Stellate ganglion block for the management of hot flashes and sleep disturbances in breast cancer survivors: an uncontrolled experimental study with 24 weeks of follow-up

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Background: We studied the stellate ganglion block (SGB) recently suggested for the treatment of severe vasomotor symptoms and sleep disturbances in breast cancer survivors. Following an initial pilot study, which focused on the acceptability and safety of SGB for this important problem, we evaluated its short- and long-term efficacy.

Materials and methods: Postmenopausal breast cancer survivors with severe vasomotor symptoms resistant to standard nonhormonal pharmacological intervention were eligible. Diaries were used to measure daily hot flash scores (frequency and intensity) and sleep quality (Pittsburgh Sleep Quality Index) during scheduled visits at baseline, 1, 4, 12 and 24 weeks following the SGB. Efficacy data were analyzed using longitudinal regression models.

Results: Thirty-four patients participated and none refused the SGB procedure. Most patients received more than one SGB. The pilot study found SGB to be safe. In the main study, hot flash scores were reduced from baseline by 64% [95% confidence interval (CI) 274% to 249%] and 47% (95% CI 262% to 227%) at weeks 1 and 24, respectively. The odds ratio of better sleep quality relative to baseline was 3.4 at week 1 (95% CI 1.6–7.2) and 4.3 at week 24 (95% CI 1.9–9.8).

Conclusion: In the short term, SGB appears to be an effective treatment with acceptable morbidity for some breast cancer survivors with therapy-resistant vasomotor symptoms and/or sleep disturbances. Although sleep quality was maintained out to 24 weeks the efficacy of SGB for hot flashes was reduced over time. A randomized controlled trial is needed to confirm these findings.

Key words: breast cancer, hot flashes, sleep disturbances, stellate ganglion block

introduction

Breast cancer survivors often suffer from severe menopausal symptoms that interfere with daily functioning, quality of life and sleep [1]. Chemotherapy, ovarian suppression and the abrupt stopping of hormone therapy induce acute menopausal symptoms. Antiestrogens further enhance these negative effects leading to poor compliance of cancer therapy [2–9]. In one survey, over half of all tamoxifen users complained of hot flashes, night sweats and disturbed sleep quality [10], highlighting the need for safe and effective nonhormonal treatments to alleviate vasomotor symptoms.

Although incompletely understood, hot flashes are thought to be due to thermoregulatory dysfunction within the hypothalamus triggered by estrogen withdrawal [1]. Estrogen withdrawal, however, is considered only part of the cause as obese women, known to have higher endogenous levels of circulating estrogen, are more likely to be affected by hot flashes than women with a low body mass index [11–15]. Other factors also thought to play a role include stress, spicy food, alcohol, smoking, low physical activity, sociodemographic factors and environmental temperature [1].

Body core temperature is regulated by the central noradrenergic system [16, 17]. Before and during a hot flash, a significant amount of norepinephrine (NE), which elevates
core body temperature when the patient is awake or asleep, is
released from the brain. The threshold for perspiration
(vasodilatation) is lowered and the threshold for shivering
(vasoconstriction) rises [18]. Pharmacological stellate ganglion
block (SGB) has been carried out for decades for different
medical purposes [19]. Given its indirect effect on the level of
brain NE, SGB has recently emerged as a new treatment of hot
flashes [20–23]. Preliminary studies report encouraging efficacy
with minimal complications [20–23] and one recent review
already considers SGB as a valuable nonhormonal alternative
for treating hot flashes [24]. Here, we report our findings on
the use of SGB for the treatment of nonhormonal therapy-
resistant hot flashes and poor sleep quality.

patients and methods

study design and setting, participants and objectives
This was a single center uncontrolled trial testing SGB in breast cancer
patients with severe vasomotor symptoms resistant to nonhormonal
alternatives. Patients were enrolled at the University Hospitals (Leuven,
Belgium) between September 2008 and October 2009. Written informed
consent was obtained for all patients by the treating physician and again by
the anesthetist performing the SGB. The hospital's institutional review
board approved the study. If the pilot study showed acceptability, safety and
efficacy at 1 month of follow-up, the main study was initiated.

