ABSTRACT

Background: Postherpetic neuralgia (PHN) is a frequent complication of herpes zoster (HZ). Treatment of this chronic pain syndrome and results are often not clear. Tricyclic antidepressants, gabapentinoids and potent opioids are first-line treatments and are highly effective, but their use is limited due to adverse effects that may occur in elderly patients with significant medical comorbidities or interaction due to multiple drug use. There are no head-to-head comparisons of non medical treatments. Dry needling appears comparable to conventional physical therapy for treating PHN.

Objective: Our aim is to determine the incidence of PHN in our population and to compare the treatments in patients with postherpetic neuralgia.

Methods: A search for HZ and PHN was conducted in a general practice research database, comprising 2 general practices (dermatologist and physiatrist) and representing 5600 people. We analyzed a retrospective 37 case with PNH of 170 herpes zoster patient admittted to the dermatology and physical therapy and rehabilitation outpatient clinic between October 2018 and October 2020. Dry needling and physical therapy methods applied in addition to medical treatment in PHN treatment were compared.

Results: In patients with postherpetic neuralgia, both dry needling therapy group and physical therapy group LANSS scores decreased significantly in the first week and in the third week compared to baseline. Dry needling therapy group has also similar results in VAS scores in the first and third week. But in physical therapy group, the VAS score did not show a significant decrease in the first week compared to the baseline, but it decreased significantly in the third week.

Conclusion: PHN is a complex, difficult to treat and severe neuropathic pain that affects patients' daily function and quality of life. Various agents and methods are available to relieve the symptoms of PHN. This study shows as both physical therapy and dry needling therapy are effective treatment for postherpetic neuralgia.

Keywords: Postherpetic nevralgia, physical therapy, dry needling.
line treatment options for the treatment of neuropathic pain. In primary or secondary recommendations, depending on the source, topical treatments (eg topical lidocaine) are in the foreground (5). Although the response rates are less than ideal and these medications are often fraught with intolerable side effects in older adults. Despite this a substantial number of older adults continue to suffer with refractory pain (6). Due to the often treatment-resistant nature of PHN, we present this study not only for sensory neuropathy, but in the hope of encouraging physicians to think broadly about older adult patients with PHN. This encourage researchers to develop and test the effectiveness of wider treatment programs such as physical therapy and dry needling program. The aim of this study was to define retrospectively the presentation and characteristic features of PHN and to compare the outcome of treatments.

2. OBJECTIVE

The aim of this study was to define retrospectively the presentation and characteristic features of PHN and to compare the outcome of treatments. In this analysis included only patients who began treatment 1 or more 3 months after HZ that are considered to have had PHN.

3. PATIENTS AND SETTING

Data were collected from the General Practice Research Database. All HZ patients diagnosed between 30.10.2018 and 31.10.2020 were identified by search- ing the database for the ICD code B0.09, B0.01 (HZ) and for free text ('zoster'). Patients admitted to hospital and diagnosed with these ICD codes were included in the study. During the study, two authors, one of whom was a dermatologist and the other a physiatrist, made general practices and examined the full-text medical records of the selected patients. The duration of pain was recorded for each HZ patient. In this study, PHN was defined as any pain that persists for at least 1 month after the diagnosis of HZ. Patients with still pain 3 months after the diagnosis of HZ were also recorded. Patients’ age, gender, localization, presence of prodrome pain, time between symptom and presentation, co-morbidity pain severity, medication for HZ (systemic local) were questioned. Relevant co-morbidity included diabetes mellitus (DM), Hypertension, cardiovascular disease, HIV and Malignancy, at the time of HZ diagnosis.

All patients undergo physical examination and had answered pain questionnaires (VAS and LANNS). 37 patients suffering from postherpetic neuralgia treated with dry needling (N=18) therapy/conventional physical therapy (N=19). Additionally during this time, all patients were using pregabalin (75-150mg/daily). Dry needling was done to trigger pain point and perineural stimulation during three weeks total 10 sessions. We use 25x0.25mm gauge needle for dry needling. Depending on the number of active trigger point, 4-5 needles were applied to the patients at intervals of 5-10 minutes. Conventional physical therapy program consist of TENS (transcutaneous electrical nerve stimulation) 70-100Hz frequency, duration of 20 minutes, therapeutic ultrasound (1watt/cm2) 5-8 minutes and home-exercise program (stretching and strengthening affected muscles). Physiotherapy program consists of 15 sessions, in three weeks. After three weeks of treatment we again performed physical examination and questionnaires for patient in each visit.

Statistical analysis

All analyzes were performed on SPSS v15 (SPSS Inc., Chicago, IL, USA). Shapiro-Wilk test was used to determine whether variables are normally distributed. Number, percentage, mean, standard deviation (SD), median, minimum and maximum values were used in the evaluation of descriptive data. Categorical data were compared using Chi-square test and continuous data were compared with Student’s t or Mann Whitney U tests according to the distribution. Univariate and Multivariate Logistic Regression Analysis was performed to determine risk factors for postherpetic neuralgia and sequelae after Herpes Zoster.
Infection.

