Abstract

Three nuclear imaging techniques can be used for the study of congenital vascular malformations (CVM): whole body blood pool scintigraphy (WBBPS), lymphoscintigraphy and transarterial lung perfusion scintigraphy (TLPS). WBBPS is able to demonstrate the whole vascular system and to recognize truncular and extratruncular vessel malformations. High flow malformations are indicated by the form of the activity-time curves. Lymphoscintigraphy for the study of CVM is best performed by a separate demonstration of the deep and superficial lymphatic systems. TLPS is effective to confirm or rule out the presence of an arteriovenous (AV) shunt.

Introduction

Nuclear imaging technique may have a more important role in the evaluation of angiodysplastic malformations, where tissue structure subversion, unpredictability of the morphological picture, frequent multifocality and, in a few cases, the remarkable extent of the corporeal districts cannot be unequivocally answered with the use of more traditional methods.

The frequent lack of a recognized anatomic and structural consideration and the difficult distinction between masses generically defined as “liquid” may result in ambiguous nuclear magnetic resonance (NMR) patterns, while the presence of an anomalous escape course, of segregated vascular districts, low recirculation speed or the pathological mixture typical of lymph-venous abnormalities represent an impasse for angiographic interpretation.

In this corner of “diagnostic half-light” nuclear investigations make a useful contribution, albeit with the intrinsic limitations of a discipline that founds its methodology more on functional than on morphological aspects [1].

While there are some procedures that have been made obsolete by the technical and diagnostic refining of radiological studies, the nuclear methods that have resisted represent a real complementary diagnostic tool for the evaluation of angiodysplasia, thanks to their procedural simplicity, lack of invasiveness, high tolerability and low biological cost from a dosimetric point of view [2].

Whole Body Blood Pool Scintigraphy (WBBPS)

WBBPS (Fig. 17.1) is valuable for the initial screening of malformations and as an intermediate evaluation parameter for partial corrective procedures (post-interventional and/or post-embolization control). On the other hand, therapeutic or conservative treatments must be attempted several times in the instrumental follow-up of suspicious recidivism.

WBBPS, a simple procedure from a technical point of view, makes red blood cells visible through the use of physiological contrast medium. This allows the vascular tree to be visualized in its entirety, as if a radiological contrast medium had been used. In this way, areas of high and/or altered “haematic” signal indicate the presence of the vascular malformation (Fig. 17.2).

As an example, in the truncular forms of vascular malformation it is possible to distinguish anomalies of both arterial and venous course, stenotic occlusions and expansions of the vessels. The
Fig. 17.1. Whole body blood pool scintigraphy (WBBPS): normal whole body scan

Fig. 17.2. Young patient with right lower limb overgrowth. WBBPS study demonstrates a total subversion of the vascular tree of the right leg. The dysplastic mass is spreading to the abdominal wall, partially surrounding the splanchnic tissues. The tomographic three-dimensional reconstruction emphasizes the chaotic structural complexity of this malformation.