



Neurosarcoidosis: MRI and CSF findings in our patients

• Vucinic Violeta^(1,2) • Rasulic Lukas^(2,3) • Stjepanovic Mihailo⁽¹⁾ • Filipovic Snezana⁽¹⁾ • Omcikus Maja⁽¹⁾ • Videnovic-Ivanov Jelica^(1,2)
(1) Department of sarcoidosis, Clinic of Pulmonary Diseases, Clinical Center Serbia, Belgrade, Serbia (2) Medical School, University of Belgrade, Serbia
(3) Neurosurgery Clinic, Clinical Center Serbia, Belgrade

Abstract

BACKGROUND: Establishing the diagnosis of neurosarcoidosis may be difficult, so the goal of this study was to elucidate the relation between clinical symptoms, MRI findings, and cerebrospinal fluid (CSF) findings. **METHODS:** 73 patients with probable diagnosis of neurosarcoidosis were analyzed (51 female/ 22 male), mean age 51.73 years; the mean follow - up period 7 years. 70 patients (95.9%) had chronic biopsy positive sarcoidosis. 3 patients had acute sarcoidosis at the time they experienced symptoms of possible neurosarcoidosis. MRI findings were classified according to Zajicek J.P.Scolding N.J et al. Central nervous system sarcoidosis-diagnosis and management.

QJ Med 1999; 92:103-117. Out of the whole group in 63 patients (87.7%), CSF was taken for ACE analysis.

RESULTS: in 13/63 patients (20%) ACE in CSF was not detected (0 U/L). 51/63 patients (80%) had different CSF ACE levels ranging from 1-15 U/L. All patients were symptomatic and besides constitutional symptoms of sarcoidosis they had: headache 47(92.2%), vertigo 24(47.1%), cranial nerve involvement (facial palsy) 7pts(13.7%), blurred vision 10 (19.6%) and seizures 2 patients (3.9%). Comparing the MRI appearances in patients with positive ACE in CSF we found:

(1).Spinal cord lesions - 3patients (5.9%);

(2).Hydrocephalus- 2 patients (3.9%)

(3).Meningeal enhancement -18 patients (35.3%);

(4).Parenchymal lesions- 31 patients (66%);

(5).White matter lesions -11 patients (23.4%)

(6).Normal MRI findings -2 patients (3.9%)

CONCLUSION: In this study we intended to show a certain relationship between the MRI findings and CSF analyses emphasizing the significance of the CSF ACE levels. In patients with biopsy positive sarcoidosis (different organs involvement) and probable diagnosis of neurosarcoidosis CSF should be obtained for further analyses among which the ACE level with MRI finding can indicate the diagnosis, because these two examinations correlated in 96% of our patients.

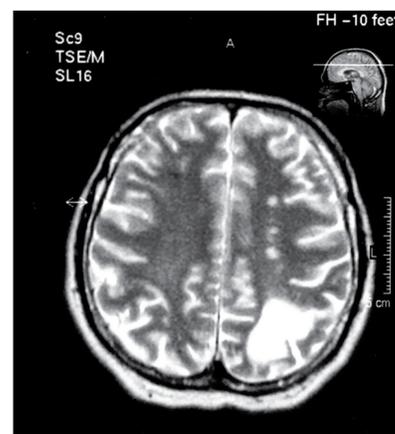
Introduction



Hydrocephalus in neurosarcoidosis

Sarcoidosis affects the central nervous system (CNS) in 14%–27% of patients in postmortem series. Symptomatic disease is less common, having been variously estimated at 3%–5%. Imaging studies can detect neurologic disease in 10% of all patients with sarcoidosis and are important in the clinical evaluation of sarcoidosis.

Although the wide spectrum of imaging findings in neurosarcoidosis is well documented, there is a paucity of data to show concordance between imaging findings and clinical information.



Parenchymal lesion in sarcoidosis

There is controversy regarding the utility of ACE levels in making the diagnosis of NS.

The goal of this study was to elucidate the relation between clinical symptoms, MRI findings, and cerebrospinal fluid (CSF) findings in our sarcoidosis patients.

