An audit of the recognition of severe Gram negative sepsis and appropriate early antibiotic administration in a large teaching hospital

Nirmalan Arulanantham[1], Una Martin[1], Barry Boland[0,2]. [1]Department of Clinical Pharmacology, University of Birmingham, Birmingham, UK, [2]Department of Accident and Emergency Medicine, Queen Elizabeth Hospital, Birmingham, Birmingham, UK

Objective

In the UK, 36 000 - 64 000 lives are lost annually from severe sepsis;[1] delay in appropriate antibiotic therapy increases mortality by 6% per hour.[2] Gram negative sepsis is associated with endotoxin release.[3] The College of Emergency Medicine (CEM) recommends that 95 % of patients with severe sepsis should have measurement of temperature, pulse, blood pressure, respiratory rate, conscious level, capillary blood glucose and lactate on arrival. For antibiotic administration targets are as follows: 50 % within the first hour and 90 % within two hours of arrival and 100 % of cases prior to leaving the department.[4]

Methods

All Gram Negative blood cultures for the period January-June 2011 were obtained and casualty cards/electronic records analysed to identify Accident and Emergency (AE) admissions within the prior seven days in order to assess compliance with the above standards. Using a CEM screening tool,[4] patients identified as having systemic inflammatory response syndrome (SIRS) were classified as having severe sepsis if infection was suspected and serum lactate was greater than 2 mmol/L, systolic blood pressure <90 mmHg or there were features of new organ dysfunction. Reasons for delays were analysed.

Results: 53 cases were audited from 83 patients who had passed through AE (notes unavailable 5, severe sepsis excluded 14, duplicate cultures 11). Targets for observations/lactate measurement were as follows: pulse and temperature 100%, blood pressure 98.1%, respiratory rate 96.2%, conscious level 92.5%, oxygen saturation 90. 6% and lactate 81.1%. Blood cultures were taken in 79.2% in AE. Five patients (10 %) received antibiotics within an hour, 20 patients (40%) received antibiotics within two hours; in three cases timing was unclear. 41 patients (77.4%) received their first antibiotic in AE; of these 36 (87.8%) were appropriate according to hospital guidelines for the suspected infection.

Reasons for delayed antibiotic administration (> 2 hours) were analysed for 28 cases (no times documented 3, severe sepsis unclear due to absent lactate 2) as follows: delays in AE despite correct diagnosis (17 patients; mean time 3.27 hours); eight of these delays were during the daytime period (0800-2000 hours), nine delays were during the night (2000-0800 hours). Other reasons were: poor i.v. access (one patient-6.1 hours), and antibiotic administration deferred for the ward (two patients-4.9 hours and 8.9 hours respectively). There were eight cases of missed severe sepsis in AE where no antibiotics were given; 5 of these had temperatures < 38° C suggesting that severe sepsis was more likely to be missed when obvious pyrexia (>38° C) was absent. 85 % of patients who received antibiotics within 2 hours had Temperatures >38° C compared to 37.5 % where the diagnosis of sepsis missed in AE.(p=0.022, Fisher's exact test)

Conclusions

Delayed administration in AE despite correct diagnosis accounts for 60.7 % of patients not receiving antibiotics within two hours. Undiagnosed sepsis accounts for 28.6 % of delays. Sepsis is more likely to be missed when temperatures < 38° C; scoring guidelines and venous lactate help in detecting early sepsis.

Reference List

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