

## Effect of L-Thyroxine Therapy on Musculoskeletal Symptoms of Hypothyroidism

Fathia Ehmouda Zaid\*, Emhmed Eljazwi and Najat Eldrasi

Department of Rheumatology, Department of Endocrinology, Benghazi University, Libya

\*Corresponding author: Fathia Ehmouda Zaid, Assistant Professor, Faculty of Medicine, Benghazi University, Libya, Tel: 0193424950; E-mail: [fatehmoda@yahoo.com](mailto:fatehmoda@yahoo.com)

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### Abstract

**Introduction:** Hypothyroid rheumatic syndromes, ranging from myalgia and arthralgia to true myopathy and arthritis are due to thyroid dysfunction. Our purpose was to assess the effect of L-thyroxine therapy on musculoskeletal symptoms.

**Patients and methods:** A follow up study was done which included patients diagnosed with hypothyroidism and a history of musculoskeletal symptoms. They were interviewed with a structured questionnaire about their past and current musculoskeletal complaints, undergoing follow-up assessment from 3 to 12 months from baseline. The data was analyzed statistically. The correlation between recovery musculoskeletal symptoms on L-thyroxine therapy and various variable factors of hypothyroidism was evaluated by Pearson's correlation coefficient. A value of  $p < 0.05$  was considered significant.

**Results:** Seventy five patients diagnosed with hypothyroidism had musculoskeletal symptoms the musculoskeletal of hypothyroidism, most patients had arthralgia (72%), carpal tunnel syndrome (61.3%), frozen shoulder (37.3%), myalgia (36%), myopathy (12%) and arthritis (10.6%) the connective tissue disease association with hypothyroidism, patients had rheumatoid arthritis (14.7%), osteoarthritis (17.3%), fibromyalgia (13.3%) and systemic lupus erythematosus (2.7%). The management of musculoskeletal symptoms patients were start L thyroxine therapy (33.3%), patients were on same dose of L thyroxine (20%), patients were increase dose of L thyroxine (46.7%). Patients were given non-steroidal anti-inflammatory drugs (49.3%), physiotherapy (38.7%) and were undergone with reduction of weight (25.9%). Some musculoskeletal symptoms disappeared (66.7%), while some were unrecovered (33.3%). The strong correlation between recovery musculoskeletal symptoms of hypothyroidism and various variable factors like age, duration of hypothyroidism disease, co morbidity diseases and level TSH.

**Conclusion:** The musculoskeletal symptoms of hypothyroidism were improved by L-thyroxine treatment.

**Keywords:** Musculoskeletal manifestations; Hypothyroidism; L-thyroxine

### Introduction

The musculoskeletal manifestations started simultaneously with the first symptoms of hypothyroidism, and disappeared with L-thyroxine administration [1]. The musculoskeletal manifestations are muscle pain and stiffness, arthralgia, synovial thickening with effusion, hypothyroid myopathy, acroparesthesia and carpal tunnel syndrome.

The muscle manifestations in hypothyroidism are proximal weakness, fatigue, slowed movements and reflexes, stiffness, myalgia, and less commonly, cramps and muscle enlargement. The muscle manifestations can occur at any time in hypothyroidism which can be replaced by thyroid hormone replacement therapy [2].

Arthropathy in hypothyroidism is non-inflammatory arthralgia, stiffness and arthritis. Arthritis is non-inflammatory, highly viscous joint effusions primarily affecting the knees, wrists and hands. The symptoms may mimic rheumatoid arthritis. Arthropathy can be treated with thyroid hormone replacement therapy [3]. Adhesive

capsulitis, also known as frozen shoulder, is a regional skeletal problem reported in association with thyroid disorders.

Neuropathy of hypothyroidism includes carpal tunnel syndrome, and thyroid abnormalities are generally sought in patients with this syndrome, may be occur before clinical hypothyroidism is apparent, thyroid replacement is complete relief of neuropathy, thus avoiding surgery [4].

