EVENT ABSTRACT

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Pain management in disorders of consciousness

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Background: Patients with disorders of consciousness (DOC) are unable to communicate about their feelings and therefore they cannot express potential painful sensation. The Nociceptive Coma Scale-Revised (NCS-R) is a valuable tool to assess nociception in those patients (Chatelle et al. 2018; Schnakers and Zasler 2007; Chatelle et al. 2012). In the present study, we aimed at investigating the use of the NCS-R in chronic patients with DOC to monitor behavioural responses to potential painful stimulation, i.e. during physical therapy (PT), as it may potentially induce a painful sensation given the common presence of neuro-orthopaedic disorders in these severely brain-injured patients and especially in case of spasticity (Thibaut et al. 2015). In this randomized double-blind placebo-controlled protocol, we investigated the prevalence of signs of nociception during PT and their changes in relation to an analgesic treatment.

Methods: We enrolled chronic (>3 months post-injury) patients in unresponsive wakefulness syndrome (UWS - Laureys et al. 2010) or minimally conscious state (MCS - Giacino et al. 2002) over 16 years old. We excluded patients with documented neurological disorders prior to the acquired brain damage. The level of consciousness was assessed with the Coma Recovery Scale-Revised (CRS-R - Giacino et al. 2004). The behavioural responses related to nociception were assessed using the NCS-R (Chatelle et al. 2012), in four different conditions: a) at rest; b) during a tactile stimulation (i.e., 5 claps on the right and left hand); c) during a nociceptive stimulation (i.e., pressure on the nailbed of the right and left middle finger); and d) during PT. If the score observed during the PT was higher or equal to the one observed during the nociceptive stimulation or if the score was equal or higher than 4 (threshold previously defined - Chatelle et al. 2012), he/she was enrolled in the second phase of the study (i.e., randomized placebo-controlled protocol). In this phase, the patient was assessed twice within 24 hours during a PT session with the same therapist, once when receiving an active pain-killer (tailored on the patient's medication - Ventafridda et al. 1985) and once after a placebo, administered in a randomized double-blind placebo-controlled manner. The CRS-R was also administered after each PT session to control for changes in the level of consciousness due to pain medication.

We used a Friedman Anova to investigate the difference in NCS-R scores between all the conditions (i.e., rest, tactile, nociceptive and during PT). Wilcoxon matched pairs signed rank tests were then used as post hoc analyses. Given the number of patients included in the second phase of the study, we also used descriptive analyses to characterize the effect of analgesics on NCS-R scores.

Results: In this preliminary dataset, 6 patients were enrolled (1 UWS, 5 MCS, see table 1). Demographics and NCS-R scores during the first evaluation are reported in table 1 and figure 1.

NCS-R total scores differed between all the conditions ($\chi 2 = 12.9$; $p = 0.005$). NCS-R total scores were higher during PT than at rest ($p = 0.034$) or after the tactile stimulation ($p = 0.036$).

Five out of 6 patients met the criteria for being enrolled in the second phase of the study (i.e., presented signs of nociception during PT more or equal than during the nociceptive stimulation or an NCS-R score during PT higher or equal to 4, see table 2). Two patients were excluded from the analysis for scheduling reasons preventing a standardized application of the protocol. Regarding the three patients included in the phase 2, only one had an improvement in the NCS-R after treatment compared to placebo (decrease of the NCS-R score from 3 at the first evaluation to 0 after treatment and to 2 after placebo), while the NCS-R score did not change for the other two patients after treatment and placebo. The CRS-R based diagnosis remained unchanged for all the patients.

Conclusions: In this preliminary dataset, our results show that most patients with DOC present signs of potential pain as measured by the NCS-R during PT (5/6; 83.3%). Indeed, we found a significant difference between the NCS-R score during PT than at rest or after a tactile stimulation, suggesting that passive mobilizations are potentially painful for patients with DOC. Regarding the second phase of the study, even if we found a decrease in the pain score after the treatment with paracetamol in one patient, this was not the case for the other two patients included as their NCS-R scores remained unchanged. This could be explained by the fact that the analgesic treatment was not enough to decrease pain. It could also be due to a failure of the NCS-R to detect the positive effect of an analgesic treatment. Additionally, it is important to highlight that 4 of the 5 patients showing signs of pain during PT were not receiving chronic analgesic treatment at the time of enrollment. Although chronic analgesic therapy is not necessary for all patients, it is crucial to pay attention to the signs of nociception during mobilizations and cares and to provide an adequate treatment.

If these results are preliminary, we point-out that PT may be painful for DOC patients and appropriate assessment and treatment before and during mobilizations should become a priority in the clinical setting. In the future, we should also correlate the NCS-R scores with the fluctuations of consciousness (i.e. CRS-R scores) and the variations of spasticity (i.e. Modified Ashworth Scale scores - Mehrholz et al. 2005) during mobilization when analgesics are administered.

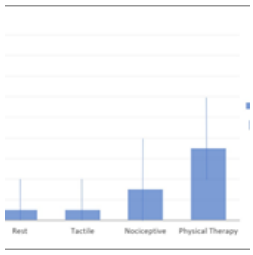
Table 1. NCS-R total scores during the first evaluation; MCS = Minimally Conscious State; NCS-R = Nociceptive Coma Scale–Revised;

PT = Physical Therapy; TBI = Traumatic Brain Injury; UWS = unresponsive wakefulness syndrome.

Figure 1. NCS-R total scores at the first evaluation; NCS-R = Nociceptive Coma Scale–Revised.

Table 2. NCS-R scores during physiotherapy and diagnosis at the first evaluation, after the treatment and after placebo; MCS = minimally conscious state; NCS-R = Nociceptive Coma Scale–Revised; UWS = unresponsive wakefulness syndrome.

Figure 1



Acknowledgements

The study was supported by the University and University Hospital of Liège, the Belgian National Funds for Scientific Research (FRS-FNRS), and the European Union's Horizon 2020 Framework Programme for Research and Innovation (Grant Agreement No. 720270 (Human Brain Project SGA1) and No. 785907 (Human Brain Project SGA2)). SL is research fellow, AT is postdoctoral researcher and SL is research director at FNRS. CC is a Marie Sklodowska-Curie fellow (H2020-MSCA-IF-2016-ADOC- 7752686).

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Keywords: Pain, disorders of consciousness, minimally conscious state (MCS), unresponsive wakefulness syndrome (UWS), Physical theraphy

Conference: Belgian Brain Congress 2018 – Belgian Brain Council, LIEGE, Belgium, 19 Oct - 19 Oct, 2018. **Presentation Type:** e-posters

Topic: NOVEL STRATEGIES FOR NEUROLOGICAL AND MENTAL DISORDERS: SCIENTIFIC BASIS AND VALUE FOR PATIENT-CENTERED CARE

Citation: Binda Fossati M, Filippini M, Bonin E, Bornheim S, Lejeune N, Bodart O, Laureys S, Thibaut A and Chatelle C (2019). Pain management in disorders of consciousness. *Front. Neurosci. Conference Abstract: Belgian Brain Congress 2018 – Belgian Brain Council*. doi: 10.3389/conf.fnins.2018.95.00096

 Received: 31 Aug 2018; **Published Online:** 17 Jan 2019.

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