Validation of Hybrid SPECT-CT in Identifying the Pain Phenotype in Patients with Chronic Low Back Pain.

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Introduction

The prevalence of chronic low back pain (CLBP) can reach up to 10%. The pain phenotype however, is unknown in more than 80 %. Recently, Single Photon Emission Computed Tomography (SPECT)-CT was suggested to narrow this diagnostic imaging knowledge gap.1 This test has not been validated for the diagnosis of CLBP.

We prospectively assessed the sensitivity and specificity of SPECT-CT in a patient cohort with CLBP as compared to a control group.
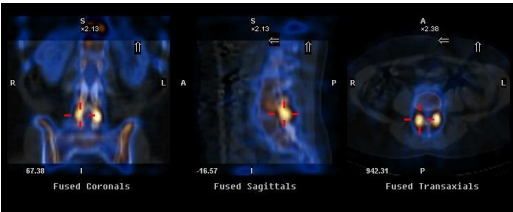
Methods

Patients with CLBP, with MRI inconclusive about the pain phenotype, were referred for SPECT -CT. The control group consisted of patients referred for SPECT-CT for other pathologies, if they did not experienced CLBP prior to the imaging. In total, 200 patients were included; 100 in each group.

Figure 1
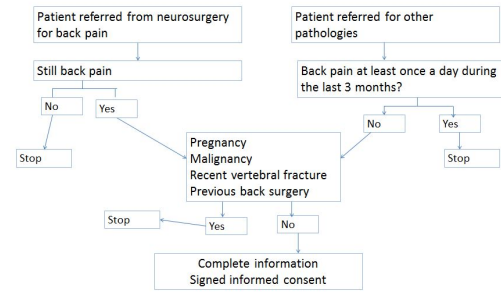
Flow chart

Figure 2

SPECT-CT image

Results

The gender and age distribution were not significantly different in both groups. The SPECT-CT showed increased bone metabolism as 'hot spots' in 76.6 % in the CLBP-group versus 36.9 % in the control group. Hot spots in facet joints and endplates were seen in 42.5% and 46.8% respectively in the CLBP patients and in 21.3% and 18.4% in the control group. The sensitivity of SPECT-CT in CLBP is 76.6 % and the specificity is 63 %.

Table 1

	Total	Control	(%)	LBP	(%)
Patients	200	104		96	
excluded	3	1		2	
Gender male	89	48	(46%)	41	(42%)
Age (mean in years)	48.47	47.07		50.14	
Normal Image		65	(63%)	22	(23%)
Hot spots in facet joints		22	(21%)	40	(42%)
Hot spots in pars articularis		1	(1%)	0	(0%)
Hot spots in vertebral endplates		19	(18%)	44	(46%)
Hot spots in SIJ		0	(0%)	6	(6%)

LBP= Low back pain, SIJ= Sacro iliac joint

Results of SPECT-CT examination

Conclusions

Our findings suggest that SPECT-CT may be a valuable complementary test for identification of the pain phenotype in patients with CLBP. With a sensitivity of 76.6 %, the likelihood of a positive test in CLBP patients is high. This is the first prospective comparative study of this kind. The grade of recommendation for the use of SPECT-CT in evaluating patients with CLBP is 1C+.

Learning Objectives

At the end of this session participants should understand the added value of SPECT-CT when looking for the exact pain phenotype in patients chronic low back pain.

References

Matar HE, Navalkissoor S, Berovic M, Shetty R, Garlick N, Casey AT, Quigley AM. Is hybrid imaging (SPECT/CT) a useful adjunct in the management of suspected facet joints arthropathy? Int Orthop. 2013;