

CASE REPORT

Clinical importance of somatosensory evoked potentials in early diagnosis of syringomyelia

Titlic M¹, Isgum V², Rados M³, Tonkic A⁴, Jukic I⁴

Department of Neurology, Clinical Hospital Split, Split, Croatia. marina.titlic@gmail.com

Abstract

We report a rare case of syringomyelia, the development of which was monitored by somatosensory evoked potentials. The evoked potentials recorded over an eight months' period of time were correlated with the incidence of syringomyelia. Changes of the evoked response latency and amplitude were detected. The evoked potential change and the sensation deficit indicated a pathological process. High-resolution MRI revealed syringomyelia in the cervical and the thoracic segments of the spinal cord.

Somatosensory evoked potentials represent a sensitive diagnostic method recording changes in the biopotentials. Potential changes require localisation of a possible process and high-resolution MRI. Evoked potentials enable to monitor both, the disease development, but also the healing process (Fig. 3, Ref. 11).

Full Text (Free, PDF) www.bmj.sk.

Key words: syringomyelia, SSEP, MRI.

Syringomyelia is a chronic progressive degenerative disease of the spinal marrow, characterised by segmental sensation deficit of the dissociated type and by brachial atrophy. Affected is the central part of the marrow, most often in its cervical segment, in some cases spreading into the medulla oblongata and the pons (cyringobulbia) or down into the thoracic or even lumbar segments (1–4). The somatosensory evoked potentials (SSEP) signal early changes of somatic sensations of the tibial nerve. The disorders can be located even more precisely.

Repeated SSEP recordings over a period of time enable to monitor the sensory deficit and more precisely locate the process. This is particularly important in the early stage of the disease, enabling an early diagnosis of the pathological process (5, 6). Magnetic resonance imaging (MRI) is a method of choice for establishing pathological processes in the spinal marrow. This is a highly sensitive method, directly correlated with the MRI device resolution degree. This method is highly specific for monitoring the spinal marrow pathological processes (7, 8). In the reviewed case SSEP significantly helped in diagnosing the syringomyelia, in addition to the clinical examinations.

Case report

57-year old woman suffered from cold legs for the last two years. In the last two months she also complained of tension in her calves. She had no significant medical history thus far. The

entire neurological status was normal. The touch and vibration sensations were normal. The blood vessels Doppler examination was normal. The serum B 12 and folic acid were within the reference values. Electromyoneurography established bilateral radicular lesion of the L5 and the S1, the neurographic findings being normal. SSEP of the median nerve was normal. SSEP of the tibial nerve indicated mild disorders in conductivity through the thoracic segment, the latencies were adequate. Eight months after the first examinations, the disorders worsened. The neurological status was dominated by the bilateral temperature sensation disorder in the lower legs and partly in the upper legs. Hypaesthesia of the lower limbs, especially the lower legs, and hypaesthesia up to the Th 8/9 level were observed.

The distinction sensation in the lower limbs was damaged. The vibration sensation was damaged in the lower limbs and the spinal processes up to the Th 8 level. The temperature sensation was damaged in the lower limbs and the trunk up to the Th 8

¹Department of Neurology, Clinical Hospital Split, Split, Croatia, ²Department of Neurology, University Hospital Zagreb, Zagreb, Croatia, ³Department of Radiology, Division of Neuroradiology, University Hospital Zagreb, Croatia, and ⁴School of Medicine University of Split, Split, Croatia

Address for correspondence: M. Titlic, MD, Dept of Neurology, Clinical Hospital Split, Spinčiceva 1, Split 21 000, Croatia.
Phone: +385.21.556426, Fax: +385.21.556675