Patients were eligible if they had nonrecurrent, early-stage post-
menopausal breast cancer diagnosed 5 years ago, Karnofsky performance
status 80 and severe treatment-resistant hot flashes, as indicated from
patient interviews. The exclusion criteria included a change of
anithormonal therapy for breast cancer within 8 weeks of the first SGB,
bleeding disorders, the use of anticoagulants (other than low-dose
aspirin), any acute infection, cardiac disorders and an American Society of
Anesthesiologists (ASA) classification system score ≥3, as determined by the
anesthetist. Previous use of systemic therapy [selective serotonin
reuptake inhibitors (SSRIs), gabapentin, clonidine] for climacteric symptoms
was recorded, but simultaneous use of these agents with SGB was not allowed.

The objectives of the pilot study were to assess the acceptability and
safety of SGB treatment as well as its efficacy after 1 month of follow-up.
The primary objective of the study was to assess the long-term efficacy of
SGB treatment and this was evaluated in the subsequent main study.

study procedures and measurements

SGB procedure. The recruiting physician explained the SGB procedure to
the patient in detail with the aid of a patient-specific information form.
Following consent, the eligible patient was admitted to the day ward of the
pain clinic. Here, the anesthetist explained the procedure again and also
reassured the patient that a temporary Horner’s sign would be proof of
a correctly carried out SGB. The procedure was carried out under routine
sterile conditions in an operating room equipped with laminar flow. An i.v.
20-gauge catheter was placed in the contralateral arm of the operated
breast. The patient lays in a ventral position on the operating table with her
neck in extension. The X-ray machine was installed to see the lower cervical
vertebrae and upper two ribs. Chlorohexidine 0.5% was applied to the
cervical region. The right C6 transverse process was controlled with a metal
pointer. A 21-gauge needle attached to a 50 cm extension line was flushed
with 50% diluted iopromide 300. The syringe was handed to the nurse who
also held 10 ml of levobupivacaine 0.25% in another syringe. The needle
was placed on the anterolateral aspect of transverse process C6. After bone
contact, the needle was withdrawn 1 mm and aspirated. Three milliliters of
contrast medium was injected to ensure that there was no vascular or
subarachnoid spread. Ten milliliters of levobupivacaine was injected with
regular aspiration and the needle withdrawn. A sterile plaster was applied. If
the block was successful, the presence of a Horner’s syndrome was seen
within a few minutes. The patient was transferred to the day hospital where
her oxygen saturation and blood pressure were monitored for 20–30 min. If
the SGB seemed unsatisfactory or it did not last throughout the study’s
follow-up period, another (contralateral) SGB was offered. A maximum of
three blocks was permitted.

procedure acceptability. The acceptability of the SGB was defined as the
proportion of patients who refused to be enrolled in the study because of
the potential risks and invasiveness of the procedure.

safety objective. Adverse events reported by patients undergoing the
procedure were recorded [25].

outcome measures: pilot study and main study. We used the Climacteric
Symptom Form, the hot flash diary and the Pittsburgh Sleep Quality Index
to assess the efficacy of SGB on hot flashes and sleep quality, respectively. In
the pilot study, patient assessments were scheduled at baseline (1 week
before the SGB procedure) and again 4 weeks after treatment. In the main
study, patients were assessed at baseline and follow-up was planned at 1, 4,
12 and 24 weeks after the procedure.

Patients recorded hot flash scores by keeping a daily diary of the
frequency (n) and severity (none = 0, mild = 1, moderate = 2, severe = 3) of
their hot flashes, as previously reported [25, 26]. A daily hot flash score,
equal to the number of mild episodes plus twice the number of moderate
episodes plus three times the number of severe episodes, was calculated. For
each week, the average daily hot flash score was also calculated. Sleep
disturbance was scored using the Pittsburgh Sleep Quality Index during the
follow-up period. Four levels of sleep quality were measured: bad,
moderate, sufficient and good.

