How should we image liver hemangioma?

To the Editor: I read with interest the case report of liver hemangioma by S. Zincirkeser in the last issue of Hell J Nucl Med, 9 : 109-110 [1]. I think that some important points should be considered about this case report: The authors report that planar liver scintigraphy with technetium-99m-red blood cells (^{99m}Tc-RBC) was false negative due to shine through of the right kidney [1]. The single photon emission tomography (SPET) images provided by the authors clearly show that the lesion is in the superior and posterior portion of the right lobe of the liver, superior to the right kidney and at the level of the spleen. Surprisingly the planar ^{99m}Tc-RBC image which is shown in that case report is in an *anterior* view. The authors indicate that ultra sonography showed a 4.7 cm solid mass in the right lateral side of the right lobe of the liver while the SPET images showed that the lesion is in the posterior and *medial* portion of the right lobe of the liver. So it seems that the false negative finding of the planar liver scintigraphy in the case report is due to bad technique (acquiring anterior rather than posterior planar view) and not due to shine through of the right kidney.

It should be noticed that accurate imaging of liver hemangioma is highly dependent on the location of the hemangioma in the liver. Some authors prefer to perform ultrasonography before the ^{99m}Tc-RBC scan to determine the location of the lesion for best view imaging. [2] SPET imaging significantly increases the sensitivity of detection of hemangioma compared to delayed planar imaging. [3] It is also reported that even the dynamic three-view display of SPET slices, is superior to the conventional static SPET presentations. [4] So it is not surprising that hemangioma located in the posterior portion of the right lobe of the liver is not seen in the anterior projection due to attenuation of the photons by the overlaying liver tissue [2]. The purpose of liver imaging for the detection of a hemangioma is to find a RBC avid, space occupying lesion and for that multiple views should be acquired. In our experience, hemangiomas located in the left lobe or in the anterior portion of the right lobe are best seen in the anterior view and hemangiomas located in the posterior part of the right lobe are best seen in the posterior view while small hemangiomas in the central portion of the liver are not usually seen in the planar images and SPET imaging is necessary to identify them.

We usually image liver in multiple planar views and if a suspected hemangioma is not seen, SPET imaging is done in the same session. Repeating imaging after a second dose of radiotracer is the second question in this case report. Furthermore, as hemangioma is well identified in the medial portion of the posterior part of the right lobe of the liver where increased RBC accumulation is seen, it does not seem to be useful to proceed again to liver imaging with ^{99m}Tc-sulfur colloid.

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Authors' reply

We thank Dr Zakavi for his interest for our case report written in H J N M 2006; 9: 109-110. Our reply is as follows: a) Since the patient after the diagnostic scintiscans underwent an operation, it was proved beyond any doubt that the hemangioma was located in such a place as we describe in our case report. Due to the anterior projection of the two organs, namely the kidney and the liver, at the anterior liver scintiscan the lesion was projected through the kidney. b) The US test could not specify correctly the position of the lesion because of the depth and the limited number of tests performed. c) The posterior view of the liver was less indicative in showing the position of the hemangioma because the kidney stood in between. d) As is mentioned in our paper all three diagnostic scanning procedures performed, gave to the patient a cumulative dose of 4mSv. This dose is quite acceptable for identifying an hemangioma that could erupt in the abdominal cavity. e) Of course many liver hemangiomas can be diagnosed after the first specific scan. Our presentation was not intended to show such an easy diagnostic procedure.

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Radiosynoviorthesis – indications, side effects