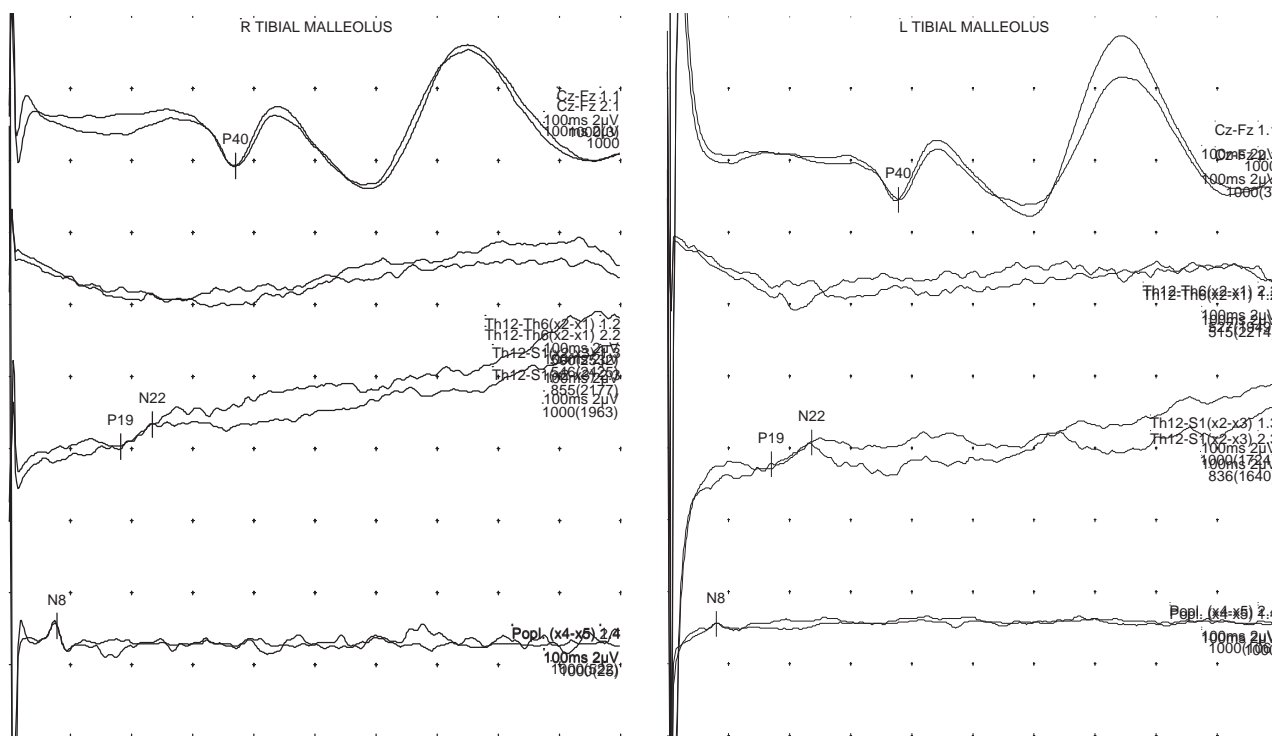


Fig. 1. SSEP of tibial nerve after eight months of the disease follow up, clinical hypesthesia from the Th 8/9 level downwards.



Fig. 2. MRI of the cervical spine – sagittal image – syringomyelia in the thoracic spine marrow from the C2 level downwards.



Fig. 3. MRI of the cervical spine – transversal image – syringomyelia.

level. A follow-up SSEP of the tibial nerve was performed which showed no spinogram, whereas the evoked response was of slightly prolonged latency and lower amplitude (Fig. 1).

The MRI of the thoracic segment performed by a 0.5 T apparatus revealed perfectly normal results, with no pathological substrate. Because of the changes noticed by recording of the tibial nerve evoked potentials, we decided to perform an MRI of the same segment with higher resolution. Therefore an MRI of the thoracic and cervical spines was performed by a Siemens Symphony 202, 1.5T device. The obtained thoracic segment and

thoraco-lumbar connection MRI showed a marked S-shaped scoliosis of the entire spine. There were signs of Hydrosyringomyelia evident, spreading caudally to the Th 8, Th 9 level, and then cranially to the C2 and C3 segments. The syrinx was 3 mm wide, except at the C4 level where it was about 5 mm wide, with no expansion into the medulla spinalis. There were no signs of a process of expansion into the spinal canal or compression of the medulla spinalis. There were no signs of the i.v. disc herniation (Figs 2 and 3).

