Abstract

Optimization of a multiplex PCR for the detection of pathogens causing acute bacterial meningitis

Background

The lack of rapid, sensitive laboratory diagnostic methods remains a key issue in diagnosing meningitis. Despite advancements in technology, affordability prevents most developing countries from using the newer techniques. However, conventional PCR is currently becoming more affordable.

Objectives

To optimize a multiplex PCR for the laboratory detection of common bacterial pathogens causing bacterial meningitis and utilize it to identify the causes of bacterial meningitis.

Methods

Cerebrospinal fluid (CSF) specimens were collected from patients with acute meningitis admitted to Teaching Hospital, Peradeniya from December 2016 to March 2017. Clinical data were gathered using a data entry form. A multiplex PCR was developed using previously described primers to detect *Neisseria meningitidis*, *Streptococcus pneumoniae* and *Haemophilus influenzae*. The PCR was optimized using known controls, adjusting primer concentrations, $MgCl_2$ concentration and annealing temperature. External validation was not conducted due to time and financial constraints. Routine laboratory tools and optimized PCR were used on the collected CSF specimens.

Results

Eighty specimens of CSF were collected during the study period. The mean duration to sample collection was 4.78 (SD2.6) from onset of symptoms.

None of the samples yielded a bacterial growth by routine culture. CSF antigen detection was performed on 50 specimens and all were negative. Of the total samples, eight yielded positive PCR results. In two of the positives, the full report was normal, one was suggestive of viral aetiology and five were suggestive of bacterial aetiology. Three were positive for *S.pneumoniae* and five for *H.influenzae*. Positive PCR results were associated with a shorter time gap between hospitalization and sample collection and a larger CSF volume.

Conclusions:

PCR is useful in the identification of the bacterial aetiology of acute meningitis. Diagnosis may be improved by collection of an adequate volume of CSF early in the illness, without delay.