statistical methods

The data were summarized using medians with 25th and 75th percentiles and
with percentages as appropriate. The effect of SGB on the hot flash score over
time was analyzed with a fixed-effects longitudinal regression model using
a heterogeneous compound symmetry covariance matrix between the four
measurement time points. The hot flash score was log transformed as log
(hot flash score + 1) due to skewness. Graphical inspection of the individual
and average patient profiles suggested a piecewise linear evolution: the effect
between baseline and week 1 was different from the effect after week 1.
This was accounted for in the model by allowing different effects of time
before and after week 1. Age and SGB number (categorical) were used as
covariates in the model. The effect of SGB on sleep quality was modeled
using a fixed-effects longitudinal ordinal regression with a proportional
odds assumption because sleep quality is an ordinal variable. Again,
a piecewise linear evolution was suggested.

results

In the pilot and main studies, all 9 patients (median age 53
years; range: 34–66 years) and all 25 patients (median age 53
years; range: 41–69 years), respectively, completed the planned
follow-up. No patient refused the SGB, giving an acceptability
result of 100% in both studies.

All 34 patients presented with a temporary Horner’s syndrome
following the procedure. There were no serious short- or long-
lastling side-effects reported apart from one patient who
presented with a temporary hoarse voice at the first follow-up.

In the pilot study, the SGB was carried out unilaterally in 5/9
patients; the remaining four patients had the block bilaterally.
Three of the nine patients reported no change in their hot flash
or sleep quality scores; two of these three patients had the SGB once. Six out of nine patients reported an improvement in either the severity of their hot flashes or in their sleep quality. Two of these six patients reported complete disappearance of their hot flashes and perfect sleep quality 1 month after having undergone a single unilateral block. Three patients experienced respectively an 80%, 70% and 50% improvement in hot flashes. Their sleep quality improved from bad to moderate (one patient) or sufficient (two patients). However, all of these patients required a contralateral block as the unilateral block was either short lasting or considered unsuccessful. Another patient experienced a 20% improvement in hot flashes and her sleep quality went from bad to moderate following a unilateral block, but she refused the procedure on the contralateral side.

Of the 25 patients in the main study, 11 were required to stop hormone replacement therapy at the time of their breast cancer diagnosis. Twenty-three patients had a history of invasive breast cancer and two had in situ breast cancer. Seventeen of the 25 patients were taking tamoxifen and 4 were on an oral aromatase inhibitor at the time the procedure was carried out. Before the first SGB, 17 patients were taking clonidine, 11 patients venlafaxine and 7 patients were taking both. Clonidine and venlafaxine were all discontinued before baseline week.

Six patients (24%) had one SGB (SGB-I), 16 patients (64%) had a second SGB, which was always positioned on the contralateral side of the first (SGB-II), and three patients (12%) required a third block (SGB-III) (Table 1). Of the SGB-II patients, 11 patients underwent a second SGB <8 weeks after the first block; two patients were retreated between 8 and 12 weeks, and three patients were retreated between 12 and 24 weeks after the first procedure. Of the three SGB-III patients, the first patient received her third SGB <8 weeks after her first block, the second was retreated between 8 and 12 weeks and the third between 12 and 24 weeks after the first SGB.

At baseline, the hot flash score was highest in SGB-II (median, 40) patients compared with SGB-I (median, 25) and SGB-III (median, 21) patients. Descriptive statistics of the efficacy outcomes are presented in Table 1 based on the average daily hot flash score for each of the indicated weeks. An apparent benefit of SGB on hot flash scores was seen at week 1 versus baseline, but this benefit had slightly worn off by weeks 12 and 24: the median score for all patients was 30 at baseline, 12 at week 1, 18 at week 12 and 19 at week 24. Sleep quality also improved substantially at week 1 versus baseline, with the improvement expanding slightly thereafter: 7 patients (28%) had sufficient or good sleep quality at baseline, 15 (60%) at week 1, 16 (64%) at week 12 and 18 (72%) at week 24. Figure 2 summarizes the sleep quality data for all patients.

