



Science

ENMG PROFILE OF PATIENTS WITH HAND PAIN COMPLAINTS

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Abstract

Introduction: Hand pain is a complaint that often found in daily practice. Electroneuromyography (ENMG) examination has pivotal role neuromuscular disorders in hand pain. This study aims to determine ENMG profile of patients with hand pain complaints also its characteristics. Methods: This research is a descriptive observational study. Data were obtained by interviewing technique conducted in neurology polyclinic General Hospital of Dr. Saiful Anwar Malang (RSSA), comprises patient characteristic and their ENMG summaries. There were a total of 58 patients with hand complaint that fulfilled inclusion criteria. ENMG was conducted to all research subjects. **Results:** For 10 months (April 2017 – December 2017) there were 58 patients complained of hand pain, comprised 50 new patients (86%) and 8 old patients (13%). A total of 41 subjects (71%) were women and 17 subjects (29%) were men with complaints of unilateral hand 44 (76%) and bilateral 14 (24%) subjects. The major age group was 45-55 years (70%). The average occupation that experienced by patients was housewife (63%). Patients came with paresthesia as their most complaints (60%) with positive Tinnel sign found in 62% of patients and hypertension 34% and DM 24% as comorbids. ENMG was conducted to all patients with carpal tunnel syndrome (CTS) 44 patients (75%), polyneuropathy 6 patients (10%), de Quervain 6 patients (10%) as results. **Conclusion:** The most ENMG results of patients with hand pain complaints is carpal tunnel syndrome.

Keywords: Hand Pain; CTS; Polyneuropathy; ENMG.

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1. Introduction

Hand pain (wrist pain) is a symptom characterized by discomfort or pain on the wrist. The causes of wrist pain are very diverse. First thing that needs to be done is determining whether the pain is caused by trauma or non-trauma. Wrist is a complex joint that bridges hand with forearm. Wrist comprises of several bone assemblies, ligaments and tendons, nerves also blood vessels. Injury to these parts can cause wrist pain. There are diverse causes for wrist pain so that is crucial to determine whether the pain is acute, subacute or chronic (Ferguson et al., 2019).

ENMG examination has pivotal role in neuromuscular or peripheral nervous system disorders. ENMG examination will help narrowing differential diagnosis with good clinical examination. This examination can help determining topis diagnosis, pathological diagnosis, and prognosis of peripheral nervous system disorders. CTS remains a clinical syndrome with appropriate symptoms and signs, in the presence of electrodiagnostic (EDX) abnormalities. Episodic numbness, tingling, burning or pain in the affected hand, frequent awakening at night, due to hand paresthesias, and relief of symptoms by hand shaking are characteristic symptoms of CTS. Palm pain, wrist pain or radiation proximal to the wrist may occur. The most common site of sensory symptoms is in all digits, followed by median digits only or a glove distribution (Basiri & Katirji, 2015).

Etiology of non-trauma pain on wrist can vary. We must find out how is the pain character and look if there are any systemic symptoms. Sudden pain indicates infection, arthritis or osteonecrosis. Symptoms that come slowly are one of the characteristic of tenosynovitis, nerve entrapment syndromes. Younger patients (less than 40 years old) are more vulnerable to carpal tunnel syndrome, while elders are more susceptible to systemic diseases and degerenative processes involving wrist joint. Osteoarthritis and rheumatoid arthritis are more common in women than men. Generally, the causes of wrist pain can be divided into 3 categories, mechanic, neurological, and systemic (Wang et al., 2001).

Hand pain is a complaint that often found in daily practices, especially in neurology polyclinic General Hospital Dr. Saiful Anwar Malang. This research is expected to find out ENMG profile of patients with hand pain complaints also its characteristics

2. Materials and Methods

As data source, medical records of patients who were treated at neurology polyclinic General Hospital Dr. Saiful Anwar Malang during April 2017 to December 2017 period were used. They were evaluated descriptive observationally as clinical data of patients associated with hand pain. Data were also obtained by interview techniques, with characteristics of patients evaluated including age, sex, occupational type, comorbidities and time length of complaint. All of manifestasions, both signs and symptoms were noted, previous history of diseases (comorbids) and ENMG was conducted to all of research subjects.

