UDC: 614-88 YU ISSN 2334-6477

NAUČNI ČASOPIS URGENTNE MEDICINE
SCIENTIFIC JOURNAL OF EMERGENCY MEDICINE
HALO 194

VOL 28 BROJ 2 2022

Izdavač i vlasnik: Zavod za urgentnu medicinu Beograd
Podružnica SLD Zavod za urgentnu medicinu Beograd
Medicinski fakultet Univerziteta u Beogradu
Grad Beograd

„Ne da budemo važni i slavni, već da budemo dorasli vremenu u kome smo i na mestu na kome smo.“

Patrijarh Pavle

Časopis je registrovan kao sredstvo javnog informisanja rešenjem Republičkog ministarstva za informisanje broj 2206 od 22.07.1996. godine. Na zajedničkoj sednici Saveta i Stručnog odbora (SO) Sistema biomedicinskih naučnih informacija Srbije (SBMNIS) održanoj 20.12.1996. godine na Medicinskom fakultetu u Beogradu doneta je lmedeća odluka: Prihvata se časopis „Halo 94“ kao časopis od značaja za sistem BMNI Srbije i kao takav biće indeksiran u domaćoj bazi podataka „Biomedicina Serbica“. Na osnovu mišljenja Ministarstva za nauku i tehnologiju, broj 413-00-430/98-01, Naučni časopis urgentne medicine „Halo 94“ je publikacija od posebnog interesa za nauku i na nju se ne plaća opšti porez na promet.

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NAUČNI ČASOPIS URGENTNE MEDICINE HALO 194

Vol. 28 **Broj 2** **Avgust 2022**

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SCIENTIFIC JOURNAL OF EMERGENCY MEDICINE

Vol. 28 **Number 2** **August 2022**

FOUNDER, OWNER & PUBLISHER
Institution for Emergency Medicine Belgrade, Serbia

SCIENTIFIC JOURNAL OF EMERGENCY MEDICINE

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Reč urednika

Poštovane koleginice i kolege,

U naučnom i uređivačkom odboru Naučnog časopisa urgentne medicine „Halo 194“ preovladava hijerarhija znanja i ideja, a ne zvanja, što može objasniti raznovrstan spektar tema objavljenih radova. Želja svih nas je da autori radova ne budu samo eminentni akademici ili profesori, već i mladi eksperti ili vodeći stručnjaci u regionalnim zdravstvenim ustanovama širom Srbije. Zbrinjavanje urgentih stanja je apsolutni prioritet u svim sistemima zdravstvene zaštite. Urgentna medicina nije skup urgentnih stanja iz raznih oblasti medicine, već je urgentni pristup stanjima koja prete da ugroze život bolesnika.

Specijalizacija iz urgentne medicine ima burnu prošlost: od borbe da se teorija pretoči u praksu, da balansira između preventivne i interventne medicine, da implementira najnovije svetske standarde i da produži liniju života bolesnika. Svi mi, deca urgentne medicine, naučeni smo trima stvarima: da budemo zadovoljni malim a da uvek težimo velikim uspesima i da umemo da zahtevamo ono što želimo. Ipak u besomučnoj borbi za prestižnim mestom na lepezi postojećih specijalizacija, ponekad je potrebno osvrnuti se unazad...Može nas neočenivano dotaći, u besmislenosti naše svirepe svakodnevice, Hipokratova zakletva i, makar na tren, vratiti na zanosni početak, gde smo bili oni pravi mi – doktori medicine...

Poziv koji smo odabrali slomiće neke od nas, i istovremeno primorati ostale da se suoče sa svojim najskrivenijim tajnama, starhovima i snovima. U areni svakodnevne borbe između života i smrti, najbriljantniji doktori hitnih medicinskih pomoći se utrkuju očajnički za najveću profesionalnu nagradu a to je spasen ljudski život. Moto svih nas je da ljudski život nema cenu.

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DOI: 10.5937/halo28-37736
UDC: 616.94:579.841.11-053.31(540)

ORIGINAL ARTICLE

CLINICO-ETIOLOGICAL PROFILE OF NEONATAL SEPSIS AT A TERTIARY CARE HOSPITAL IN SOUTH INDIA

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Santhos KK. Neonatal sepsis. Halo 194. 2022; 28(2):38-44.

Rad primljen: 08 .05.2022.

Prihvaćen: 13.07.2022.

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ABSTRACT

Introduction/Objective Neonatal sepsis is the leading cause of morbidity and mortality among neonates. Neonates are at risk of sepsis due to several immaturities that they possess inherently. Sepsis is classified as early-onset or late-onset neonatal sepsis. Pathogenesis is different in both types. This study aims to determine the pattern of microorganisms causing sepsis and the clinical presentation of neonates admitted with suspicion of sepsis to the Government Kilpauk Medical College Hospital, a tertiary medical care centre.

Methods Descriptive cross-sectional study performed in Government Kilpauk Medical College and Hospital, India.

Results Out of 207 neonates admitted with suspected sepsis, 112 were male and 97 were female. Male to female ratio was 54.1% : 45.9 % (1.2 : 1). On categorizing the newborns based on birth weight, 11 newborns were of very low birth weight, 107 were of low birth weight, 88 had normal birth weight, and one baby weighed more than 4,000 grams. Blood culture was positive in 88 out of the 207 cases (42.51%). Klebsiella was the commonest microorganism causing sepsis (45%) in our Neonatal Intensive Care Unit. Other Gram-negative isolates included Escherichia Coli (31%), Pseudomonas (6%), Enterobacter (1%) and Acinetobacter (2%). The Gram-positive organisms grown were coagulase-positive and coagulase-negative Staphylococci (8%), Group B Beta Hemolytic Streptococcus (5%) and Enterococcus (2%). Late-onset sepsis cases were found to be 1.5 times more common than early-onset sepsis. The best overall sensitivity among Gram-negative isolates was to Imipenem (92%), followed by Amikacin (82.66%) and the best sensitivity among Gram-positive isolates was to Vancomycin (84.61%), followed by Cloxacillin and Ampicillin (61.53%). Out of 88 positive cultures, 6 were multi-drug resistant (6.8%).

Conclusion Acquiring knowledge about the microorganisms causing sepsis in neonates helps prevent morbidity, mortality and the development of antibiotic resistance.

Keywords: neonatal sepsis, antibiotic sensitivity, Klebsiella, low birth weight

Introduction

Sepsis in neonates continues to be one of the leading causes of morbidity and mortality despite the advances in the field of neonatology. Sepsis is a clinical syndrome characterized by the presence of bacteremia along with signs and symptoms of infection and inflammation [1]. Inherent factors like a poorly developed innate immune system, immature skin barrier, mucosal defence mechanisms and blood-brain barrier contribute to the increased susceptibility of neonates to infection. Early recognition and aggressive treatment play a pivotal role in saving the lives of those neonates.

Based on the time of onset, neonatal sepsis is classified as early-onset sepsis and late-onset sepsis. Early-onset sepsis is defined as the occurrence of features of septicemia within the first 72 hours of life and is largely attributed to the perinatal transmission of infection from the mother to the neonate. Therefore, the pattern of microorganisms causing early-onset sepsis are those present in the maternal genital tract, labour room or operating theatre. On the other hand, late-onset sepsis occurs when features of sepsis develop in a neonate older than 72 hours and is predominantly community or hospital-acquired. The pattern of microorganisms causing it are those present in the environment where the neonate is cared for and nursed [2,3]. Recent data published by the World Health Organization (WHO) estimates that 5 million neonates die each year and around a quarter of those deaths are sepsis-related [3]. Data from the National Neonatal Perinatal Database (NNPD, 2002-03) attributes 19% of all neonatal deaths to sepsis [4].

The usual presentation of neonatal sepsis is septicemia, meningitis, pneumonia, rarely septic arthritis and osteomyelitis, and in very few cases a urinary tract infection. Neonatal sepsis is caused by Gram-positive as well as Gram-negative bacteria and rarely by fungus and yeast [5]. Making a clinical diagnosis of neonatal sepsis is very difficult as the symptoms and signs are non–specific and often missed in the early stages. It is therefore required to have a high index of suspicion to identify sepsis and intervene at an early stage.

Antimicrobial agents form the backbone of neonatal sepsis treatment. Supportive management includes maintenance of euthermia, euglycemia and fluid and inotropic support. GM-CSF, G-CSF, blood products and exchange transfusion are other adjuvants that play a key role in affecting the overall outcome of the neonate.

The patterns of microorganisms causing neonatal sepsis vary according to place and time even within the same department [5,6]. Therefore, regular testing of the microbe agents and their sensitivity patterns must be done by the infection control team of the hospital to aid in choosing appropriate antibiotics.

Objective

This study was conducted to determine the microbial pattern and the clinical presentation of neonates admitted with suspicion of sepsis to the Government Kilpauk Medical College and Hospital, a tertiary medical care centre.

Methods

After the approval of institutional ethics committee and the signing of full informed consent by every patient who participated in the study, we performed a descriptive 2-years study in Government Kilpauk Medical College and Hospital, India.

Inclusion criteria: Neonates who satisfied any one of the following criteria:

Neonatal criteria: Neonates showing the under-mentioned signs and symptoms: respiratory distress, apnea or gasping respiration; temperature instability – hypothermia or fever; lethargy; weak cry; the refusal of feeds; vomiting; ileus; abdominal distension; poor peripheral perfusion, bradycardia or tachycardia; more than 10 pustules on the body or purulent umbilical discharge along with periumbilical erythema; neonatal convulsions; irritability; hypotonia; altered sensorium.

Maternal criteria: maternal fever with evidence of bacterial infection within 2 weeks before delivery; rupture of membranes longer than 18 hours; foul smelling discharge; evidence of chorioamnionitis; more than 3 vaginal examinations or one unclean vaginal examination during labour; prolonged labour (sum of the first and second stage of labour lasting more than 24 hours).

Both term and preterm babies irrespective of gestational age and birth weight were included in the study. Newborns belonging to both sexes were included in the study.

Exclusion criteria: Extramural admissions with features of sepsis and those neonates who had priorly received antibiotics.

Blood culture was performed for all neonates suspected to have septicemia. The blood culture sample included a single sample collected from a peripheral vein under aseptic conditions. C-reactive protein estimation and the septic screen were also done as per department policy before administering an empirical antibiotic.

Neonates were classified as clinical sepsis, probable sepsis and proven sepsis based on the case definition described below.

Case definitions

Clinical sepsis: Neonates in whom only clinical features were consistent with sepsis, without laboratory abnormalities or microorganism growth in body fluid cultures.

Probable sepsis: Neonates in whom clinical and laboratory findings are consistent with sepsis but the blood culture is negative. They can be either CRP-positive neonates or neonates who were positive for two haematological parameters.

Proven sepsis: Neonates with positive blood culture or positive cerebrospinal fluid culture or positive culture of other body fluids.

Statistical analysis

All the statistical analysis in this study was performed by using the SPSS software version 17.0 package. Statistical tools such as the chi-square test, independent t-test and one-way analysis of variance (ANOVA) were used in the analysis. A P-value of <0.05 is considered statistically significant.

Results

This study included 207 neonates with suspected sepsis admitted to the newborn department of the hospital. Sepsis workup was done for all the neonates, including blood culture, CSF culture (wherever indicated), tests for indirect evidence of infection like C-reactive protein (CRP), and haematological indicators such as peripheral blood smear studies for abnormal WBC counts, immature to mature leukocytes ratio (IT ratio) and the presence of toxic granules in neutrophils. Based on the sepsis screen results, the diagnosis was categorized into 3 categories.

