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The clinical utility of serum amyloid P component (SAP) imaging in amyloid

P. Hawkins (London)

Amyloidosis and basis for SAP scintigraphy: Amyloidosis is a disorder of protein folding in which normally soluble proteins are deposited in the extracellular space as insoluble fibrils that progressively disrupt tissue structure and function. Systemic amyloidosis is the main diagnosis in 2.5 percent of renal biopsies, and is the cause of death in about 1 in 1500 people in the UK. Most forms of amyloidosis are progressive and fatal, but better understanding of their pathogenesis has led to rational and often successful treatments. Traditionally, amyloidosis has exclusively been a histological diagnosis, but biopsies provide small samples and therefore can never provide information on the extent, localization, progression or regression of amyloid deposits generally.

Qualitative and quantitative information yielded by labelled SAP studies: Serum amyloid P component (SAP) is a normal plasma protein that binds specifically to all types of amyloid fibril and thus becomes incorporated as universal non-fibrillar constituent of all amyloid deposits. Iodine-123 labelled SAP localizes rapidly and specifically to amyloid deposits of all fibril types, in proportion to the amount of amyloid present. Planar whole body SAP scintigraphy produces diagnostic images in most patients with AL amyloidosis, and virtually all with AA type as well as most hereditary forms. It is a non-invasive and quantitative, and can be used repeatedly to monitor the course of the disease. Dual modality SPECT-CT imaging has lately facilitated superior localization.

Clinical applications of SAP imaging for diagnosis and monitoring amyloidosis: Clinically useful observations provided by SAP scintigraphy include different organ distributions of amyloid in different types of the disease, demonstration of amyloid in anatomic sites not available for biopsy, and evidence for rapid progression and regression of amyloid deposits with different rates in different organs. Scintigraphic estimation of whole body amyloid load can provide information on prognosis and risks associated with chemotherapy and organ transplantation. Serial monitoring of the deposits guides the effects of and need for therapy in individual patients, and contributes to systematic studies of existing and novel treatments. SAP scintigraphy is available routinely for all known or suspected cases of amyloidosis in the NHS National Amyloidosis Centre in London, but it has not been developed commercially.

References

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