Multimodal surveillance of Care-related infections by Alert microorganisms in Ospedali Riuniti di Vittoria e Comiso ASP Ragusa

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Key Words:

Cross-infection; alert microorganism; care-related infections; multidrug-resistant microorganisms; surveillance.

Abstract

Background: *monitoring the incidence and surveillance of alert microorganism infections detected in inpatients of the Ospedali Riuniti di Vittoria and Comiso in the year 2023.*
Objectives: *early identification and implementation of shared pathways aimed at prevention and control of care-related infections. the spread of colonization and infections; promotion and implementation of effective risk assessement programs.*
Methods: *the prevalence and multicenter study was conducted on n.79 patients with infections with Alert microorganisms, in ordinary hospitalization, day service and day hospital, of the "R. Guzzardi" hospitals of Vittoria and "R. Margherita" of Comiso. Sample stratification was performed according to gender, females 51.9% and males 48%, and the four age groups: 18-40 (4.8%), 41-60 (9.5%), 61-80 (45.2%), >80 (40.5%), $\bar{x}$ 51.90. The calculated mortality rate was n.16 (20.25%). The types, number and frequency of use of invasive devices were described (n.68, 86%, including 64.5% urinary bladder catheter).*
Results: *the operating unit in which there is significant positivity to Alert infections is the UOC of Internal Medicine (40.5%), followed by RSA (16.46%) and ICU (8.86%), table 1. The most representative Alert is Acinetobacter baumannii (24.05%), other microorganisms isolated are Klebsiella P. (22.78%), Escherichia c. (21.52%), and Staphylococcus A. (18.99%). In addition, a significant correlation between microorganism and sample type was found (p=0.019). Inpatient days are proportional to the care complexity index (p=0.0021). In addition, there is no correlation between inpatient days and microorganism type.*
Conclusions: *the reduction of inpatient time and the move toward territorial continuity of care will promote the community spread of selected antibiotic-resistant bacteria in the hospital. Surveillance measures include early identification of patients positive to Alerts, active follow-up of colonized patients, isolation of colonized/infected patients, and adoption of contact precautions in the management of such patients.*

Introduction

Antibiotic resistance (antimicrobial resistance, AMR), designated by the World Health Organization (WHO) as one of the global priorities requiring urgent multisectoral actions, represents one of the major risks to human health. Among the multiple multimodal strategies implemented in global health scenarios include the "One Health" approach, aimed at designing and prospecting integrated programs that will allow health threats to be addressed with a holistic view.

Among the main culprits for the emergence and spread of AMR is the recognized overuse and misuse of antibiotics, which leads to a significant increase in the incidence of hospital mortality from Care-Related Infections (CRIs). Prevention and control of CRIs in all care settings are essential interventions to reduce the impact of these infections and, more generally, to reduce the spread of antibiotic-resistant microorganisms in every care setting. Well then, the need arises to structure protocols for each type of care unit. In fact, with a view to benchmarking, the Medical Directorate

of the Ospedali Riuniti di Vittoria e Comiso, to which the CRIs control operations group belongs, has implemented several projects to combat AMR, each with differentiated objectives: approval and sharing of standardized tools, such as presidium procedures. Epidemiological characteristics of CRIs, invasive procedures used, timeliness of laboratory analysis in providing responses to requested culture tests, and alert responsible microorganisms were identified. In addition, antibiotic consumption was monitored, and lastly, the clinical outcomes of the patients under study were analyzed. The most frequently used molecules were Meropenem (26.2%), Linezolid (14.3%) and Tigecycline (10.7%). General objective is to contain the risk of infection and implement appropriate protective measures to health professionals involved in care processes. Other strategies aim at the early identification of individual cases of colonization/infection by microorganisms, termed sentinel (or alert), which re-

quire immediate reporting to surveillance bodies; interventions to ensure spatial/functional isolation of patients with infectious pathology; target-therapy of CRIs-positive patients in order not to compromise their general clinical picture; planning and implementation of training programs aimed at all health professionals; and awareness campaigns to patients and caregivers.

MATERIALS AND METHODS

The multicenter study was conducted on 79 patients with infections with Alert microorganisms, in ordinary hospitalization, day service and day hospital, of the "R. Guzzardi" hospitals of Vittoria and "R. Margherita" of Comiso. The average hospital stay of the sample was 28.95%.

The prevalence survey was conducted both by examining the computerized medical records of the Network Sanitario "Agile" system and by on-site audits, on occasions of which it was possible to ascertain the implementation of the operational instructions of the procedure, such as isolation of the patient, modulation of antibiotic therapy, depending on the outcome of the antibiogram, observance of good clinical-care practices.

Sample stratification was performed according to gender, females 52% and males 48%, and the four age groups: 18-40 (4.8%), 41-60 (9.5%), 61-80 (45.2%), >80 (40.5%), x̄ 51.90. The calculated mortality rate was 16 (20.2%). The types, number and frequency of use of invasive devices (n.68, 86%, of which 64% urinary bladder catheter) were described, and the data obtained were correlated with CRIs since many of them are associated with their use.

RESULTS:

The prevalence rate was assessed for:
- operating unit.
- presence of invasive procedures: urinary catheter for urinary infections (66.23%), surgical wound for site infections (18.18%), other invasive procedures (15.58%).
- antibiotic use and antibiotic resistance profile of etiologic agents.
- effectiveness of the CRIs control program.

