have had radiation synovectomy using Yttrium-90 /Y-90/ by up to five times compared to baseline levers.166-Holmium-phytate /166-Ho/ is a new radiopharmaceutical currently on trial which appears to have less extra-articular leakage than Y-90 compounds. **Objectives:** The aim of this study was to indentify any increase in specific chromosome-type abnormalities, using published criteria, in patients following 166-Ho synovectomy of the knee. **Patients:** Gender (male/female): 7-23; Age: 57,13 (37-77) Stage of knee joint x-ray (I / II): 7/23; Duration of synovitis (years): 7,38 (0,5-27), Duration of disease (years): 9,1 (1-27); Number of punctures before the Ho-166 treatment: 12,8; Number of steroid injections before the treatment: 12.9 The cytogenetic analysis was performed in each patient before and 4 weeks after the RSO. Method: Conventional cytogenetic analysis was performed on the preipheral blood sample. Cells were incubated for 72 hours in RPMI 1640 containing 20% fetal calf serum, antibiotics and 0,1 ml Phytohemagglutinin. Colcemid was subsequently added for 1 hour. 100 metaphases were analyzed from each sample. The following chromosomal aberations were scored: ring chromosome, gap lesion, terminal and interstitial deletion, translocation ring chromosome. **Results:** The normal range of the structural deviation is 0-4%. Pathologic rate of the chromosomal aberrations are above 5%. In our study in only one case a ring chromosome was identified in the post-therapy sample/0.00055%/ **Conclusion:** There was no increase in the scored chromosome- type abnormalities after 166-Ho RSO. This study further supporth the relative safety of 166-Holmium-phytate compared to other radiopharmaceuticals. **References:** Stevenson A. C., Bedford J., Hill A. G. S., Hill H.: Chromosoma damage in patients who have had intra-articular injections of radioactive gold. Lancet 4. 24. 837-839. 1971.

P736

Comparison between 153-samarium or 90-ytrium synovectomy in knees of hemophilic patients

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Aim- To compare the use of 740 MBq of ^{153}Sm and 185 of ^{90}Y,both labelling hydroxyapatite (HA), in the synovectomy of hemophilic patients to assess the possible equivalence. Material and Methods-Twenty seven patients , 26 males, and 31 knees , were divided in two groups: 1-treatment with intra-articular dose of 740 MBq of ^{153}Sm-HÁ: 15 knees of 13 patients, average age=22,3 years (range from 7 to 57 years old) and arthropathy evolution of 6,8 years; 2-trestment with 185 MBq of ^{90}Y-HÁ: 16 kness of 14 patients, average age=26,4 years (range from 9 to 45 years old) and arthropathy evolution of 10,2 years. The evaluation before and after 1 year of synovecromy used the following criteria: reduction in the number of haemarthrosis and pain by visual analogic scale and improvement in articular motility. The ocurrence of adverse effects were considered also. Early scintigraphic studies (1-2 h) were made after the synoviorthesis. Results- We did not found significant difference inthe reduction of frequency of haemarthrosis (p=0,37) and pain (p=0,60) that were, respectively- group 1: 53,6% and 34,8%; group 2:74,3% and 29,6% (Fisher test).The improvement in articular motility was not significant in both groups. Three cases of mild synovitis were observed in each group. The scintigraphic control showed no articular escape and homogenous distribution of the injected material. Conclusions- The beta energy=2.2 MeV of ^{90}Y is better for knees synovectomy, but the use of higher activities of ^{153}Sm (beta=0,80 MeV) have similar biological effect in hemophilic patients. This may be useful in places that have only production of ^{153}Sm.

