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IMPLEMENTING AN ANTIMICROBIAL STEWARDSHIP PROGRAM AND COMPLETE SCREENING IN AN INTENSIVE CARE UNIT IN RELATION TO THE OVERALL CLINICAL OUTCOME OF PATIENTS

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ABSTRACT

Background: The high prevalence of resistant microorganisms indicates a multidisciplinary approach, which will ensure efficiency and balance between resistance therapy of choice and the implementation of an antimicrobial stewardship (AMS) program in intensive unit care (ICU).

Objectives: The objectives are based on the assessment of AMS in a cardiac surgical intensive care unit (CICU), by determination with the reduction of: inotropic support, length of antibiotic treatment, and need for renal replacement therapy (RRT).

Material and methods: The research is a retrospective, group comparative, analytical cross-sectional study, in the period from 2020-2023, within the Cardiosurgery department, at Acibadem Sistina. 1277 patients participated in the research, divided into two groups: group 1 (2020-2021) and group 2 (2022-2023). Primary endpoints investigated: inotropic support, need for RRT and length of antibiotic treatment. Secondary endpoints investigated: optimization of antibiotic therapeutic regimen and clinical outcome assessment of patients (survival).

Results: The inotropic support during 24, 48 and 72 h was statistically significantly lower in group 2. A statistically significant shorter length of time for antibiotic treatment was determined in patients in group 2 (p=0.000), as well as a lower value of the need for RRT. A statistically significant difference in time to event (fatal outcome) was determined between the two groups (p=0.000). A significant difference (p=0.000) was determined in the prescription and optimization of the therapeutic regimen.

Conclusion: Integrating AMS, initial comprehensive microbiological screening and application of biomarkers in the CICU, established appropriately, will result in improved overall clinical outcome for patients.

Keywords: antimicrobial resistance, AMS in CICU, microbiological screening, biomarkers, Acibadem Sistina

BACKGROUND

The concept of antimicrobial stewardship essentially represents the practical, judicious use of antimicrobial agents. The goal is based on minimizing the negative outcomes of the prescribed antimicrobial agents through the optimization of the treatment of bacterial infections in order to reduce the resistance to pathogenic agents. The vital importance of antimicrobial stewardship, above all, refers to the screening carried out in order to timely diagnose the origin and classification of infections. AMS is a structured initiative that encourages the judicious utilization of antimicrobial agents, including antibiotics, to enhance patient outcomes, diminish microbial resistance, and contain the spread of infections caused by multi-resistant organisms. AMS program is effective in enabling healthcare providers to improve clinical outcomes and minimize negative effects by promoting better antibiotic prescription practices. ICU clinicians who are part of the AMS have a role in deciding whether critically ill patients really need antimicrobial agents. If so, through an initial microbiological screening, the principles are based on choosing the most appropriate antimicrobial drug by determining the dose, method and length of therapy. All this is based on two related goals: optimization of prescribed therapy and minimizing the risk of its side effects [1].

The colonization rates of resistant microorganisms and confirmed infections in the ICU, record high values, analogously to what persists at the same time a high rate of antibiotic use. Reducing the use of broad-spectrum antibiotics will have a direct impact on reducing the rate of resistance. These facts, again, rely on the crucial importance of the use of AMS, which significantly affects the reduction of the irrational use of antibiotics during the initial antibiotic treatment in the ICU [2].

It is crucial to highlight the ongoing progress in the management of critically ill patients in the ICU, using biomarkers to guide antimicrobial treatment, which is essentially the focus of AMS. There are numerous observational studies and randomized clinical trials in adult patient populations for biomarker-guided antimicrobial treatment. The results of these investigations place a major emphasis on procalcitonin (PCT), C-reactive protein (CRP) and presepsin, which are already part of AMS and delegate the antimicrobial therapeutic regimen in ICU patients [3-5].

At the same time, targeted (definitive) therapy, based on precise diagnosis with the help of microbiological diagnostic tests, as part of a completely conducted microbiological screening in the ICU, represents a crucial option for antimicrobial treatment oriented towards the pathogenic agent in the ICU. In fact, it represents an invaluable opportunity for effective antimicrobial stewardship of ICU patients [6].