Hypothyroidism can be confused with fibromyalgia; the estimated incidence of hypothyroidism in FMS is higher than in the general public [5].

Patients with rheumatic diseases, such as rheumatoid arthritis or systemic lupus erythematosus, may have an increased association with hypothyroidism on an autoimmune basis. Patients with connective tissue diseases suffering with increasing fatigue in the absence of increased inflammation should have their thyroid function checked [6]. Our purpose was clinical assessment the effect of L-thyroxine therapy on musculoskeletal symptoms.

## Patients and Methods

The study was conducted on 7<sup>th</sup> October 2011 at University Hospital till October 2012. Follow up study, which included patients diagnosed with hypothyroidism and musculoskeletal symptoms. They were interviewed with a structured questionnaire about their past and current musculoskeletal complaints, who visited the outpatient clinic of rheumatology, follow-up assessment 3 and 12 months from baseline. The data are analyzed statistically. The correlation between recovery musculoskeletal symptoms on L-thyroxine therapy and various variables factor in hypothyroidism the effect on musculoskeletal symptoms. It was calculated by Pearson's correlation coefficient and its statistical significance was defined as  $p < 0.05$ .

## Results

Seventy-five patients diagnosed with hypothyroidism were included in the study. Patients' clinical characteristics are shown below (Table 1). The age of the study patients ranged from 20-85 years,  $M = 30 \pm 55$  years. 68 (90.7%) were females and Duration of the disease ranged from 4 months-25 years (mean  $M = 12 \pm 13$  years). The frequencies of co-morbid conditions in the study patients were as follow: diabetes mellitus (DM) (16%), hypertension (HTN) (13.3%), Obesity (BMI  $\geq 30$  kg/m<sup>2</sup>) (46.7%), cardiovascular disease (2.7%) and chronic renal failure (CRF) (2.7%) the musculoskeletal of hypothyroidism, most patients had arthralgia (72%), carpal tunnel syndrome (61.3%), frozen shoulder (37.3%), myalgia (36%), myopathy (12%) and arthritis (10.6%) the connective tissue disease association with hypothyroidism, patients had rheumatoid arthritis (14.7%), osteoarthritis (17.3%), fibromyalgia (13.3%) and systemic lupus erythematosus (2.7%). The management of musculoskeletal symptoms patients were start l-thyroxine therapy (33.3%), patients were on same dose of l thyroxine (20%), patients were increase dose of l-thyroxine (46.7%). The patients were use non-steroidal anti-inflammatory drugs (49.3%), patients were do physiotherapy (38.7%) and patients were under go reduction of weight (25.9%). It disappeared musculoskeletal symptoms on follow-up was (66.7%), where unrecovered musculoskeletal symptoms (33.3%). We demonstrated (Figure 1 and Table 2) a significant positive stronger correlation between recovery musculoskeletal symptoms of hypothyroidism and various variable factors like age, duration of hypothyroidism disease, co morbidity diseases and level TSH.

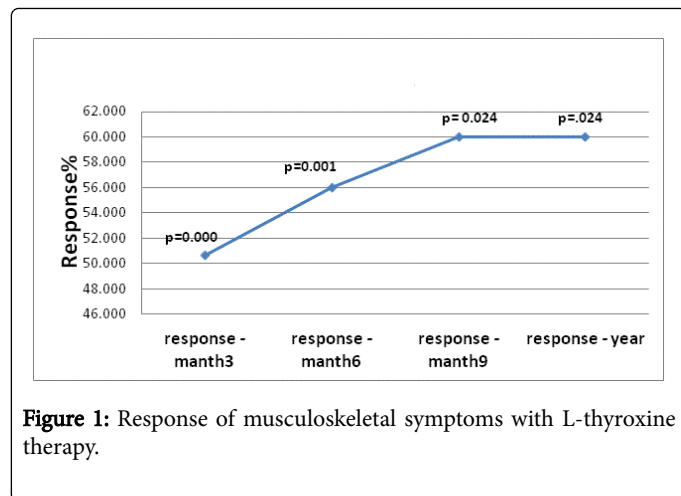
Age	20-85Y M=30 ± 55Y
Females	68/75 (90.7%)
Disease duration	4m-25Y M=12 ± 13Y
History of diabetes	12/75 (16%)
Hypertension	10/75 (13.3%)
Obesity	35/75 (46.7%)
Cardiovascular disease	2/75 (2.7%)
Chronic renal failure	2/75 (2.7%)
Arthralgia	54/75 (72%)
Carpal tunnel syndrome	46/75 (61.3%)
Frozen shoulder	28/75 (37.3%)
Myalgia	27/75 (36%)