Table 1. Categories of neonatal sepsis

Classification	No. of neonates	%
Clinical	67	32.4
Probable	52	25.1
Proven	88	42.5

Of the 207 neonates admitted with suspected sepsis, 112 were male and 97 female. Male to female ratio was 54.1% : 45.9 % or 1.2 : 1. On categorizing the newborns based on birth weight, 11 babies were of very low birth weight, 107 were of low birth weight, 88 babies were of normal birth weight and one baby weighed more than 4000 grams. (**Table 2**)

Blood culture was positive in 88 out of the 207 cases (42.51%). Based on their age at the time of clinical presentation, neonates were classified as **early-onset sepsis** (EOS) when the age was less than or equal to 3 days old and as **late-onset sepsis** (LOS) when the neonate was older than 3 days. According to that classification, 34 neonates had EOS and 54 had LOS.

Table 2. Demographic Characteristics

Parameter	No. of neonates (%)
Sex	
Male	112 (54.1%)
Female	97 (45.9%)
Birth weight	
<1500 gm	11 (5.31%)
1500gm to 2500 gm	107 (51.69%)
2500 gm to 4000 gm	88 (42.51%)
>4000 gm	1 (0.48%)
Blood culture	
Positive	88 (42.51%)
Negative	119 (57.49%)
Onset of sepsis	
Early-onset	34 (16.42%)
Late-onset	54 (26.08%)
CRP	
Positive	92 (44.44%)
Negative	115 (55.55%)
Platelet count	
<150000	74 (35.75%)
>150000	113 (54.58%)

Clinical presentation of sepsis

Most of the neonates presented with non-specific symptoms which included lethargy, poor feeding, excessive crying, apnea and temperature abnormalities. Only 12 of them presented with respiratory symptoms, which were diagnosed as pneumonitis. Another 16 neonates presented with seizures, some of which had hypoglycemia and hypocalcemia. The rest of the neonates had other presentations such as ecthyma or gastrointestinal symptoms (abdominal distention, excessive vomiting, blood-stained stools) (**Figure 1**).

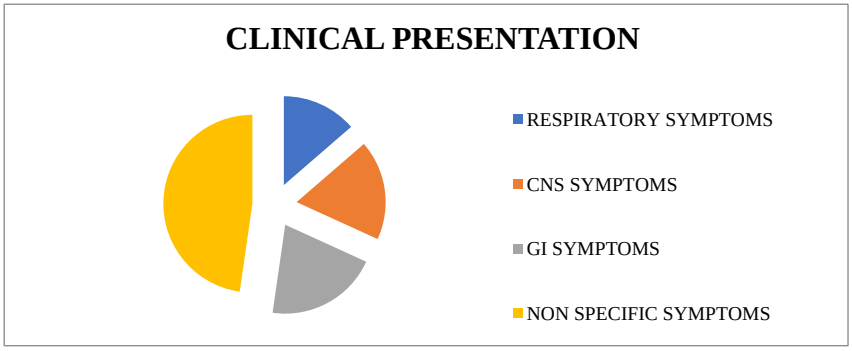

Figure 1. Clinical presentation

Microorganisms causing sepsis and antimicrobial sensitivity patterns

Klebsiella is the commonest microorganism causing sepsis (45%) in our Neonatal Intensive Care Unit. Other Gram-negative isolates included Escherichia Coli (31%), Pseudomonas (6%), Enterobacter (1%) and Acinetobacter (2%) (**Figure 2**).

The best overall sensitivity among Gram-negative isolates was to Imipenem (92%) followed by Amikacin (82.66%) and the best sensitivity among Gram-positive isolates was to Vancomycin (84.61%), followed by Cloxacillin and Ampicillin (61.53%).

Out of 88 positive cultures, 6 were multi-drug resistant (6.8%) (**Figure 3**).

The Gram-positive organisms grown were coagulase-positive and coagulase-negative Staphylococci (8%), group B beta-hemolytic Streptococcus (5%) and Enterococcus (2%) (**Figure 4**). Late-onset sepsis cases were found to be 1.5 times more common than early-onset sepsis.

Out of 88 cases, 34 (38.64%) had early-onset sepsis and 54 (61.36%) had late-onset sepsis (**Figure 5**).

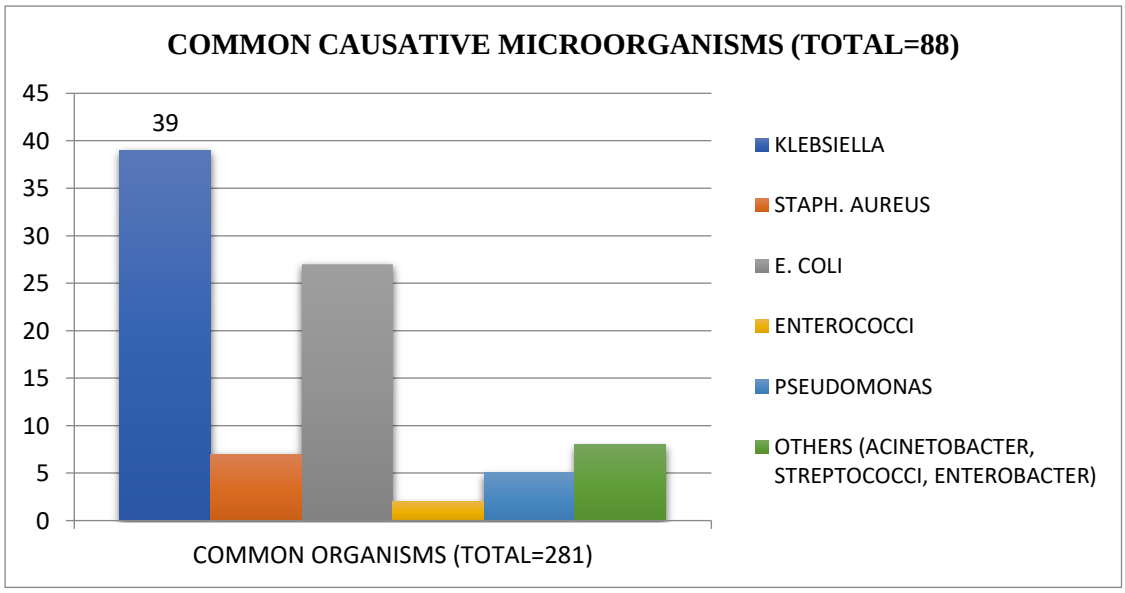

Figure 2. Microorganisms causing neonatal sepsis

ANTIBIOTIC SENSITIVITY PATTERN OF GRAM-NEGATIVE MICROORGANISMS

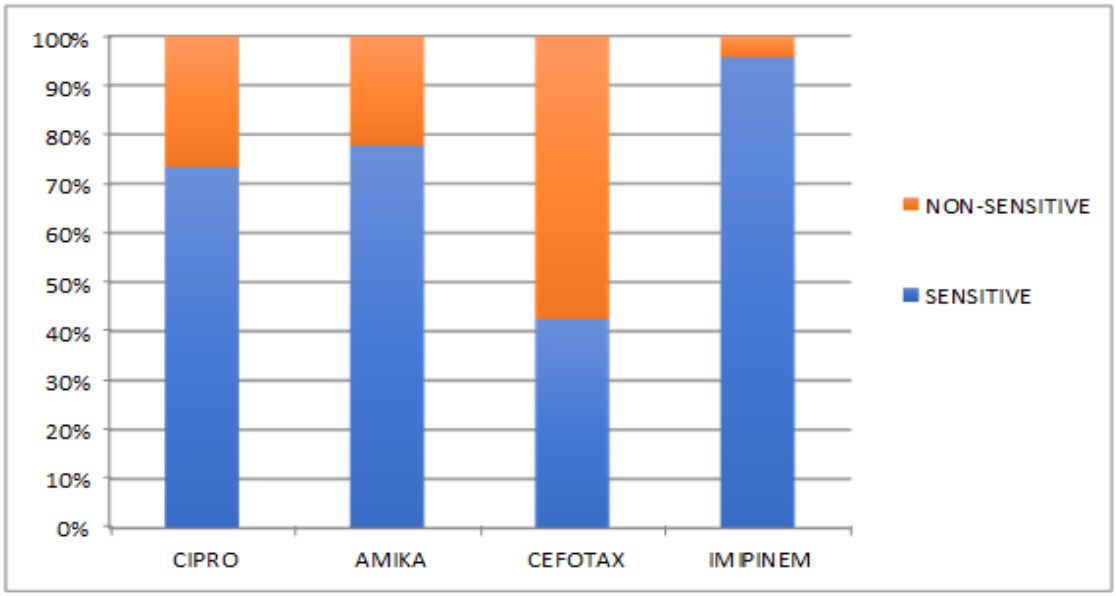

Figure 4. Antibiotic sensitivity pattern among Gram-negative microorganisms

ANTIBIOTIC SENSITIVITY PATTERN OF GRAM-POSITIVE ORGANISMS

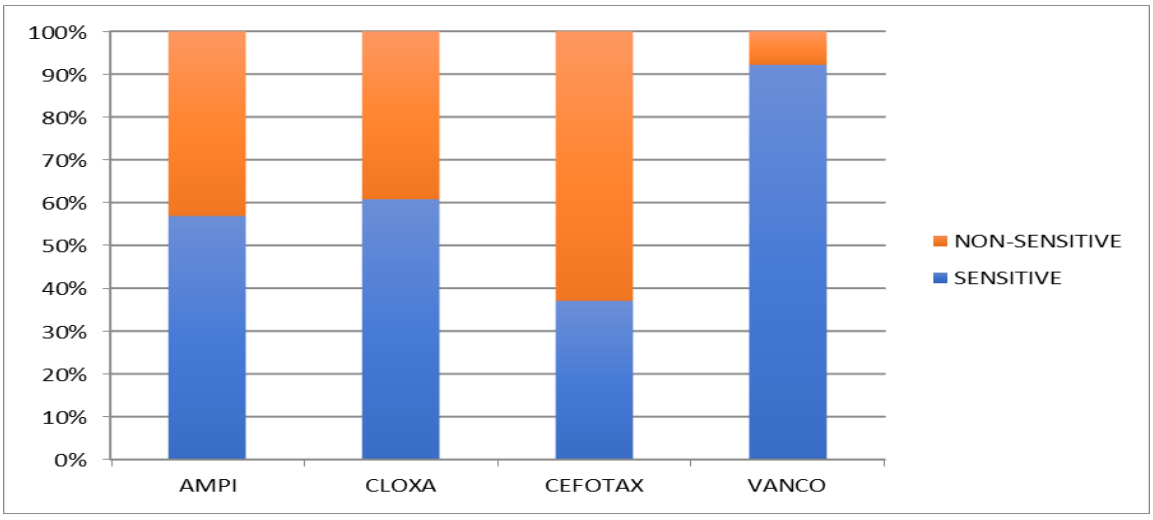

Figure 5.Antibiotic sensitivity pattern among Gram-positive microorganisms

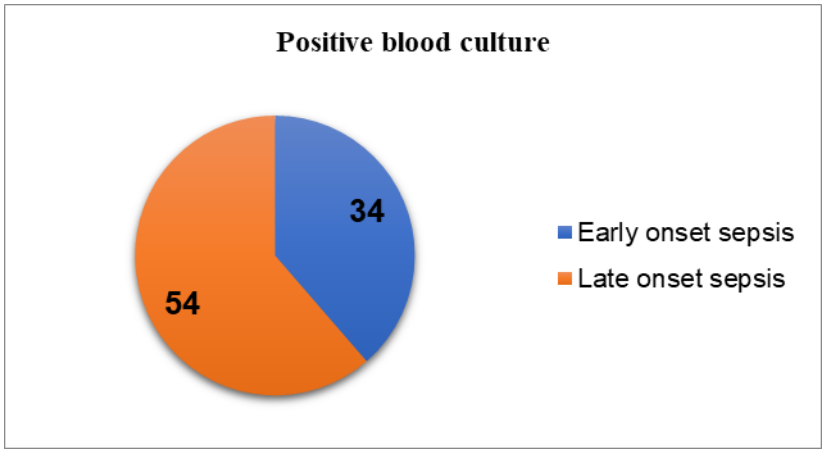

Figure 2. Blood culture

Discussion

Sepsis in neonates continues to be a major cause of morbidity and mortality in both developed and developing countries. It accounts for more than a third of all neonatal deaths in neonatal departments in most countries. There has been a slight reduction in the sepsis rate in developed countries mainly due to effective prenatal checkups, preterm labour prevention, tocolytic use, prenatal steroids and good, clean intrapartum care and postnatal management of the neonate including hand hygiene and aseptic procedures by all those who care for the neonates during the postnatal hospital stay.

