A feasibility study to investigate the effects of procalcitonin testing on antibiotic prescribing in lower respiratory tract infections in an Irish hospital

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Introduction

Diagnostic uncertainty and a high prevalence of viral infections[1] contribute to inappropriate antimicrobial prescribing[2] for the treatment of lower respiratory tract infections (LRTI). Procalcitonin (PCT) is a biomarker which has shown promise in reducing antimicrobial prescribing.[3]

Methods

We conducted a prospective, observational, single centre, randomised, open-label feasibility study to investigate the effects of PCT testing on antimicrobial prescribing in patients admitted with a LRTI.

PCT levels were interpreted using the following values:

- antimicrobials-strongly discouraged <0.1µg/l,
- discouraged - 0.1 to <0.25µg/l
- encouraged - 0.25 to <0.5µg/l
- strongly encouraged - >0.5µg/l.

Primary outcomes were: patient's antimicrobial consumption, duration, and length of hospital stay (LOS)

Results

119 patients were recruited with 79 randomised to have PCT measured along with standard care, and 40 control patients received standard care.

The addition of PCT testing led to a significant decrease in duration of antimicrobial prescriptions (Mean 6.8 vs 8.9 days) p=0.012 (fig.1) and decreased length of hospital stay (Mean 7.4 vs 10.5 days) (p=0.003) (Fig 2).

PCT did not demonstrate a significant reduction in antimicrobial consumption (measured by total days or DDDs of therapy) (Fig. 1).

Fig 1: Days and DDDs of antimicrobial therapy in PCT arm compared to control arm

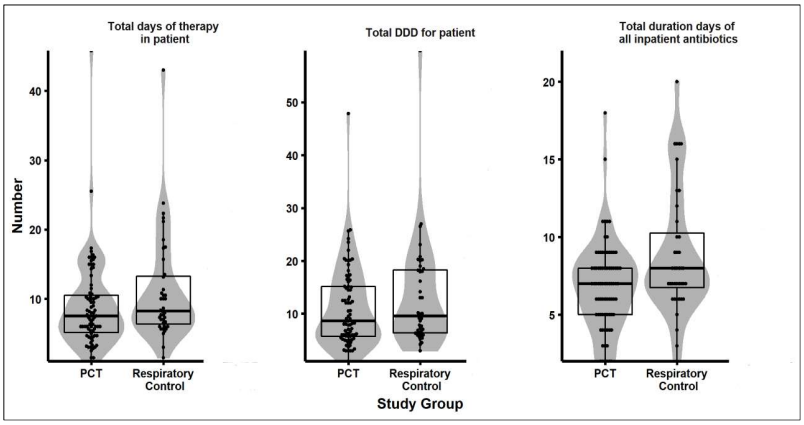
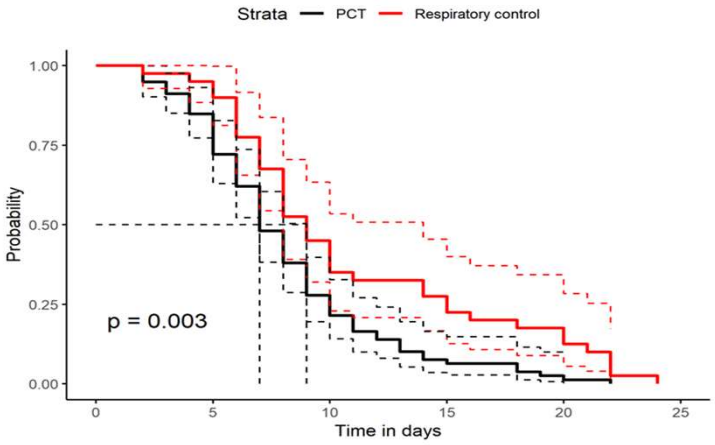


Fig 2: Kaplan–Meier curve of the comparison of time to discharge for PCT versus respiratory control arm. (Median probability of discharge is given by the horizontal dashed line).



PCT levels were low: median and IQR of 0.075µg/l (0.05-0.26µg/l). 73% of patients had an initial PCT levels <0.25µg/l.

Algorithm compliance was 100% when PCT levels were high and low (6%) when levels were low with an overall compliance rate of 32%.

PCT levels were associated with supporting shorter course lengths in 12 patients (<7 days), early IV to oral switch in 4 patients (<4 days) and completion of antibiotic courses prior to discharge in 3 patients. Adverse events, relapse of infection requiring re-admission to hospital were similar in both groups.

Discussion and Conclusion

The addition of PCT testing had an effect on reducing antimicrobial durations and length of hospital stay. It appears to be a useful additional biomarker test to support antimicrobial prescribing decisions even with low levels of compliance with antibiotic discontinuation advice. With further experience with PCT testing, reserving use for the management of exacerbations of non-severe COPD, community acquired pneumonia and influenza we anticipate greater confidence in clinicians using PCT to support antibiotic prescribing decisions.

References :

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