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Pain and Neurologist: A Comprehensive Evaluation of Patterns, Management, and Training Implications

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ABSTRACT

Objective: A large number of patients with chronic pain are admitted to neurology clinics. In Türkiye, the pain specialty is included in the pain management fellowship program. The aim of this study was to determine the patients presenting to neurology outpatient clinics with pain complaints, to examine the role of neurologists in the management of chronic pain, and to discuss the arrangements that can be made in this regard.

Materials and Methods: Retrospectively, a total of 2000 patients were included in the study who presented to the neurology outpatient clinic at Yenimahalle Training and Research Hospital between April 2024 and June 2024. In patients with pain lasting more than 3 months, the type of pain was determined by medical history, clinical examination and laboratory tests.

Results: Among 418 patients with chronic pain, 201 (48.1%) had neuropathic pain, predominantly caused by diabetic polyneuropathy (47%). The neuropathic pain group was older (59.08±13.92 vs. 52.02±16.55 years, $p<0.001$) and had higher referral rates to specialized care ($p<0.001$). Headaches were significantly less frequent in the neuropathic pain group compared to the non-neuropathic group (2% vs. 40.1%, $p<0.001$).

Conclusion: We believe that there is a deficiency in the diagnosis, treatment, and referral of patients to algology when necessary, particularly for non-neuropathic pain. In this regard, the revision of the main educational program and the addition of an algology rotation will guide neurologists in their choice of specialty.

Keywords: Algology, Chronic pain, Neuropathic pain, Non-neuropathic pain, Pain management

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INTRODUCTION

Pain is a common symptom reported by patients worldwide. It significantly increases healthcare costs and reduces productivity. Pain also impacts individuals emotionally and socially. The International Association for the Study of Pain defines pain as an unpleasant experience linked to actual or potential tissue damage.[1] It can be classified as acute or chronic, depending on its duration and characteristics.[2]

Neurology clinics frequently encounter patients with chronic pain. Chronic pain can be nociceptive or neuropathic. Nociceptive pain results from tissue damage and is mediated by pain receptors (nociceptors).[3] Neuropathic pain arises from damage to the somatosensory system, presenting with symptoms such as burning, paresthesia, and hyperalgesia. Common causes include diabetic neuropathy, post-herpetic neuralgia, and radiculopathy.[4]

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In Türkiye, pain specialization has been subject to a pain specialty which is included in the pain management fellowship program since 2012. Algology (pain specialty) is a subspecialty of neurology, physical medicine, and anesthesiology. Neurologists often diagnose and treat patients with chronic pain, reflecting their critical role in pain management.

This study aims to analyze the types and number of patients presenting with chronic pain to neurology outpatient clinics. It also evaluates the role of neurologists in pain management and provides recommendations for improving patient care.

MATERIALS AND METHODS

This retrospective study included 2000 patients who visited the neurology outpatient clinic at Yenimahalle Training and Research Hospital between April and June 2024. Ethical approval was obtained from the ethics committee of the Antalya Training and Research Hospital (September 26, 2024, Decision Number: 14/9). Literature analyses were performed using the PubMed database, searching for the keywords "pain management," "neuropathic pain," "algology," "chronic pain," "nociplastic pain," "neuromodulation." This study was conducted in accordance with the Declaration of Helsinki and relevant ethical standards. As the study is retrospective in design, informed consent from participants was not required. However, participant confidentiality was maintained, and all ethical guidelines were strictly followed.

Patients

Patients with pain lasting more than 3 months were evaluated based on medical history, clinical examination, and laboratory tests. Demographic data, including age and gender, were collected from 418 patients with chronic pain. Patients were grouped according to the clinics where they were treated. The presence of headache was recorded separately.

Inclusion Criteria

- Patients aged 18 and older with pain lasting more than 3 months.

Exclusion Criteria

- Patients with pain lasting <3 months
- Patients with isolated headache and patients with isolated trigeminal neuralgia
- Patients under 18 years of age.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences version 25.0 software. The normality of continuous variables was assessed using the Shapiro–Wilk test. Continuous variables were presented as mean±standard deviation, while categorical variables were expressed as frequencies and percentages. Comparisons of categorical variables between groups were performed using the Chi-square test or Fisher's exact test as appropriate. Independent samples t-test was used to compare continuous variables between groups. P<0.05 was considered statistically significant.