The implemented AMS within the ICU aims at the appropriate practice of recommendations for prescribing antimicrobials established on evidence-based medicine in order to prevent overuse of antibiotics and thus antimicrobial resistance. In fact, there are strictly defined clinical situations in which prolonged antibiotic therapy is useful and indicated. Conversely, a prolonged antibiotic course is associated with an increased rate of resistance, high hospital treatment costs, as well as side effects of the therapy [7].

In the context of applied antibiotic therapy in the ICU, especially if it is carried out in a prolonged course, most published studies confirm the correlation of an increased rate of MDR [8-9]. In fact, it is necessary to adopt strategies to minimize the use of broad-spectrum antibiotics, as well as their timely administration in order to reduce the resistance rates.

Precisely because of this, the key role for the application of strategies for the rational application of antimicrobial agents within the ICU is emphasized, which in their domain include: early de-escalation of therapy, monitoring of serum levels of antimicrobial agents, monitoring of the duration of implemented antibiotic regimen and prevention of MDR colonization [10]. It concludes with the fact that as part of AMS, it is necessary to establish local strategies that will promote and ensure timely administration of appropriate antibiotic treatment in order to improve the clinical outcome of patients, as well as to reduce the length of hospitalization.

MATERIALS AND METHODS

The research is a retrospective, group comparative, analytical cross-sectional study, in the period from year 2020-2023, within the Cardiosurgery department, at the Clinical Hospital Acibadem Sistina. 1,277 adult patients were included in the research, after cardiac surgery and admission to the CICU. The investigated patients were divided into two groups: 636 (49.80%) patients – group 1 (year 2020-2021) and 641 (50.20%) patients – group 2 (year 2022-2023). Data on the subjects included in the study, and related to the clinical postoperative follow-up as part of the AMS in the CICU, were recorded in pre-prepared forms including: laboratory-biochemical parameters, microbiological analyses, drug allergy and glomerular filtration rate (GFR). The Medicines Management Committee at Acibadem Sistina Clinical Hospital developed an AMS program to address the problem of irrational antibiotic use and misuse. The strategy involves several critical activities, including the formation of an antimicrobial stewardship committee, the introduction of a policy for the use of antimicrobial stewardship programs, the active involvement of a multidisciplinary team in assessing antimicrobial treatment, the promotion of delayed strategies for prescribing antimicrobial therapy, the reduction of therapy duration where possible, personalized treatment based on pharmacokinetic and pharmacodynamic patient characteristics, and the implementation of pragmatic studies and internal processing of available databases for a precise approach to patient complications and clinical outcomes. This study provides an evaluation of the outcomes resulting from the strategy and activities undertaken as part of the AMS program. We identified an AMS-Committee multidisciplinary team, including clinical infectious disease specialist, clinical microbiologist, hospital pharmacist and infection prevention and control nurses. The AMS-Committee implemented the following major interventions: education and training medical staff at the Acibadem Sistina Clinical Hospital in the prescription of antibiotic prophylaxis, empiric and definitive antibiotic therapy in accordance with the relevant protocols, creation of a standardized medical record with a form for daily monitoring of antibiotic therapy, and revision of the initial microbiological screening.