The clinical presentation of neonatal sepsis in our study was noticed to be similar to previously published reports. We reported nonspecific findings in most of the cases followed by gastrointestinal symptoms in 18 cases, meningitis in 16 cases and pneumonia in 12 cases. These presentations are similar to previously published clinical presentations [3-6].

The yield of the blood culture in our study was around 42.51% which is similar to the findings by Zuhair M. Al-Musawi et al [7], whose culture demonstrated a 45% growth. This is also similar to reports by K.V. Shyamala et al. [8] who reported a positive culture rate of 51.3% and Rekha Sriram et al. [9] who reported a positive culture rate of 50.4% in her study. The blood culture yield is affected by several factors which include the way the blood sample was collected, the volume of collected blood, and the amount of time passed between the collection and the inoculation into the culture plate.

The microorganisms implicated in neonatal sepsis in developing countries differ from those seen in developed countries [3]. In our study, out of 88 positive cultures, the majority of causative microorganisms were Gram-negative (85.22%), specifically Klebsiella (45%) and E. coli (31%). Among the Gram-positive microorganisms Staphylococcus aureus (8%) predominated. This is consistent with data from NNPD 2000, which states that the most common microorganism responsible for neonatal sepsis in India is Klebsiella [1].

These findings are similar to previous reports which have demonstrated a predominance of Gram-negative microorganisms as the cause of neonatal sepsis [6-10]. However, the recently concluded DeNIS study [11] has shown that Acinetobacter spp were the most common isolate followed by the Klebsiella spp. This differs slightly from our results.

The Gram-negative and Gram-positive septicemias were encountered in respectively 85.22% and 14.78% of the culture-positive cases in our study, which is in contradiction to the results of studies by Gudia et al. [10] and Agnihotri et al. [12], where Gram-negative microorganisms were predominant, but Gram-positive isolates contributed to nearly 40% to 50% of septic cases. This could be explained by the fact that most of our cases were late-onset sepsis. However, the early-onset cases of sepsis in our study were also predominantly caused by Gram-negative microorganisms.

The analysis of the drug resistance patterns showed that among Gram-negative isolates nearly 60% were resistant to cefotaxime and 66% were resistant to ciprofloxacin. Both of those drugs are commonly used as first-line drugs. Six out of 88 isolates were multidrug-resistant and this was even more common among the predominant pathogens (Klebsiella and E.Coli). These findings are also similar to the recently published DeNIS study reports [11].

The prevalence rate of group B beta-hemolytic Streptococcus in our study is comparable to the results of the study by Milton et al. [13].

Conclusion

Neonatal sepsis is a common problem in neonatal units and is one of the leading causes of neonatal death. The causative microorganisms vary depending on place and time. The most common causative microorganisms in our country are Gram-negative bacteria as opposed to the western world where Group B beta-hemolytic Streptococcus is the most common. With regards to antimicrobial therapy, there is no universal recommendation which can be applied.

There is recent evidence of an increase in drug-resistant microorganisms. A careful analysis of prevailing microbial patterns and their sensitivity to antimicrobial agents must be done in all neonatal units to overcome the development of antimicrobial resistance. The hospital infection control team should work in liaison with treating physicians to create a protocol, which in turn needs to be revisited from time to time, to effectively control sepsis among neonates.

Conflict of interest: none declared.

REFERENCES:

1. Hayes R, Hartnett J, Semova G, Murray C, Murphy K, Carroll L, et al. On behalf of the Infection, Inflammation, Immunology and Immunisation (I4) section of the European Society for Paediatric Research (ESPR). Neonatal sepsis definitions from randomised clinical trials. Pediatr Res. 2021. DOI: https://doi.org/10.1038/s41390-021-01749-3.
2. Singh M, Alsaleem M, Gray CP. Neonatal Sepsis. [Updated 2022 May 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from:https://www.ncbi.nlm.nih.gov/books/NBK531478/
3. Nyenga A, Mukuku O, & Wembonyama S. Neonatal sepsis: A review of the literature. Theory and Clinical Practice in Pediatrics. 2021; 3(1): 94-101. DOI: https://doi.org/10.25082/TCPP.2021.01.006.
4. Kamalakannan SK.Neonatal sepsis: past to present. Biomed J Sci&Tech.Res. 2018; 3(3): 3309-3314. DOI: 10.26717/BJSTR.2018.3.000909.
5. Asinobi IN, Ekwochi U, Edelu BO, Iheji CC, Onu NN, Ndu IK. Bacterial isolates of surfaces in the neonatal intensive care unit of Enugu State university teaching hospital, Parklane, Enugu, and their antibiotic susceptibility patterns. Niger J Med. 2021;30:171-175. DOI: 10.4103/NJM.NJM_157_20.
6. Jatsho J, Nishizawa Y, Pelzom D, Sharma R. Clinical and Bacteriological Profile of Neonatal Sepsis: A Prospective Hospital-Based Study. Int J Pediatr. 2020; 2020: 1835945. doi: 10.1155/2020/1835945. PMID: 32952574.
7. Zuhair MA. The role of CRP in the diagnosis and duration of antibiotic therapy in neonatal sepsis. Kufa Med J. 2008;11(2):33-40.
8. Shyamala KV, Subbalakshmi NK, Raghuveera K. Role of CRP and platelet count in newborn sepsis. J Chi Clin Med. 2010;5:474.
9. RekhaSriram. Correlation of Blood culture results with the Sepsis score and the Sepsis screen in the diagnosis of Neonatal Septicemia. Int J Biol Med Res. 2011;2:360–368.
10. Guida J D, Anette MK, Leef KH, McKenzie SE, and Paul DA. Platelet Count and Sepsis in Very Low Birth Weight Neonates: Is There an Organism-Specific Response? Paediatrics. 2003;111:1411-1415.
11. Agarwal R, Sankar J. Characterisation and antimicrobial resistance of sepsis pathogens in neonates born in tertiary care centres in Delhi, India: a cohort study. The Lancet Global Health. 2016;4(10):e752-60.
12. Agnihotri N, Kaistha N, Gupta V. Antimicrobial susceptibility of isolates from neonatal septicemia. JpnJ Infect Dis 2004;57:2735.
13. Milton R, Gillespie D, Dyer C, Taiyari K, Carvalho M, Thomson K, et al. Neonatal sepsis and mortality in low-income and middle-income countries from a facility-based birth cohort: an international multisite prospective observational study. The Lancet. 2022; 10(5): E661-E672. https://doi.org/10.1016/S2214-109X(22)00043-2.

ORIGINALNI RAD

NEONATALNA SEPSA – KLINIČKO-ETIOLOŠKI PROFIL U ZDRAVSTVENOJ USTANOVI TERCIJARNOG NIVOA U JUŽNOJ INDIJI

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SAŽETAK

Uvod/Cilj Neonatalna sepsa je vodeći uzrok mortaliteta i morbiditeta novorođenčadi. Neonatusi su zbog svojstvene nezrelosti, podložni razvijanju sepse. Sepsa se po vremenu nastanka deli na sepsu sa ranim i kasnim ispoljavanjem, pri čemu je patogeneza kod ta dva oblika različita. Cilj studije je da se definišu mikrobiološki izazivači sepse i klinička prezentacija neonatusa, koji su pod dijagnozom sumnje na sepsu primljeni u GovtKilpauk Medical College Hospital, zdravstvenu ustanovu tercijarnog nivoa.

Metodologija Sprovedena je deskriptivna studija poprečnog preseka u Govt Kilpauk Medical College Hospital, Južna Indija.

Rezultati: Od 207 neonatusa koji su primljeni zbog sumnje na sepsu, 112 je bilo muškog pola i 97 ženskog pola. Odnos muškog i ženskog pola je bio 54.1% : 45.9% (muški pol : ženski pol = 1.2:1). Po kategorizaciji novorođenčadi na osnovu telesne težine na rođenju, 11 novorođenčadi je imalo izuzetno malu telesnu težinu na rođenju, 107 je imalo nižu telesnu težinu, 88 je imalo normalnu telesnu težinu i jedno novorođenče je imalo više od 4000g. Hemokultura je bila pozitivna u 88 od 207 slučajeva (42.51%). Klebsiella je bila najčešći izazivač sepse (45%) na našem odeljenju intenzivne nege za novorođenčad. Drugi Gram negativni izazivači koji su izolovani iz uzoraka su bili Escherichia Coli (31%), Pseudomonas (6%), Enterobacter (1%) i Acinetobacter (2%). Gram pozitivni organizmi koji su porasli na podlogama su bili koagulaza pozitivni i koagulaza negativni Stafilococcus (8%), Streptococcus Beta Haemolyticus grupe B (5%) i Enterococcus (2%). Sepsa sa kasnim ispoljavanjem je bila 1.5 put češća od sepse sa ranim ispoljavanjem. Pokazalo se da su Gram negativni mikroorganizmi bili najosetljiviji na Imipenem (92%), zatim na Amikacin (82.66%), dok su Gram pozitivni mikroorganizmi bili najosetljiviji na Vankomicin (84.61%), a zatim na Cloxacillin i Ampicillin (61.53%). Od 88 pozitivnih hemokultura, 6 je bilo rezistentno na više antibiotika (6.8%).

Zaključak Poznavanje prirode mikroorganizama koji izazivaju sepsu kod novorođenčadi pomaže u sprečavanju morbiditeta, mortaliteta i razvoja rezistencije na antibiotike.

Ključne reči: neonatalna sepsa, osetljivost na antibiotike, Klebsiella, niska težina na rođenju

DOI: 10.5937/halo28-36844
UDC: 616.12-008.315-085

ORIGINAL ARTICLE

SURVIVAL AND NEUROLOGIC RECOVERY AFTER OUT-OF-HOSPITAL CARDIAC ARREST

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Jaraković M, et al. Survival and neurological recovery after OHCA. Halo 194. 2022; 28(2):45-52.

Rad primljen: 10.03.2022.

Prihvaćen: 13.07.2022.

