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Reliability of PainDETECT for Evaluating Low Back Pain Caused by Cluneal Nerve Entrapment

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Background: Superior/middle cluneal nerve entrapment (CN-E) is an elicitor of low back pain (LBP). The painDETECT questionnaire is used to characterize CN-E symptoms.

Methods: Nineteen consecutive patients with LBP caused by CN-E (superior CN-E = 7; middle CN-E = 12) participated in a Japanese language painDETECT questionnaire survey before surgery. A score of 12 or lower was recorded as 'neuropathic component unlikely', a score of 19 or higher as 'neuropathic pain likely', and scores between 13 and 18 as 'neuropathic pain possible'. LBP severity was recorded on a numerical rating scale, the Roland-Morris Disability Questionnaire, and the EuroQol-5 dimension-5 level.

Results: The mean painDETECT score was 11.8 and did not significantly differ between the superior CN-E and middle CN-E groups. We classified low back pain as unlikely to have a neuropathic component in 13 patients, as likely to have a neuropathic component in 2 patients, and as possibly neuropathic in 4 patients. There was no significant difference in the pain level of patients with scores of ≤12 and ≥13 on painDETECT. All patients reported trigger pain; the positive rate was high for electric shock pain, radiating pain, and pain attacks and low for a burning or tingling sensation, pain elicited by a light touch, and pain caused by cold or hot stimulation.

Conclusion: The painDETECT questionnaire may not reliably identify LBP caused by superior/middle CN-E as neuropathic pain. A diagnosis of LBP due to CN-E must be made carefully because symptoms resemble nociceptive pain. (J Nippon Med Sch 2024; 91: 328–332)

Key words: cluneal nerve entrapment, low back pain, PainDETECT

Introduction

Pain is classified as nociceptive, neuropathic, or mixed pain. Neuropathic pain is caused by primary lesions or dysfunction of the nervous system, is more severe than nociceptive pain, and affects patient quality of life (QOL)[1]. The cause of low back pain (LBP) varies. Takahashi et al.[2] classified LBP and/or leg pain in patients with lumbar spinal canal stenosis as nociceptive in 57.9%, neuropathic in 17.6%, and unclear in 24.5% of patients. A cross-sectional study showed that 59% of patients from southeastern England referred for physiotherapy for LBP had nociceptive pain, 16% had neuropathic pain, and 25% had mixed pain[3]. Other studies[2–6] reported that LBP due to neuropathic pain tended to be severe; 15-47% of all LBP was attributable to neuropathic pain.

Superior/middle cluneal nerve entrapment (CN-E) is an elicitor of LBP that manifests as neuropathic pain. The superior CN originates from the lower thoracic and lumbar posterior nerve root and can be entrapped around the iliac crest at the thoracolumbar fascia. The middle CN originates at the sacral posterior nerve root and can

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be entrapped by the long posterior iliac ligament between the posterior superior/inferior iliac spine[7–14].

Previous reports[1,10–13] indicate that 1.6-14% of LBP patients present with superior CN-E and 13% with middle CN-E and that QOL was compromised[15,16]. LBP due to CN-E is exacerbated by lumbar movement. Because it can produce lower limb symptoms[10–13,16–18], it is sometimes misdiagnosed as lumbar spine disease. Although conservative treatment was successful for 28-100% of patients with LBP due to SCN-E[12–14], some eventually require surgery.

Neuropathic and nociceptive pain require different pain management strategies. The painDETECT questionnaire is a screening tool to predict the likelihood of a neuropathic pain component in LBP[19], and the Japanese language version was reported to be a valuable pain assessment tool[20]. We used it to evaluate the incidence of LBP due to CN-E among Japanese patients and assessed whether it could differentiate neuropathic from nociceptive pain.

Patients and Methods

Our study was approved by the ethics committee of Nippon Medical School Chiba Hokusoh Hospital (approval number: H-2023-072). Because patients could opt out on the homepage of our hospital, the requirement of written informed consent for inclusion in the study was waived.

We enrolled 19 consecutive patients (11 men, 8 women; mean age 71 years [range 42-85 years]) with LBP caused by CN-E (superior CN-E, n = 7; middle CN-E, n = 12). All underwent surgery between December 2021 and June 2023. One patient underwent surgery for middle CN-E 1 month after surgery for superior CN-E, and only the questionnaire submitted before the first operation was used. All patients had received conservative treatment with oral medications and cluneal nerve blocks for longer than 3 months but did not respond to treatment.