1. Pickuth D, Spielmann RP, Heywang-Kobrunner SH. Role of radiology in the diagnosis of neurosarcoidosis. *Eur Radiol* 2000;10:941–44
2. Zajicek JP, Scolding NJ, Foster O, et al. Central nervous system sarcoidosis: diagnosis and management. *QJM* 1999;92:103–17
3. Smith JK, Mathews MG, Castillo M. Imaging manifestations of neurosarcoidosis. *AJR Am J Roentgenol* 2004; 182:289–95
4. Fels C, Riegel A, Javaheripour-Otto K, et al Neurosarcoidosis: findings in MRI. *Clin Imaging* 2004; 28:166–69

Conclusion



Increased CSF ACE may have significant role in the diagnosis of neurosarcoidosis, especially in symptomatic patients. This is the least invasive diagnostic procedure in evaluating the diagnosis of neurosarcoidosis.

In patients with already positive diagnosis of sarcoidosis (other organs involvement) and symptoms suggesting neurosarcoidosis, CFS ACE analysis and MRI may improve the accuracy in diagnosis of neurosarcoidosis.

Patients



Table 1. Patients analyzed for neurosarcoidosis 73 out of 1500 (4.8%)

Biopsy positive sarcoidosis patients with clinical symptoms suggesting neurosarcoidosis	73pts
70/73 (96%)	Chronic sarcoidosis
3/73 (4%)	Acute sarcoidosis
Mean age 51.73 years	
Cerebrospinal fluid taken for: ACE analyses, including lymphocyte (pleocytosis), protein levels, and glucose concentration	63 /73 (87.7%) patients

Diagnostic biopsies in 73 patients with neurosarcoidosis		
	No	%
Lung (transbronchial)	67	91 %
Skin	18	25 %
Lymph nodes	11	15 %
Parotid	6	8%
Bone	1	1.3 %
Liver	6	8 %

*A few patients had more than one biopsy performed

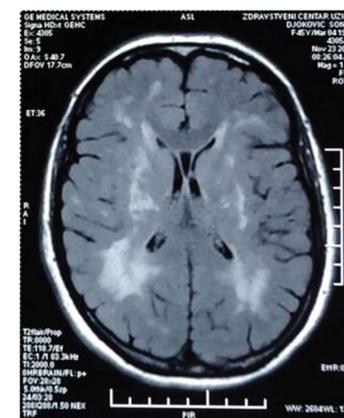
Table 3. Symptoms: (Patients with CSF analyses and NMR)

Clinical symptoms of the analyzed patients with CFS analyses and NMR	No	%
	63/73	87.7 %
Headache	47	92.2 %
Vertigo	24	47.1 %
Cranial nerves involvement (facial palsy)	7	13.7 %
Blurred vision	10	19.6 %
Seizures	2	3.9 %

Results

Patients with CFS analyses	63 patients
ACE in CSF NEGATIVE	13/63 (20%)
ACE in CSF POSITIVE (1-15 U/l)	51/63 (80%)

In 13patients / 63 (20%) ACE in CSF was not detected (0 U/L) . 51patients /63 (80%) had different CSF ACE levels ranging from 1-15 U/l.



White matter lesion in neurosarcoidosis

Correlation between serum ACE and CSF ACE levels: POOR

In 10 patients who had both high serum ACE and CSF ACE positive, there was a poor correlation between the two levels (Spearman's r = 0.02, P = 0.88).

This suggests that the CSF ACE levels may represent intrathecally synthesized ACE and not passive transfer from the serum.



Space occupying lesion in sarcoidosis

Cerebrospinal fluid features:

- Lymphocyte pleocytosis (15pts)
- Elevated protein levels (23pts)
- Decreased glucose concentration (4pts)

This agrees with the suggestion that CSF protein and CSF ACE co-vary, as proposed by Zajicek.

(Zajicek JP, Scolding NJ, Foster O, et al. Central nervous system sarcoidosis: diagnosis and management. *QJM* 1999;92:103–17)

However, CSF ACE is a product of sarcoid granulomas, whereas increase in CSF protein is a nonspecific indicator of inflammation.

MRI Findings

MRI findings in patients with CSF ACE positive (No 51pts)	No	%
Spinal cord lesions	3	(5.9%)
Hydrocephalus	2	(3.9%)
Parenchymal lesions	31	(66%)
Meningeal involvement	18	35.3%
White matter lesions	11	23.4%
Normal MRI findings	2	3.9%