Prevalence of Neuropathic Pain According to the IASP Grading System in Patients with Chronic Non-Malignant Pain

Henrik Bjarke Vaegter, MSc,*
Per Grunwald Andersen, MD,*
Marianne Frobøse Madsen, BSN,*
Gitte Handberg, MD,* and Thomas Peter Enggaard,
MD, PhD†

*Pain Center South and
†ESES Unit, Department of Anaesthesiology and
Intensive Care Medicine, University Hospital Odense,
Odense C, Denmark

Reprint requests to: Henrik Bjarke Vaegter, MSc, Pain
Center South, University Hospital Odense, Heden 9,
Entrance 201, 5000 Odense C, Denmark.
Tel: +45 60 61 68 64; Fax: 0045 66 11 74 76;
Email: henrik.bjarke.vaegter@rsyd.dk.

Conflict of interest: Per Grunwald Andersen has
participated in pain congresses sponsored by
Norpharma and Pfizer Denmark in the period
2011–2012. Gitte Handberg has participated in pain
congresses sponsored by Grunenthal ApS Denmark
in 2012.

Thomas Peter Enggaard has been a member of a
national advisory board for Grunenthal ApS Denmark

Abstract

Objective. The primary objective was to determine
the prevalence of neuropathic pain according to the
new International Association for the Study of
Pain (IASP) grading system. The secondary objec-
tive was to compare the system classification of
neuropathic pain with the classification of neuro-
pathic pain according to a patient-administered
screening questionnaire.

Setting. A Multidisciplinary Pain Center.

Subjects. One hundred twenty patients with a
variety of chronic pain conditions referred to a mul-
idisciplinary pain center.

Methods. Consecutively referred patients filled out
the PainDETECT Questionnaire before the first con-
sultation. During the first consultation, patients had
pain history taken and bedside examination per-
formed by a pain specialist. Patients were classified
according to the score on the PainDETECT Ques-
tionnaire and graded according to the IASP grading
system about the certainty of neuropathic pain.

Results. According to the IASP grading system, 22
patients (18.3%) classified as probable or definite
neuropathic pain and 90 patients (75%) as unlikely
neuropathic pain. According to the PainDETECT
Questionnaire, 55 patients (45%) were classified as
likely neuropathic pain and 13 patients (10.8%) as
unlikely neuropathic pain. Eleven patients (20%)
who were classified as neuropathic pain according
to PainDETECT were also classified as probable or
definite neuropathic pain by the new IASP grading
system.

Conclusions. According to the new IASP grading
system, less than 20% of the patients referred to a
multidisciplinary pain center fulfilled the criteria for
neuropathic pain. The classification of neuropathic
pain with the IASP system varies from the classifi-
cation of neuropathic pain with the use of a self-
administered screening questionnaire.

Key Words. Neuropathic Pain; Assessment; Pain
DETECT; Chronic Pain; IASP Grading System;
Epidemiology

Introduction

Neuropathic pain is probably second only to musculoskel-
etal pain as the greatest cause of chronic pain [1]. The
definition of neuropathic pain has recently been revised by
the Neuropathic Pain Special Interest Group (NeuPSIG) of
the International Association for the Study of Pain (IASP)
as “pain arising as a direct consequence of a lesion or
disease affecting the somatosensory system” [2]. This
new definition is proposed to ensure that neuropathic pain
is distinguished from pain due to secondary changes in
the nociceptive system as a result of its inherent plasticity
in response to strong nociceptive stimulation [3,4] and to ensure that neuropathic pain is distinguished from musculoskeletal pain and other types of pain that arise indirectly in the course of neurological disorders [5,6]. The Assessment Committee of the NeuPSIG has produced recommendations on the assessment of neuropathic pain in primary care [7] as well as guidelines directed at pain specialists, neurologists, and clinical researchers based on the revised definition of neuropathic pain, and a new grading system about the certainty of neuropathic pain has been developed [8].