The longitudinal regression model for hot flashes (Table 2) estimated a decrease of 64% in the hot flash score at week 1 versus baseline (95% CI 49–74), and a 1.7% increase per week from week 1 onward (95% CI 0.2–3.1). This resulted in an estimated decrease of 47% at week 24 versus baseline (95% CI 27–62). Figure 1 shows the evolution of the hot flash score for a patient (median age 53 years), while controlling for (panel A) or stratifying by (panel B) the number of SGB procedures. The longitudinal ordinal regression model for sleep quality (Table 3) estimated that the odds of having better sleep quality was 3.36 times higher at week 1 compared with baseline (95% CI 1.58–7.16; Figure 2). From week 1 onward, the odds of experiencing improved sleep quality was found to be 1.01 times greater than the week before (95% CI 0.98–1.04). This resulted in an odds ratio of 4.26 for week 24 compared with baseline (95% CI 1.86–9.77).

### Table 1. Descriptive statistics of the efficacy outcomes in the main study

<table>
<thead>
<tr>
<th>Group</th>
<th>Week</th>
<th>Hot flash scores</th>
<th>Sleep quality (%)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Baseline</td>
<td>Bad</td>
<td>Moderate</td>
<td>Sufficient</td>
<td>Good</td>
<td>Suff/good</td>
</tr>
<tr>
<td>All patients (n = 25);</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median age 53 years</td>
<td>Baseline</td>
<td>30 (24–48)</td>
<td>7 (28)</td>
<td>11 (44)</td>
<td>4 (16)</td>
<td>3 (12)</td>
<td>7 (28)</td>
</tr>
<tr>
<td></td>
<td>Week 1</td>
<td>12 (6–24)</td>
<td>2 (8)</td>
<td>8 (32)</td>
<td>11 (44)</td>
<td>4 (16)</td>
<td>15 (60)</td>
</tr>
<tr>
<td></td>
<td>Week 12</td>
<td>18 (6–27)</td>
<td>4 (16)</td>
<td>5 (20)</td>
<td>12 (48)</td>
<td>4 (16)</td>
<td>16 (64)</td>
</tr>
<tr>
<td></td>
<td>Week 24</td>
<td>19 (6–35)</td>
<td>3 (12)</td>
<td>4 (16)</td>
<td>14 (56)</td>
<td>4 (16)</td>
<td>18 (72)</td>
</tr>
<tr>
<td>SGB-I (n = 6); Median</td>
<td>Baseline</td>
<td>25</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1 (17)</td>
</tr>
<tr>
<td>age 54 years</td>
<td>Week 1</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3 (50)</td>
</tr>
<tr>
<td></td>
<td>Week 12</td>
<td>13</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3 (50)</td>
</tr>
<tr>
<td></td>
<td>Week 24</td>
<td>5.5</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2 (33)</td>
</tr>
<tr>
<td>SGB-II (n = 16); Median</td>
<td>Baseline</td>
<td>40</td>
<td>3</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>5 (31)</td>
</tr>
<tr>
<td>age 52.5 years</td>
<td>Week 1</td>
<td>16.5</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>10 (63)</td>
</tr>
<tr>
<td></td>
<td>Week 12</td>
<td>21.5</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>10 (63)</td>
</tr>
<tr>
<td></td>
<td>Week 24</td>
<td>25</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>4</td>
<td>13 (81)</td>
</tr>
<tr>
<td>SGB-III (n = 3); Median</td>
<td>Baseline</td>
<td>21</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1 (33)</td>
</tr>
<tr>
<td>age 55 years</td>
<td>Week 1</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2 (67)</td>
</tr>
<tr>
<td></td>
<td>Week 12</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3 (100)</td>
</tr>
<tr>
<td></td>
<td>Week 24</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3 (100)</td>
</tr>
</tbody>
</table>

*Average daily hot flash score for each of the indicated weeks. Data are presented as median or as median (P25–P75), with P25 and P75 the 25th and 75th percentiles.

*Data are presented as n or as n (%).

SGB, stellate ganglion block.
In this study, we were able to further support that SGB is a feasible and safe procedure for the treatment of severe hot flashes and poor sleep quality in selected symptomatic breast cancer patients. No short- or long-term side-effects were observed. We also provide data to support that the efficacy of SGB for the treatment of severe hot flashes and sleep quality is maintained over time. We report for the first time that the efficacy of SGB on hot flashes is reduced over time but that the procedure appears to maintain sleep quality out to 24 weeks (Figures 1 and 2).

