Quality Improvement: Improving adherence to guidelines for urinary legionella antigen testing in a large teaching hospital

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Introduction

Community acquired pneumonia (CAP) is a common presentation associated with considerable morbidity and mortality. A rare but important cause of pneumonia is legionnaries' disease. Legionnaires' disease is caused by *L. pneumophila* and other Legionella species. This is a notifiable disease with 447 cases reported in England and Wales in the 8 months leading up to August this year (1). Diagnosis and management of outbreaks is crucial with source control essential.

The legionella antigen test tests specifically for *Legionella pneumophila* serogroup 1 antigen in urine. This is responsible for 85-90% of infections. The urinary antigen test is reported to be 95% sensitive, however it must be noted that it only tests for serogroup 1 infection (2).

Between 1/8/2014 and the 31/7/2016 North Bristol Trust (NBT) processed 3311 legionella antigen tests. 9 were positive representing a pick-up of <0.5%. With budgets under increased scrutiny it is essential that patients are appropriately tested for this. The British Thoracic Society (BTS) guidelines state that patients with a high severity community acquired pneumonia (usually considered to be CURB score >2), specific risk factors, or during outbreaks should be tested for urinary legionella antigen. (3).

With this in mind this project sought to look at ways of rationalising current testing.

Methods

A random 100 patient sample from the first 4 months of 2016 were used as the baseline data collection. Data on the location, duration of stay, and diagnosis on discharge were collected retrospectively.

Prompts when ordering urinary legionella antigen tests via our electronic requesting system (ICE) were introduced in January 2017 (see figure 2). This included a comment on the BTS guidelines, an error message to reduce duplicate testing, removing testing from the GP panel, and a prompt to calculate the CURB-65 score before requesting.

A repeat sample of 190 samples was reviewed from February 2017.

During the two time periods sampled there were no positive results. Initial data showed that 45% had a diagnosis of community acquired pneumonia (CAP) or lower respiratory tract infection (LRTI) on discharge. Other diagnosis ranged from pulmonary embolism, infective exacerbation of COPD and influenza. A list of other conditions were legionella antigen was not indicated are listed in figure 1. 10% did not have a diagnosis associated with respiratory symptoms. 25% of patients were discharged from the emergency department (ED) prior to results being available. 1% patients had had a duplicate test, and 1% had been sent from General Practice. 2% of patients were tested over 14 days into their inpatient stay.

Figure 1 Examples of the diagnosis from discharge where legionella was tested inappropriately

-Perforated diverticular abscess
-B cell lymphoma
-Pulmonary embolus
-Hospital acquired pneumonia
-Steven Johnson's syndrome
-Lung Abscess

Results Continued

Following the implementation of changes to requesting 2% of patients from ED were discharged prior to results. 1% were duplicate tests, and no samples were sent from General Practice. Looking at the diagnosis on discharge there was a slight improvement from 45% with CAP to 53%. All requestors gave a CURB score on the request, 16% were for a CURB score of 1. 2.6% patients were tested over 14 days into their inpatient stay.

Discussion

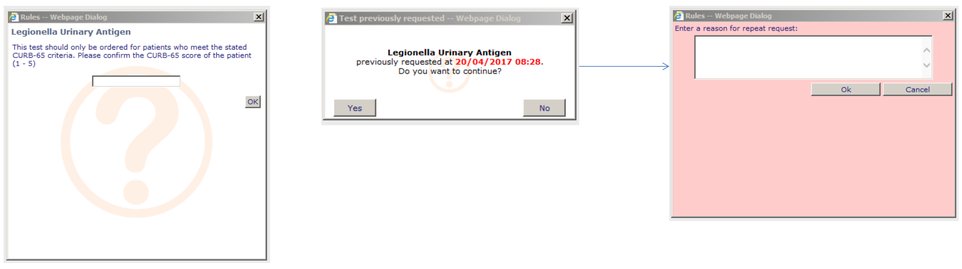
The results highlight that there is still considerable confusion about the indications for testing. The fact that 16% were listed as having a CURB score of 1 was a concern. While these patients potnetially had specific risk factors such as travel and immunosuppression we suspect that a number of these were sent inappropriately. We have introduced further ICE prompts to try and reduce this including a prompt to reduce testing of patients with hospital acquired pneumonia.

Challenging this at the point of request offers potential but clearly this is not fail safe. Delaying testing until admission from ED was one potential way to try and reduce diagnostic uncertainty. Our current trust guidelines cover for atypical infection so the only implication in the delay would be the public health implications. For this reason we have continued to allow ED to test for legionella, but this may be reviewed in the future given the fact that patients admitted under medicine usually have a Consultant review within 14 hours of admission to the medical admissions unit (5).

Education and training is another important area that needs to be improved. Further work continues with a re-cycle planned following the latest changes (see figure 3) . Hopefully this project can provide an insight into the challenges and potential solutions to rationalise and ensure appropriate testing.

Figure 2: ICE prompts

Initial ICE prompts



Revised ICE prompts

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