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ABSTRACT

Introduction/Objective: Survival and neurologic recovery after out-of-hospital cardiac arrest remain poor despite significant advances in the therapeutic approach. The study aimed to evaluate predictors of intrahospital survival and neurologic outcome among patients after out-of-hospital cardiac arrest as well as to evaluate the influence of mild therapeutic hypothermia introduction on intrahospital survival and neurologic outcome among comatose patients after out-of-hospital cardiac arrest.

Methods The research was conducted as a retrospective observational study among patients hospitalized at the Cardiac Intensive Care Unit of the Institute for Cardiovascular Diseases of Vojvodina from January 2007 until November 2019 as a result of an out-of-hospital cardiac arrest.

Results. The research included 506 survivors of OHCA. Multivariate regression analysis showed that initial shockable rhythm, cardiopulmonary resuscitation efforts lasting no longer than 20 minutes and a Glasgow Coma Score above 8 at admission, were predictors of intrahospital survival and good neurological outcome. Introduction of mild therapeutic hypothermia improved intrahospital survival (54.1% vs. 24.4%; $p < 0.0005$) and neurological outcome (42.9% vs. 18.3%; $p < 0.0005$) in comatose patients with initial shockable rhythm.

Conclusion. In our study group of out-of-hospital cardiac arrest patients, initial shockable rhythm, cardiopulmonary resuscitation efforts lasting no longer than 20min and a Glasgow Coma Score above 8 at admission were predictors of intrahospital survival and favourable neurological outcome. The introduction of mild therapeutic hypothermia significantly improved survival and neurological outcomes in comatose patients with initial shockable rhythms.

Keywords: out-of-hospital cardiac arrest; cardiopulmonary resuscitation; mild therapeutic hypothermia; predictors, good neurologic outcome.

Introduction

Survival rate and neurologic outcome in patients after out-of-hospital cardiac arrest (OHCA) have not improved in the past several decades despite the advances in diagnostic and therapeutic algorithms. According to different registries, the in-hospital survival rate after OHCA with both initial shockable and non-shockable rhythms varies from 2.7% to 26.5%, with higher rates reported for patients with initial shockable rhythm (from 26.4% to 44.3%) [1] and very low rates for patients with initial non-shockable rhythm [2].

When it comes to favourable neurologic outcomes after OHCA, nearly 65% of cardiac arrest patients with initial shockable rhythm achieve good neurologic outcomes, in contrast to those with non-shockable rhythm in whom the good neurological outcome is seen in 2-15% of the cases. [3].

Different studies report initial shockable rhythm, resuscitation efforts lasting no longer than 20 min, witnessed cardiac arrest, bystander cardiopulmonary resuscitation (CPR), as well as early coronary angiography and percutaneous coronary intervention (PCI) as independent predictors of in-hospital survival among patients successfully resuscitated after OHCA [4,5].

There have been very few randomized controlled studies in the field of post-resuscitation hypothermia. Current guidelines published by the American Heart Association (AHA), European Resuscitation Council (ERC), and Neurocritical Care Society (NCS) recommend targeted temperature management (TTM) after OHCA as an effort to improve survival and alleviate post-hypoxic brain injury [6-8].

The European Resuscitation Council (ERC) Guidelines for CPR published in 2021 strongly support TTM for patients with OHCA and initial shockable rhythm. On the other hand, recommendations for patients with OHCA and initial non-shockable rhythm are still weak and based upon results of applying TTM among successfully resuscitated patients after OHCA with initial non-shockable rhythm [8].

Objective

The objective of our study is to evaluate predictors of intrahospital survival and neurologic outcome among patients resuscitated after OHCA, as well as to evaluate the influence of targeted temperature management (TTM) on comatose patients successfully resuscitated after OHCA, based on their intrahospital survival and neurologic outcome.

Methods

The research was conducted as a retrospective observational analysis of 506 comatose patients after OHCA, treated at the Cardiac Intensive Care Unit (CICU) of the Institute of Cardiovascular Diseases of Vojvodina from January 2007 to November 2019. Data was collected through the hospital information system.

This study included 506 patients, 322 of which were male, aged 64.08 ± 12.52 years, and 184 female, aged 66.45 ± 14.27 years.

Data relevant to our trial study, acquired through the hospital information system, were as follows: type of cardiac arrest, witnessed/unwitnessed cardiac arrest, duration of resuscitation, defibrillation performed, state of consciousness at hospital admission, electrocardiographic (ECG) signs of ST-segment elevation myocardial infarction (STEMI), early PCI.

The type of cardiac arrest was defined as follows: ventricular fibrillation (VF) and ventricular tachycardia (VT) were defined as shockable rhythms, and asystole and pulseless electrical activity (PEA) as non-shockable rhythms. Duration of cardiopulmonary resuscitation was defined as ≤ 20 minutes and > 20 minutes. The level of consciousness at hospital admission was assessed against the Glasgow Coma Scale (GCS), according to which all patients with values of GCS ≤ 8 were identified as comatose. ECG signs of STEMI included an ST elevation of ≥ 2mm in two or more consecutive leads covering the same myocardial wall. Early PCI was defined as PCI performed within 24 hours of admission.

In our cohort study, we evaluated predictors of intrahospital survival and favourable neurologic outcome. A favourable neurologic outcome was defined by the Cerebral Performance Score (CPC). A score of ≤ 2 was considered to be a favourable neurologic outcome without significant neurological deficits and the ability to independently perform daily activities.

In our trial study, comatose patients at admission (387) were divided into two groups according to their type of OHCA (shockable rhythm or non-shockable rhythm). Each of the two groups was then divided into two subgroups depending on whether the patients had been treated with targeted temperature management (TTM).

In both groups, the decision to introduce TTM was made by the Emergency Department physician at hospital admission. The decision about whether to use an intravascular catheter (ZOLL ICY Intravascular Heat Exchange Catheter Model IC-3893A) connected to an intravascular cooling device (ZOLL Coolgard 3000/Thermogard XP Thermal Regulation System) or to apply the surface cooling method using cold pads (EMCOOLS Flex. Pad) and targeted cooling temperature was at the discretion of the admitting physician at the Cardiac Intensive Care Unit. With all patients, the achieved targeted temperature was maintained for 24 hours, followed by spontaneous or active rewarming.

The study was approved by the Ethical Committee of the Institute for Cardiovascular Diseases of Vojvodina.

The following descriptive statistics measures have been applied: arithmetic mean, standard deviation, median and percentiles, frequencies, and percentages. To compare the median of the two group variables, the independent samples t-test was used. The association between the categorical variables was tested by the contingency table Chi-Square test or by Fisher's exact test. The effects of variables on the treatment outcome were determined using the univariate and multivariate binary logistic analysis. The results are shown in tables and graphs. A statistical test significance value of $p < 0.05$ was applied. Statistical data management was done in SPSS 17.0 software package.

Results

The study included 506 successfully resuscitated comatose patients after OHCA, 322 (63.6%) of which were male. The average age of the study population was 65.7 ± 12.8 years. The average age of the male patients was 64.1 ± 12.5, whereas the average age of the female patients was 66.5 ± 14.3 years, and statistically, there was not a significant difference ($p = 0.090$) in age.

In the patient cohort study, cardiac arrest was witnessed in 412 (81.4%) cases, bystander CPR was initiated in 197 (38.9%) cases, resuscitation lasted less than 20 minutes in 291 (57.5%) cases, and the initial rhythm was shockable in 304 (60.1%) cases. ECG upon admission showed STEMI in 176 (34.8%) cases and early PCI was performed in 145 (28.6%) cases. In-hospital survival accounted for 225 (45.5%) patients and 185 (36.6%) patients had a favourable neurologic outcome.

Multivariant regression analysis showed that predictors of in-hospital survival were: initial shockable rhythm, early PCI, CPR ≤ 20 min and GCS > 8. Results of univariant and multivariant predictors regression analysis of in-hospital survival are shown in **Table 1.** Hosmer Lemeshow test has shown that our model is good ($p = 0.987$).

In our cohort study, the results of multivariant regression analysis showed that predictors of good neurological outcome were: initial shockable rhythm, initial ECG upon admission showing STEMI, duration of CPR ≤ 20 min and GCS > 8. Both univariant and multivariant analyses of predictors of good neurological outcomes are shown in **Table 2.** Hosmer Lemeshow test has shown that our model is good ($p = 0.973$).

Table 1. Predictors of intrahospital survival

Variable	Univariant analysis		Multivariant analysis	
	OR(95%CI)	P value	OR(95%CI)	P value
Initial shockable rhythm	3.391(2.310-4.977)	< 0.0005	2.507(1.598-3.933)	< 0.0005
ECG signs of STEMI	0.346(0.237-0.505)	< 0.0005	/	ns
Early PCI	0.260(0.173-0.392)	< 0.0005	0.368(0.226-0.599)	< 0.0005
Defibrillation	0.423(0.286-0.626)	< 0.0005	/	ns
Witness present	0.436(0.268-0.709)	0.001	/	ns
CPR initiated	0.538(0.374-0.772	0.001	/	ns
CPR ≤ 20 min	5.872(3.926-8.781)	< 0.0005	4.249(2.688-6.718)	< 0.0005
GCS > 8	0.098(0.058-0.165)	< 0.0005	0.194(0.110-0.343)	< 0.0005

Legend: ECG – electrocardiogram; STEMI – ST-segment elevation myocardial infarction; PCI – percutaneous coronary intervention; CPR – cardiopulmonary resuscitation; GCS – Glasgow Coma Scale

Table 2. Predictors of favourable neurologic outcome

Variable	Univariant analysis		Multivariant analysis	
	OR(95%CI)	P value	OR(95%CI)	P value
Initial shockable rhythm	4.041(2.659-6.141)	< 0.0005	3.301(2.002-5.441)	< 0.0005
ECG signs of STEMI	0.401(0.274-0.586)	< 0.0005	0.528(0.326-0.853)	0.009
PCI	0.320(0.215-0.477)	< 0.0005	/	ns
Defibrillation	0.373(0.244-0.570)	< 0.0005	/	ns
Witness present	0.435(0.258-0.735)	0.002	/	ns
CPR initiated	0.411(0.283-0.596)	< 0.0005	/	ns
CPR ≤ 20 min	7.411(4.706-11.671)	< 0.0005	5.144(3.090-8.565)	< 0.0005
GCS > 8	0.087(0.053-0.143)	< 0.0005	0.152(0.088-0.260)	< 0.0005

Legend: ECG – electrocardiogram; STEMI – ST-segment elevation myocardial infarction; PCI – percutaneous coronary intervention; CPR – cardiopulmonary resuscitation; GCS – Glasgow Coma Scale

At admission, 387 (76.5%) patients were comatose (GCS < 8) and TTM was introduced in 177 (45.7%) patients. Among them, 215 (55.6%) patients had an initial shockable rhythm and 172 (44.4%) patients had an initial non-shockable rhythm.

There was a significant difference in intrahospital survival rate between the OHCA patients with an initial shockable rhythm, and those with an initial non-shockable rhythm (42.8% vs. 19.8%, p < 0.0005). Among the OHCA patients with an initial shockable rhythm, TTM considerably increased intrahospital survival (54.1% of patients treated with hypothermia as opposed to 24.4% of patients not treated with hypothermia), which presented a significant difference (p < 0.0005). In OHCA patients with the initial non-shockable rhythm, TTM also increased the intrahospital survival rate (29.5% in patients treated with TTM versus 16.4% in patients not treated with TTM; p < 0.0005). **Figure 1** shows the intrahospital survival rate according to initial rhythm and introduction of hypothermia.