To the Editor: Related to the subject of radiosynoviorthesis (RSV) or radiosynovectomy and the papers and correspondence about this subject published recently in HJNM, we would like to add and discuss the following, that briefly represent according to our knowledge, the main points for applying this treatment today [1-3]: It has been more than 50 years since the first intra-articular administration of radiopharmaceuticals for therapeutic purposes was introduced. Since then, RSV has been a reliable, safe, easy-to-use, and low cost treatment for chronic, persistent/relapsing synovitis [4,5]. This technique aims at the destruction of the pathologic-hypertrophied synovial membrane, resulting in local remission of the inflammation and improvement of patient's life. Particles labeled with β-emitting isotopes are injected (although a small amount of low energy gamma-emission within the energy range, that is easily detected by conventional gamma camera systems, could be an advantage since it could provide imaging of the treated joint) [4,5]. The injection of the radiopharmaceutical into the joint cavity results in phagocytosis of the radio-labeled molecules by the phagocytes of the synovial membrane. Irradiation at first decreases hyperaemia, although often a slight thickening of synovium occurs. Thrombotic occlusion of capillaries in the superficial synovial lining is striking. Within a few weeks to months, fibrosis of the synovial lining is formed [5]. Filtration and resorption of the synovial fluid are reduced [5]. The main radiopharmaceuticals used are: yttrium-90 (^{90}Y)-citrate/silicate for radiosynoviorthesis of the knees, rhenium-186 (^{186}Re)-sulphide for joints of intermediate size (hip, shoulder, elbow, etc) and erbium-169 (^{169}Er)-citrate for small joints (interphalangeal, metacarpophalangeal, metatarsophalangeal) [5, 6]. During the last 15-20 years, new radiopharmaceuticals have been introduced in clinical practice such as dysprosium-165 (^{165}Dy), holmium-166 (^{166}Ho), samarium-153 (^{153}Sm), rhenium-188 (^{188}Re), lutetium-177 (^{177}Lu), etc. [7-9].

The main indications for RSV are: rheumatoid arthritis, seronegative arthritis (ankylosing spondylitis, psoriatic arthritis, etc.), Bechet's disease, Lyme's disease, persistent/recurrent joint effusions (usually after joint replacement), haemophilic synovitis, pigmented villonodular synovitis, chondrocalcinosis and ochronosis [6]. RSV is recommended when a six-month systemic treatment and one at least intra-articular treatment with long-term corticosteroids have failed [5, 6]. In active osteoarthritis with concomitant synovitis, RSV may be effective, although less efficient than in rheumatoid arthritis [10].

Pregnancy, breast-feeding, septic arthritis, local skin infections or ruptured Becker's cyst are absolute contra-indications [5]. Age under 20 years and joints with significant bone and cartilage destruction are relative contra-indications [5, 6]. The main side effect during the procedure of RSV is the leakage of the radiopharmaceutical outside the joint cavity where from it is drained mainly by the lymphatic system towards the regional lymph-nodes and may end up to the liver and spleen, resulting in increased irradiation of the patient. Leakage is significantly reduced by a 48 h immobilization of the joint. Fever, allergy, ulceration with local skin radiation necrosis, local infection, septic arthritis and haemorrhage are rare complications of RSV [2, 3-5].

The three-phase bone scan with technetium-99m methylene diphosphonate (^{99m}Tc-MDP), especially the second (vascular) phase of the scan, allows discrimination of chronic arthritis from degenerative arthrosis, where bone and cartilage destruction occur. Also bone scan indicates localization of the affected joint, particularly in the small joints of the foot, detects the polyarthretic pattern of the disease and may have prognostic value by evaluating radiotracer's uptake during the vascular phase of the scan. Bone scan is therefore suggested to be performed before RSV [5, 6, 11].

If the effect of a single application of RSV is not satisfactory, RSV can be repeated not earlier than six months [12]. If an especially thickened synovia is revealed by sonography, the necessity for a second RSV is anticipated [5].

The whole body radiation-absorbed dose, resulting from the administration of ^{90}Y after a usual dose 185-222 MBq in the knee, is 40-130 mSv, while the absorbed dose in the synovia is approximately 100 Gy per 100 g [5].

The outcome of this treatment was shown to be satisfactory at 60-80% and is significantly better compared to intra-articular glucocorticoid injection, although radiopharmaceuticals and steroid injections are usually combined, especially for knee RSV [6-9, 13-15]. It should be noted that ^{90}Y RSV produces similar results to those from surgical SV and as a therapeutic option has been favored on the basis of a lower risk of morbidity, side-effects and duration of post procedure rehabilitation [5]. RSV is particularly useful at the first stages of chronic arthritis with minor damage of the synovial cartilage and the adjacent bones [13-15]. Nevertheless, RSV is a minimally invasive method which may relieve joint pain and swelling thereby improving mobility of the inflammed joints.

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