A nurse-led protocol improves the time to first-dose intravenous antibiotics in septic patients post-chemotherapy

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Introduction
Sepsis is a time-dependant emergency, with early interventions demonstrated to improve outcomes. Neutropenic sepsis, in particular, has high mortality rates and prolonged in-hospital stays.

Broad-spectrum intravenous (IV) antibiotic administration is the initial therapy in patients with suspected febrile neutropenia. Delays in the provision of antibiotics to such patients is associated with increased morbidity and mortality.

Compliance with early antibiotic administration in febrile neutropenia patients is poor. A 2011 national UK audit revealed that just 26% of patients with suspected neutropenic sepsis received IV antibiotics within 1 hr of presentation.

At the Christie NHS Foundation Trust, a “Patient Group Directive” (PGD) exists, which allows trained nursing staff on the Acute Medical Unit (AMU) to prescribe and administer first dose IV antibiotic to patients with suspected neutropenic sepsis.

This poster aims to demonstrate how such a PGD improves the time-to-delivery of potentially life-saving antibiotic therapy in patients with suspected febrile neutropenia.

Materials and methods
A retrospective analysis was performed at a specialist oncology hospital from January 1st 2015 to January 31st 2016. All patients who had presented to the AMU with suspected neutropenic sepsis, as defined by the PGD (Fig 1). Patients can present to the AMU directly from home, via outpatient clinics, or as tertiary referrals from other hospitals.

For every patient who presented with suspected sepsis, basic demographic data was collected in addition to primary site of cancer and time taken from presentation to first-dose IV antibiotic delivery. They were excluded from our analysis if antibiotics were administered prior to arrival.

Results
During the study period, 697 patients presented to the AMU with suspected sepsis post-chemotherapy. Four hundred thirty-eight (62.5%) were female and two hundred fifty-nine (37.1%) male. The median age of patient was 60 (range 16 to 87).

The most common malignancies presenting with suspected sepsis following chemotherapy were colorectal (14.8%) and breast (14.6%).

Six hundred seventy-two (96.4%) of patients received their first dose of antibiotic within 60 minutes of arrival to the AMU (Table 1). Of this group, 323 (48%) were administered IV antibiotic therapy within 15 minutes (Chart 1). The majority of patients had received their first dose of antibiotics within 30 minutes of presentation (63%).

Discussion
Our study suggests that a nurse-led protocol is a highly effective and consistent strategy towards early administration of first-dose IV antibiotics in patients with suspected neutropenic sepsis.

Despite the well-documented importance of early antibiotic delivery in sepsis, many patients experience prolonged delays. One single-centre UK study revealed that just 9% of patients with febrile neutropenia received IV antibiotics within 60 minutes of presentation. Another study performed in 2014 revealed that one in five patients experienced a delay of at least 5 hours prior to receiving first-dose IV antibiotics.

There are multiple reasons why delays occur in the context of antibiotic delivery. These include:
- a delay in initial assessment by a doctor
- an absence of a febrile neutropenia protocol
- a lack of understanding of the evolution of sepsis in neutropenic patients, amongst junior medical staff.

Our PGD protocol circumvents a number of these factors.

The protocol was introduced following recognition of the importance of prompt antibiotic delivery to patients with neutropenic sepsis by both nursing and medical staff. The PGD has been driven by clinical leadership and flattening of hierarchy in favour of improving performance in this key area.

Traditional triage is not appropriate in the initial management of patients with febrile neutropenia. There have been several studies demonstrating a significant reduction in time to antibiotic delivery via the development of Emergency Department Initiatives. Through regular review via root-cause analysis of delays, performance can be improved even further.

To conclude, our study has demonstrated that nurse-led protocols are a safe, effective and sustainable method for achieving early antibiotic administration in patients with suspected neutropenic sepsis. Such protocols have a clear role in the present, and future, management of febrile neutropenia.

Literature cited

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