When the effect of TTM on intrahospital neurological outcome was evaluated among cardiac arrest patients with an initial shockable rhythm, mild induced hypothermia significantly influenced a favourable

neurologic outcome (42.9% among patients who received hypothermia versus 18.3% among those who did not receive hypothermia; p < 0.0005), while no statistically significant difference was found among patients with initial non-shockable rhythm (13.6% among patients who received hypothermia versus 10.9% among those who did not receive hypothermia; p = 0.388) (**Figure 2**).

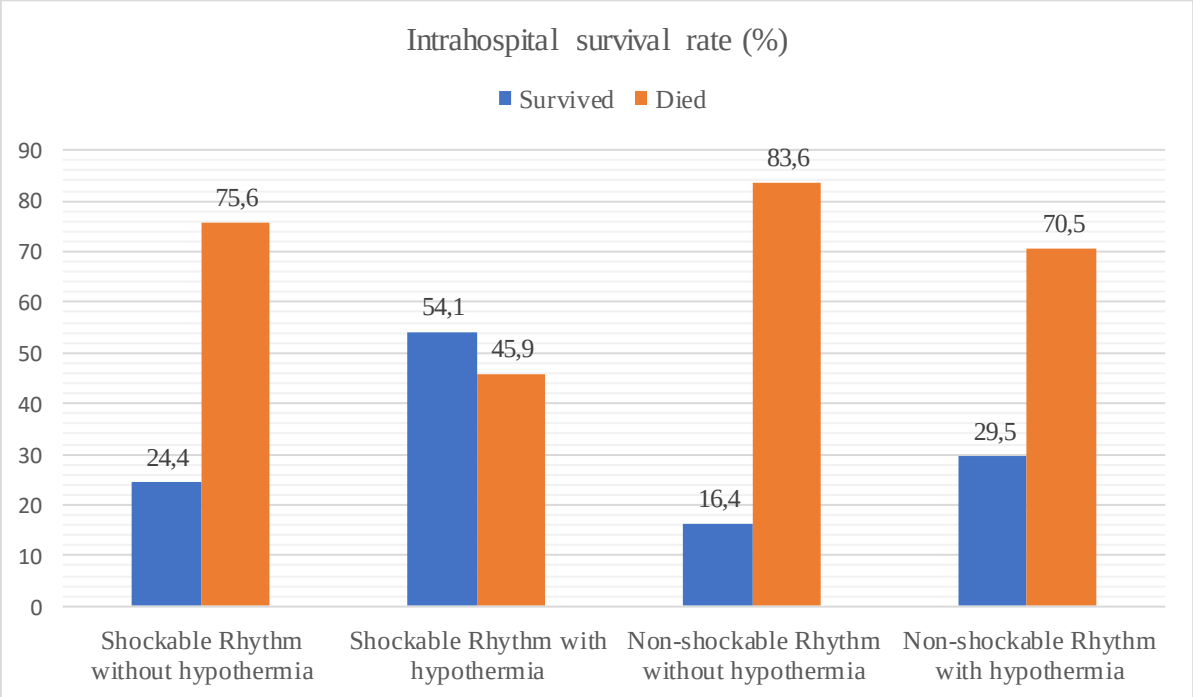

Figure 1. Intrahospital survival rate according to initial rhythm and introduction of hypothermia

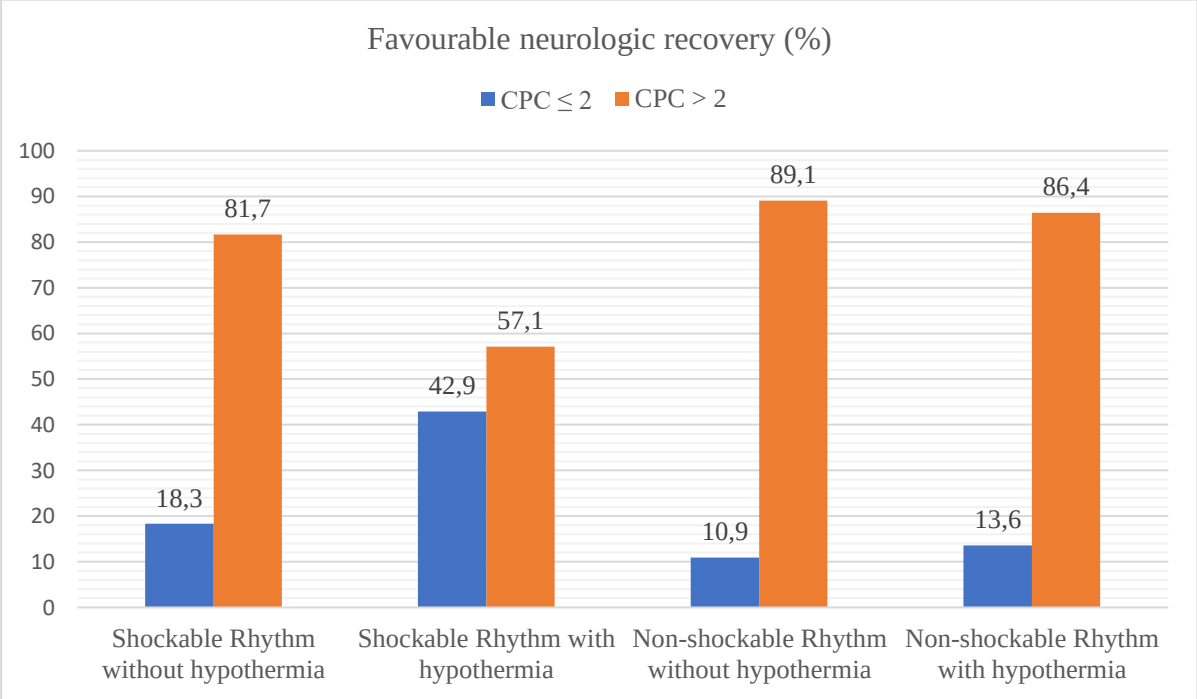

Figure 2. Favourable neurologic recovery at discharge according to initial rhythm and introduction of hypothermia
Legend: CPC – cerebral performance category

Discussion

In our study cohort, we analyzed predictors of in-hospital survival and favourable neurologic outcome among patients after OHCA. We also analyzed the effects of TTM on intrahospital survival and neurologic outcome in comatose patients after OHCA.

Regarding the effects of prehospital factors closely related to resuscitation on intrahospital survival and good neurological outcome, Mathiesen et al., who analyzed 1138 OHCA patients, concluded that bystander CPR and resuscitation duration affect intrahospital survival rate [9].

Navab et al. have published similar results, observed in their study group of 3214 OHCA patients, where initial shockable rhythm and bystander CPR impacted intrahospital survival rate [10].

In their study trial of 11368 OHCA patients, included in the ROC-PRIMED multicenter cluster-randomized clinical trial, Reynolds et al. concluded that patients with an initial shockable rhythm, witnessed cardiac arrest, and shorter resuscitation efforts were more likely to survive with favourable neurologic outcomes [11].

According to our study results, initial shockable rhythm, resuscitation efforts lasting less than 20 minutes and GCS > 8 were predictors of not only intrahospital survival but also of favourable neurological outcomes in patients successfully resuscitated after OHCA.

Despite that, according to our study results, early PCI was an independent predictor of intrahospital survival and ECG showing STEMI upon admission was an independent predictor of good neurological outcome. Similar results were published by Lahmann et al. in their recently published study of 519 patients hospitalized after OHCA, where they found that the 30-day and 1-year survival rates were significantly higher among patients undergoing immediate coronary angiography compared to patients on whom immediate coronary angiography was not performed (221/370 (59.7%) vs. 30/131 (22.9%), p = 0.001) and that in patients on whom immediate coronary angiography was performed, a good neurologic outcome at discharge, defined as CPC 1 or 2, was achieved in 164/299 (54.8%) [12]. This is a very important finding since the benefit of early revascularization has been proven in patients with STEMI, while diagnostic pathways remain unclear in the absence of STEMI.

There have been very few randomized controlled studies in the field of post-resuscitation hypothermia.

Data from a prospective HACORE study, that analyzed the effects of mild induced hypothermia in 233 patients successfully resuscitated after out-of-hospital cardiac arrest, outlined the arguments in favour of targeted temperature management in relation to intrahospital survival, which was reported to be 56% [13].

Our study showed similar results to such an extent that the intrahospital survival rate in patients after cardiac arrest by type of shockable rhythm, who had received induced hypothermia, was 54.1%. Among the patients who had suffered cardiac arrest with non-shockable rhythm in our study group, targeted temperature management increased the likelihood of intrahospital survival to 29.5%.

Until recently, guidelines for unconscious survivors of out-of-hospital cardiac arrest with non-shockable rhythm were deduced from trial studies of patients with shockable rhythm and have led to much debate. In 2019, the HYPOTERION trial showed the potential benefits of 33℃ targeted temperature management on survival and neurological outcomes in patients after non-shockable cardiac arrest, as compared to targeted normothermia (37℃) at 90 days. On day 90, a total of 29 of 284 patients (10.2%) in the hypothermia group were alive with a CPC score of 1 or 2, as compared with 17 of 297 (5.7%) in the normothermia group [3].

Furthermore, Seok Goo Kim et al. analyzed a clinical trial group of 401 resuscitated patients with initial non-shockable rhythm, including 89 (22%) with induced hypothermia, and found that TTM was related to a three-fold increase in neurologically favourable survival at 30 days [14].

According to several clinical trials, a favourable intrahospital neurological outcome has been reported in 26%-39% of the patients after out-of-hospital cardiac arrest, whereas targeted temperature management increased this percentage to 49%-55% [1,15].

Similar results have been found in our trial study. Among the patients with out-of-hospital cardiac arrest and shockable rhythm, 18.3% had favourable neurological outcomes, as compared to a significantly lower percentage of 10.9% in the initial non-shockable rhythm group.

The introduction of TTM in our study group significantly influenced favourable neurologic outcomes to 42.9% among patients with initial shockable rhythms, which is in line with previously cited trials, while it did not influence neurologic outcomes among patients with initial non-shockable rhythms.

Randomized trials analysing the effects of therapeutic hypothermia versus regular care on out-of-hospital cardiac arrest patients usually included fewer than 500 participants, and many of the trials were small and at a high risk of bias [16].

Eagerly awaited results of a large multicenter, randomized TTM2 trial were recently published. This randomized study included 1900 patients after out-of-hospital cardiac arrest in whom TTM was introduced. It compared the effects of a target temperature of 33℃ with a strategy to maintain normothermia (36°C) and early treatment of fever (≥37.8°C), which presents one of the leading concerns within the patient rewarming phase. The results of the study showed that at 6 months follow-up, targeted hypothermia did not lower death incidence nor did it improve neurological outcomes in comparison with targeted normothermia [16].

Conclusion

In our trial, prehospital predictors that increase both intrahospital survival and influence favourable neurologic outcomes were initial shockable rhythm, resuscitation efforts lasting less than 20 minutes and GCS ≥ 8 upon admission. Along with these, early PCI among resuscitated OHCA patients was a predictor of intrahospital survival and ECG showing STEMI upon admission was a predictor of good neurologic outcome.
The introduction of TTM significantly improved both survival and neurologic outcome in comatose patients with initial shockable rhythms. Despite significantly lower intrahospital survival and neurologic outcome levels in patients resuscitated after OHCA with non-shockable rhythm, TTM also improved 95

intrahospital survival, but it did not affect the neurologic outcome.

