Indicators of Central Fever in the Neuroscience Intensive Care Unit

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Importance
Fever is common in critically ill neurologic patients. Knowledge of the indicators of central fever may allow greater antibiotic stewardship in this era of rapidly developing super-resistant microorganisms.

Objective
To develop a model to differentiate central from infectious fever in critically ill neurological patients with fever of undetermined cause.

Methods
Retrospective data collection from January 2006 to December 2010. Fever was classified as infectious if there was culture growth of a pathogenic species or documented clinical diagnosis of infection treated with antibiotics. Remaining patients were considered to have central fever. Continuous fever > 6h over ≥2 consecutive days was considered persistent.

Setting
20-bed neurological intensive care unit (NICU) of a large teaching hospital

Participants
Consecutive patients > 18 years admitted for ≥48 hours with core body temperature >38.3°C on at least one measurement for two consecutive days. Patients with alternative identified causes of non-infectious fever were excluded. 526 patients were included in the final analysis (Figure 1).

Main Outcome(s) and Measure(s)
Percentage incidence and odds ratios of variables associated with central fever.

Results
Fever was central in 246 patients (47%). Patients with infectious fever were older (mean 57.4 vs 53.5 years, p = 0.01) and had longer ICU length of stay (mean 12.1 vs 8.8 days, p=0.001). Central fever was more likely to occur within 72 hours of NICU admission (76% vs 61%; p = 0.01). Blood transfusion (OR 3.06 (95% CI 1.63-5.76)), absence of infiltrate (OR 3.02 (95% CI 1.81-5.05)), diagnosis of SAH, IVH or tumor (OR 6.33 (95% CI 3.72-10.77)), and onset of fever within 72 hours of admission (OR 2.2 (95% CI 1.23-3.94)), were independent predictors of central fever on multivariable analysis. The combination of negative cultures, absence of infiltrate, diagnosis of SAH, IVH or tumor and onset of fever within 72 hours of admission predicted central fever with a probability of 0.9 (Figure 2). A decision tree using these variables is presented in Figure 3.

Conclusions and Relevance
We provide a reliable model to differentiate central from infectious fever in critically ill neurological patients allowing clinicians to select patients in whom antibiotics may be safely discontinued despite ongoing fever.