Increased Prevalence of Hypothyroidism Among Patients with Scoliosis

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PURPOSE

A possible direct relationship between hypothyroidism and scoliosis has not previously been studied. The purpose of this study is to evaluate whether there is an increased prevalence of scoliosis in a population of patients with hypothyroidism.

METHODS

We performed a retrospective analysis of patients at CHI Creighton University Medical Center - Bergan Mercy in Omaha, Nebraska from 2013 to 2023 who were 65 years of age or older and had an MRI lumbar spine with “scoliosis” indicated in the report. Within that cohort, electronic medical records were used to identify patients who had a diagnosis of hypothyroidism, were prescribed thyroid replacement, and/or had thyroid stimulating hormone lab values. Hypothyroidism was defined as patients with a medical diagnosis of hypothyroidism and/or on thyroid replacement medication.

We performed a review of the literature utilizing “hypothyroidism and scoliosis” and “hypothyroidism and degenerative spine” on PubMed. Papers were excluded if they dealt with animal models or did not pertain to degenerative spine disease.

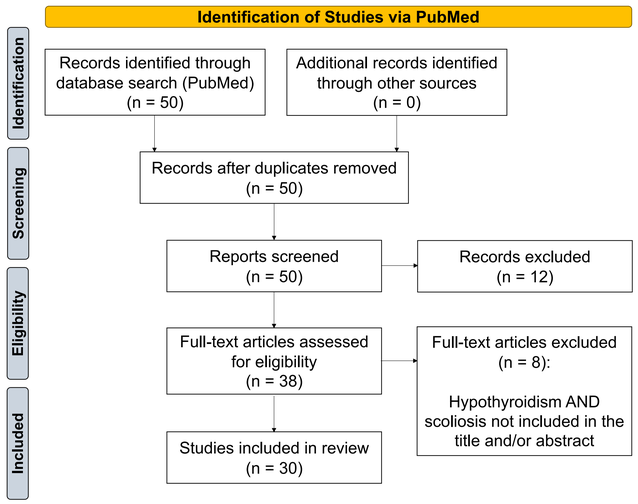

Figure 1. PRISMA flow diagram for the systematic review detailing the database searches, number of abstracts screened, and full texts retrieved.

RESULTS

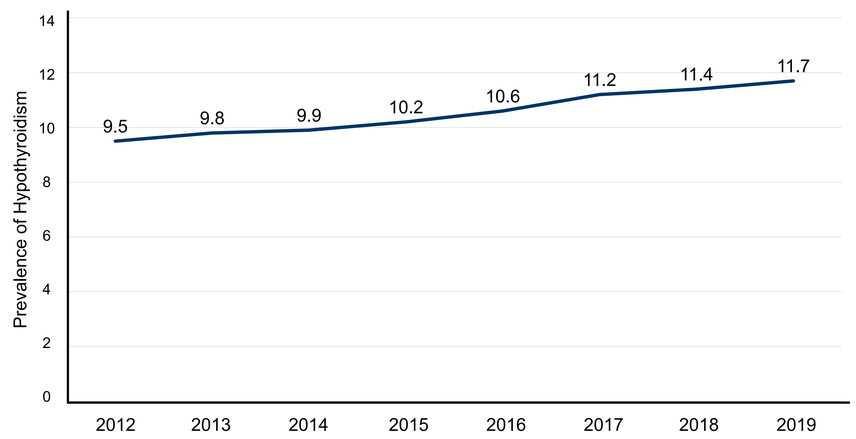

Figure 2. Prevalence of hypothyroidism in the general adult population from 2012 to 2019. Estimates are from the Optum administrative claims database[8].

Author	Year	Sample Size	Rate of HT
Mok et al. [5]	2009	89	12%
Inoue et al. [1]	2015	76	25%
Reames et al. [6]	2015	32	31%
Katz et al. [2]	2019	27	11%

Table 1. Rate of hypothyroidism in the adult degenerative scoliosis population (HT, hypothyroidism).

	Overall Population of Adult Scoliosis N = 974	HT N = 282	High TSH (> 4mU/L) N = 45	Combined HT + Subclinical HT N = 327	Non-HT [a] N = 647
Age (years), mean ± SD	80.6 ± 7.7	81.7 ± 7.7	79.9 ± 8.3	81.4 ± 7.8	80.1 ± 7.6
Gender, n (%)					
Female	696 (71.5)	235 (83.3)	33 (73.3)	268 (82.0)	460 (66.8)
Male	278 (28.5)	47 (16.7)	12 (26.7)	59 (18.0)	229 (33.2)
BMI, mean ± SD	28.3 ± 6.7	29.1 ± 7.1	28.2 ± 6.7	29.0 ± 7.1	28.0 ± 6.4

Table 2. Patient demographic and clinical characteristics (HT, hypothyroidism; TSH, thyroid stimulating hormone).
[a] Includes patients diagnosed with hyperthyroidism and those without a diagnosis of hypothyroidism or on thyroid replacement medication.

RESULTS

974 patients were identified as having an MRI lumbar spine with scoliosis and included in the retrospective analysis. 29.0% (N = 282) of those patients were found to have hypothyroidism; 81.9% (N = 231) had both a hypothyroidism diagnosis while concurrently taking Levothyroxine, 11.0% (N = 31) had a hypothyroidism diagnosis alone, and 7.1% (N = 20) were taking Levothyroxine without a formally listed diagnosis. 4.8% (N = 47) had no formal diagnosis or thyroid replacement medication but had a “high” TSH value (greater than 4mU/L).

The literature search revealed that no direct relationship has been established between hypothyroidism and scoliosis. Rather, symptoms within different disease processes would occasionally report the two occurring individually or simultaneously.

CONCLUSIONS

Our study describes an increased prevalence (29.0%) of hypothyroidism in patients with adult scoliosis which may be higher given undiagnosed hypothyroidism (4.8%) in our cohort. The prevalence is higher than previously reported values in the adult population (11.7% amongst adults, 6.9% amongst those at least 65 years of age). Further studies are required to establish a causative relationship.

FUTURE DIRECTIONS

To validate the results of this study, the incidence of hypothyroidism in patients with scoliosis (and other degenerative spinal diseases) should be evaluated at other institutions. Furthermore, we will evaluate whether there is a correlation between severity of hypothyroidism and scoliosis curvature.

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