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Case study: Tuberculosis skin testing study tool

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Abstract

Tuberculosis continues to infect millions of people in the world each year and is the leading cause of death for people with HIV. Use of a Tuberculin Skin Test (TST) can be used to identify latent tuberculosis and to diagnose active tuberculosis disease. To assist in developing this skill a TST study tool was developed. The TST study tool has been used by various tuberculosis instructors in a mid-western state to meet the intent of providing skilled health care providers to do TST for patients entering long term care and employees in other health facilities.

Background

Tuberculosis (TB) is still a deadly disease. As many as 104 million in the world became ill with TB disease in 2016. A total of 1.7 million died from TB worldwide and TB is the leading killer of people who have HIV [1]. In the U.S. there were 9,272 TB cases for a case rate of 2.98 cases per 100,000 persons in 2016. This is a 3.6% decrease from the TB cases in 2015. Of the new cases CDC estimates that 14% are recent transmissions and not reactivation of longstanding untreated TB infection [1]. Indiana is a low incidence state and recorded 109 new case of TB in 2016 a 6% decrease over 2015 and 1.7 cases per 100,000. Over ten years TB has decreased 15.5% in Indiana. Marion County Indiana had the most cases in the state with 44 new cases in 2016 and 408 cases over the past ten years [2]. The vision of ISDH TB Control program is a "Tuberculosis Free Indiana" [2].

Problem

Indiana Code requires Tuberculosis testing to be done for residents entering skilled nursing facilities and for healthcare workers and employees (Health Facilities Licensing and Operational Standards 410-IAC 16.2-3.1-14(t)). In Indiana the Tuberculosis Skin Test (TST) must be administered and read by a trained Tuberculosis practitioner. Tuberculosis skin testing is an acceptable alternative when an Interferon-γ Release Assay (IGRA) is not available, or too costly or too burdensome [3]. Use of Quantiferon or T-Spot tests can also be used by health facilities in Indiana and then measuring of skin reactions would not be done. Eliminating this subjective measure can provide better standardization of potential latent TB or TB disease [4].

A Tuberculosis Basic Course was designed by the American Lung Association Indiana Affiliate and the Indiana State Department of Health. The training requires completing a standardized online didactic course content and successfully passing a quiz with a score of 80% or above correct. This is followed by an in person skill validation session. During the skill validation session participants must successfully read 10 simulated manikin arm reactions measuring the indurations within 1mm. Students may

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repeat one time for measurements that are off by more than 1mm. Students must also administer a TST using normal saline and produce a 8-10 mm wheal [5].

During ten years as a community health nursing instructor, the author observed that the measurement activity and determining if a person would be considered a positive reaction was difficult for students to demonstrate. Using the TB skin testing tool students can become more efficient and accurate in interpretation of mantoux reaction measuring. There are three cut off points to be considered after the measurement and that information is added to data from the history and physical examination of the patient.

An induration of 5 mm would be considered positive if one of the following was present:

- If the patient has an HIV infection
- Persons exposed to a recent diagnosed tuberculosis case
- Person has other immune-suppressed conditions
- Person has a chest radiograph with fibrotic lesions likely to represent old healed TB.

An induration that measures 10mm or more would be considered positive if the person also has one of the following;

- Injection drug user
- Certain lab personnel
- Recent immigrant from high TB prevalent country
- Persons with other medical risk factors (Diabetes mellitus, head and neck cancer, and some gastric diagnosis)
- Children under 5 years of age
- Infants, children and adolescents exposed to adults at high risk for developing active TB
- Residents and employees of high risk congregate facilities (prisons, homeless shelters, dormitories)
- Health care workers who work with high risk clients

An induration that measures 15mm or more would be considered positive if the person has no other known risk factors [5].

Method

The author developed a Tuberculosis Measuring Activity that can be used to practice the measuring induration step and then combined with a brief case scenario to determine if the person would be considered a positive or negative screening test. The Tuberculosis Measuring Activity was reviewed for by a cohort of ten Tuberculosis instructors at a training meeting for content validity and for interrater reliability of the measurements. The tool was modified and retested. The tool has been used consistently since 2012 by various TB skin testing instructors in Indiana [6]. The form can be found in the Appendix 1.

Results

Student feedback of the form was that it was easy to use and help them successfully practice the decision making to determine if a tuberculosis reaction would be consider positive or negative. The form takes on average less than five minutes and can be done while students are waiting to complete the practicum assessment. TB Instructor feedback included that use of the TB measuring tool assisted their students in understanding the TB skin test measurement process.

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