RESULTS

Of the 2000 patients who visited the neurology outpatient clinic over a 3-month period, 418 presented with chronic pain. Among these, 201 patients were diagnosed with neuropathic pain based on clinical examination and laboratory tests. The douleur neuropathique 4 (DN4) test was used to assess neuropathic pain.[5] Patients with a DN4 score of 4 or higher, or a prior diagnosis of neuropathic pain, were classified as having neuropathic pain. The remaining 217 patients reported pain without a neuropathic component lasting more than 3 months. Treatment distribution between the groups was also evaluated using the Chi-square test (Fig. 1).

The gender distribution between the neuropathic and non-neuropathic pain groups was compared using the Chi-square test. No significant difference was found (p=0.522). The age difference between the groups was analyzed with an independent samples t-test. A significant difference was found, with the mean age of the neuropathic pain group being 59.08±13.92, compared to 52.02±16.55 in the non-neuropathic pain group (p<0.001).

In the neuropathic pain group, 173 patients were treated by neurology, ten were referred to algology, and 18 were referred to physical medicine and rehabilitation (PMR). In the non-neuropathic pain group, 210 patients were treated by neurology, two were referred to algology, and five were referred to PMR. A significant difference in treatment distribution was found (p<0.001). Referral rates were higher in the neuropathic pain group (Table 1).

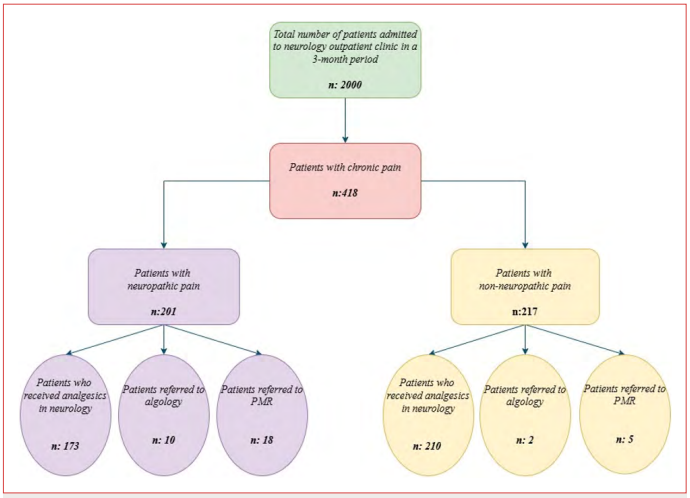

Figure 1. Flow-chart of chronic pain management and referral in neurology.

Table 1. Comparison of gender, treatment clinic and age of patients with neuropathic and non-neuropathic pain

Variables	Neuropathic pain n=201 (48.1%)	Non-neuropathic pain n=217 (51.9%)	p
Female/male	134/67	151/66	0.522
Age	59.08±13.92	52.02±16.55	**<0.001**
Treatment clinics neurology/ PMR/algology	173/18/10	210/2/5	**<0.001**

PMR: Physical medicine and rehabilitation.

Table 2. Comparison of headache presence with gender and pain type

Variables	Neuropathic pain n=201 (48.1%)	Non-neuropathic pain n=217 (51.9%)	p
Female/male	134/67	151/66	0.522
Age	59.08±13.92	52.02±16.55	<0.001
Treatment clinics neurology/PMR/algology	173/18/10	210/2/5	<0.001

PMR: Physical medicine and rehabilitation.

Headache presence was analyzed using Fisher's exact test. In the neuropathic pain group, 2% had headaches, while in the non-neuropathic pain group, 40.1% reported headaches. This difference was statistically significant (p<0.001). The gender distribution between the groups with and without headaches was assessed by Chi-square test, and no significant difference was found (p=0.619).

Age differences between the groups with and without headaches were analyzed with an independent samples t-test. A significant difference was found, with the mean age of the headache group being 58.09±14.86, compared to 45.81±15.09 in the non-headache group (p<0.001) (Table 2).