The prevalence of neuropathic pain in the community according to self-administered questionnaires varies between 3% and 8% [9–11], but the prevalence appears to be much higher in populations with chronic pain. Freynhagen and colleagues found that among patients with chronic low back pain, that 37% of the patients had symptoms indicating neuropathic pain [12]. In a recent study, Amris and colleagues found that 75% of patients with chronic widespread musculoskeletal pain had somatosensory symptoms indicating neuropathic pain [13].

Patient-administered screening tools for neuropathic pain has also been applied in studies of specific sensory profiles in established neuropathic pain conditions [14] and in patients suffering from highly different chronic pain conditions such as cancer pain [15], low back pain [12], knee osteoarthritis [16], fibromyalgia [13], spinal cord injury [17], and persistent postoperative pain [18,19].

However, screening tools fail to identify about 10–20% of patients with clinician-diagnosed neuropathic pain indicating that screening questionnaires may offer guidance for further diagnostic evaluation but cannot replace clinical judgment [8].

The relevance of clinical examination to differentiate neuropathic pain from non-neuropathic pain has been demonstrated in several studies using large sample sizes [20–22]. These studies have shown that sensory examination (i.e., pinprick, heat, cold, and tactile stimuli) in the painful area could discriminate patients with neuropathic pain from those without neuropathic pain, and that allodynia to brush and cold, hypoalgesia to pinprick and temporal summation to tactile stimuli was observed with much higher frequency in patients with neuropathic pain.

The prevalence of neuropathic pain according to the new IASP grading system in patients with chronic pain referred to a multidisciplinary pain clinic is currently unknown.

The primary aim of this study was to determine the prevalence of neuropathic pain according to the new IASP grading system in patients with a variety of chronic pain conditions referred to a multidisciplinary pain clinic. The secondary objective was to compare the IASP system classification of neuropathic pain with the classification of neuropathic pain according to a patient-administered screening questionnaire.

Materials and Methods

Subjects

Patients with chronic nonmalignant pain, who was referred to the Pain Center South, Odense University Hospital, Denmark between the 1st of June and 1st of November 2011, were included in the study. Inclusion criteria were pain for more than 6 months and Danish language skills. Patients were by letter asked to fill in the PainDETECT questionnaire (PDQ) as well as questionnaires on demographic data, pain intensity, and pain duration prior to their first visit at the pain clinic. Pain history, including onset of pain, pain location, and prior investigations, as well as clinical bedside examination were performed by four pain specialists as part of routine assessment in the clinic during the first visit. A study flow diagram is illustrated in Figure 1.

A separate test sheet was made for recordings from the pain history and the bedside examination, and this was filled in immediately after the examination. The pain specialists were blinded to the patient’s PainDETECT score.

Following the consultation, each patient was graded by the investigator of the study (HBV) according to the new IASP grading system algorithm about the certainty of neuropathic pain. The investigator did neither take part in the pain history nor the bedside examination and was blinded to the PainDETECT score until after the grading was complete.

Self-Reporting of Somatosensory Symptoms of Neuropathic Pain

The PDQ is a patient-administered screening questionnaire developed and validated to predict the likelihood of a neuropathic pain component being present in individual patients. PDQ has been translated into 19 different languages, including Danish. It comprises questions regarding pain intensity, course of pain, radiation of pain, and the presence and perceived severity of seven somatosensory symptoms of neuropathic pain rated on a 0–5 rating scale (never, hardly noticed, slightly, moderately, strongly, and very strongly). For diagnostic purposes, a validated algorithm is used to calculate a total score ranging from 0 to 38 based on the patient’s answers. A total score above 18 indicates that a predominantly neuropathic pain component is likely, whereas a total score below 13 indicates that neuropathic pain is unlikely [12].

Bedside Examination

Standardized bedside examination was performed on each patient by one of four pain specialists from the pain clinic. In all subjects, the character of sensations (hypo-, sensitive, normal, or hypersensitive) to brush (SENSELab Brush 05, Somedic AB, Horby, Sweden), single pinprick (toothpick), and cold roll of 20°C (Somedic AB, Horby, Sweden) at the most painful site were recorded. The
characters of the sensations were compared with a nonpainful reference area when possible.