Discussion

Nowadays, in the time of developed technology, diseases and conditions are expected to be diagnosed as soon as possible. A full development of clinical symptomatology in this case means a greater neurological deficit. Besides temperature and touch sensation deficits, also muscular atrophy develops. An early diagnosis enables early surgery, this further prevents development of a greater neurological deficit. SSEP enables assessment of the sensation deficit and monitoring of the damage over a period of time, thereby a very early diagnosis of the disease, before greater neurological deficits develop. Measuring of particular evoked-response latencies and monitoring of its amplitudes indicate possible pathological changes of conductivity. Correlation of latencies and amplitudes of particular SSEP responses over a period of time enables monitoring of a possible pathological process and completes the information on the clinical and neurological statuses (9).

High-resolution MRI is a diagnostic method that definitely confirms the existence of a syringomyelia and small changes, as established by other authors as well (10, 11). In conclusion, SSEP provides an additional information on the clinical state of a still undeveloped disease and helps to early diagnose syringomyelia, thereby decreasing the development of neurological deficits.

References

1. **Logue V, Edwards MR.** Syringomyelia and its surgical treatment: An analysis of 75 cases. *J Neurol Neurosurg Psychiatr* 1981; 44: 273–275.
2. **Goel A, Sharma P.** Craniovertebral junction realignment for the treatment of basilar invagination with syringomyelia: preliminary report of 12 cases. *Neurol Med Chir (Tokyo)* 2005; 45 (10): 512–518.
3. **Noordeen MH, Taylor BA, Edgar MA.** Syringomyelia. A potential risk factor in scoliosis surgery. *Spine* 1994; 19 (12): 1406–1409.
4. **Fu H.** Arnold-Chiari malformation presenting in adult life. *Zhonghua Shen Jing Jing Shen Ke Za Zhi* 1992; 25 (2): 100–102.
5. **Urasaki E, Fukumura A, Hoh Y, Hoyama Y, Koga K, Wada S, Yokota A, Ushio Y.** Correlation between abnormal SSEP and clinicoradiological findings in cervical lesions. *No Shinkei Geka* 1988; 16 (4): 367–375.
6. **Milhorat TH, Kotzen RM, Capocelli AL Jr, Bolognese P, Bendo AA, Cottrell JE.** Intraoperative improvement of somatosensory evoked potentials and local spinal cord blood flow in patients with syringomyelia. *J Neurosurg Anesthesiol* 1996; 8 (3): 208–215.
7. **Di Lorenzo N, Cacciola F.** Adult syringomyelia. Classification, pathogenesis and therapeutic approaches. *J Neurosurg Sci* 2005; 49 (3): 65–72.
8. **Marinkurve GG, Sciubba D, Amundson E, Jallo GI.** Familial Chiari type I malformation with syringomyelia in two siblings: case report and review of the literature. *Childs Nerv Syst* 2005; 21 (11): 955–959.
9. **Utzig N, Burtzlaff C, Wiersbitzky H, Lauffer H.** Evoked potentials in Chiari-malformation type I with syringomyelia — a case history. *Klin Pediat* 2003; 215 (4): 241–243.
10. **Colak A, Boran BO, Kutlay M, Demircan N.** A modified technique for syringo-subarachnoid shunt for treatment of syringomyelia. *J Clin Neurosci* 2005; 12 (6): 677–679.
11. **Mollano AV, Weinstein SL, Menezes AH.** Significant scoliosis regression following syringomyelia decompression: a case report. *Iowa Orthop J* 2005; 25: 57–59.

Received December 20, 2006.

Accepted June 9, 2006.