PREDICTORS OF ADVERSE OUTCOMES OF ICU-ACQUIRED SEPSIS IN THE ITALIAN SPIN-UTI NETWORK

Antonella Agodi[1], Martina Barchitta[1], Francesco Auxilia[2], Silvio Brusaferro[3], Marcello Mario D'Errico[4], Maria Teresa Montagna[5], Cesira Pasquarella[6], Stefano Tardivo[7], Cristina Arrigoni[8], Leila Fabiani[9], Patrizia Laurenti[10], Anna Rita Mattaliano[11], Giovanni Battista Orsi[12], Raffaele Squeri[13], Maria Valeria Torregrossa[14], Ida Mura[15]

et SPIN-UTI *network* GISIO-SItI[16]

[1]Department of Medical and Surgical Sciences and Advanced Technologies "GF Ingrassia", University of Catania, Catania, Italy; [2]Department of Biomedical Sciences for Health, University of Milan, Milan, Italy; [3]Department of Medicine, University of Udine, Udine, Italy; [4]Department of Biomedical Sciences and Public Health, Polytechnic University of Marche, Ancona, Italy; [5]Department of Biomedical Sciences and Human Oncology, University of Bari `Aldo Moro', Bari, Italy; [6]Department of Medicine and Surgery, University of Parma, Parma, Italy; [7]Department of Diagnostic and Public Health, University of Verona, Verona, Italy; [8]Department of Public Health, Experimental and Forensic Medicine, Unit of Hygiene, University of Pavia, Pavia, Italy; [9]Department of Life, Health and Environmental Sciences, University of L'Aquila, L'Aquila, Italy.; [10]Institute of Public Health, Hygiene Section, Catholic University of Sacred Heart, Rome, Italy; [11]ARNAS Garibaldi, Catania, Italy; [12]Department of Public Health and Infectious Disease, Sapienza University of Roma, Roma, Italy; [13]Department of Biomedical and Dental Sciences and Morphofunctional Imaging, University of Messina, Messina, Italy; [14]Department of Sciences for Health Promotion and Mother-Child Care "G. D'Alessandro", University of Palermo, Palermo, Italy; [15]Department of Medical, Surgical and Experimental Sciences, University of Sassari, Sassari, Italy; [16]Italian Study Group of Hospital Hygiene - Italian Society of Hygiene, Preventive Medicine and Public Health, Italy

BACKGROUND

Sepsis is the major cause of mortality from any infectious disease worldwide. Healthcare-associated infections (HAIs) can trigger sepsis particularly in patients who are already at high risk, such as those admitted in Intensive Care Units (ICUs).

PURPOSE AND HYPOTHESIS

The present study was conducted using data collected during a ten-years period in the framework of the Italian Nosocomial Infections Surveillance in ICUs - SPIN-UTI network, in order to report the frequency of ICU-acquired sepsis and to identify predictor factors associated with adverse outcomes.

MATERIALS AND METHODS

The SPIN-UTI network adopted the European protocols for patient-based surveillance (HELICS and HAI-Net ICU protocols). For sepsis the definition of the ACCP/SCCM Consensus Conference Committee (1992) was adopted.

Variables*	All patients	Patients with ICU-acquired sepsis
Patients	13512	832
Males	8690 (61.8)	509 (61.9)
Mean age in years ± SD	66 ± 16.3	63.7 ± 16.6
Median age in years (IQR)	69 (58-78)	68 (55-76)
Median SAPS II score at admission (IQR)	39 (27-54)	47 (35-59)
Trauma	490 (3.7)	68 (8.3)
Impaired immunity	740 (5.5)	78 (9.5)
Administration of antibiotics within 48 hours of admission	8351 (62.6)	654 (79.5)
Type of ICU admission		
- Medical	7083 (52.9)	450 (54.7)
- Scheduled surgery	3475 (26.0)	100 (12.2)
- Unscheduled surgery	2833 (21.1)	273 (33.2)
Origin of patients		
- Other ward of this/other hospital	9073 (68.2)	589 (71.8)
- Another ICU	304 (2.3)	36 (4.4)
- Community (home)	3798 (28.4)	186 (22.7)
- Long-term care facility	142 (1.1)	9 (1.1)
Median length of stay in ICU in days (IQR)	6 (4-11)	25 (15-40)
Mortality/Case fatality rate	2556 (19.2)	370 (46.0)

RESULTS

- During the five editions of the SPIN-UTI project, from 2008 to 2017, a total of 13,512 patients admitted in 76 Italian ICUs of 55 Hospitals were enrolled for a total of 142,190 patient-days. Data on 832 patients with ICU-acquired sepsis were recorded and a summary of characteristics is shown in the Table.

- The cumulative incidence of ICU-acquired sepsis was 9.7 per 100 patients and the incidence density was 9.2 per 1000 patient-days. Overall, 57.0% episodes were classified as sepsis, 20.5% as severe sepsis and 22.5% as septic shock.

- The most common type of infection leading to sepsis was pneumonia (45.3%), followed by bloodstream infections (31.5%), catheter related infections (14.8%) and urinary tract infections (8.4%). Overall, the most common isolated microorganisms from sepsis episodes were *Acinetobacter baumannii, Klebsiella pneumoniae* (15.9%, each) and *Pseudomonas aeruginosa* (13.1%).

- Among infected patients, mortality case fatality rate was 46.0% in patients with ICU-acquired sepsis and 31.4% in infected patients without sepsis ($p<0.01$; RR: 1.466; CI95%: 1.304-1.649).

- The mortality case fatality rate increased with the severity of sepsis, from 36.4% in patients with sepsis, 45.3% in patients with severe sepsis, to 69.3% in patients with septic shock ($p<0.01$).

- Mean length of ICU-stay was significantly higher in patients with ICU-acquired sepsis than in patients without ICU-acquired sepsis (31.2 versus 24.3 days; $p<0.01$).

CONCLUSIONS

Our study demonstrates that ICU-acquired sepsis greatly increases mortality and length of ICU-stay in ICU patients. However, in order to explain these findings further analyses are needed to investigate determinants of higher mortality and of length of ICU-stay in this population of ICU patients. The identification of the predictors of sepsis occurrence and mortality is essential to design interventions for the prevention of infection, sepsis and of adverse clinical outcomes.

A. Agodi, M. Barchitta, F. Auxilia, S. Brusaferro, M.M. D'Errico, M.T. Montagna, C. Pasquarella, S. Tardivo, C. Arrigoni, L. Fabiani, P. Laurenti, A.R. Mattaliano, G.B. Orsi, R. Squeri, M.V. Torregrossa, I. Mura et SPIN-UTI network GISIO-SItI. Epidemiology of intensive care unit-acquired. sepsis in Italy: results of the SPIN-UTI network. Ann Ig 2018; 30 (Suppl. 2): 1-16