The effect of SGB on hot flashes was of early onset. The estimated decrease in the hot flash score versus baseline was 64% (95% CI 49–74) at week 1 versus 47% (95% CI 27–62) at week 24 (Table 2). The odds ratio for sleep quality at week 24 compared with baseline was 4.26 (95% CI 1.86–9.77), (Table 3). Thus, SGB seemed to maintain its positive effect on sleep quality over time.

Our results, coupled with those of others, may result in SGB finding a new indication in breast cancer patients [20–22]. Recently, Lipov et al. [20–22] hypothesized the results of a similar study involving 13 patients followed for a mean duration of 42.6 weeks (Standard Deviation 6.33; range: 37–52). He found that the number of hot flashes gradually decreased or stabilized over the period of study. In our study, however, after 24 weeks of follow-up, only 60% of patients (15/25) reported a more permanent benefit of reduced hot flashes despite multiple procedures in 19/25 patients.

Lipov et al. [27] also reported that Chronic Regional Pain Syndrome (CRPS), Post Traumatic Stress Disorder (PTSD) and hot flashes are triggered by a rise in nerve growth factor (NGF) resulting in an increase in brain NE. SGB may cause a decreased and prolonged reduction of NGF, which reduces brain NE and consequently the symptoms of hot flashes, CRPS and PTSD. The stellate ganglion has second- and third-order synaptic connections to the brain centers that control core body temperature, the maintenance of neuropathic pain and episodes

### Table 2. Analysis of the hot flash score in the main study: fixed-effects longitudinal regression model with piecewise effect of time and with age and number of SGB procedures as covariates

<table>
<thead>
<tr>
<th>Effect</th>
<th>Model coefficient</th>
<th>SE</th>
<th>Percentage change (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>−0.0047 per year</td>
<td>0.0158</td>
<td>−64% at week 1 versus baseline (−74 to −49)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>SGB I</td>
<td>0.21</td>
<td>0.42</td>
<td>1.7% per week (0.2 to 3.1); Implying: −57% at week 12 versus baseline (−68 to −42)</td>
<td>0.03</td>
</tr>
<tr>
<td>SGB II</td>
<td>0.66</td>
<td>0.37</td>
<td>−47% at week 24 versus baseline (−62 to −27)</td>
<td></td>
</tr>
<tr>
<td>SGB III Reference level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect week 1 versus baseline</td>
<td>−1.020</td>
<td>0.165</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear effect from week 1 onward</td>
<td>0.016 per week</td>
<td>0.007</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*aThis is derived from the antilog of the model coefficient and its 95% CI.

**CI,** confidence interval; **SE,** standard error; **SGB,** stellate ganglion block.

**Discussion**

In this study, we were able to further support that SGB is a feasible and safe procedure for the treatment of severe hot flashes and poor sleep quality in selected symptomatic breast cancer patients. No short- or long-term side-effects were observed. We also provide data to support that the efficacy of SGB for the treatment of severe hot flashes and sleep quality is maintained over time. We report for the first time that the efficacy of SGB on hot flashes is reduced over time but that the procedure appears to maintain sleep quality out to 24 weeks (Figures 1 and 2).

The effect of SGB on hot flashes was of early onset. The estimated decrease in the hot flash score versus baseline was 64% (95% CI 49–74) at week 1 versus 47% (95% CI 27–62) at week 24 (Table 2). The odds ratio for sleep quality at week 24 compared with baseline was 4.26 (95% CI 1.86–9.77), (Table 3). Thus, SGB seemed to maintain its positive effect on sleep quality over time.

Our results, coupled with those of others, may result in SGB finding a new indication in breast cancer patients [20–22].

![Figure 1](image-url)

**Figure 1.** Predicted daily hot flash score for a patient of median age (53 years), either controlling for (panel A) or stratifying by (panel B) the number of stellate ganglion block (SGB) procedures. CI, confidence interval.

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of PTSD [27]. The NGF hypothesis put forth by Lipov et al. may also account for the increased rate of hot flashes seen with aromatase inhibitors, which are likely to increase NGF [28].

While our results and those of others support that SGB is an effective treatment of hot flashes, the uptake of this treatment in breast cancer patients may be limited. The cost of the procedure may be a drawback despite long-term medication no doubt costing more. The short-term (2–6 h) side-effects of Horner’s syndrome (ptosis, miosis, anhidrosis and enophthalmos) may not be acceptable to all patients. Nonhormonal medications used to treat hot flashes may also be preferred compared with an invasive procedure.