Because superior/middle CN-E cannot be diagnosed radiologically, the diagnosis is based on symptoms and the effect of nerve blocks. LBP involves the area affected by the nerve: superior CN-E affects the area around the iliac crest, and middle CN-E the middle of the lower buttock. Trigger-point pain is elicited at the entrapment site; when selective cluneal nerve blockage with 1% xylocaine (2 mL per site) improves symptoms, a diagnosis can be made.

Preoperatively, the present LBP patients participated in a questionnaire survey using painDETECT[20], a screening tool to assess the possibility of a neuropathic pain component[19]. It comprises 9 items: 7 evaluate pain level, and 1 each addresses the pain course and the presence of radiating pain. The total painDETECT score ranges from 1 to 38. A score of 12 or lower indicates that a neuropathic component is unlikely (<15%), a score of 19 or higher suggest that a neuropathic component is likely (>90%), and a score between 13 and 18 indicates uncertainty regarding the presence/absence of neuropathic pain[19]. We divided our 19 patients into a likely or possibly neuropathic pain group (score 13 or higher) and a non-neuropathic pain group (score 12 or lower)[21–24].

LBP severity was recorded on a Numerical Rating Scale (NRS), the Roland-Morris Disability Questionnaire (RDQ), and the EuroQol-5 Dimension-5 Level (EQ-5D-5L) form. The NRS divides the pain intensity into 11 stages from 0 to 10, where 0 is no pain and 10 is the worst pain. A higher RDQ score indicates lower QOL because of LBP, whereas a higher EQ-5D-5L score indicates better QOL. All scores were recorded on the day before surgery, and NRS was recorded on the last postoperative visit.

Statistical analyses were performed with IBM SPSS for Windows ver. 25.0 (IBM Corp., Armonk, NY, USA). Preoperative and postoperative scores were evaluated with the Wilcoxon signed-rank test, and groups were compared with the Mann-Whitney *U*-test. A p value of <0.05 was considered to indicate statistical significance. All values are expressed as mean ± SD.

Results

After CN-E Surgery

LBP significantly improved after CN-E surgery (mean 7.3 months postoperatively; range, 5-13 months). Mean NRS changed from 7.7 ± 0.8 to 1.9 ± 1.3 ($p < 0.05$).

Use of PainDETECT to Identify LBP Due to CN-E

The mean preoperative painDETECT score for our 19 patients was 11.8 ± 4.6 (range 5-23). There was no significant difference between the superior CN-E (mean 10.7 ± 3.9) and middle CN-E (mean 12.4 ± 5.0) groups.

According to painDETECT criteria, in 13 of 19 patients (68.4%) the score was 12 or lower, indicating that a neuropathic component was unlikely. In 2 patients (11%) it was 19 or higher and a neuropathic component was recorded as likely. A score between 13 and 18 was obtained in 4 patients (21%) and a neuropathic component was considered possible. We therefore divided our 19 patients into a likely/possibly neuropathic pain group (score ≥13, n = 6) and a non-neuropathic pain group (score ≤12, n = 13). As shown in **Table 1**, there was no significant difference in pain level (NRS, RDQ, EQ-5D-5L) between these

Table 1 Comparison of pain grade recorded on painDETECT and other questionnaires

PainDETECT score	12 or lower	13 or higher	Significance ($p<0.05$)
Number of cases	13	6	
NRS	7.6±1.0	8.0±0.0	no
RDQ	13.4±5.1	13.7±4.8	no
EQ-5D-5 L	0.56±0.2	0.54±0.1	no

NRS: Numerical Rating Scale, RDQ: Roland-Morris Disability Questionnaire, EQ-5D-5 L: EuroQol-5 Dimension-5 Level

Table 2 Total painDETECT score and pain course pattern

PainDETECT score	12 or lower	13 or higher
Number of patients	13	6
Persistent pain with slight fluctuations	1 (7.7%)	0
Persistent pain with pain attacks	3 (23.1%)	0
Pain attacks only	4 (30.8%)	3 (50%)
Pain between pain attacks	5 (38.5%)	3 (50%)

groups.

PainDETECT Items

Radiating pain was reported by 16 patients (84.2%), 10 (62.5%) of whom had pain that radiated to the lower limbs. With respect to pain course pattern, among the 13 patients with a painDETECT score of 12 or lower, 4 (30.8%) had persistent pain, and 9 (69.2%) reported pain attacks only or pain between pain attacks. All 6 patients with a score of 13 or higher reported pain attacks; none had persistent pain (**Table 2**).

PainDETECT lists 7 items for pain gradation. All patients reported that finger pressure (trigger pain) elicited strong pain. The numbers of patients with severe electric shock pain, burning or prickling sensation, pain upon light touching, and pain due to cold or hot stimulation are shown in **Table 3**. Numbness was reported by 10 (52.6%) patients; its severity was low (mean 1.9 ± 1.3).

