



# ER and Laboratory together to fighting sepsis. The experience of Ospedale Santa Croce Fano (PU). The results of a prospective clinical study.



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**Introduction:** Sepsis is a complex clinical syndrome, difficult to diagnose and manage which is characterized by a severe prognosis and a high mortality. The incidence of severe sepsis ( $\geq 65$  y): several risk factors predispose elderly to a higher incidence of sepsis. Besides frail patient with sepsis poses different diagnostic and management challenges, especially in a fast-paced environment like the ED (Emergency Department).



**Aim of the study:** Because of the high number of elderly ( $\geq 65$ y) admitted daily to our ER and the well known shortage of beds for ward admissions, in 2010 in collaboration with the laboratory and microbiology colleagues, we performed an internal audit process reviewing all the literature about sepsis diagnostics and management available to the date. Then we designed a so called "sepsis PDTA" (Figure 1) we started to implement in practice from January 2011. In brief, patients admitted to the ER presenting signs/symptoms suggestive of sepsis or, worse case scenario, only suspicious for could be tested stat for PCT (procalcitonin) available 24/h, PCR and for the needed microbiology tests.

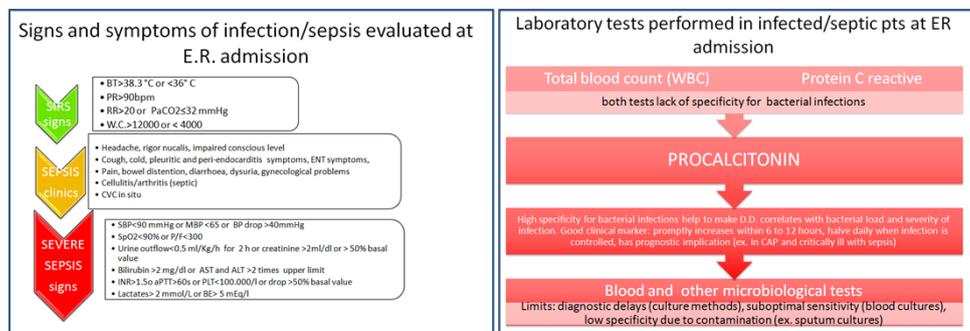


Figure 1: Sepsis PDTA.

**Results:** 2700 of patients  $\geq 65$  y out of the 34762 were admitted to the Ospedale Santa Croce Fano (PU) ER from January to December 2011. Among them, 129 pts [72 females (mean age 71.46 y) and 57 males (mean age 65 y)] accounting for the 4.7 % of the Santa Croce ER admissions went through the "sepsis PDTA" in 2011. 129 PCT determinations have been performed that year for the ER with a positive predictive rate of 68.2% (88/129). According to the cut-offs in use in our lab: 17/129 PCTs (13.17%) were  $> 10$  ng/ml with slightly higher prevalence among old (76yo) females (53% vs 47%). These data correlated with a higher detection on microbiology specimens of high risk microorganism as *E. coli* ESB, *Acinetobacter baumannii* complex, *S. aureus* MRSA, *P.aeruginosa* MDR and the worst outcomes. 29/129 (22.48%) PCT tests were 2.01-10 ng/ml, 12/29 (9.30%) were 0.51-2.00, 30/129 (23.26%) were 0.05-0.6. PCT (0.00-0.05) ruled out septic cause of clinical signs in 32% of cases (41/129). After 5 years of using of PDTA this trend has been confirmed and the detection of PTC levels helped us to identify even better patients at medium-low risk among all the patients suspected for sepsis admitted to our ER (Figure 2 - 3).

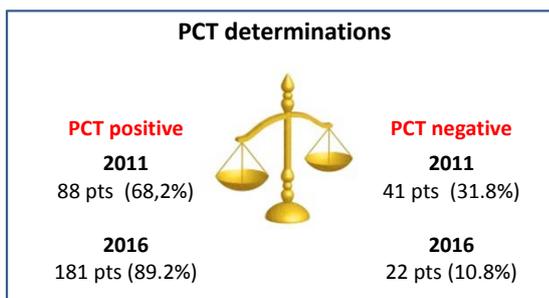


Figure 2: PCT determinations: 2011 vs 2016.

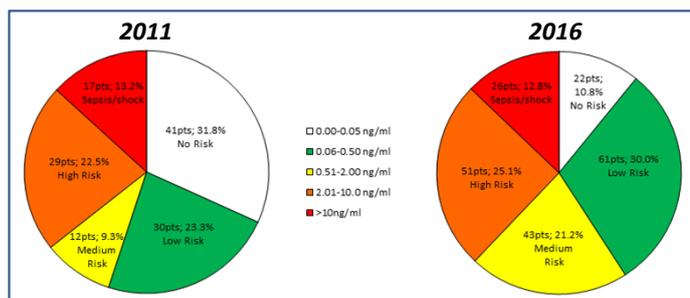


Figure 3: PCT levels classified for risk of sepsis/shock: 2011 vs 2016.

**Conclusion:** The sepsis PDTA is an example of application of the principles of clinical governance to a Health System Organization. Referrals supported by scientific evidence and implementation in practice through common agreement, as it has been the case of our sepsis PDTA, set the stage for improving our diagnostic power in a high paced environment, working out tricky diagnostic pitfalls and fostered a more rational use of Hospital settings (high intensity of care vs low intensity of care) ultimately providing better clinical outcomes.