The medical record used to track antibiotic therapy contains the following information: review of patients who are receiving antibiotic therapy for proper indication, review of patients who have been prescribed three or more broad spectrum antibiotics, overview of basic microbiological and laboratory parameters, review of the prescribed antibiotic dose according to the laboratory parameters. Compliance with the relevant protocols was assessed during the audits. Primary endpoints that were investigated in order to evaluate the effectiveness of the implemented AMS in the CICU were based on the reduction of: need for inotropic support, need for RRT and length of the antibiotic treatment, against secondary endpoints related to optimization of antibiotic therapeutic regimen and clinical outcome assessment of patients (survival). The data analysis was performed in the statistical programs: Statistica 7.1 for Windows and SPSS Statistics 23.0. In the analysis of series with attributive features (inotropic support - 24, 48 and 72 h, need for RRT) percentages of structure (%) were determined. The differences in the series with attributive marks between the two groups of patients were tested using the Pearson Chi-square test / Monte Carlo Sig.(2-sided) (p), Fisher Exact test / Monte Carlo Sig.(2-sided) (p), Fisher Exact test / Exact Sig. (2-sided) (p). Descriptive Statistics (Mean; Std. Deviation; ±95.00%CI; Median; Minimum; Maximum) were made for the series with numerical marks (length of antibiotic treatment), while the differences between the two groups of patients were tested with the Mann-Whitney U test (Z/p). The data distribution was tested with: Kolmogorov-Smirnov test; Lilliefors test; Shapiro-Wilks test (p). The data related to the survival time of the patients from both groups were analyzed with Kaplan Meier analysis (Log Rank (Mantel-Cox) test. A significance level of $p<0.05$ was used to determine statistical significance.

ETHICS APPROVAL

All methods used in the study were in accordance with the international guidelines, with the standards of the Helsinki Declaration of 1975, revised in 1983 and approved by Ethics commission from Clinical Hospital Acibadem Sistina.

RESULTS

Post interventional inotropic support in the CICU

The results shown in Table 1 refer to the distribution of patients in terms of inotropic support at CICU admission in both groups, 24, 48 and 72 hours postoperatively.

Of a total of 636 patients in group 1 (2020-2021), 224 (35.2%) had no inotropic support 24 hours postoperatively, and 412 (64.8%) had inotropic support 24 hours postoperatively. Of a total of 641 patients in group 2 (2022-2023), 268 (41.8%) had no inotropic support 24 hours postoperatively, and 373 (58.2%) had inotropic support 24 hours postoperatively. For Pearson Chi-Square = 5.853 and $p<0.05$($p=0.016$) there is a significant difference in the distribution of patients regarding inotropic support between the two groups, 24 hours postoperatively.

Of the total of 636 patients in group 1 (2020-2021), 268 (42.1%) had no inotropic support 48 hours postoperatively, and 368 (57.9%) had inotropic support 48 hours postoperatively. Of the total of 641 patients in group 2 (2022-2023), 311 (48.5%) had no inotropic support 48 hours postoperatively, and 330 (51.5%) had inotropic support 48 hours postoperatively. For Pearson Chi-Square = 5.243 and $p<0.05$ ($p=0.022$)

there is a significant difference in the distribution of patients regarding inotropic support between the two groups, 48 hours postoperatively.

Of the total of 636 patients in group 1 (2020-2021), 420 (66.0%) had no inotropic support 72 hours postoperatively, and 216 (34.0%) had inotropic support 72 hours postoperatively. Of the total of 641 patients in group 2 (2022-2023), 528 (82.4%) had no inotropic support 72 hours postoperatively, and 113 (17.6%) had inotropic support 72 hours postoperatively. For Pearson Chi-Square = 44.531 and p<0.001(p=0.000) there is a significant difference in the distribution of patients regarding inotropic support between the two groups, 72 hours postoperatively.

Table 1. *Distribution of patients with respect to inotropic support at CICU admission in both groups, 24 hours, 48 hours and 72 hours postoperatively*

		Group				Total	
		2020-2021		**2022-2023**			
		Count	%	Count	%	Count	%
Inotropic support 24h	Yes	412	64.8%	373	58.2%	785	61.5%
	No	224	35.2%	268	41.8%	492	38.5%
	Total	636	100.0%	641	100.0%	1277	100.0%
Inotropic support 48h	Yes	368	57.9%	330	51.5%	698	54.7%
	No	268	42.1%	311	48.5%	579	45.3%
	Total	636	100.0%	641	100.0%	1277	100.0%
Inotropic support 72h	Yes	216	34.0%	113	17.6%	329	25.8%
	No	420	66.0%	528	82.4%	948	74.2%
	Total	636	100.0%	641	100.0%	1277	100.0%

Need for RRT

The results shown in Table 2 refer to the need for RRT in both groups. Out of the total of 636 patients in group 1 (2020-2021), 608 (95.6%) did not need RRT, and 28 (4.4%) did. Out of the total of 641 patients in group 2 (year 2022-2023), 631 (98.4%) did not need RRT, and 10 (1.6%) did. For Pearson Chi-Square = 8.934 and p<0.01(p=0.003) there is a significant difference in the need for renal replacement therapy between the two groups.