Conflict of interest: None declared.

ABBREVIATIONS

OHCA – out-of-hospital cardiac arrest; CPR – cardiopulmonary resuscitation; PCI – percutaneous coronary intervention; TTM – targeted temperature management; ECG – electrocardiograph/electrocardiographic; STEMI – ST-segment elevation myocardial infarction; GCS – Glasgow Coma Scale; CPC – Cerebral Performance Score

REFERENCES:

1. Berger S. Survival From Out-of-Hospital Cardiac Arrest: Are We Beginning to See Progress? J Am Heart Assoc 2017; 6(9): e007469. DOI: https://doi.org/10.1161/jaha.117.007469. PMID: 28939721.
2. Han KS, Lee SW, Lee EJ, Kim SJ. Prognostic Value of the Conversion to a Shockable Rhythm in Out-of-Hospital Cardiac Arrest Patients with Initial Non-Shockable Rhythm. J Clin Med 2019; 8(5): 644. DOI: https://doi.org/10.3390/jcm8050644. PMID: 31075958.
3. Lascarrou JB, Merdji H, Le Gouge A, Colin G, Grillet G, Girardie P, et al. Targeted Temperature Management for Cardiac Arrest with Non-shockable Rhythm. N Engl J Med 2019; 381: 2327-37. DOI: https://doi.org/10.1056/NEJMoa1906661.
4. Balan P, Hsi B, Thangam M, Zhao Y, Monlezun D, Arain S, et al. The cardiac arrest survival score: A predictive algorithm for in-hospital mortality after out-of-hospital cardiac arrest. Resuscitation 2019; 144: 46-53. DOI: https://doi.org/10.1016/j.resuscitation.2019.09.009. PMID: 31539610.
5. Trepa M, Bastos S, Fontes-Oliveira M, Costa R, Dias-Frias A, Luz M, et al. Predictors of In-Hospital Mortality after Recovered Out-of-Hospital Cardiac Arrest in Patients with Proven Significant Coronary Artery Disease: A Retrospective Study. J Crit Care Med (Targu Mures) 2020; 6(1): 41-51. DOI: https://doi.org/10.2478/jccm-2020-0006. PMID: 32104730
6. Panchal AR, Bartos JA, Cabanas JG, Donnino MW, Drennan IR, Hirsch KG, et al. 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. Part 3: Adult Basic and Advanced Life Support. Circulation 2020; 142 (16 Suppl 2): S366-S468. DOI: https://doi.org/10.1161/CIR.0000000000000916
7. Madden LK, Hill M, May TL, Human T, McKenna Guanci M, Jacobi J, et al. The Implementation of Targeted Temperature Management: An Evidence-Based Guideline from the Neurocritical Care Society. Neurocrit Care 2017; 27(3): 468-87. DOI: https://doi.org/10.1007/s12028-017-0469-5. PMID: 29038971.
8. Perkins GD, Graesner JT, Semeraro F, Olasveengen T, Soar J, Lott C, et al. European Resuscitation Council Guidelines 2021: Executive summary. Resuscitation 2021; 161: 1-60. DOI: https://doi.org/10.1016/j.resuscitation.2021.02.003. PMID: 33773824.
9. Mathiesen WT, Bjorshol CA, Kvalou JT, Soreide E. Effects of modifiable prehospital factors on survival after out-of-hospital cardiac arrest in rural versus urban areas. Crit Care 2018; 22(1): 99. DOI: https://doi.org/10.1186/s13054-018-2017-x. PMID: 29669574.
10. Navab E, Esmaeili M, Poorkhoishidi N, Salimi R, Khazaei A, Moghimbeigi A. Predictors of Out of Hospital Cardiac Arrest Outcomes in Pre-Hospital Settings; a retrospective Cross-sectional Study. Arch Acad Energ Med 2019; 7(1): e36. PMID: 31555766.
11. Reynolds JC, Grunau BE, Rittenberger JC, Sawyer KN, Kurz MC, Callaway CW. Association Between Duration of Resuscitation and Favorable Outcome After Out-of-Hospital Cardiac Arrest. Circulation 2016; 134: 2084–94. DOI: https://doi.org/10.1161/circulationaha.116.023309. PMID: 27760796.
12. Lahmann AL, Bongiovanni D, Berkefeld A, Kettern M, Martinez L, Okrojek R, et al. Predicting factors for long-term survival in patients with out-of-hospital cardiac arrest – A propensity score-matched analysis. PLoS One 2020; 15(1): e0218634. DOI: https://doi.org/10.1371/journal.pone.0218634. PMID: 31940337.
13. Akin M, Sieweke JT, Zauner F, Garcheva V, Tongers J, Napp LC, et al. Mortality in Patients With Out-of-Hospital Cardiac Arrest Undergoing a Standardized Protocol Including Therapeutic Hypothermia and Routine Coronary Angiography: Experience From the HACORE Registry. J Am Coll Cardiol Intv 2018; 11(18): 1811-20. DOI: https://doi.org/10.1016/j.jcin.2018.06.022. PMID: 30236353.

14. Kim SK, Cha CW, Sim SM, Hwang SY, Shin TG, Park JH, et al. Targeted temperature management is related to improved clinical outcome of out-of-hospital cardiac arrest with non-shockable initial rhythm. J Korean Soc Emerg Med 2019; 30(3): 208-16. URL: https://www.jksem.org/m/journal/view.php?number=2311
15. Watanabe M, Matsuyama T, Oe H, Sasaki M, Nakamura Y, Miyamoto Y, et al. Impact of cooling method on the outcome of initial shockable or non-shockable out of hospital cardiac arrest patients receiving target temperature management: a nationwide multicentre cohort study. Annals of Intensive Care 2021; 11(1): 163. DOI: https://doi.org/10.1186/s13613-021-00953-y. PMID: 34825993.
16. Dankiewicz J, Cronberg T, Lilja G, Jakobsen JC, Levin H, Ullen S, et al. Hypothermia versus Normothermia after Out-of-Hospital Cardiac Arrest. N Engl J Med 2021;3 84: 2283-94. DOI: https://doi.org/10.1056/nejmoa2100591. PMID: 34133859.

ORIGINALNI RAD

PREŽIVLJAVANJE I NEUROLOŠKI OPORAVAK NAKON VANHOSPITALNOG SRČANOG ZASTOJA

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SAŽETAK

Uvod/cilj: Uprkos terapijskom napretku, preživljavanje i neurološki oporavak nakon vanhospitalnog srčanog zastoja su i dalje loši. Cilj istraživanja je bio da se odrede prediktori intrahospitalnog preživljavanja i neurološkog oporavka kod bolesnika nakon vanhospitalnog srčanog zastoja, kao i uticaj uvođenja blage terapijske hipotermije na intrahospitalno preživljavanje i neurološki ishod kod komatoznih bolesnika nakon vanhospitalnog srčanog zastoja.

Metode Istraživanje je osmišljeno kao retrospektivna opservaciona studija na osnovu uzorka bolesnika hospitalno lečenih u Jedinici intenzivne kardiološke nege Instituta za kardiovaskularne bolesti Vojvodine u periodu od januara 2007. do novembra 2019. godine zbog vanhospitalnog srčanog zastoja.

Rezultati Istraživanje je obuhvatilo 506 bolesnika nakon vanhospitalnog srčanog zastoja. Multivarijanta regresiona analiza je pokazala da su: inicijalni šokabilni ritam, trajanje kardiopulmonalne reanimacije ≤ 20 minuta i Glazgov koma skor > 8 na prijemu prediktori intrahospitalnog preživljavanja i dobrog neurološkog oporavka. Inicijacija blage hipotermije je popravila kako intrahospitalno preživljavanje (54,1% nasuprot 24,4%; $p < 0,0005$), tako i neurološki oporavak (42,9% nasuprot 18,3%; $p < 0,0005$) kod komatoznih bolesnika sa inicijalnim šokabilnim ritmom.

Zaključak U našoj grupi bolesnika, nakon vanhospitalnog srčanog zastoja, inicijalni šokabilni ritam, trajanje kardiopulmonalne reanimacije ≤ 20 minuta i Glazgov koma skor > 8 na prijemu su uticali na intrahospitalno preživljavanje i povoljan neurološki oporavak. Primena blage terapijske hipotermije je poboljšala preživljavanje i neurološki oporavak kod komatoznih bolesnika sa inicijalnim šokabilnim ritmom.

Ključne reči: vanhospitalni srčani zastoj; kardiopulmonalna reanimacija; blaga terapijska hipotermija; prediktori; dobar neurološki oporavak

DOI 10.5937/halo28-37737

UDC: 616.98:578.834(540)

ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDE AND PRECAUTIONARY MEASURES REGARDING COVID-19 AMONG MOTHERS IN A TERTIARY CARE HOSPITAL – A CROSS-SECTIONAL STUDY

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Santhos KK. Knowledge, attitude and precautionary measures regarding covid-19. Halo 194. 2022; 28(2):53-59.

Rad primljen: 08 .05.2022.

Prihvaćen: 13.07.2022

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Introduction Knowledge, attitude and precautionary measures regarding COVID-19 among mothers play an important role in reducing the spread of the infection and helping control the pandemic. It also provides insight into the role of the media in controlling the pandemic.
Objective To assess knowledge, attitude and precaution measures (KAP) regarding COVID-19 among mothers in a tertiary care hospital.
Methodology This was a questionnaire-based cross-sectional study regarding COVID-19 which was conducted at a tertiary care obstetric facility in India among 100 consenting mothers. The consenting mothers were assessed for demographic data and KAP scores (Knowledge - 8 questions, Attitude - 7 questions, Precautionary measures - 5 questions).
Results A total of 100 mothers participated in the study. 21% of the mothers were less than 25 years of age, 67% of them were between the ages of 25 and 29 and the remaining 12% were between the ages of 30 and 35. The participants were asked to fill out a questionnaire on COVID-19 from which their knowledge was assessed. Common questions were about the type of disease, the mode of transmission and the symptoms. Concerning the current stage of distribution of COVID-19, the majority of the mothers stated that it was a pandemic (81%). Regarding the type of disease, the majority of the mothers stated that it was a communicable disease (79%). When enquired about the symptoms of the disease, the majority of the mothers stated fever (97%), cough (98%), and breathlessness (97%). All of the mothers (100%) agreed that the delivery of the baby should be performed at a hospital if they contracted COVID-19.
Conclusion This study demonstrates that the majority of the mothers had satisfactory knowledge, a positive attitude and were applying appropriate precautionary measures to protect themselves from COVID-19.

Keywords: Covid-19, pandemic, knowledge, attitude

Introduction

The infectious disease caused by the coronavirus (COVID-19) led to a global pandemic [1, 2]. Since there is no proven definitive treatment for the disease, reducing the spread of the infection is the only effective way to control the pandemic [3]. The government of India (GOI) has conducted media campaigns to educate people and create awareness about the novel coronavirus. The Health Ministry has reached out to people across the country via telecommunication networks to disseminate the required information among citizens. The GOI has launched the Aarogya Setu mobile application to monitor and control the spread of the infection [4].

The public knowledge and attitude toward infectious diseases affect a population's emotional and mental well-being and could lead to panic reactions which may seriously impede the preventive attempts to control the spread of infection [6]. Due to unique changes in a woman's body during pregnancy, pregnant women form a vulnerable group with a significantly higher risk of contracting severe infection [3].