P737

The Effectiveness of Radioisotope Synovectomy for Chronic Synovitis

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AIM: Hemophilia is the most common congenital coagulation disorder. Hemophilic arthropathy, caused by chronic synovitis is the most common musculoskeletal complication in hemophilia patients. The aim of this study was to evaluate the efficacy of radioisotope synovectomy (RS) for chronic hemophilic arthropaties. MATERIAL METHOD: Between January 2006 and February 2010, 37 radioisotope synovectomies (RS) in 18 severe hemophilic patients (factor 8 < 1%) have been performed at our centre. Their mean age was 12 years (range: 8 - 20 years). Hemophilic patients with grade-II or III synovitis were selected for RS in our study. We preferred to use Y90 for all large joints and Re186 for small joints. Mean follow-up period after procedure was 22.6 months (range: 6 months to 33 months). RESULTS: The distribution of joints injected was as follows; rhenium-186 [Re186] 19 joints (ankles, 8 and elbows, 11) and yttrium-90 [Y90] 18 joints (knees, 18). RS was performed in 8 ankles for 7 patients, 11 elbows for 7 patients, and 18 knees for 13 patients. Mean bleeding rate before the procedure and after the procedure were as follows: Ankles, 3.43 vs 0.62 (P= 0.002); elbows, 3.12 vs 0.55 (P= 0.000); and 3.83 vs 0.62 (P= 0.011). No major complication requiring secondary treatments has been observed. CONCLUSION: An early RS is the best way to halt the evolution of chronic hemophilia synovitis to devastating hemophilic arthropathy. RS is very effective and safe in the treatment of chronical synovitis of children with hemophilia. We highly recommend this procedure for developing countries to prevent joint disabilities. For a better and a healthier generation, RS has to be introduced in all the developing countries.

P738

Sm-153 EDTMP in chronic multifocal arthritis; initial results of a prospective study

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Purpose: To evaluate the effect of systemic radiation therapy with Sm-153 EDTMP on pain and disease activity in patients with Idiopathic Multifocal Polyarthritis (IMP). **Material and Methods:** Seven patients (2 men, 6 women; mean age, 64.2 years, age range, 68-76 years) with long life history of painful IMP, non-responding to the classical symptomatic therapies (anti-inflammatory schemes) and with a total of 38 diseased joints (mean number, 5.04; range, 4-7 joints), 11 proximal and 27 distal interphalangeal, were treated by systemic application of Sm-153 EDTMP (Quadramet, GE Health Care) in a dosage of 16 MBq / kgr BW (0.5 mCi / kgr BW) intravenously, at onset. The follow up period covered 18 months. The efficacy of the treatment was assessed by. a pain and performance question-naire that patients were asked to complete daily, including the parameter of the tender and swollen joint count number as well as the acute phase reactant value. **Results:** In 6 out of 7 patients (85.7 %) the single Sm-153 EDTMP was adequate to lead to obvious clinical improvement of the disease activity, i.e. pain relief plus swollen decrease in 2, simple pain relief in 5 (average relief in of 5.2 joints) and simple swollen decrease in 3 (average decrease in 1.8 joints) patients, respectively. An erythrocyte sedimentation rate drop was observed in 6 cases. Repetition of the scheme was performed in 2 patients leading to a pain relief prolongation. **Conclusions:** These preliminary results show that systemic low dose treatment with Sm-153 EDTMP decreases the disease activity in patients suffering from IMP. The methodology is simple to be performed by any, even inexperienced nuclear physician, painless, and shows promising preliminary results that have to be followed by longer patients' series. Repetition of the scheme prolongs the analgesic period. Investigations with other radiopharmaceuticals, already used for cancer palliative therapy such as Re-186/Re-188 HEDP and Sn-117 m DTPA should be performed and compared for final evaluation.

P64 — Tuesday, October 12, 2010, 16:00 — 16:30, Hall Z

Therapy & Clinical Trials: Miscellaneous

P739

Usefulness of Fluorine-18-Fluorodeoxyglucose Positron Emission Tomography for Predicting Outcome of Sorafenib Treatment in Patients with Hepatocellular Carcinoma