4. RESULTS

A total of 170 patients with herpes zoster were reviewed, 37 of whom had PHN (20 (54.1%) male, 17 (45.3%) female), with an incidence rate of 21.8%.

In the study group, 37 patients with postherpetic neuralgia after herpes zoster infection had significantly higher medians of age (p<0.001), duration of shingles infection (p<0.001), VAS-baseline (p<0.001), LANSS-baseline (p<0.001) than those without postherpetic neuralgia. In patients with postherpetic neuralgia, the frequency of comorbidity (p<0.001), the frequency of prodromal findings (p<0.001), and the frequency of receiving medical treatment (p=0.002) were statistically significantly higher. The distribution of HZ dermatome outside the cervical region was found to be significantly different in patients with and without postherpetic neuralgia (p=0.005) (Table 2).

The medians of age (p<0.001), duration of disease (p<0.001), VAS-baseline (p<0.001), and LANSS-baseline (p<0.001) of patients with sequelae after shingles infection were higher than those without sequelae. The majority of patients with sequelae were male (57.8%) (p=0.04). The frequency of comorbidity (p<0.001) and the frequency of prodromal signs (p<0.001) were higher in patients with sequelae after HZ infection. All of the patients (100%) with sequelae were those who received medical treatment (p<0.001). The distribution of regions other than the cervical region was different between the groups with and without sequelae (p=0.004) (Table 1). In the univariate logistic regression analysis performed for factors affecting the development of postherpetic neuralgia after shingles infection, increased age (p<0.001), increased shingles infection duration (p<0.001), increased VAS-baseline (p<0.001), increased

| Postherpetic neuralgia | Univariate logistic regression analysis | Multivariate logistic regression analysis |
|------------------------|----------------------------------------|------------------------------------------|
| Age                    | 1.07 (1.04-1.09) <0.001                 | 1.05 (1.01-1.10) 0.019                   |
| Gender (male)          | 1.62 (0.78-3.36) 0.198                 |                                          |
| Duration of disease    | 1.33 (1.21-1.45) <0.001                 | 1.22 (1.09-1.36) <0.001                 |
| VAS-baseline           | 1.53 (1.24-1.89) <0.001                 | 0.77 (0.49-1.23) 0.274                  |
| LANSS-baseline         | 1.24 (1.11-1.38) <0.001                 | 1.23 (1.05-1.45) 0.013                  |
| Comorbidity            | 21.95 (5.07-95.03) <0.001               | 21.75 (0.66-719.29) 0.085               |
| Lumbar                 | 4.22 (0.85-21.08) 0.080                 | 1.15 (0.13-10.64) 0.898                 |
| Sacral                 | 0.73 (0.09-5.66) 0.764                  | 0.85 (0.06-11.17) 0.901                 |
| Cervical               | 9.50 (1.64-54.99) 0.012                 | 60.79 (1.21-3057.21) 0.040              |
| Toracal                | 2.33 (0.48-11.29) 0.293                 | 0.67 (0.08-5.32) 0.707                  |

Post-infectious sequelae

| Age                    | 1.06 (1.04-1.09) <0.001                 | 1.04 (1.00-1.08) 0.047                   |
| Gender (male)          | 2.05 (1.03-4.10) 0.041                 | 6.16 (1.73-21.93) 0.005                  |
| Duration of disease    | 1.27 (1.17-1.37) <0.001                 | 1.17 (1.04-1.32) 0.010                  |
| VAS-baseline           | 1.53 (1.26-1.85) <0.001                 | 0.84 (0.55-1.29) 0.430                  |
| LANSS-baseline         | 1.20 (1.11-1.29) <0.001                 | 1.19 (1.04-1.36) 0.009                  |
| Comorbidity            | 13.92 (7.40-41.26) <0.001               | 5.82 (0.96-35.41) 0.056                 |
| Prodromal sign         | 9.33 (2.74-31.76) <0.001                | 4.53 (0.81-25.50) 0.086                  |
| Lumbar                 | 2.38 (0.67-8.48) 0.181                 | 1.21 (0.19-7.77) 0.842                  |
| Sacral                 | 0.33 (0.50-2.00) 0.225                 | 0.23 (0.03-2.01) 0.184                  |
| Cervical               | 5.46 (1.26-23.77) 0.024                | 20.17 (1.13-359.22) 0.041               |
| Toracal                | 1.36 (0.40-4.63) 0.623                 | 0.77 (0.13-4.51) 0.770                  |

Table 2. Univariate and multivariate logistic regression analysis of factors affecting postherpetic neuralgia and post-infectious sequelae

| VAS-baseline | Physical therapy and rehabilitation | p     |
|--------------|-------------------------------------|-------|
| 9 (6-30)     | 9 (7-10)                             | 0.575 |
| 7 (6-9)      | 8 (5-10)                             | 0.294 |
| 4 (1-8)      | 4 (1-9)                              | 0.868 |
| p < 0.001    | < 0.001                              |       |
| LANSS-baseline | 24 (22-24) | 24 (10-24) | 0.476 |
| LANSS-first week | 18 (10-24) | 18 (5-24) | 0.534 |
| LANSS-third week | 10 (0-18) | 10 (0-18) | 0.964 |
| p < 0.001    | < 0.001                              |       |