Discussion

According to painDETECT, in 13 of our 19 (68.4%) patients with LBP due to CN-E, a neuropathic component was unlikely, which suggests that a misdiagnosis of nociceptive pain is possible. We believe that the screening questionnaire fails to differentiate between LBP due to CN-E and nociceptive pain. The intensity and nature of pain in our 19 patients did not differ significantly between the likely neuropathic pain group (n = 2), the possibly neuropathic pain group (n = 4), and the non-neuropathic pain group (n = 13).

Sixteen of our 19 LBP patients (84.2%) had radiating pain, an apparently characteristic symptom of CN-E; pain radiated to the lower limbs in 10 of the 16 patients (62.5%). Previous studies[10–13,17] reported that 47-84% of patients with superior CN-E and 71-82% of patients with middle CN-E had lower limb symptoms. Lumbar movement elicits pain in patients with LBP caused by CN-E[10–13,16–18], and paroxysmal pain similar to neuralgia may be a characteristic of CN-E. A burning or tingling sensation and pain elicited by a light touch or cold or hot stimulation are unlikely symptoms in patients with LBP due to CN-E.

In our series of 19 LBP patients, painDETECT identified pain due to CN-E as nociceptive. Patients with CN-E may experience pain that is similar to nociceptive LBP. Previous studies[10,12–14] found that CN-E may be misdiagnosed as LBP caused by lumbar spine disease. Because the painDETECT method was not ideal for evaluating CN-E, we think that a different type of questionnaire is needed to detect neuropathic pain components, especially in patients with chronic LBP. Freynhagen et al.[19] introduced painDETECT in 2006 and reported that diagnostic sensitivity and specificity were 85% and 80%, respectively. They proposed that such a questionnaire should rely on characteristic clinical neuropathic symptoms and interviewed recognized pain experts and included the reported symptoms in a database for neuropathic pain. Their painDETECT method to identify neuropathic pain includes 7 questions, pain patterns, and radiating pain; it

Table 3 Pain gradation on painDETECT in 19 patients

	Pain positive	Average scores
Burning sensation at specific sites	2 (10.5%)	2.5±1.5
Tingling or prickling sensation in pain area	7 (36.8%)	2.3±1.2
Pain upon light touch	3 (15.8%)	1.3±0.5
Sudden pain attacks in pain area–electric shock-like	17 (89.5%)	3.4±1.0
Cold or heat sensation in pain area–occasionally painful	4 (21.1%)	1.8±0.8
Numbness in pain area	10 (52.6%)	1.9±1.3
Trigger pain	19 (100%)	3.5±0.9

does not include factors that were subsequently discovered as being associated with neuropathic or nociceptive pain. In 2023, Truini et al.[25] promulgated pain guidelines for neuropathic pain assessment. Their investigation of the reliability of painDETECT revealed that the pooled sensitivity and specificity in 13 international studies were 0.73 and 0.81, respectively, and issued a weak recommendation for its use. LBP due to CN-E is a relatively new clinical phenomenon and it is likely that painDETECT cannot evaluate neuropathic pain elicited by CN-E. Therefore, such pain may be misdiagnosed as nociceptive pain when the diagnosis is based on painDETECT scores alone. As some of our patients may have had diseases in addition to CN-E, a nociceptive pain component may have been part of their LBP. We and others[10–18] reported that CN-E surgery significantly improved LBP and yielded a high level of patient satisfaction, although not all LBP resolved completely[10–18].

Concomitant medical conditions (vertebral fractures, lumbar spine diseases, sacroiliac joint pain) may be present in patients with LBP due to CN-E[10–13,17,18]. Therefore, concurrent factors eliciting nociceptive pain in LBP patients may affect findings based on painDETECT. To address this issue, future studies should investigate only patients with full resolution of LBP after CN-E surgery.

Our study has some limitations. The number of patients was small and the follow-up time was relatively short. We studied only patients operated on by us, but many had been referred from other institutions because conservative treatments had failed. Finally, because our data for painDETECT pertain only to LBP due to CN-E, we cannot compare the present finings with those for other medical conditions.

Conclusion

Our findings indicate that the painDETECT questionnaire does not reliably identify neuropathic pain in patients with LBP due to superior/middle CN-E. To diagnose CN-E, it is important to perform neurological/physiological tests that include identification of pain trigger points and to consider the effect of nerve blocks. Because LBP from CN-E is similar to nociceptive pain, care must be taken in making the diagnosis.

Conflict of Interest: The authors declare no conflicts of interest and no commercial relationships or financial support from pharmaceutical or other commercial entities.

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