Objective

This study aims to evaluate the KAP of pregnant women regarding COVID-19 at a tertiary care hospital in India.

Methods

This is a hospital-based cross-sectional study. The study area is the Outpatient Department of Saveetha Medical College and Hospital in Tamil Nadu. The study population are mothers using the services of the Outpatient Department of Saveetha Medical College and Hospital in Tamil Nadu. The study was carried out from May 2021 to August 2021. Convenient sampling was done. The sample size for the study was determined using previous studies to select a convenient sample size. Therefore the sample size selected for this study was 100 women.

Inclusion criteria: Mothers with children using the services of the Outpatient Department of the Saveetha Medical College and Hospital who were willing to participate in the study by giving informed oral consent were included in the study.

Exclusion criteria: Mothers not willing to participate in the study were excluded.

Study tool and data collection method: A semi-structured pretested questionnaire was used to interview the subjects during the study. The questionnaire was prepared in the local language and then translated back for validation before it was used in the study. Demographic details were recorded and the mothers' knowledge of basic information about the Covid-19 was analyzed.

Informed consent: Informed oral consent in the local language i.e Tamil, was obtained from the participants involved in this study before administering the questionnaire.

Statistical analysis: The data was entered and analyzed using Microsoft Excel.

Results

A total of 100 mothers participated in the study. The participants' socio-demographic data is presented in **Table 1**. Out of the 100 participants in the study, 21% of the mothers were less than 25 years of age, 67% of them were between the ages of 25 and 29 and the remaining 12% were between the ages of 30 and 35.

Table 1. Socio-demographic characteristics

Parameters	**n (%)**
Age of mother:	
<25 years	21 (21%)
25-29 years	67 (67%)
30-35 years	12 (12%)
Participants' educational qualifications:	
Primary School	14 (14%)
Secondary School	49 (49%)
Graduation and higher	37 (37%)
Area of living :	
Rural	34 (34%)
Urban	17 (17%)
Semi-urban	49 (49%)
Gender of the baby:	
Male	37 (37%)
Female	63 (63%)
Occupation	
Healthcare related	13 (13%)
Unrelated to healthcare	87 (87%)

About 14% of the mothers had achieved primary education or less, 49% had completed secondary education and 37% had achieved graduation and higher education. About 13% of the mothers were healthcare-related workers and the remaining 87% were not.

Knowledge regarding COVID-19

The participants were asked to fill out a questionnaire on COVID-19 from which their knowledge was assessed. Common questions were about the type of disease, the mode of transmission and the symptoms. Concerning the current stage of distribution of COVID-19, the majority of the mothers stated that it was a pandemic (81%). Regarding the type of disease, the majority of the mothers stated that it was a communicable disease (79%). When enquired about the symptoms of the disease, the majority of the mothers stated fever (97%), cough (98%), and breathlessness (97%). The distribution of participants' responses to each of the questions on knowledge was analyzed (**Table 2**).

Attitude towards COVID-19

The attitude of the participants in the study toward COVID-19 is presented in **Table 3**. All of the mothers (100%) agreed that the delivery of the baby should be performed at a hospital if they contracted COVID-19 [7].

Precautionary measures against COVID-19

An insight into the precautionary measures practiced by the mothers during the COVID-19 pandemic is presented in **Table 4**.

Table 2. Knowledge about COVID-19

Parameters	**N (%)**
What type of disease is COVID-19?	
Communicable	81 (81%)
Both communicable and non-communicable	7 (7%)
Not communicable/not answered	12 (12%)
What is the current stage of distribution of COVID-19?	
Pandemic	79 (79%)
Epidemic or others	21 (21%)
Which of the following are symptoms of COVID-19?	
Fever	99 (99%)
Myalgia/weakness	71 (71%)
Cough	99 (99%)
Breathlessness	94 (94%)
How does the virus spread?	
Respiratory droplets	97 (97%)
Others [mosquitoes, contacts with contaminated surfaces] (3%)	3 (3%)
Which group is at the highest risk of contracting a severe form of COVID-19?	
Adults with comorbidities	98 (98%)
Others (adults without comorbidities, all age groups, pregnant women)	2 (2%)
What should be the mode of delivery in COVID-19?	
Vaginal delivery	28 (28%)
Operational vaginal delivery	1 (1%)
Caesarean section	37 (37%)
Not affected by COVID-19 status	34 (34%)
What are the feeding options for the baby born to a COVID-19 mother?	
Breastfeeding	27 (27%)
Expressed breast milk	31 (31%)
Formula-feed	47 (47%)
Can pregnant and lactating mothers get the COVID-19 vaccine?	
Yes	23 (23%)
No	33 (33%)
Don’t know	44 (44%)

Table 3. Attitude towards COVID-19

Parameters	**N (%)**
How often do you check for COVID-19-related news in the media?	
Very often	37 (37%)
Often	42 (42%)
Occasionally	20 (20%)
Not often	1 (1%)
Do you think you could get COVID-19?	
Yes	34 (34%)
No	51 (51%)
Don’t know	17 (17%)
What will you do if you suspect that you have COVID-19?	
Visit healthcare facility	92 (92%)
Visit traditional/ local healer	8 (8%)
Do not believe in treatment	0 (0%)
Where should pregnant females with COVID-19 deliver their baby?	
Home	0 (0%)
Hospital	100 (100%)
What concerns you the most if you are diagnosed with COVID-19?	
Fear of transmitting it to my baby/family members	78 (78%)
Social stigma	6 (6%)
Cost of treatment	7 (7%)
Fear of death	6 (6%)
I am confident that I will get cured	3 (3%)
Are you worried about being infected with COVID-19 during your pregnancy?	
Very worried	64 (64%)
Worried	32 (32%)
Neutral	1 (1%)
Not worried	3 (3%)
Will you get vaccinated during pregnancy or lactation?	
Yes	22 (22%)
No	66 (66%)
Can't say	12 (12%)

Table 4. Precautionary measures against COVID-19

Parameters	**N (%)**
Which precautions are you taking to prevent yourself from contracting and spreading COVID-19?	
Wearing a mask	99 (99%)
Avoiding crowded places	98 (98%)
Avoiding handshakes	94 (94%)
Washing vegetables before storing them	89 (89%)
Social distancing (97%)	97 (97%)
Have you changed the frequency of hand washing to prevent yourself from contracting and spreading COVID-19?	
Increased	97 (97%)
Decreased	1 (1%)
Same as before	2 (2%)
How often do you practise social distancing during the current pandemic?	
Very often	75 (75%)
Often	21 (21%)
Sometimes	2 (2%)
Hardly ever	2 (2%)
Never	0 (0%)
How often do you stay at home for social distancing?	
Very often	23 (23%)
Often	21 (21%)
Sometimes	33 (33%)
Hardly ever	22 (22%)
Never	1 (1%)
Do you take herbal products and traditional medicine to prevent yourself from contracting and spreading COVID-19?	
Yes	31 (31%)
No	69 (69%)

Discussion

This study aims to provide an insight into the knowledge, attitude and precautionary measures regarding COVID-19 in the population of mothers. Since mothers usually take care of their children in Indian society it is important to analyze their knowledge about the COVID-19 disease and the precaution measures they are taking to prevent their child and themselves from contracting the infection. This is crucial in a developing country like India where the health infrastructure and awareness are not as developed as they are in developed countries.

The participants in the study showed an overall correct knowledge demonstrating that the majority of the mothers were knowledgeable about COVID-19. Since the pandemic began the Government of India made huge efforts to spread information and increase awareness about the pandemic. Mass media was the primary source of information about COVID-19 for the majority of the study participants. Commonly known COVID-19-related symptoms were fever (99%), cough (99%) and breathlessness (94%) but pregnant women were comparatively less aware of the symptom of myalgia/weakness (71%) which is similar to the results of a study conducted in Iran by Erfani et al. [8].

Overall, the study participants showed a positive attitude toward the seriousness of applying preventive measures against COVID-19. These findings are in line with recent studies by Zhong et al. and Al-Hanawi et al. where the results showed a positive attitude among the general public [9,10].

Knowledge and attitude towards vaccination against COVID-19 were also a part of this questionnaire. The participants showed less knowledge about vaccination for pregnant women and lactating mothers and the positive attitude towards vaccination was also reduced in our study. The possible reason for this was that our study was conducted just as the recommendations for vaccinating pregnant women and lactating mothers were published, so there was a certain lack of knowledge and a reluctance to be vaccinated among the participants.

These findings suggest that telecommunication and mass media play a key role in the dissemination of knowledge about COVID-19 and its prevention. The efforts by the State and Central governments need to be appreciated in this regard.

Conclusion

This study demonstrates that the majority of the mothers had satisfactory knowledge, a positive attitude and were applying appropriate precautionary measures to protect themselves from COVID-19. Knowledge about the importance of hand washing among mothers was higher than expected and this is due to the efforts of GOI in spreading the information.

Conflict of interest: none declared.

REFERENCES:

1. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, Li J, Zhao D, Xu D, Gong Q, Liao J, Yang H, Hou W, Zhang Y. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. Lancet. 2020;395(10226):809-815. doi: 10.1016/S0140-6736(20)30360-3. Erratum in: Lancet. 2020;395(10229):1038. Erratum in: Lancet. 2020;395(10229):1038. PMID: 32151335.
2. Andrews MA, Areekal B, Rajesh KR, Krishnan J, Suryakala R, Krishnan B, et al. First confirmed case of COVID-19 infection in India: a case report. Indian J Med Res. 2020;151(5):490–492. doi: 10.4103/ijmr.IJMR_2131_20. PMID: 32611918.
3. Docherty AB, Harrison EM, Green CA, Hardwick HE, Pius R, Norman L, et al; ISARIC4C investigators. Features of 20 133 UK patients in hospital with covid-19 using the ISARIC WHO Clinical Characterisation Protocol: prospective observational cohort study. BMJ. 2020;369:m1985. doi: 10.1136/bmj.m1985. PMID: 32444460.
4. National Portal of India. Combating Coronavirus [NPI website]. https://www.india.gov.in/spotlight/combating-coronavirus [Accessed January 17, 2021].
5. Abe K, Hamada H, Yamada T, Obata-Yasuoka M, Minakami H, Yoshikawa H. Impact of planning of pregnancy in women with epilepsy on seizure control during pregnancy and on maternal and neonatal outcomes. Seizure. 2014; 23(2):112-6. doi: 10.1016/j.seizure.2013.10.003. PMID: 24183922.
6. McCauley M, Minsky S, Viswanath K. The H1N1 pandemic: media frames, stigmatization and coping. BMC Public Health. 2013;3(13):1116. https://doi.org/10.1186/1471-2458-13-1116.
7. Kaur TP, Rana A, Perumal V, Sharma A, Dadhwal V, Kulshrestha V, et al. A Cross-Sectional Analysis to Evaluate Knowledge, Attitude And Practices Among Pregnant Women During COVID-19 Pandemic. J Obstet Gynaecol India. 2021;71(Suppl 1):18-27. doi: 10.1007/s13224-021-01558-y. PMID: 34511781.
8. Erfani A, Shahriarirad R, Ranjbar K, Mirahmadizadeh A, Moghadami M. Knowledge, attitude and practice toward the novel coronavirus (COVID-19) outbreak: a population-based survey in Iran. Bull World Health Organ. 2020; 30(10.2471). DOI: 10.2471/BLT.20.256651.
9. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, Li Y. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. Int J Biol Sci. 2020; 16(10):1745-1752. doi: 10.7150/ijbs.45221. PMID: 32226294.
10. Al-Hanawi MK, Angawi K, Alshareef N, Qattan AMN, Helmy HZ, Abudawood Y, Alqurashi M, Kattan WM, Kadasah NA, Chirwa GC, Alsharqi O. Knowledge, Attitude and Practice Toward COVID-19 Among the Public in the Kingdom of Saudi Arabia: A Cross-Sectional Study. Front Public Health. 2020;8:217. doi: 10.3389/fpubh.2020.00217. PMID: 32574300.

