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ATTITUDES TOWARDS LATENT TUBERCULOSIS AMONG PHYSICIANS IN TRAINING: THE ROLE OF BCG VACCINATION

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Abstract

Introduction—Prior work has demonstrated that international medical graduates (IMG) physicians are less likely to recommend treatment of LTBI for themselves or their patients. Our objective was to measure differences in LTBI treatment attitudes among resident physicians when diagnosis is established with a positive TST, as compared with a positive IGRA, and to determine whether a resident physician's personal history of BCG vaccination was associated with these attitudes.

Methods—We conducted a cross-sectional survey of Internal Medicine resident physicians at two different training sites. Based on the country and year of birth, each respondent was assigned a putative BCG vaccination status based on a query of the BCG World Atlas (bcgworldatlas.org). We then asked whether the respondent agreed or disagreed with offering LTBI treatment in several clinical scenarios.

Results—Among their patients with a history of BCG vaccination, we found that resident physicians were least likely to agree with LTBI treatment for a first-ever positive tuberculin skin test (TST), and most likely to agree with treatment for a converted interferon gamma release assay (IGRA). Contrary to our hypothesis, a resident physician's personal history of BCG vaccination was not associated with their LTBI treatment attitudes.

Conclusions—Resident physicians broadly disagreed with LTBI treatment guidelines from the Centers for Disease Control and Prevention (CDC). Educational interventions designed to improve adherence to LTBI treatment recommendations should be broadly implemented, without regard to the educational or cultural backgrounds of physician.

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Keywords

Latent tuberculosis infection (LTBI); BCG vaccination; Tuberculin skin testing (TST); Interferon gamma release assays (IGRAs)

BACKGROUND

Prior work has demonstrated that international medical graduates (IMG) physicians are less likely to recommend treatment of LTBI for themselves or their patients.¹ Qualitative surveys have also demonstrated that lay individuals with a history of Bacillus Calmette–Guerin (BCG) vaccination overestimate the protective effect of the vaccine, and are likely to attribute a positive TST to the BCG vaccine itself rather than LTBI.² Interferon gamma release assays (IGRAs) may be used as a screening test for LTBI, and provide greater specificity for LTBI in patients with a history of BCG vaccination.³ Our objective was to measure differences in LTBI treatment attitudes among resident physicians when diagnosis is established with a positive TST, as compared with a positive IGRA, and to determine whether a resident physician's personal history of BCG vaccination was associated with these attitudes.

METHODS

Setting and participants

We conducted a cross-sectional survey study of Internal Medicine resident physicians at two separate training sites: Hahnemann University Hospital (Philadelphia, PA) and Cooper University Hospital (Camden, NJ). Surveys were completed and returned anonymously during teaching conferences. This anonymous survey study was granted exempt status by the Institutional Review Board at each institution.

Data collection

We queried demographic information (country of birth, year of birth), educational history (country of medical school), and internal medicine training history (post-graduate year). We also asked about respondents' personal history of LTBI and pulmonary tuberculosis. Based on the country and year of birth, each respondent was assigned a putative BCG vaccination status based on a query of the BCG World Atlas (bcgworldatlas.org), a searchable, open-access database of BCG practices worldwide.⁴ We chose this approach because of the low accuracy of self-reported vaccination histories.⁵ We then provided respondents with various clinical scenarios, and asked whether the respondent agreed or disagreed with offering LTBI treatment in each scenario. We designed each of these scenarios so that LTBI treatment would be consistent with CDC guidelines.⁶

Analysis

We described respondents regarding their demographic, educational, and training characteristics. To test the hypothesis that a resident physician's personal BCG history would influence their treatment recommendations, we compared responses in each clinical scenario for residents with and without a putative history of BCG vaccination. In secondary

analyses, we examined the relationship of other demographic and educational factors with LTBI treatment attitudes. All analyses were conducted in Stata 13.0 (StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP).

RESULTS

We obtained 138 responses from 207 Internal Medicine resident physicians (66% response rate) at the two training programs (Table 1). Respondents were from 20 different countries, and most respondents (59%) were born in the U.S. Among 55 foreign-born resident physicians, 46 (83%) were born in countries where BCG vaccination was in use during the year of birth.