The most common cause of neuropathic pain was diabetic polyneuropathy (47%, n=94). Other causes included central neuropathic pain (Multiple sclerosis, stroke, and spinal cord injury), post-herpetic neuralgia, radiculopathy, plexopathy, polyneuropathies, and advanced carpal tunnel syndrome (Table 3).

The most common cause of non-neuropathic pain was spinal pain without radiculopathy (38%, n=82), followed by osteoarthritis, fibromyalgia, and other musculoskeletal disorders (Table 4).

Table 3. Causes of neuropathic pain

Neuropathic pain	n	Percentage
Diabetic polyneuropathy	94	47
Central neuropathic pain	32	16
Post-herpetic neuralgia	22	11
Radiculopathy	21	10
Carpal tunnel syndrome	19	9
Other polyneuropathies	9	5
Plexopathy	4	2

Table 4. Causes of non-neuropathic pain

Non-neuropathic pain	n	Percentage
Spinal pain without radiculopathy	82	38
Osteoarthritis	62	29
Fibromyalgia	51	23
Other musculoskeletal disorders	22	10

DISCUSSION

Neuropathic pain is a complex disorder caused by lesions or diseases in the somatosensory system. It presents a major challenge in clinical practice. This study examines the prevalence of neuropathic pain, its common causes, and treatment effectiveness, comparing our findings with existing literature. Furthermore, we will explore the differences between neuropathic and non-neuropathic pain, treatment approaches, and referral rates. Based on the findings, we will provide recommendations for clinical practice.

Neuropathic pain is a complex condition caused by lesions or diseases in the somatosensory system, including peripheral nerves (Aβ, Aδ, and C fibers) and the central nervous system.[6] It is a major health concern that complicates clinical practice.

In our study, 201 patients (10.05%) out of 2000 were diagnosed with neuropathic pain. The literature reports a prevalence of 7–10%, and our findings align with this range.[7]

The mean age of patients with neuropathic pain was 59.08±13.92 years, with 66.7% being female. The most common cause was diabetic polyneuropathy (47%, n=94). Other causes included various polyneuropathies, post-herpetic neuralgia, radiculopathy, plexopathy, central neuropathic pain, and advanced carpal tunnel syndrome. Neuropathic pain was diagnosed based on clinical and laboratory findings. In 173 patients (86.1%), treatment was initiated or approved by a neurologist. Eighteen patients (9%) were referred to PMR. Ten patients (5%) were referred to algology.

Among patients with neuropathic pain, only 4 (2%) reported chronic headaches. Headache frequency was significantly higher in those with non-neuropathic pain. This suggests that the severity of neuropathic pain may mask the presence of headaches in these patients.

In our study, diabetic neuropathy was the most common cause of neuropathic pain. Distal symmetric polyneuropathy, the most common type of diabetic neuropathy, typically affects both small and large nerve fibers. Small fiber neuropathies often develop early and may remain undetected due to a lack of objective signs or electrophysiological evidence. Diagnosing diabetic neuropathy relies mainly on a comprehensive history and physical examination.[8] These patients often experience a significant decline in quality of life, with sleep disturbances due to chronic pain being common.[9] Treatment for neuropathic pain includes glycemic control, gabapentinoids, antidepressants, physiotherapy, and various interventional options.[10-12]

Post-herpetic neuralgia is a challenging pain syndrome, particularly in elderly patients. These patients are typically assessed by dermatologists and neurologists during the acute phase. During this phase, interventional treatments such as erector spinae plane block, paravertebral blocks, and lumbar sympathetic neurolysis can be used to prevent the pain from becoming chronic. Lumbar sympathetic neurolysis is recommended for severe, inoperable ischemic rest pain in the lower limbs, such as that caused by peripheral vascular disease, post-herpetic neuralgia, and amputation stump pain.[13,14] These blocks, commonly used in algology clinics, are highly effective in pain control. The majority of patients with neuropathic pain were diabetic polyneuropathy and post-herpetic neuralgia, while only ten patients were referred for interventional treatments. We found that neurologist referred patients for interventional treatments at a low rate, suggesting that referral rates to algology should be increased.