Length of antibiotic treatment

Table 3 and Graph 1 show descriptive statistics of length of antibiotic treatment in both groups. In group 1, the length of antibiotic treatment varied in the interval 8.10±5.08 days, ±95.00% CI: 7.71-8.50; the median is 7 days, the minimum antibiotic treatment is 3 days, and the maximum antibiotic treatment is 53 days. In group 2, the length of antibiotic treatment varied in the interval 4.17±1.25 days, ±95.00% CI: 4.07-4.27; the median is 4 days, the minimum

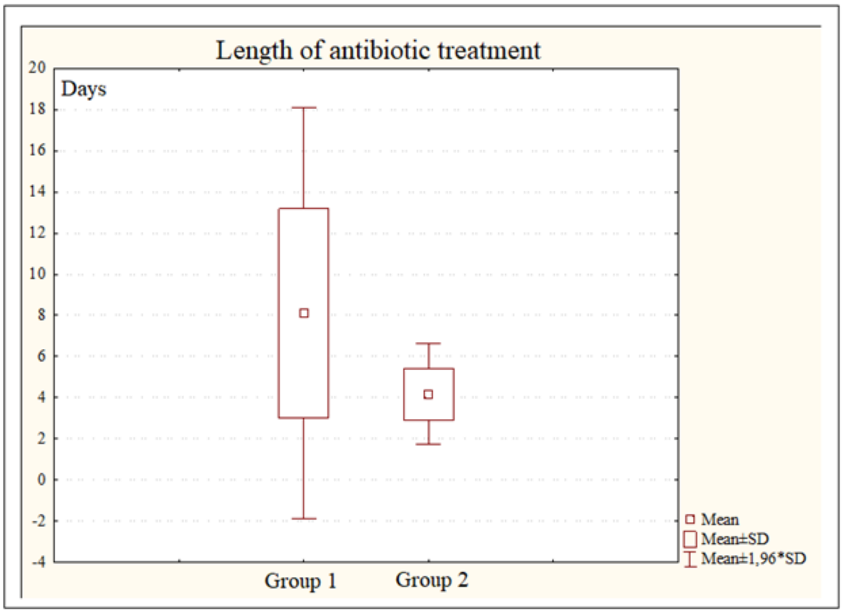
Table 2. *Need for renal replacement therapy in both groups of patients*

			Need for renal replacement therapy		Total
			No	Yes	
Group	2020-2021	Count	608	28	636
		%	95.6%	4.4%	100.0%
	2022-2023	Count	631	10	641
		%	98.4%	1.6%	100.0%
Total		Count	1239	38	1277
		%	97.0%	3.0%	100.0%

antibiotic treatment is 2 days, and the maximum antibiotic treatment is 11 days. For Z = 27.00 and p<0.01(p=0.00) patients from group 1 have a significantly longer length of antibiotic treatment than patients from group 2 (Table 3).

Table 3. *Descriptive statistics and difference in length of antibiotic treatment in both groups*

Length of antibiotic treatment	Valid N	Mean	Confidence -95.00%	Confidence +95.99%	Median	Minimum	Maximum	Std. Dev.
Group 1	636	8.10	7.71	8.50	7	3	53	5.08
Group 2	641	4.17	4.07	4.27	4	2	11	125
Difference in length of antibiotic treatment between the two groups of patients								
Variable	Rank Sum Group 1	Rank Sum Group 2	U	Z	p-level	Valid N Group 1	Valid N Group 2	
Length of antibiotic treatment	582051.5	233951.5	28190.5	27.00	**0.00**	636	641	