Overall, 22 respondents (17%) reported a personal history of TB, including four (3%) with a history of active TB, and 18 (14%) with a history of LTBI. Among 18 resident physicians with a history of LTBI, 12 (67%) reported being offered LTBI treatment, and five accepted LTBI treatment (all of these respondents reported treatment completion). Among 114 resident physicians without a personal history of tuberculosis, 87 (76%) reported that they would accept LTBI treatment for themselves if the diagnosis were based on a positive TST, and 103 (90%) would accept LTBI treatment for themselves if the diagnosis was based on a positive IGRA ($P < 0.01$).

We observed significant variability in the attitudes towards LTBI treatment in the various clinical scenarios. Only 54 of 138 respondents (39%) agreed with LTBI treatment for a BCG-vaccinated patient with a first-ever positive TST, as compared with 106 of 137 respondents (77%) agreeing with treatment for a first-ever positive TST in a patient without a BCG vaccination history ($P < 0.01$). For patients with a first-ever positive IGRA, agreement with LTBI treatment was 115/137 (84%) for BCG-vaccinated patients, compared with 128/137 (93%) for patients without a history of BCG vaccination ($P < 0.01$).

Contrary to our hypothesis, a resident physician's personal history of BCG vaccination, as assigned by the BCG World Atlas based on country and year of birth, was not associated with LTBI treatment attitudes for the clinical scenarios (Table 2). There was no significant relationship between a respondent's attitudes towards LTBI treatment and their country of birth, country of medical school, or post-graduate year, for any of the clinical scenarios.

CONCLUSIONS

In this cross-sectional survey of resident physicians at two separate Internal Medicine training programs, we found a significant departure from national guidelines regarding the treatment of LTBI, both for themselves and for their patients. Self-reported treatment completion was also low among resident physicians with a personal history of LTBI.

Knowledge gaps may contribute to discordance between national guidelines and LTBI treatment attitudes among physicians in training. Interestingly, we found no difference in attitudes across the post-graduate years of training, and both survey sites demonstrated similar proportions of disagreement with treatment recommendations. The observed rate of disagreement with LTBI treatment guidelines is also similar to previously reported findings

among physicians in clinical practice, suggesting the consistency of this disagreement across stages of a physician's career.^{7,8}

Our study was limited by inability to assess the respondent clinical practices regarding LTBI treatment, relying instead on their self-assessment. As an anonymous survey, we were unable to directly assess BCG vaccination history (for example, the presence of a BCG scar), relying instead on an approach to assign BCG vaccination history based on country and year of birth.⁴

In summary, we found low agreement between national guidelines and resident physician attitudes towards LTBI treatment in both themselves and their patients, with increased acceptance of LTBI treatment based on a positive IGRA rather than a positive TST. Given the consistency of this disagreement across various groups of respondents, educational interventions designed to improve adherence to LTBI treatment recommendations should be broadly implemented, without regard to the educational or cultural backgrounds of physician.

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TABLE 1

Characteristics of survey respondents (n=140)

Characteristic	n (%)
Country of origin (n=138)	
U.S.-born	82 (59%)
Foreign-born	56 (41%)
Postgraduate year (n=138)	
1	53 (38%)
2	42 (30%)
3	43 (31%)
Location of medical school training (n=137)	
U.S.	77 (56%)
Non-U.S.	60 (44%)
Type of medical school (n=138)	
Allopathic	121 (88%)
Osteopathic	17 (12%)

TABLE 2

LTBI treatment attitudes among resident physicians

Clinical scenario [*]	Agreement with LTBI Treatment (%)		P value
	Resident physicians likely to have received BCG vaccine	Resident physicians unlikely to have received BCG vaccine	
A positive TST in themselves ^{**}	19/29 (66%)	68/85 (80%)	0.11
A positive IGRA in themselves ^{**}	27/29 (93%)	76/85 (89%)	0.56
First-ever positive TST in a patient with a history of BCG vaccination	18/45 (40%)	34/90 (38%)	0.80
Converted TST in a patient with a history of BCG vaccination	37/46 (80%)	75/89 (84%)	0.57
First ever TST in a patient without a history of BCG vaccination	35/45 (78%)	68/89 (76%)	0.86
First-ever positive IGRA in a patient with a history of BCG vaccination	40/45 (89%)	73/89 (82%)	0.30
Converted IGRA in a patient with a history of BCG vaccination	44/45 (98%)	78/89 (88%)	0.05
First ever IGRA in a patient without a history of BCG vaccination	42/45 (93%)	84/89 (94%)	0.81

* Total respondents differ because not all respondents completed all treatment scenarios

** Among resident physicians without a self-reported history of TB