Myopathy	9/75 (12%)
Arthritis	8/75 (10.6%)
Osteoarthritis	13/75 (17.3%)
Rheumatoid arthritis	11/75 (14.7%)
Fibromyalgia	10/75 (13.3%)
Systemic lupus erythematosus	2/75 (2.7%)
Jogren's syndrome	2/75 (2.7%)
Polymyositis	1/75 (1.3%)
Start L-thyroxine therapy	25/75 (33.3%)
Same dose of L-thyroxine therapy	15/75 (20%)
Increase dose of L-thyroxine therapy	35/75 (46.7%)
Nonsteroidal anti-inflammatory drug	37/75 (49.3%)
Physiotherapy	29/75 (38.7%)
Weight reduction	9/75 (25.9)
TSH level base line	1.50-24 mU/L M=8.9 mU/L SD=5.37
TSH level during follow up	0.2-6.7 mU/L M=2.7 mU/L SD=1.2
Recovery musculoskeletal symptoms	50/75 (66.7%)
Unrecovered musculoskeletal symptoms	25/75 (33.3%)

**Table 1:** Patients' clinical characteristics, co-morbidities, musculoskeletal symptoms, and concomitant medications.

Variable factor	Correlation	p value
Age	-0.322	0.006
Sex	0.032	0.783
Duration of musculoskeletal symptoms	-0.585	0
Duration of hypothyroidism disease	-0.51	0
Co-morbidity	-0.283	0.014
TSH levels	-0.265	0.022
L-thyroxine therapy	0.495	0
Physiotherapy	0.31	0.007
Non-steroidal anti inflammatory drugs	0.207	0.074

**Table 2:** Correlation between recovery musculoskeletal symptoms on L-thyroxine therapy and variable factors that effect on recovery musculoskeletal symptoms in hypothyroidism.



**Figure 1:** Response of musculoskeletal symptoms with L-thyroxine therapy.

## Discussion

Recently it has been accepted that patients with hypothyroidism may show a variety of musculoskeletal symptoms well before the obvious features of hypothyroidism have appeared [7]. Higher prevalence arthropathy and carpal tunnel syndrome in our study can be attributed to high BMI (body mass index) observed and comorbid disease like Diabetes mellitus in our study population. In our study there is agreement with previous studies, we found the recovery or disappearance of musculoskeletal symptoms with L thyroxine therapy on follow-up (66.7%). They reached complete response between 6 to 9 months [8,9].

We observed increase response with age of patients less than 60 years old, duration of hypothyroidism less than 5 years, musculoskeletal symptoms less than 2 years, no comorbidity disease like diabetes mellitus, obesity, control level TSH and physiotherapy.

## Conclusion

A follow-up study for these rheumatic manifestations will be better; it was improved by L-thyroxine treatment, reach complete response between 6 to 9 months, statistical significance strong relation between the recovery musculoskeletal symptoms with L-thyroxine therapy.

The variable factors that effect on recovery musculoskeletal symptoms in hypothyroidism like age, duration of hypothyroidism and musculoskeletal symptoms, comorbidity disease, and TSH level which were interfering on recovery musculoskeletal symptoms in hypothyroidism.

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