Graph 1. *Graphic display of descriptive statistics of length of antibiotic treatment in both groups*

Optimization of antibiotic therapeutic regimen

In Table 4, the results shown refer to the group of antibiotics prescribed to patients in group 1 and group 2. Of the 636 patients in group 1 (2020-2021), 501 (78.8%) were given empiric antibiotic therapy, 76 (11.9%) were treated with definitive antibiotic therapy, 33 (5.2%) were given a combination of three or more antibiotics and empiric antibiotic therapy, while 26 (4.1%) patients were given a combination of three and more antibiotics and definitive antibiotic therapy. Of the 641 patients in group 2 (2022-2023), 179 (27.9%) were given empiric antibiotic therapy, 461 (71.9%) were treated with definitive antibiotic therapy, and 1 (0.2%) patient was given a combination of three or more antibiotics and definitive antibiotic therapy. For Pearson Chi-Square = 484.637 and p<0.001(p=0.000) / Monte Carlo Sig. (2-sided) / 0.000 – 0.000 / there is a significant difference in the group of antibiotics prescribed for patients in group 1 and group 2 (Table 4).

Table 4. *Distribution by prescribed group of antibiotics among patients in both groups*

Group		Group of antibiotics				Total
		Empiric antibiotic therapy	Definitive antibiotic therapy	Three or more antibiotics and empiric antibiotic therapy	Three or more antibiotics and definitive antibiotic therapy	
2020-2021	Count	501	76	33	26	636
	%	78.8%	11.9%	5.2%	4.1%	100.0%
2022-2023	Count	179	461	0	1	641
	% a	27.9%	71.9%	0.0%	0.2%	100.0%
Total	Count	680	537	33	27	1277
	%	53.2%	42.1%	2.6%	2.1%	100.0%

Clinical outcome assessment of patients (survival)

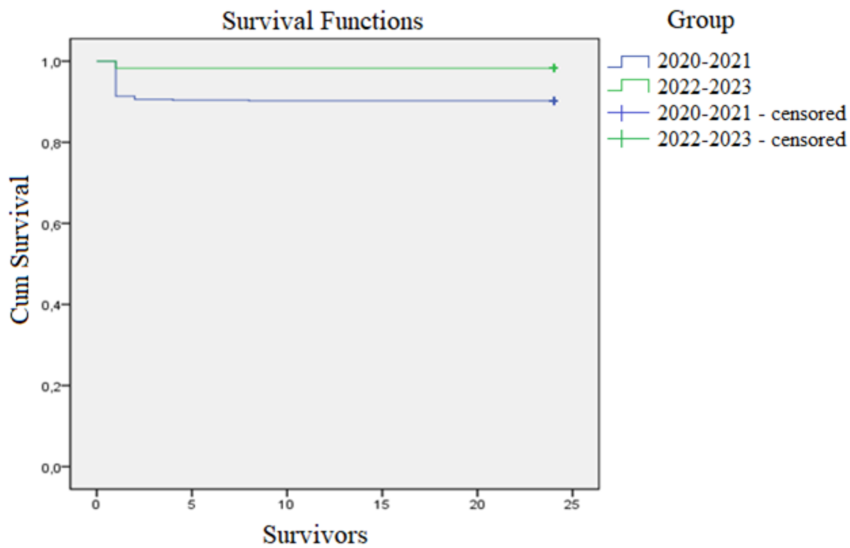
The results shown in Table 5 refer to the average operated patient survival in both groups.

In group 1 (2020-2021), out of the total of 636 operated patients, 62 (9.7%) had a fatal outcome, and 574 (90.3%) remained alive. The average survival in group 1 (2020-2021), ranged in the interval 21.78±0.27 months, ±95.00%CI:21.26-22.31.

In group 2 (2022-2023), out of the total of 641 operated patients, 11 (1.7%) had a fatal outcome, and 630 (98.3%) remained alive. The average survival in group 2 (2022-2023), ranged in the interval 23.61±0.19 months, ±95.00%CI:23.37-23.84.