3. Results and Discussions

3.1. Characteristic of Research Subjects

During April 2017 to December 2017 in Neurology Polyclinic General Hospital Dr. Saiful Anwar Malang found 58 cases of hand pain, consisted of 50 new cases and 8 old cases. 41 women and 17 men. The youngest age was 18 years (1 person) and the oldest was 79 years (1 person). Distribution of age and gender can be seen in table 1.

Table 1: Distribution of age and sex

Age	Female (%)	Male (%)	Total (%)
15 – 25	1 (1,8)	1 (1,8)	2 (3,4)
26 – 35	3 (5,2)	3 (5,2)	6 (10,3)

36 – 45	5 (8,6)	2 (3,4)	7 (12,0)
46 – 55	20 (34,4)	5 (8,6)	25 (43,1)
56 – 65	9 (15,5)	4 (6,8)	13 (22,4)
>65	3 (5,2)	2 (3,4)	5 (8,6)
Total	41 (71)	17 (29)	58 (100)

Most patients were housewives (48.2%) with descriptions of activities including washing, cooking and kneading. In patients with three other occupational types, factory employees who were also housewives for instance, they were included in occupational group that dominantly raised complaints. Job characteristics can be seen in table 2.

Table 2: Characteristics of occupation in patient with hand pain based on gender

Occupation	Activity Description	Female (%)	Male (%)	Total (%)
House wife	Washing, cooking, teasing, typing	29 (50,0)	0 (0,0)	29(50,0)
Factory Employee	Push down, Lift heavy	7(12,0)	12 (20,6)	19(32,7)
Teacher	Typing	4(6,8)	4(6,8)	8(13,7)
Collage student	Typing	1(1,7)	1(1,7)	2(3,4)
Total		41 (70,6)	17 (29,3)	58(100)

3.2. Clinical Manifestations

The most common clinical complaint was parasthesia, that was tingling sensation on the hands of 35 patients (60%), followed with 29 wrist pain patients (50%) (table 3).

Table 3: The Symptoms

Symptoms	n	%
Parasthesia on hand	35	60
Wrist Pain	29	50
Numbness on hand	22	37
Pain radiating on shoulder	2	3,4

Noted: one subject can have more than one symptom.

Supportive neurological examination found in hand pain patients were tinnel test (62%) and flick test (51%). While the least found were limited ROM (10%) and thenar atrophy (5.1%)(table 4).

Table 4: Clinical Manifestation

Clinical Manifestation	n	%
Tinnel sign	36	62,0
Flick sign	30	51,7
Phalen test	20	34,4
Prayer test	15	25,8
Flinkestain	8	13,7
Limited ROM	6	10,3
Thenar atrophy	3	5,1

Noted: one subject can have more than one symptom.

3.3. Supporting Examination

ENMG electrodiagnostic examination was performed on all patients with other examinations such as blood sugar laboratory, cholesterol and hand X-ray also ultrasound (table 5).

Table 5: Supporting Examination

Supporting Examination	n	%
ENMG	58	100,0
Laboratories	31	53,4
Rontgen manus	22	37,9
USG	9	15,5

3.4. Comorbidities

The most common comorbidities were hypertension, diabetes mellitus and dyslipidemia. Not all comorbidities stood alone. Some hypertensive patients also suffered from diabetes mellitus (11 people), dyslipidemic (8 people), and arthritis manus (3 people) (table 6).

Table 6: Comorbids

Komorbid	n	%
Hipertension	22	37,9
Diabetes mellitus	14	24,1
Dislipidemia	8	13,7
Arthritis manus	3	5,1
Herpes zooster	1	1,7

3.5. Diagnosis and ENMG Profile

From 58 patients who complained of hand pain and underwent ENMG examination, 35 patients (60.3%) had carpal tunnel syndrome, 8 patients had polyneuropathy (13.7%), 4 patients had dequervain (6.89%). ENMG profile of those patients can be seen in table 7.

Table 7: Profile ENMG of patient with hand pain

Diagnoses	Frekuensi	Persentase (%)
CTS	35	60,35
De Quarvain	4	6,89
Triger finger	1	1,72
PNP	8	13,7
Combination	9	15,52

Noted: one subject can have more than one symptom.