The mean age of patients with non-neuropathic pain in our study was 45.81±15.09 years, with 69.6% being female. The most common cause of non-neuropathic pain was spinal pain without radiculopathy (38%, n=82), followed by osteoarthritis, fibromyalgia, and other musculoskeletal disorders. Fibromyalgia syndrome (FMS) is a common primary pain condition, with a global prevalence of 2–4%. FMS is recognized as a distinct pain type called nociplastic pain, which is separate from both neuropathic and nociceptive pain.[15,16] Therefore, we included patients with FMS in the non-neuropathic pain group in our study.

In the non-neuropathic pain patient group, the proportion of patients referred to algology has remained quite low, although these patients with chronic pain have conditions that may benefit from interventional treatments to be performed in algology. We would like to highlight the role of the neurologist. In our country, it is not possible for the patient to get an appointment without a referral to the algology unit. Therefore, neurologists should refer patients.

Neurologists in our country have demonstrated considerable competence and success in diagnosing and managing neuropathic pain. However, in some cases, it may be difficult to control symptoms with medical treatment alone. In such cases, referral to interventional pain management may be necessary. Spinal and musculoskeletal pain is also common reasons for consultation in neurology outpatient clinics. Although these symptoms are often seen as manifestations of neurological disorders, underlying spinal and musculoskeletal pathologies are often the primary causes. For instance, shoulder pain, an early symptom of Parkinson's disease (PD), is often overlooked, and its treatment tends to be inconsistent. Pain is a common and debilitating symptom in PD patients, affecting their quality of life, but it remains underdiagnosed and inadequately treated.[17] Furthermore, pain management is particularly challenging in multiple sclerosis patients, who are often associated with painful syndromes. Opioids and cannabinoids may sometimes be required for effective pain control in these patients.[18] Pain is also linked to various other neurological syndromes.[19] However, addressing pain as a primary symptom rather than an additional symptom of neurological conditions could improve treatment outcomes.

Recently, the use of neuromodulation in the treatment of neurological disorders has gained momentum. Neuromodulation is increasingly employed in managing conditions such as epilepsy, movement disorders, and chronic pain. Many chronic pain syndromes are now treated with neuromodulation, focusing on symptom management rather than eliminating the underlying etiology.[20] While neurologists are well-experienced in cortical neuromodulation, their role in peripheral and spinal

neuromodulation remains less prominent in our country.

It would be beneficial to include more topics related to algology, including spinal and peripheral neuromodulation, in neurology specialty training. No similar study was found in the literature review.

This study highlights the absence of algology rotations in the main educational program as an important deficiency. Therefore, this study will contribute to future regulatory changes in neurology education.

Limitations

This study has several limitations. Its retrospective design and reliance on a single institution may restrict the generalizability of the findings. In addition, the diagnosis of neuropathic pain was based solely on clinical evaluation and the DN4 test, which may limit diagnostic accuracy compared to more objective tests. The study focused on patients aged 18 and older, which means that the results may not be applicable to pediatric populations. Furthermore, the treatment approaches evaluated in this study may be influenced by individual preferences and patient compliance, potentially introducing variability in the findings.

CONCLUSION

There is a noticeable gap in the diagnosis, treatment, and referral of patients, especially those with non-neuropathic pain. Neurologists need to be knowledgeable about pain syndromes, available treatments, and referral protocols. To address this issue, we suggest updating the main educational program to include an algology rotation. This arrangement will make neurologists more effective in providing comprehensive patient care and making informed decisions about pain management.

DECLARATIONS

Ethics Committee Approval: The study was approved by Antalya Training and Research Hospital Ethics Committee (No: 14/9, Date: 26/09/2024).

Author Contributions: Concept – C.A., P.O.; Design – C.A., P.O..; Supervision – C.A., P.O.; Materials – P.O.; Data collection &/or processing – P.O.; Analysis and/or interpretation – C.A.; Literature search – C.A., P.O.; Writing – C.A.; Critical review – C.A., P.O.

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