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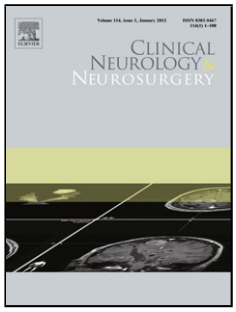


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# Circadian Rhythm in idiopathic Normal Pressure Hydrocephalus

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## Highlights

- We hypothesize that there is a disturbance of circadian rhythm in iNPH-patients.
- The aim was to study any changes of the diurnal rhythm in iNPH-patients before and after a shunt operation.
- This is the first systematic study of circadian rhythm in iNPH-patients.

## Abstract

**Objectives**
The pathogenesis of idiopathic normal pressure hydrocephalus (iNPH) takes place in structures close to the cerebral ventricular system. Suprachiasmatic nucleus (SCN), situated close to the third ventricle, is involved in circadian rhythm. Diurnal disturbances are well-known in demented patients. The cognitive decline in iNPH is potentially reversible after a shunt operation. Diurnal rhythm has never been studied in iNPH. We hypothesize that there is a disturbance of circadian rhythm in iNPH-patients and the aim was to study any changes of the diurnal rhythm (mesor and circadian period) as well as any changes of the diurnal amplitude and acrophase of the activity in iNPH-patients before and after a shunt operation.
**Patients and Methods**
Twenty consecutive iNPH-patients fulfilling the criteria of the American iNPH-guidelines, 9 males and 11 females, mean age 73 (49-81) years were included. The patients underwent a pre-operative clinical work-up including 10 meters walk time (w10mt) steps (w10ms), TUG-time (TUGt) and steps (TUGs) and for cognitive function an MMSE score was measured. In order to receive circadian rhythm data actigraphic recordings were performed using the SenseWear 2 (BodyMedia Inc Pittsburgh, PA, USA) actigraph. Cosinor analyses of accelerometry data were performed in “R” using non-linear regression with Levenburg- Marquardt estimation. Pre- and post-operative data regarding mesor, amplitude and circadian period were compared using Wilcoxon-Mann-Whitney test for paired data.
**Results**
Twenty patients were evaluated before and three month post-operatively. Motor function (w10mt, w10ms, TUGt, TUGs) was significantly improved while MMSE was not significantly changed.