In all subjects, repetitive pinprick (2 Hz for 30 seconds) stimulations were performed in close proximity to the most painful area. Subjects were asked whether they perceived the stimulations as equally painful or as increasingly painful during the stimulations (wind-up-like pain).

Classification of Neuropathic Pain According to the IASP Grading System

The new IASP grading system is based on four criteria (see Figure 2): pain distribution (criterion 1), the link between pain distribution and the patient’s history (criterion 2), confirmatory tests of neurologic status demonstrating positive or negative sensory signs confined to the innervation territory of the lesioned nervous structure (criterion 3), and further confirmatory diagnostic tests to identify the lesion or disease entity underlying the neuropathic pain (criterion 4). Criteria 1 and 2 must be met to initiate the working hypothesis of possible neuropathic pain. Either criterion 3 or 4 must be met in addition to reach the grade of probable neuropathic pain, while the grade of definite neuropathic pain is achieved only when both criteria 3 and 4 are satisfied [2].

Statistical Analysis

All data are reported using descriptive statistics. All outcome variables were tested using the Shapiro–Wilk Test [23], and due to mostly non-normally distributed data ($P < 0.05$), results are presented as median and range and nonparametric inferential statistics were used. Mann–Whitney $U$-test was used to test for differences in pain characteristics between groups based on the predominant pain mechanism as stated by the new IASP grading system and the PDQ classification. $P$ values less than or equal to 0.05 were considered significant.

Results

Participant Demographics

The PDQ was sent to a total of 274 consecutive patients referred to the pain center by their general practitioner. Thirty patients did not return the PDQ, and 44 samples of the PDQ had missing data, when returned. PDQ was completed by 200 patients. Eighty patients had incomplete bedside examination: 3 patients due to pain location in the genital area and 11 patients due to primary pain complaint being headache, both areas not suitable for sensory examination, 9 patients were not motivated for treatment and were not tested, 26 patients due to time issues during the consultation, 19 patients due to the pain specialist forgetting about data collection and 12 was seen by a new physician, who was not yet introduced to the standardized bedside examination.

The following results are based on the 120 subjects who completed the PDQ, had bedside examination, and were graded according to the new IASP grading system.
Pain Characteristics

Sixty-six patients presented with low back pain as their primary complaint, 17 with cervicobrachial pain syndrome, 9 with hip or knee pain, 8 with shoulder and arm pain, 6 with fibromyalgia, 3 with plexus brachialis lesions, 3 with hand pain, and 8 with other pain conditions (2 abdominal pain, 2 post mastectomy syndrome, 1 multiple sclerosis, 1 post-herpetic neuralgia, 1 postoperative ankle pain, and 1 apoplexia cerebri). All patients reported long-lasting pain. The median duration was 72 month with a minimum of 6 months and a maximum of 396 months. Median average pain intensity in the past week was 7 (Numerical Rating Scale [NRS] range 3–10). Median worst pain intensity in the past week was 9 (NRS range 5–10). Ninety-four patients reported radiating pain. Demographic and pain characteristics are presented in Table 1.

Sensory Characteristics

Ninety-three patients (77.5%) reported one or more sensory abnormalities on bedside examination. Hyposensation to pinprick was the most frequent feature reported by 50 patients (41.7%). Forty-seven patients (39.2%) reported hyposensation to brush, and 47 patients (39.2%) reported hyposensation to cold stimulation. Twenty-two patients (18.3%), 13 patients (10.8%), and 10 patients (8.3%) reported hypersensation to pinprick, cold, and brush, respectively. None of the patients had paradoxical heat sensation upon cold stimulation. Sixty-eight patients (56.7%) reported increasing pain (wind-up-like pain) during the stimulation.