Table 5. *Kaplan-Meier average operated patient survival in both groups*

Group	Total N	N of Events	Censored		Mean[a]			
			N	Percent	Estimate	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
2020-2021	636	62	574	90.3%	21.781	.268	21.256	22.307
2022-2023	641	11	630	98.3%	23.605	.118	23.374	23.837
Overall	1277	73	1204	94.3%	22.697	.148	22.406	22.987
Difference in time to the event (survival period) between the two groups of operated patients								
			Chi-Square		df		Sig.	
Log Rank (Mantel-Cox)			38.178		1		**.000**	



Graph 2. *Graphic display of difference in time to event (survival period) between the two groups of operated patients*

For Log Rank (Mantel-Cox) / Chi-Square = 38.18 and p<0.001(p=0.000) there is a significant difference in the time to the event between the two groups of operated patients (Table 5 and Graph 2).

DISCUSSION

In general, the AMS implemented in the ICU setting with applied complete microbiological screening promotes the appropriate use of antimicrobial agents by: improving the clinical outcome of patients, reducing the resistance of microorganisms and reducing the spread of infections caused by MDR. In the scope of this research, the implementation of AMS in the CICU and the implementation of a complete microbiological screening were applied in order to ensure the appropriate early identification of all potentially pathogenic agents, based on which an appropriate therapeutic regimen will be implemented with minimal susceptible changes that will directly affect the reduction of the resistance rate. The appropriate therapeutic regimen, implemented in a timely manner, will affect the timely reduction of inflammatory biomarkers and the systemic inflammatory response of the body after the cardiosurgical intervention. As for the total length of antibiotic treatment, exactly the timely administrated therapy that corresponds to the microbiological screening, carried out according to all the appropriate guidelines mandated by the AMS itself, is expected to be administered in the minimum time frames that would bring the infection under control, while establishing the eradication of pathogens and simultaneously reducing resistance rates.

This research also provided an overview of the post-intervention inotropic support in the CICU, during initial admission within the CICU, in both groups of patients. A comparison was made of the post-interventional course and the need for inotropic support in patients during 24, 48 and 72 hours, postoperatively. When comparing patients in both groups, during 24 hours postoperatively, a statistically significant difference (p=0.016) was obtained, regarding the need for inotropic support. Consequently, with respect to inotropic support during 48 hours postoperatively, the percentage of patients who did not require inotropic support was significantly increased. Namely, in group 1, 42.1% of patients did not need inotropic support 48 hours postoperatively, compared to group 2, in which the percentage of patients was 48.5%, as a result of which a significant statistical difference was determined (p=0.022), in terms of the inotropic support between the two groups, 48 hours postoperatively.

As for the distribution of patients in terms of inotropic support 72 hours postoperatively, within our research we determined a significant statistical difference. Out of the total of 636 patients who participated in group 1, 66.0% were patients who did not have inotropic support 72 hours postoperatively, while out of the total of 641 patients who were included in our research in the domain of group 2, the percentage of patients who did not need inotropic support 72 hours postoperatively records a significant 82.4%. Precisely because of this, in the postoperative 72 hours within the CICU, a significant statistical difference was determined (p=0.000). The results of our research correspond with the results of the literature [11].

In our research, the subject of processing was as well the analysis of the need for RRT among patients in both groups, respectively. In fact, as a result of implementing AMS, mandatory adjustment of doses according to GFR, limitation in prescribing a combination of two or more antibiotics, through daily monitoring of patients renal function and the level of inflammatory markers, we can effectively prevent acute renal failure caused by improper ly administered dosage regimen. All these facts are also confirmed in our research through confirmed statistically significant difference (p=0.003), in terms of the need for RRT in both groups. The results were confirmed by a significant reduction in the percentage of patients who needed RRT, from 4.4% in group 1 to 1.6% in group 2, respectively. The results of our research are consistent with the results published in the literature [12-13].

