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Thyroid Function Testing in Patients With Newly Diagnosed Hyperlipidemia

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Hypothyroidism is present in 1.4% to 13% of patients with hyperlipidemia.[1] Overt hypothyroidism is a secondary cause of hyperlipidemia and associated coronary heart disease.[2] Cholesterol profiles may be improved by treating overt hypothyroidism.

Current guidelines from the National Cholesterol Education Program, the American Association of Clinical Endocrinologists, and the American Thyroid Association recommend screening for hypothyroidism in patients with newly diagnosed hyperlipidemia prior to starting a lipid-lowering agent.[3–6] It is unclear how well these guidelines are being followed in clinical practice. We performed a retrospective cohort study to determine the prevalence of thyroid function screening in patients with newly diagnosed hyperlipidemia at an inner-city academic medical center (Boston Medical Center [BMC]).

Methods

Boston University Medical Campus's institutional review board approved the protocol and approved a waiver of informed consent. We conducted a retrospective medical chart review of patients at least 18 years old with a total serum cholesterol level of at least 200 mg/dL or

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Acquisition of data: Willard.
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low-density lipoprotein cholesterol (LDL-C) level of at least 160 mg/dL managed at BMC's general internal medicine or family medicine clinics from 2003 to 2011. Patients who had previously been prescribed lipid-lowering agents or thyroid medications were excluded. (To convert cholesterol and LDL-C to millimoles per liter, multiply by 0.0259.)

Demographic data and the proportion of patients with serum thyroid function testing obtained within about 6 months of the initial cholesterol elevation were determined. We ascertained the proportion of patients with abnormal serum thyroid-stimulating hormone (TSH) concentrations among those tested and determined whether patients were subsequently treated with levothyroxine within 6 months or with a lipid-lowering agent within 1 year.

Results

There were 8795 patients (mean [SD] age, 53 [12] years; 55% were women; 45%, African American; 24%, white; 16%, Hispanic) with new hyperlipidemia within the study period (Table).Thyroid function testing rates were higher among white patients (58%) than in other races/ethnicities (45%–59%; $P < .01$), and among women (60%) than men (37%; $P < .01$).

Serum TSH level was checked within about 6 months of the hyperlipidemia diagnosis in 49.5%, of whom 226 (5.2%) had an elevated level: 151 (3.5%) had a TSH level of 5 to 10 mIU/L; 74 (1.7%) had a TSH level greater than 10 mIU/L. Of those with an elevated TSH level, 114 (50.7%) were treated with levothyroxine, including 52 of 74 patients (70.3%) with a TSH level greater than 10 mIU/L. Eight hundred patients (18.3%) also had peripheral thyroid function tests checked (21 [2.6%] had overt hypothyroidism; 89 [11.1%], subclinical hypothyroidism). Among patients treated with levothyroxine, only 25% (vs 44% of patients with hyperlipidemia not treated with levothyroxine) were also prescribed a lipid-lowering agent within 1 year (Figure).

Discussion

Only about 50% of patients with newly diagnosed hyperlipidemia were screened for thyroid dysfunction, despite current guidelines. Testing resulted in a diagnosis of hypothyroidism in 5.2%, consistent with findings in previous studies.[1] Patients with TSH levels greater than 10 mIU/L, for whom levothyroxine treatment is recommended, comprised only 1.7% of screened patients.[6]

Approximately 50% of those with elevated TSH levels were treated with levothyroxine; 30% of patients with TSH levels greater than 10 mIU/L were not treated. Among patients who received levothyroxine, a considerable proportion (75%)did not require a lipid-lowering agent within 1 year. Although 79% of these patients had correction of their hypothyroidism, 60.5% did not have lipid levels rechecked. Among those whose lipid levels were rechecked, 21 (61.8%) no longer had hyperlipidemia.

Strengths of this study include the large sample and diverse inner-city population. However, this was a retrospective study, and we could not evaluate whether patients received screening and/or levothyroxine and antilipemic treatment at other medical institutions during the time frame studied.