Table 3. Comparison of dry needling and physical therapy and rehabilitation in PNH treatment

LANSS-baseline (p<0.001), having comorbidity (p<0.001), having shingles in the cervical dermatome (p=0.012) were found to be risky in terms of postherpetic neuralgia. In the multivariate logistic regression model, which was created with factors found to be effective in univariate analysis, increased age (p=0.019), increased shingles infection duration (p<0.001), increased LANSS-baseline (p=0.013), and had shingles infection in the cervical dermatome (p=0.040), increased the risk of developing postherpetic neuralgia. It was found that the risk of postherpetic neuralgia increased 1.05 (1.01-1.10)-fold with one-unit age increase, 1.22 (1.09-1.36)-fold with one-unit increase in duration of infection, and 1.23 (1.05-1.45)-fold with one-unit increase in LANSS-baseline. It was found that having a shingles infection in the cervical dermatome carries a 60.79 (1.21-3057.21) fold postherpetic neuralgia risk compared to the cranial dermatome (Table 2).

Table 2. Univariate and multivariate logistic regression analysis of factors affecting postherpetic neuralgia and post-infectious sequelae

Table 3. Comparison of dry needling and physical therapy and rehabilitation in PNH treatment
Topical therapies such as capsaicin and lidocaine may be considered for patients with PHN who have mild to moderate localized pain and who are considered to be intolerant of treatment with oral medications. In a meta-analysis of four randomized, controlled trials involving 1,272 patients with PHN, overall efficacy results were significantly better in patients treated with a single application of 8% topical capsaicin compared to those treated with 0.014% topical capsaicin (12). In the practice of acupuncture, without the use of injectate the insertion of thin monofilament needles is named as ‘Dry needling’. It is typically used for the management of a variety of neuromusculoskeletal pain syndrome for muscles, ligaments, tendons, subcutaneous fascia, scar tissue, peripheral nerves, and neurovascular bundles (13, 14). ‘Intramuscular manual therapy’ (IMT) or ‘trigger point dry needling’ (TDN) is a procedure of dry needling. IMT, or the insertion of needles into trigger point is not exact same with the term dry needling (15, 16).

Intramuscular manual therapy is a physical intervention that uses a filiform needle no larger than a 25-gauge needle to stimulate trigger points, diagnose and treat neuromuscular pain and functional movement deficits according to Mississippi State Board of Physical Therapy (17, 18).

There is a high quality evidence of direct dry needling into myofascial trigger points for the purpose of short/long-term pain and disability reduction in patients with musculoskeletal pain syndromes (19, 20, 21).

Peri-neural needling of non-trigger point structures helps reduce pain and disability while improving sensory and motor nerve conduction velocities. Perineural needling has evidence to stimulate microcirculation in patients with mild to moderate carpal tunnel syndrome (22, 23, 24).

The optimum dosage (frequency of treatment sessions per week or month), duration (length of time the needles should remain in situ), and intensity (the number of needles used and degree of manual manipulation or electrical stimulation) has yet to be determined for many neuromusculoskeletal conditions (25, 26, 27).

Majority of 'dry' needling randomized trials attempt to elicit a deqi response. Deqi has been defined as a dull ache, heaviness, distension, numbness, tingling, cramping, pressure, fullness, spreading, warmth, or coolness (28, 29). In our study, patients diagnosed with PHN were questioned for neuropathic pain by the physiatrist before starting treatment and at each visit and also was evaluated with VAS and LANSS scores. Out of 18 of patients take dry needling therapy for PHN. We applied a total of 10 sessions of dry needles to our patients for 3 weeks. 25x0.25mm gauge needle injected intramuscularly through the corresponding dermatome. Transcutaneous electrical nerve stimulation (TENS) is widely used as a non-pharmacological approach for pain relief in a variety of clinical conditions. Most clinical trials have demonstrated the efficacy of TENS in attenuating neuropathic pain (30).

In a study, TENS frequencies (110 or 4 Hz) and two intensities (strong but comfortable or highest tolerable) were applied at three sites relative to the measurement site (segmentally, extrasegmentally or a combination of these), for 30 min. The high frequency, high intensity segmental, and combined stimulation groups, showed rapid onset and significant hypoalgesic effects. All other TENS intervention
groups showed hypoalgesic responses similar to the sham TENS group, and none of these groups reached a clinically significant hypoalgesic level (31).

In our study, 19 of patients undergo conventional physical therapy treatment with therapeutic ultrasound, TENS and exercise therapy. We observed a significant reduction in neuropathic pain complaints in our patients with conventional physical therapy programs. In addition, it provides a good advantage, especially in the elderly patient group, as a method that has no side effects and is well tolerated.

6. CONCLUSION
Physical therapy and dry needling appear to be an effective option for the treatment of PHN. When we evaluate the systemic side effects and drug interactions of other drugs, the non-invasive nature of these treatments (Physical therapy program and dry needling) provides some advantages, especially in the elderly population with com-morbidity. Considering these advantages, longer-term studies are required to establish the long-term safety and efficacy of physical therapy and dry needling therapy in the treatment of PNH.

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