Regarding the length of antibiotic treatment in both groups, within the framework of this research we confirmed that the length of the same in group 1 varies in the interval 8.10±5.08 days, compared to group 2 in which the average values vary in the interval 4.17±1.25 days. The median of this determinant in group 1 is 7 days, compared to group 2 in which it records a value of 4 days. And in this segment of our research, we confirmed a significant success by almost double reduction of the length of antibiotic treatment in both groups. In fact, for Z=27.00 and (p=0.00) we statistically significantly confirmed that patients from group 1 have a significantly longer length of antibiotic treatment compared to patients from group 2. Again and in this segment the essential importance of AMS is confirmed within CICU [14-16], whose primary goal lies in the appropriate practice of the recommendations for prescribing antibiotic therapy established on evidence-based medicine in order to prevent their excessive use.

As for the group of antibiotics that was prescribed to the patients in this study, there is a significant difference (p=0.000) between patients in group 1 and group 2. In fact, the significant difference between the two groups of subjects is due to the initial complete microbiological screening. The effectiveness of its implementation during the initial admission of patients is confirmed precisely by the results of this research. In group 1, the percentage of empirically administered therapy is 78.8% and basically reflects a situation in which the patients were subjected only to a basic screening – nose and throat swab. The situation has completely changed and confirmed with convincing results, where 71.9% administered definitive therapy in group 2 represents a real proof of the effectiveness of the implementation of the complete microbiological MRSA, ESBL and CRE screening, during the initial admission of patients [15, 17-19]. In fact, as a result of the fully applied screening as part of AMS within the framework of this research, we have enabled early detection and complete insight into the entire range of potential pathogens, as well as earlier colonization of patients. First of all, this fact is extremely important when it is basically a question of patients who should be subjected to an appropriate type of intervention, in our case – a cardiosurgical type of intervention that requires treatment in the CICU, which represents another risk factor for the progression of the clinical condition of the patients. Compared to the literature, the efficiency of the conducted complete microbiological screening and emphasizing its importance, primarily within the ICU, allows timely implementation of targeted (definitive therapy). This fact represents an invaluable opportunity for effective antimicrobial management of patients in the ICU. These steps will contribute to the effective reduction of the length of empirical therapy for patients in the ICU, which in this study is the case with the second group of patients in which the percentage of the same is drastically reduced and amounts to 27.9%.

In our study, we performed a Kaplan-Meier analysis of the survival time of patients in both groups. In doing so, we determined that the average survival in group 1 (year 2020-2021) varies in the interval 21.78±0.27 months, compared to group 2 (year 2022-2023) in which there is a variation in the interval 23.61±0.19 months. Due to the obtained research results, we determined that there is a significant difference in the time to the event (fatal outcome) between the two groups of patients (p=0.000). In fact, we are generally talking about the effect of implemented AMS and fully implemented microbiological screening at the initial admission of patients, on the overall final clinical outcome of patients. Its primary goal is based precisely on a desired successful clinical treatment that will in itself give a positive clinical outcome by reducing mortality rates, first of all within the CICU, and then on a long-term plan. Through timely detection of potential pathogens, timely and narrow-spectrum empiric therapy, appropriate targeted therapy, established control of inflammatory markers and systemic inflammatory response after cardiac surgery, as basic principles delegated by AMS, we strive to achieve a successful clinical outcome that will primarily reduce the existing high mortality rate within the CICU. In fact, the results of our research correlate with the results of the literature [20], which evaluated the impact of de-escalation of antimicrobial therapy on mortality, as one of the basic principles of AMS, which prefers as short as possible courses of therapy and early de-escalation. At the same time, conclusions of a similar nature [21] have been documented, confirming that there is no increased mortality rate when antimicrobial de-escalation is implemented in AMS-led treatment of general infections in the ICU setting. The results in our study are consistent with those of clinical studies in which the emphasis is placed on the choice of the initially administered antibiotic regimen as a key determinant affecting the mortality rate of patients in the ICU setting. Precisely the correlation in our case, is based on the fact that, with timely and appropriately implemented initial antibiotic therapy as part of the AMS guidelines within group 2 patients, we achieved a reduction in the mortality rate within the CICU [22-23].