3.6. Correlation of Patient CTS and Non-CTS with Affecting Factors

Based on the research above, we conducted an analysis to determine factors that influence CTS incidence with gender, age and occupation as independent variables. For gender variable, there

were 8 male CTS patients (15.5%) and 34 women (58.6%). Chi-square test obtained p value 0.023 ($p < 0.05$) and it can be concluded that there was significant difference in CTS incidence between men and women. For age variable, there was found that the age of CTS patients in late adolescence (17-25 years) were 2 people (3.4%), early adulthood (26-35 years) as many as 2 people (3.4%), late adulthood (36-45 years) 4 people (6.8%), early elderly period (46-55 years) as many as 17 people (29.3%) and late elderly (56-65 years) as many as 12 people (22.4%)) From chi square test that obtained p value 0.291 ($p > 0.05$), it was concluded that there was no significant difference in CTS incidence between the ages. For occupation variable, there were 6 teachers (10.3%), 29 housewives (50%), 2 students (3.4%) and 6 factory employees (10.3%). From the chi square test that obtained p value of 0.043 ($p < 0.05$), it can be concluded that there were significant differences in CTS incidence on type of occupation.

Table 8: The Analysis result of factors that influence CTS incidence

Characteristics	CTS	Non-CTS	Significance
Gender			
Male	8	8	0,023
Female	34	17	
Age			
17-25	2	0	0,291
26-35	2	3	
36-45	4	3	
46-55	17	5	
56-65	13	2	
Occupation			
Teacher	6	2	0,043
Housewife	29	7	
Factory Employee	2	0	
College Student	6	6	

This research involved 58 people consisting of patients with hand pain complaints who underwent ENMG, and found that ratio of female patients was more than the amount of male patients. This result corresponds with research indicating that hand pain complaints are more common in women, that is around 71%. Allegedly in women there are hormonal changes such as the use of contraceptive drugs and menopause.

Based on epidemiological studies, patients with hand pain are more common to be women and it frequently occurs in their middle age (middle-aged women) before menopause. This corresponds with research we conducted that the prevalence was found more in women ranging in age from 46 to 55 years by 43.1%, with housewives as their occupation. However another study stated that younger patients (less than 40 years) are more vulnerable to carpal tunnel syndrome, while elder populations are more susceptible to systemic diseases and degenerative processes (Blumenthal et al., 2006).

The most common clinical manifestations complained in this research were tingling or paresthesia on hand by 60% although one subject could have more than one type of complaint. Based on the literatures that we obtained, wrist pain can be limited to that region as well as in general

considering that manifestations in hand are often to be a sign of another diseases (Özdemir, 2017; Sit et al., 2017).

In this research, patients with hand pain complaints were examined by ENMG, laboratory, hand x-ray, and some patients diagnosed with CTS were performed hand ultrasound. Electro diagnostics are useful for confirming diagnosis in patients with extended hand pain in establishing another neuropathy diagnosis. From ENMG results, there was around 60.35% that supported CTS diagnosis. This corresponds with literatures stated that carpal tunnel syndrome is the most common condition after tenosynovitis dequervain and osteoarthritis. carpal tunnel syndrome is also the most common neuropathic disease that causes hand pain symptoms, especially in middle-aged women (Lutsky et al. , 2016; Spies-Dorgelo et al., 2009).

Most comorbidities that accompanied patients with hand pain complaints in this research were hypertension by 37% and diabetes mellitus approximately by 24%. Hypoparathyroidism, pregnancy, and diabetes are stated to be predisposing factors for the emergence of various peripheral neuropathy diseases. Correlation between hypertension and hand pain incidence has not been known yet, some patients with hypertension are also suffered from diabetes mellitus. Microvascular complications of diabetes mellitus can attack small blood vessels so that the circulation carrying oxygen and nutrients for nerves becomes disorganized, especially in eyes, kidneys, and peripheral nerves that can lead to peripheral diabetic neuropathy (Sözen et al., 2018).

4. Conclusions

Hand pain patients profile in the general hospital polyclinic of Dr. Saiful Anwar Malang for April 2017 - December 2017 period found woman as majority with range of age 52.02 ± 16.62 . Most common found clinical manifestation was paresthesia by 60%, with the most supporting neurological examination was tinnel test by 62%. CTS was found to be diagnosis of patients with hand pain complaints and underwent ENMG by 60% percentage, with the most common comorbids were hypertension and diabetes mellitus 38%.

There was a correlation between female gender with the probability to suffer from CTS as much as 58.6%. Likewise, in terms of the occupation of women who work as housewives, 50% have a susceptibility to CTS. Seen from the age, although the incidence in productive adulthood is not common, it can be concluded that there is no correlation between age and CTS incidence.

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