Procalcitonin - a valuable diagnostic marker in meningococcal disease

Graham D Mills\textsuperscript{1}, Hamish M Lala\textsuperscript{1}, Michael R Oehley\textsuperscript{1}, Angela B Craig\textsuperscript{1}, Kevin Barratt\textsuperscript{1}, Dell Hood\textsuperscript{1}, Craig N Thornley\textsuperscript{2}, Annette Nesdale\textsuperscript{3}, Noel E Manikkam\textsuperscript{1}, Paul Reeve.\textsuperscript{1}

Waikato\textsuperscript{1}, Auckland\textsuperscript{2}, and Hutt Valley\textsuperscript{3} District Health Boards, New Zealand

**Background:** Some patients with meningococcal disease (MCD) seeking medical attention create a diagnostic dilemma for clinicians due to the non-specific nature of their presentation. We have assessed the diagnostic accuracy of procalcitonin within the emergency department (ED), to clarify its role in the evaluation of MCD.

**Methods:** Two overlapping cohorts have been studied. Procalcitonin levels were measured in a cohort of patients with confirmed MCD diagnosed within the current New Zealand serogroup B epidemic, to assess the sensitivity of procalcitonin. In the second cohort, a large consecutively recruited ED population of febrile patients, enabled specificity and likelihood ratios of procalcitonin to be evaluated.

**Results:** There were 193 patients in the MCD cohort (92 children, 101 adults). The procalcitonin geometric mean was 10.9ng/ml with higher childhood than adult values (22.9ng/ml vs 5.5ng/mL, \(p=0.01\)). The overall sensitivity of procalcitonin, using a 2.0ng/ml cut-off in children and 0.5ng/ml for adults, was 94\% (95\% CI 89-97\%). Despite the higher paediatric cut-off, a trend towards greater procalcitonin sensitivity existed in children (96\% vs 92\%, \(p=0.30\)). Procalcitonin was correlated with whole blood meningococcal load (\(r=0.50\)) and Glasgow Meningococcal Septicaemia Prognostic Score (\(r=0.40\)). Within the cohort of 1521 febrile ED presentations, 28 patients were confirmed to have MCD. We showed a procalcitonin specificity in MCD of 85\% (95\% CI 83-87\%), positive and negative likelihood ratios of 6.1 and 0.08, and corroborated the sensitivity of procalcitonin (93\%; 95\% CI 76-99\%).

**Conclusions:** Procalcitonin can provide an important tool in the diagnosis of patients with MCD who present with non-specific febrile illnesses. The diagnostic accuracy surpasses current early laboratory markers and can be used to guide patient management decisions.