Table 1  Summary statistics for the 120 participants. Data are presented as median and range

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (female/male)</td>
<td>120 (75/45)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>46 (23–87)</td>
<td></td>
</tr>
<tr>
<td>Body mass index</td>
<td>26.32 (15.94–39.61)</td>
<td></td>
</tr>
<tr>
<td>Pain duration in months</td>
<td>72 (6–396)</td>
<td></td>
</tr>
<tr>
<td>Average pain intensity over past week</td>
<td>7 (3–10)</td>
<td></td>
</tr>
<tr>
<td>Worst pain intensity over past week</td>
<td>9 (5–10)</td>
<td></td>
</tr>
</tbody>
</table>
Prevalence of Neuropathic Pain According to the New IASP Grading System

Twenty-two patients (18.3%) classified as probable or definite neuropathic pain, and 90 patients (75%) classified as unlikely neuropathic pain. There was no significant difference in pain characteristics between groups. The relationships between demographic characteristics, pain characteristics and psychological data, and the predominant pain mechanism as stated by the IASP grading system are presented in Table 2.

Self-Reporting of Somatosensory Symptoms of Neuropathic Pain

Fifty-five patients (45%) had a PDQ score above 18 indicating a predominantly neuropathic pain component being present. Thirteen patients (10.8%) had a PDQ score below 13 indicating that a neuropathic pain component was unlikely. There was no significant difference in pain characteristics between classification groups. The relationships between demographic characteristics, pain characteristics and psychological data, and total score on the PDQ are presented in Table 3.

Comparison between the IASP Grading System and the PDQ

Eleven out of the 45 patients (20%) with a PDQ score above 18 also classified as probable or definite neuropathic pain according to the new IASP grading system. Twelve out of 13 patients (92%) with a PDQ score below 13 also classified as unlikely neuropathic pain according to the IASP grading system (Figure 3).

Discussion

This study is the first to determine the prevalence of neuropathic pain in a multidisciplinary pain center, with a variety of chronic nonmalignant pain conditions, according to the new IASP grading system and to compare the prevalence according to this system with the prevalence according to a patient-administered screening questionnaire. Eighteen percent of the included patients had

Table 2 Summary statistics for participants classified according to the new IASP grading system. Data are presented as median and range

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Does not Fulfill Criteria (N = 90)</th>
<th>Fulfill Criteria 1 + 2 (not 3 or 4) (N = 8)</th>
<th>Fulfill Criteria 1 + 2 (3 and/or 4) (N = 22)</th>
<th>P value (Independent sample Mann–Whitney U-Test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>47 (23–87)</td>
<td>45 (33–74)</td>
<td>45 (30–73)</td>
<td>0.748</td>
</tr>
<tr>
<td>Body mass index</td>
<td>26.33 (15.94–39.61)</td>
<td>25.34 (22.32–36.75)</td>
<td>26.52 (17.99–35.41)</td>
<td>0.933</td>
</tr>
<tr>
<td>Pain duration (months)</td>
<td>72 (6–360)</td>
<td>36 (24–384)</td>
<td>120 (24–396)</td>
<td>0.251</td>
</tr>
<tr>
<td>Average pain intensity over past week</td>
<td>7 (3–10)</td>
<td>6 (4–9)</td>
<td>7 (3–9)</td>
<td>0.351</td>
</tr>
<tr>
<td>Worst pain intensity over past week</td>
<td>9 (5–10)</td>
<td>8 (5–10)</td>
<td>9 (5–10)</td>
<td>0.259</td>
</tr>
</tbody>
</table>

Table 3 Summary statistics for participants classified according to their score on the PainDETECT Questionnaire. Data are presented as median and range

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>48 (33–79)</td>
<td>45 (23–87)</td>
<td>47 (24–84)</td>
<td>0.178</td>
</tr>
<tr>
<td>Body mass index</td>
<td>23.39 (15.94–35.41)</td>
<td>25.11 (17.31–36.75)</td>
<td>27.47 (17.99–39.61)</td>
<td>0.1</td>
</tr>
<tr>
<td>Pain duration (months)</td>
<td>72 (12–384)</td>
<td>72 (12–396)</td>
<td>72 (6–300)</td>
<td>0.956</td>
</tr>
<tr>
<td>Average pain intensity over past week</td>
<td>7 (5–8)</td>
<td>7 (3–10)</td>
<td>7 (3–10)</td>
<td>0.234</td>
</tr>
<tr>
<td>Worst pain intensity over past week</td>
<td>8 (5–10)</td>
<td>9 (5–10)</td>
<td>9 (5–10)</td>
<td>0.178</td>
</tr>
</tbody>
</table>
probable or definite neuropathic pain according to the new IASP grading system. Fifty-five percent of the included patients reported symptoms indicating neuropathic pain according to PDQ. Twenty percent of the patients who were classified as neuropathic according to PDQ also classified as neuropathic according to the new IASP grading system.