Statistical findings reveal no correlation between department and microorganism. The operating unit in which there is significant positivity for Alert infections is the UOC of Internal Medicine (40.5%), followed by RSA (16.46%) and ICU (8.86%), Table 1. The most representative Alert is Acinetobacter baumannii (24.05%), other microorganisms isolated are Klebsiella P. (22.78%), Escherichia c. (21.52%), and Staphylococcus A. (18.99%). In addition, a correlation between microorganism and sample type is confirmed (p=0.019). Days of hospitalization are proportional to the care complexity index (p=0.0021). In addition, there is no correlation between inpatient days and microorganism type (Figure 1).

Table 1.

Summary of characteristics of 79 AMR patients, % in brackets.

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Age, yrs	48.29 (27.87)
Gender, F	41 (51.90)
UO	
ANESTESIA RIANIMAZIONE	7 (8.86)
CARDIOLOGIA	3 (3.8)
CHIRURGIA VASCOLARE	9 (11.39)
KG	1 (1.27)
KV	4 (5.06)
FISICA E RIABILITATIVA	1 (1.27)
MEDICINA INTERNA	25 (31.65)
NEUROLOGIA	3 (3.8)
ORTOPEDIA	1 (1.27)
RIABILITAZIONE	1 (1.27)
RIANIMAZIONE	4 (5.06)
RSA	13 (16.46)
Days of hospitalization	27.33 (28.95)
Sample type	
ASPIRATO BRONCHIALE	8 (10.13)
EMOCOLTURA	9 (11.39)
ALTRO	11 (13.92)
TAMPONE FERITA	15 (18.99)
URINA	19 (24.05)
URINOCOLTURA	17 (21.52)
Alert isolated antibiotic therapy	
ACINETOBACTER B	19 (24.05)
ESCHERICHIA COLI	17 (21.52)
KLEBSIELLA PNEUMONIAE	18 (22.78)
OTHERS	10 (12.66)
Staphylococcus Aureus	15 (18.99)
INVASIVE PROCEDURE	
CVU	51 (66.23)
FCH	14 (18.18)
Other	12 (15.58)
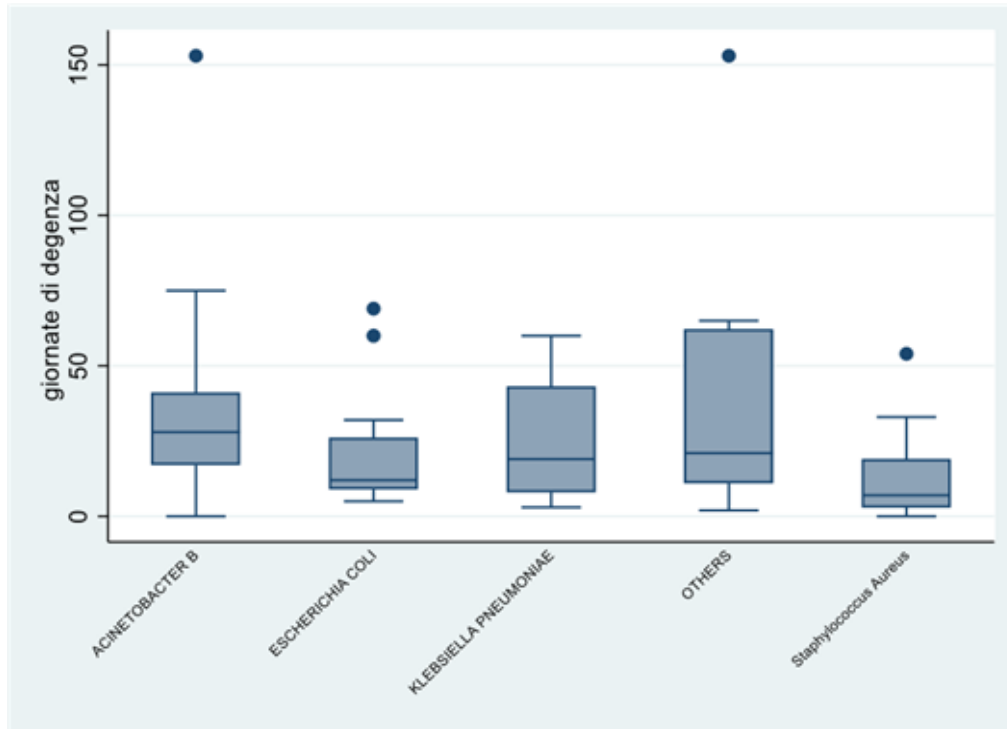
Figure 1. *Days of hospitalization not associated with the type of microorganism*

DISCUSSIONS

Surveillance is considered the key component to identify significant rates of CRIs and obtain data on specific care practices (invasive procedures, antibiotic use) as well as to enable the identification of a prevention and control program in order to reduce the incidence of hospital infections. Therefore, the study conducted, due to the information of the data obtained, concretely provides a predictive character geared toward future improvement of clinical governance. The reduction of inpatient time and the move toward territorial continuity of care will promote the community spread of selected antibiotic-resistant bacteria in the hospital. Surveillance measures include early identification of patients positive to Alerts, active follow-up of colonized patients, isolation of colonized/infected patients, and adoption of contact precautions in the management of such patients. The implementation of infection control protocols and the proper use of antibiotics are certainly useful tools, however, not sufficient to achieve the set goals. In fact, concrete actions are needed through an active participation of the Antimicrobial Stewardship team that is engaged on a daily basis in the implementation of shared strategies. In conclusion, the effort devoted to this study is intended to be a moment of reflection and awareness to enact changes.

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