Emergence of acute GI illness in predisposition, insult, response, outcomes (PIRO) sepsis model

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Introduction:
The purpose of this study was:
1. To determine the effect of pre-existing health and acute illness characteristics on sepsis responses and outcomes in Intensive Care Unit (ICU).
2. To identify the effect of Acute Diagnoses (Dx), Active Treatments (Rx), Past Health (PH) and APACHE IV ICU Admission Diagnosis on quality and predictability of PIRO model

Methods:
Tele-ICU physiological severity adjusted observational cohort obtained at 6 hospitals from 2008 to 2013 (n=10,232; 5,643 sepsis, 2,321 severe sepsis, 2,268 septic shock).
Identified factors (F) derived from internally validated exploratory analysis: 118 Dx (up to 28 per patient), 192 Rx factors (up to 15), and 64 PH factors (up to 15) and APACHE admission diagnosis were considered as predictors in models for sepsis severity, mortality and acutely acquired organ dysfunction (AAOD).

Results:
More Severe Sepsis: GI
F1 OR = 1.65, p = 0.000, 95% CI = [1.39; 1.96]
F2 OR = 1.45, p = 0.026, 95% CI = [1.04; 2.03]
F3 OR = 1.25, p = 0.000, 95% CI = [1.11; 1.40]

Model explained 20% variability (R2O=0.193)

Conclusion:
Acute GI illnesses were revealed as prevalent contributors to high risk.
Following known risk factors and factors that are plausibly linked directly to sepsis pathophysiology, GI illnesses, were prevalent in all models (Dx, Rx, PH, and Admit Dx). This is novel finding and good illustration how practitioners when given right tool and method can be empowered to target unique homogenous subsets of vulnerable sepsis patients. Lessons learned is that application of PIRO model concept allows us to identify disease subtypes and important predictors. Those predictors not only further the development of the PIRO conceptual model, they contain a promise that data-driven methods may be applied to varied illnesses for the advantage of patient health.