The prevalence of neuropathic pain according to PDQ is in line with the results from the work of Freynhagen and colleagues [12]. Although the prevalence of neuropathic pain according to PDQ in our sample is in line with other studies, the prevalence of neuropathic pain according to the new IASP grading system was below 20%. Several issues may explain this discrepancy. First of all, the PDQ may be measuring other aspects of the chronic pain condition in addition to discriminating between neuropathic pain and nociceptive pain. Amris and colleagues found a high prevalence of neuropathic pain according to the PDQ in patients with chronic widespread pain and found that the score on the PDQ was significantly negatively correlated with pressure pain threshold [13]. That study did not indicate whether the patients fulfilled the criteria of the new IASP grading system, and data on positive or negative sensory signs as well as signs of nerve lesions or diseases affecting the somatosensory nervous systems were not reported. Secondly, a potential challenge to the assumption that higher PDQ scores reflect an increased likelihood of neuropathic pain is the possibility that PDQ scores may really only reflect condition severity [24]. The results of the present study do not support this hypothesis, as pain intensity scores were not significantly different between groups classified according to the PDQ score. Thirdly, the included patients could have pain in more than one area, thus making the answers on the PDQ related to several pain areas with different symptoms in different areas making the total PDQ score higher.

PDQ was chosen as screening tool for this study because it is self-administered, it does not require a clinical examination, and it is easy to use. PDQ has been validated in a multicenter study with almost 400 patients as well as in a population of patients with chronic low back pain. In the validation sample, PDQ was found to have a sensitivity of 85%, a specificity of 80% and an overall agreement of 83% compared with expert evaluation [12].

PDQ was originally developed for identification of neuropathic pain in patients with low back pain, which may have affected the results in this study with a variety of chronic pain condition. However, the majority of the included patients in the present study had low back pain as their primary pain complaint, and PDQ was originally validated in a population with mixed pain conditions, not much different from our sample. Several other screening tools that distinguish features associated with neuropathic pain from features associated with other types of pain have been developed (e.g., DN4, NPQ, and LANSS) and would be interesting to compare with the new IASP grading system, as equal sensitivity and specificity have been found compared with PDQ [17]. A potential benefit of using PDQ compared with LANSS and DN4 is that it does not include a clinical examination that gives the possibility of blinding the pain physician to the score from the questionnaire.

In most cases of chronic pain, it is difficult to establish the presence or absence of nerve dysfunction, regardless of symptoms, and until consensus on a diagnostic approach to neuropathic pain is agreed on, screening tools will serve
to identify potential patients with neuropathic pain. However, clinicians should be alerted to undertake further clinical examination before classifying pain as either neuropathic or nociceptive, which may subsequently influence management decisions.

The results from this study should be considered in the light of the relative small sample size. A priori sample size calculation was not performed due to the uncertainty in prevalence of neuropathic pain in our sample. Compared with the study by Freynhagen and colleagues [12], the sample size in the present study was smaller, which may increase the uncertainty of our results.

Conclusion

In this study, we found that 18% of the included patients referred to a multidisciplinary pain clinic fulfilled the criteria of probable or definite neuropathic pain according to the new IASP grading system. Nearly half of the included patients reported somatosensory symptoms indicating neuropathic pain according to the neuropathic pain screening questionnaire PainDETECT. Twenty percent of the patients who were classified as neuropathic according to PDQ also classified as neuropathic according to the new IASP grading system.

Acknowledgment

The authors would like to acknowledge Lisbeth Skovmand, MD and Mai Tiang Ninh, MD from the Pain Center for their valuable help in collecting data.

References


19. Steegers MA, Snik DM, Verhagen AF, van der Drift MA, Wilder-Smith OH. Only half of the chronic pain...