Alternative treatments include SS(N)RIs, which have grown in popularity for the treatment of hot flashes in breast cancer patients despite the well-known side-effects of headache, nervous and sexual dysfunction, dry mouth, loss of appetite and constipation. A daily dose of 75 mg of venlafaxine blocks serotinine and NE reuptake. In one study, this was shown to reduce hot flashes by 61% compared with a 27% reduction with placebo [29].

Other SSRIs [30–32], gabapentine [33–35] and megestrol acetate [36, 37] have also been studied in randomized placebo-controlled phase III trials to treat hot flashes. Although SSRIs and megestrol acetate are effective, compliance is low. SSRIs are not popular in nondepressed patients and the use of progestins raises concern due to the risk of relapse in women with a history of invasive breast cancer [38]. Gabapentin and pregabalin are possible alternatives. They reduce noradrenergic hyperactivity and are effective for the control of hot flashes in breast cancer patients [33–35]. They can, however, induce cognitive problems such as somnolence and dizziness; they also raised the risk of suicide, although in absolute terms this risk was still small. In contrast to our study, which included patients with therapy resistant hot flashes, all these studies included a majority of patients with hot flashes that were previously untreated. Acupuncture, another option for hot flashes, is less invasive than SGB. Although the majority of studies, which afflicted this issue have not been able to report a benefit, a recently reported study showed a marked clinical improvement in hot flashes comparing acupuncture to a control group ($P < 0.001$) [39].

Although the length of follow-up (24 weeks) is one of the strengths of this study, the study is not without weaknesses. Part of the efficacy reported here may be derived from a placebo effect. In some studies, the placebo effect has been reported to be as high as 50%, especially when there were a high baseline number of hot flashes [40]. Another weakness is that we ignored to what extent a second or third injection affected outcome in some nonresponders. We only have anecdotal evidence that subsequent procedures may be of benefit if the effect of the first procedure was short lived. As such, we can only confirm previous findings. Using pulsed radio frequency may also provide a more permanent SGB without the risk of a permanent Horner’s syndrome [41]. Finally, our study used bilateral SGB, whereas other studies used only right side SGB [20–23].

In conclusion, SGB is safe in all and appears efficacious in some patients with severe hot flashes and poor sleep quality. Although its effect tends to decrease over time, we have demonstrated that 60% of patients appear to benefit from reduced hot flashes 24 weeks after the initial procedure. The results of this study, coupled with the work of others, support the need for a placebo-controlled trial with long-term follow-up in order to exclude a placebo effect.

**Acknowledgements**

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**Disclosure**

The authors declare no conflicts of interest.

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**Table 3.** Analysis of sleep quality in the main study: fixed-effects longitudinal proportional odds ordinal regression model with piecewise effect of time and with age and number of SGB procedures as covariates

<table>
<thead>
<tr>
<th>Effect</th>
<th>OR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>1.05</td>
<td>0.97–1.13</td>
<td>0.22</td>
</tr>
<tr>
<td>SGB I</td>
<td>0.21</td>
<td>0.05–0.83</td>
<td></td>
</tr>
<tr>
<td>SGB II</td>
<td>0.90</td>
<td>0.37–2.17</td>
<td></td>
</tr>
<tr>
<td>SGB III</td>
<td>Reference level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect week 1 versus baseline</td>
<td>3.36</td>
<td>1.58–7.16</td>
<td>0.002</td>
</tr>
<tr>
<td>Linear effect from week 1 onward</td>
<td>1.01/week; implying:</td>
<td>0.98–1.04</td>
<td>0.54</td>
</tr>
<tr>
<td>baseline, week 12 versus baseline</td>
<td>3.76</td>
<td>1.88–7.53</td>
<td></td>
</tr>
<tr>
<td>baseline, week 24 versus baseline</td>
<td>4.26</td>
<td>1.86–9.77</td>
<td></td>
</tr>
</tbody>
</table>

CI, confidence interval; OR, odds ratio; SGB, stellate ganglion block.


