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Fever-to-needle time in the neutropenic cohort: are we meeting the gold-standard?

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Abstract Content: Febrile neutropenia is a medical emergency; risk of severe bacterial infection markedly rises when absolute neutrophil counts (ANC) fall below 0.5 x 10^9/L. Reported mortality rates range from 2%-20%, increasing proportionally with prolonged time-to-antibiotic administration. The UK National Institute of Health and Care Excellence advocates for antibiotic administration within one-hour of fever onset, and this target is reflected in our local guidelines.

A previous audit (2020) evaluating fever in both neutropenic and non-neutropenic haemato-oncology patients found median time from fever to administration of first antibiotic of 60 minutes. This current project aims to evaluate the fever-to-needle (F2N) time in the neutropenic cohort alone.

Data were collected prospectively over an 8-week period (Sept-Oct 2021) in the haemato-oncology department (inpatient and day unit) at St Bartholomew's Hospital. The primary outcome measure was the time interval between first recorded pyrexia of ≥ 38°C in neutropenic patients (ANC <1.0), and time of administration of first antibiotic. We also evaluated choice of antibiotics and noted any positive findings where the following investigations were performed: blood cultures, urine cultures, chest x-ray (CXR).

In total, 25 episodes of febrile neutropenia were recorded. The primary haematological diagnoses were acute leukaemia (60%) and multiple myeloma (28%), with 64% receiving chemotherapy alone and 33% also undergoing stem cell transplantation. Median neutrophil count was 0.0 at fever onset (range 0.0-0.9). The median F2N time (first antibiotic) was 55 minutes (range 17 minutes – 4 hours 4 minutes, inter-quartile range (IQR) 35 minutes – 1 hour 30 minutes). 72% of neutropenic fevers were treated with combination of piperacillin-tazobactam and amikacin, and the remaining 28% with meropenem, as per local guidelines. Median time to administration of second antibiotic (amikacin) was 1 hour 23 minutes (range 30 minutes - 3 hours 30 minutes, IQR 1 hour 7 minutes- 2 hours 2 minutes). Blood cultures were taken in 92% of cases, with a median time from fever of 39 minutes (range 8 minutes - 3 hours 41 minutes, IQR 18 minutes – 58 minutes). 18% of blood cultures were taken over one-hour after recorded fever, and empirical antibiotics were commenced prior to blood cultures in 16%. Positive yield for blood cultures was 18%, with E.coli and Viridans Streptococci equally represented (9% each). Urine cultures were taken in 48%, with mixed growth in 17% and no significant positive results. CXR was performed within 12 hours in 80% of cases, with no infective changes.

Our reported F2N time of 55 minutes is a slight improvement on the previous F2N time of 60 minutes. This may reflect increased clinical urgency in treating neutropenic patients over the mixed cohort in the previous audit. The F2N time for amikacin administration remains prolonged, with a median delay of 23 minutes from the gold standard. This is a major concern in view of increasing rates of resistance to piperacillin-tazobactam. The time elapse between fever onset and blood culture samples was also suboptimal, and barriers to this should be investigated. Recommendations to

improve F2N times include encouraging administration of amikacin first, prior to piperacillin-tazobactam, establishment of a clear escalation pathway from healthcare assistants to nursing staff as soon as pyrexia is identified and trialling early nurse-led prescribing of antibiotics.

Disclosure of Interest: None Declared