We conclude that the low rate of thyroid function testing in patients with new-onset hyperlipidemia demonstrates the need for more awareness of current guidelines. Future studies are needed to better understand reasons for low thyroid function screening rates among patients with hyperlipidemia and cost-effectiveness of hypothyroidism screening and treatment among these patients. Thyroid function screening guidelines for patients with

hyperlipidemia may need revision if future studies demonstrate lack of cost-effectiveness; our results show that current guidelines may be underused.

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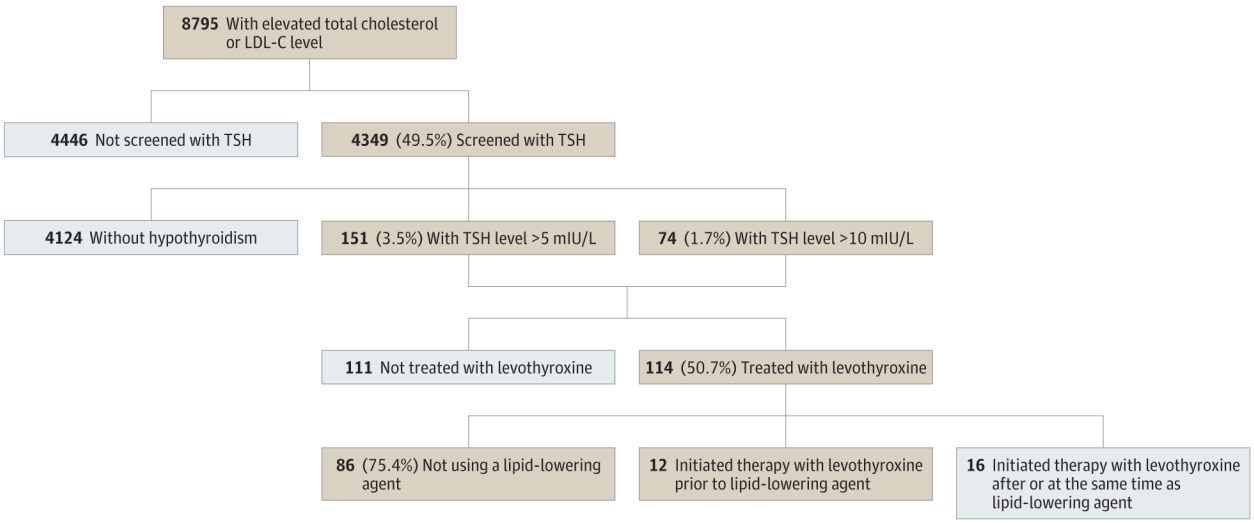

Figure. Flowchart of Patients Evaluated

LDL-C indicates low-density lipoprotein cholesterol; TSH, thyroid-stimulating hormone.

Table

Demographics of 8795 Patients[a]

Characteristic	No. (%)[b]	
	Total	Screened
Sex		
Women	4840 (55)	2881 (60)
Men	3955 (45)	1468 (37)
Race/ethnicity		
White	2082 (24)	1204 (58)
African American	3927 (45)	1837 (47)
Hispanic	1409 (16)	656 (47)
Asian	286 (3)	129 (45)
Native American	17 (0.19)	10 (59)
Other	938 (11)	442 (47)
Unknown	136 (2)	71 (52)
Boston Medical Center clinic		
General internal medicine	7118 (81)	3569 (50)
Family medicine	1677 (19)	780 (47)

Abbreviations: LDL, low-density lipoprotein; TSH, thyroid stimulating hormone.

[a]Mean (SD) age, 53 (12) years [range, 18–95 years]. Mean (SD) cholesterol and low-density lipoprotein cholesterol (LDL-C) levels, 242 (46) mg/dL, and 185 (29) mg/dL, respectively; mean thyroid-stimulating hormone (TSH) level, 1.52 mIU/L [range, 0.01–370.92]. To convert cholesterol and LDL-C to millimoles per liter, multiply by 0.0259.

[b]P= .01 for percentage screened for all comparisons.