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Purpose Sorafenib (Nexavar) is an orally active multikinase inhibitor that is approved in the EU for the treatment of hepatocellular carcinoma (HCC). Monotherapy with sorafenib prolongs overall survival and delays the time to progression in patients with HCC who are not candidates for potentially curative treatment or transarterial chemoembolization. In this study, we used [18F]-2-fluoro-2-deoxyglucose [FDG] with positron emission tomography combined with computed tomography (PET/CT) to predict the treatment response of sorafenib in patients with advanced HCC. **Materials and Methods** 29 patients, 22 males and 7 females, with a mean age of 61 years (27-79 years), with advanced HCC were enrolled. Sorafenib was given 400mg twice daily orally. Nine patients underwent primary tumor resection, 19 had extrahepatic metastases; eleven with metastatic lymphadenopathy, eight with metastatic lung lesions, and eight with skeletal metastasis. The [18F] FDG-PET/CT was performed before treatment for each patient. A region of interest (ROI) was placed over every primary and metastatic lesion using 3D isocontour at 41% of the maximum pixel value, measuring the maximal and mean uptake values within each ROI. Based on the maximal and mean SUVs, we chose the most hypermetabolic lesion and calculated its ratios, SUVmax and SUVmean ratios, using the cerebellum as the reference. We statistically anayzed the correlation between the calculated ratios and overall survival (OS) and progression-free survival (PFS) of the involved patients. **Results** The average OS and PFS were 6.1 ± 5.5 and 4.0 ± 4.2 months, respectively. Treatment response based on RECIST criteria was as follows; SD in fourteen patients, PD in twelve, and PR in one (not available in two). OS and PFS correlated significantly with SUVmax ratio (r = -0.511, p <0.01, and r = -0.413, p <0.05, respectively). OS showed significant relationship with SUVmean ratio (r = -0.435, p <0.05) but PFS showed marginal relationship with SUVmean ratio (r = -0.319, p = 0.06). On the basis of SUVmax ratio, the patients were divided into two groups: group A (n=10), SUVmax ratio of ≤1.0; and group B (n=19), SUVmax ratio of > 1.0. The OS and PFS were significantly higher in group A than in group B. **Conclusion** [18F] FDG-PET/CT may be useful for prediction of outcome of sorafenib treatment in patients with HCC.

P740

Hepatic falciform ligament Tc99m-macroaggregated albumin activity on SPECT/CT prior to Yttrium-90 microsphere radioembolization: Prophylactic measures to prevent non-target microsphere localisation via patent hepatic falciform arteries

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AIM: Yttrium-90 (Y-90) intrahepatic arterial microsphere radioembolization may be used in selected cases of unresectable hepatocellular carcinoma. Non-target delivery of Y-90 resin microspheres along the hepatic falciform ligament have been reported to cause acute radiation dermatitis of the anterior abdominal wall. We describe two patients where hepatic falciform ligament Tc99m-macroaggregated albumin (MAA) activities were found on SPECT/CT during pre-therapy planning and its impact on treatment strategy. MATERIALS AND METHODS: Two patients with hepatocellular carcinoma underwent routine pre-therapy Tc99m-MAA liver-lung shunting study and abdominal SPECT/CT. In both patients, hepatic falciform ligament Tc99m-MAA activity were seen on SPECT/CT leading to active measures being taken to prevent non-target Y-90 resin microsphere localisation. RESULTS: The first patient underwent prophylactic coil embolization of the patent hepatic falciform artery; the second patient underwent super-selective infusion of Y-90 resin microspheres to avoid the patent hepatic falciform artery. Both patients experienced no acute post-therapy complications. CONCLUSION: SPECT/CT provides valuable diagnostic information for treatment planning prior to Y-90 resin microsphere therapy. Careful evaluation of the Tc99m-MAA SPECT/CT is essential to identify any extrahepatic radiotracer activity. In our patients the finding of hepatic falciform ligament Tc99m-MAA activity led to appropriate treatment strategy and intervention. The outcome was the safe and uneventful delivery of Y-90 resin microspheres.

P741

Selective internal radiation therapy (SIRT) with Yttrium-90 (90Y) radiomicrospheres in the treatment of unresectable hepatocellular carcinoma

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OBJECTIVE Hepatocellular carcinoma (HCC) is one of the most common cancers worldwide with few treatment options. The therapeutic benefit and safety of 90Y microspheres is well supported in the literature. The aim of this study is to review the role of liver directed radiotherapy with 90Y microspheres for unresectable HCC. MATERIAL AND METHOD Twelve patients with HCC were considered for SIRT . All patients had PET/CT scan to detect any extra hepatic metastases. Patients with sufficient liver function had pre-treatment visceral angiography to define and