CONCLUSION

From the previously presented facts, we can conclude that the implementation process of AMS within CICU is extremely important. Part of it, of great importance and potential, is the completely implemented microbiological screening with the aim of: timely detection of all potential pathogenic agents, timely implemented definitive therapy, shortening of length of antibiotic regimen and finally shortening of the total length of hospitalization in the CICU and the total length of hospitalization of patients. It is crucial to highlight the current advances in the management of critically ill patients in the CICU, using biomarkers to guide antimicrobial treatment, which is essentially the focus of AMS. All three key points emphasized in our research: implemented AMS in the CICU, initial comprehensive microbiological screening and application of biomarkers, established in an appropriate manner will result in improved overall clinical outcome for patients, reduced CICU patients stay and total patients hospitalization, reduced duration of antibiotic regimen, reduced hospital costs, reduction of high rates of antimicrobial resistance and MDR, as well as emphasis on practices for rational application of therapeutic antibiotic regimen.

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Резиме

ИМПЛЕМЕНТИРАЊЕ НА ПРОГРАМА ЗА АНТИМИКРОБНО УПРАВУВАЊЕ И КОМПЛЕТЕН СКРИНИНГ ВО ЕДИНИЦА ЗА ИНТЕНЗИВНА НЕГА ВО ОДНОС НА СЕВКУПНИОТ КЛИНИЧКИ ИСХОД НА ПАЦИЕНТИТЕ

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Вовед: Високата преваленција на микроорганизмите што манифестираат резистентност претставува индикација за мултидисциплинарен пристап, кој ќе обезбеди ефикасност и рамнотежа меѓу терапија од избор во однос на резистенцијата и спроведување програма за антимикробно управување (AMS) во единиците за интензивна нега (ICU).

Цели: Целите на спроведеното истражување се темелат на процена на AMS во единица за кардиохируршка интензивна нега (CICU), преку утврдување во намалување на: инотропната поддршка, должината на антибиотскиот третман, потребата од бубрежна надоместителна терапија (БНТ).

Материјал и методи: Истражувањето претставува ретроспективна, групно споредбена, аналитичка студија на пресек, во период од 2020 до 2023 година, во рамките на одделот Кардиохирургија, при Клиничката болница „Аџибадем Систина". Во истражувањето учествуваа 1277 пациенти поделени во две групи: Група 1 (2020–2021 година) и Група 2 (2022–2023 година). Примарните крајни точки што беа иследувани се: инотропната поддршка, потребата од БНТ и должината на антибиотскиот третман. Секундарните крајни точки во својот домен вклучуваат: оптимизација на антибиотскиот терапевтски режим и процена на клиничкиот исход на пациентите (преживување). Анализата на податоците беше изведена во статистички програми: Statistica 7.1 for Windows и SPSS Statistics 23.0.

Резултати: Инотропната поддршка во текот на 24, 48 и 72 часа беше статистички значајно пониска во Групата 2. Беше утврдена статистички значајна помала должина на антибиотскиот третман кај пациентите во Групата 2 ($p = 0$), како и пониска вредност на потреба од БНТ. Беше утврдена статистички значајна разлика во времето до настан (летален исход) меѓу двете групи ($p = 0$). Утврдена е значајна разлика ($p = 0$) во пропишувањето и оптимизацијата на терапевтскиот режим, преку значајно пониски вредности на пропишаната емпириска терапија во Групата 2, во однос на значајно повисоките вредности на дефинитивната терапија во неа.

Заклучок: Интегрирањето на AMS, иницијалниот комплетен микробиолошки скрининг и примената на биомаркери во CICU, воспоставени на соодветен начин, ќе резултираат со подобрување на севкупниот клинички исход кај пациентите.

Клучни зборови: антимикробна резистенција, програма за антимикробно управување во CICU, микробиолошки скрининг, биомаркери, Клиничка болница „Аџибадем Систина"