ORIGINALNI RAD

STUDIJA POPREČNOG PRESEKA SA CILJEM ANALIZE UPUĆENOSTI, STAVA PREMA COVID-19 PANDEMIJI I PRIMENE MERA PREDOSTROŽNOSTI KOD MAJKI U ZDRAVSTVENOJ USTANOVI TERCIJARNOG NIVOA

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SAŽETAK

Uvod/cilj: Upućenost, stav prema COVID-19 pandemiji i primena mera predostrožnosti kod majki igra značajnu ulogu u sprečavanju širenja infekcije i utiče na kontrolu pandemije. Takođe pruža uvid i u ulogu medija u kontroli pandemije. Cilj rada je procena nivoa upućenosti, stava prema COVID-19 pandemiji i primene mera predostrožnosti (USP) u vezi sa COVID-19 pandemijom među majkama u bolnici tercijarnog nivoa.

Metodologija Analiza poprečnog preseka je sprovedena uz pomoć upitnika koji je podeljen stotini majki, koje su potpisale saglasnost, u porodilištu zdravstvene ustanove tercijarnog nivoa u Indiji, a odnosio se na COVID-19. Majkama koje su potpisale saglasnost su uzeti demografski podaci i USP skor (upućenost – 8 pitanja, stav -7 pitanja i mere predostrožnosti -5 pitanja).

Rezultati Studija je uključila 100 majki, od kojih je 21% mlađe od 25 godina, 67% je bilo starosti između 25 i 29 godina a preostalih 12% između 30 i 35 godina. Učesnice su popunjavale unapred pripremljeni upitnik o COVID-19 na osnovu koga je procenjivano njihovo znanje. Najveći broj pitanja se odnosio na tip bolesti, način prenošenja i moguće simptome. Većina majki (81%) je bila upoznata da je proglašena pandemija COVID-19 bolesti, a 79% da je u pitanju zarazna bolest. Na pitanje koji su najčešći simptomi bolesti, najveći procenat majki navodi temperature (97%), kašalj (98%), i otežano disanje (97%). Sve ispitanice (100%) bi pristale na porođaj u bolnici ukoliko se zaraze virusom COVID-19.

Zaključak Ova studija pokazuje da je većina majki imala zadovoljavajuće znanje, pozitivan stav i da je primenjivala odgovarajuće mere predostrožnosti kako bi se zaštitila od COVID-19.

Ključne reči: covid-19, pandemija, upućenost, stav.

DOI: 10.5937/halo28-39566

UDC: 616.596-005.1-02
616.24-005.7-07
616.127-005.8-07

PRIKAZ BOLESNIKA

SPLINTER HEMORAGIJE KAO MOGUĆI ZNAK INFARKTA MIOKARDA I PLUĆNE EMBOLIJE

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Đorđević S.&Anđelić S. Splinter hemoragije. Halo 194. 2022; 28(2):60-65.

SAŽETAK

Uvod/ Cilj Subungvalne splinter hemoragije (SSH) su čest ali ne specifičan klinički nalaz jednostavan za prepoznavanje i udružen sa bolestima različite težine. Prezentuju se u obliku bezbolnih longitudalnih crnih linija na distalnom delu nokatne ploče. Prikazujemo pacijenta sa novonastalim bolom u grudima, diferencijalno-dijagnostičkom nedoumicom između akutnog infarkta miokarda (AIM) i plućne embolije (PE), a čijom se inspekcijom evidentira prisustvo SSH.

Prikaz slučaja: Ekipa hitne medicinske pomoći (HMP) upućena je na lekarsku intervenciju kod 58.-og pacijenta zbog bola u grudima. Pacijent zatečen u sedećem položaju, daje anamnestičke podatke o naglonastalom probadajućem bolu u grudima, bez propagacije, koji je počeo nekoliko sati ranije, i da nikada ranije nije imao slične tegobe. Pri pregledu afebrilan, hipertenzivan 180/100 mmHg, umereno tahikardičan 84/min, normalne saturacije kiseonikom SpO2 – 97% ambijentalno. EKG nalaz: sinusni ritam, levogram, S1 zubac u D1, ST elevacija u odvodima D2, D3 i aVF ≤1mm, ST depresija V4-V6. Fizikalnim pregledom uočene su SSH na distalnim delovima nokatnih ploča prstiju šaka. Transportovan do dežurne kardiologije gde su kontinuiranim praćenjem, uočene rastuće vrednosti troponina T vrednosti (310, 2628, 1507 ng/l) i kreatin kinaze (934, 1228 U/l). Na osnovu povišene vrednosti D dimera i nalaza multislajsna komjuterizova tomografija (MSCT) plućne arterije posumnjano je i na plućnu emboliju (PE).

Zaključak: Buduća istraživanja treba usmeriti na definisanju uzročno-posledične veze između SSH sa AIM i/ili PE. Ovo bi bilo od signifikantnog značaja u postavljanju prehospitalne dijagnoze, pogotovo u državama poput naše koje imaju veliki javnozdravstveni problem sa kardiovaskularnim bolestima. Jednostavnim i brzim pregledom nokatnih ploča prstiju šake pacijenta koji ima simptome AIM/PE a bez značajnih promena na EKG-u, prisustvo SSH bi moglo da pomogne u diferencijalnoj dijagnozi bola u grudima.

Ključne reči: Subungvalne splinter hemoragije, infarkt miokarda, plućna embolija

Rad primljen: 09.08.2022.

Prihvaćen: 16.08.2022.

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Uvod

Poznato je da je bol u grudima, glavni simptom akutnog infarkta miokarda (AIM) i plućne tromboembolije (PE). Najčešći prateći simptomi su kod AIM propagacija bola u levu ruku, a dispneja, kašalj i hemoptizije kod PE, međutim nisu retki ni asimptomatski ili nespecifični slučajevi bola u grudima [1]. Zbog široke lepeze diferencijalnih-dijagnoza bola u grudima, lekaru na vanhospitalnom nivou sa ograničenim dijagnostičkim metodama otežano je postavljanje tačne radne dijagnoze.

SSH je čest poremećaj noktiju koji može biti idiopatski, izazvan lekovima, ili znak dermatološke bolesti, kao što su psorijaza i lihen planus, ili širok spektar sistemskih poremećaja, od kojih su najvažniji infekcije i vaskulitis [2]. Prvi opis SSH objavio je davne 1920. godine Tomas Holder, kod pacijenta sa subakutnim endokarditisom [3]. SSH čine oko 10% svih dermatoloških stanja i uključuju poremećaje nokatne ploče, ležište nokta, nabor nokta i vidljivi deo lunula [2]. Manifestuju se kao asimptomatske, sitne, linearne, crvenkasto-braon do crne, uzdužne pruge 1-3 mm dužine ispod nokatne ploče [2]. U težim formama, SSH mogu formirati neprekidnu liniju i dovesti do labavljenja nokatne ploče i odvajanja nokta od ležišta nokta. Iako se obično detektuje u distalnoj trećini, može se naći i u srednjoj i proksimalnoj trećini nokta. Početne formacije SSH su boje šljive, ali u roku od nekoliko dana potamne do smeđe ili crne. Obično se pomeraju distalno kako nokat raste, ali povremeno ostaju nepokretni ako su pričvršćeni za nokatni krevetac a ne za nokatnu ploču. Javljaju se uglavnom na noktima šaka, ređe nogu, i obično su ograničeni na jedan prst, sa izuzećem fizičkih radnika kod kojih je SSH lokalizovan na palcu i kažiprstu desne ruke [2].

Mehanizam nastanka splinter hemoragija može biti tromboza kapilara nokatnog kreveca, ili njegova mehanička trauma [2]. Kod starijih osoba su uglavnom posledica trauma, crne su boje i locirani u distalnom delu nokta, dok su kod osoba sa sitemskim oboljenjem crvene boje i proksimalne lokacije [4].

Iako su jednostavan klinički znak za prepoznavanje, SSH i dalje predstavljaju veliku nepoznanicu sa aspekta etiopatogeneze i mogućih komorbiditeta. U literaturi su opisana mnoga stanja koja mogu biti uzrok nastanka tromboze kapilara nokta, ali izuzetno je mali broj studija i meta-analiza koje se bave prevalencom SSH.

Dokazano je da SSH ima nisku senzitivnost ali visoku specifičnost u postavljanju dijagnoze infektivnog endokarditisa kod pacijenata sa suspektnom infekcijom.

Zaključak studije Schwiebert-a i saradnika, koja se bavila ovom tematikom je da bi uključivanje SSH u Duke kriterijume kao minorni vaskularni kriterijum, smanjilo dijagnostičku nedoumicu kod pojedinih Duka pozitivnih slučajeva [5].

U objavljenim radovima, SSH se sve češće predstavlja i kao jedan od mogućih znakova za ranu detekciju kardiovaskularnih bolesti [4].

Cilj rada

Cilj rada je prikazati pacijenta sa novonastalim bolom u grudima, diferencijalno-dijagnostičkom nedoumicom između AIM i PE, a čijom se inspekcijom evidentira prisustvo SSH.

Prikaz bolesnika

Ekipa hitne medicinske pomoći (HMP) upućena je na lekarsku intervenciju kod 58.-og pacijenta zbog bola u grudima. Pacijent zatečen u sedećem položaju, daje anamnestičke podatke o naglonastalom probadajućem bolu u grudima, bez propagacije, koji je počeo nekoliko sati ranije, i da nikada ranije nije imao slične tegobe. Nakon izmerenog krvnog pritiska vrednosti 160/80mmHg, popio je dve tablete amlodipine, 20-ak minuta pre dolaska ekipe HMP. Negira alergije, skorašnje povrede, otežano disanje, i druge tegobe po sistemima organa. Boluje od hipertenzije. Ima pozitivnu porodičnu anamnezu na AIM i kardiovaskularne bolesti (KVB).

Pri pregledu: svestan, orjentisan, afebrilan, eupnoičan, aktivno pokretan, normalne osteomuskularne građe, srednje uhranjen, zauzima aktivan stav, koža i vidljive sluznice normalno prebojene, odaje utisak lakog bolesnika. Hipertenzivan 180/100 mmHg, umereno tahikardičan 84/min, normalne saturacije SpO2 97% ambijentalno. Srčana akcija ritmična, tonovi tmuliji, bez udvajanja i bez šumova. Auskultatorno nad plućima vezikularno disanje bez propratnih šušnjeva. Trbuh mek i neosetljiv, bez organomegalije. Na ekstremitetima nema vidljivih edema. Uočene SSH na distalnim delovima nokatnih ploča prstiju šaka (**Figura 1**).

Figura 1. Subungvalne splinter hemoragije distalno na nokatnoj ploči palca

EKG nalaz: sinusni ritam, levogram, S1 zubac u D1, ST elevacija u odvodima D2, D3 i aVF ≤1mm, ST depresija V4-V6 (**Figura 2**).

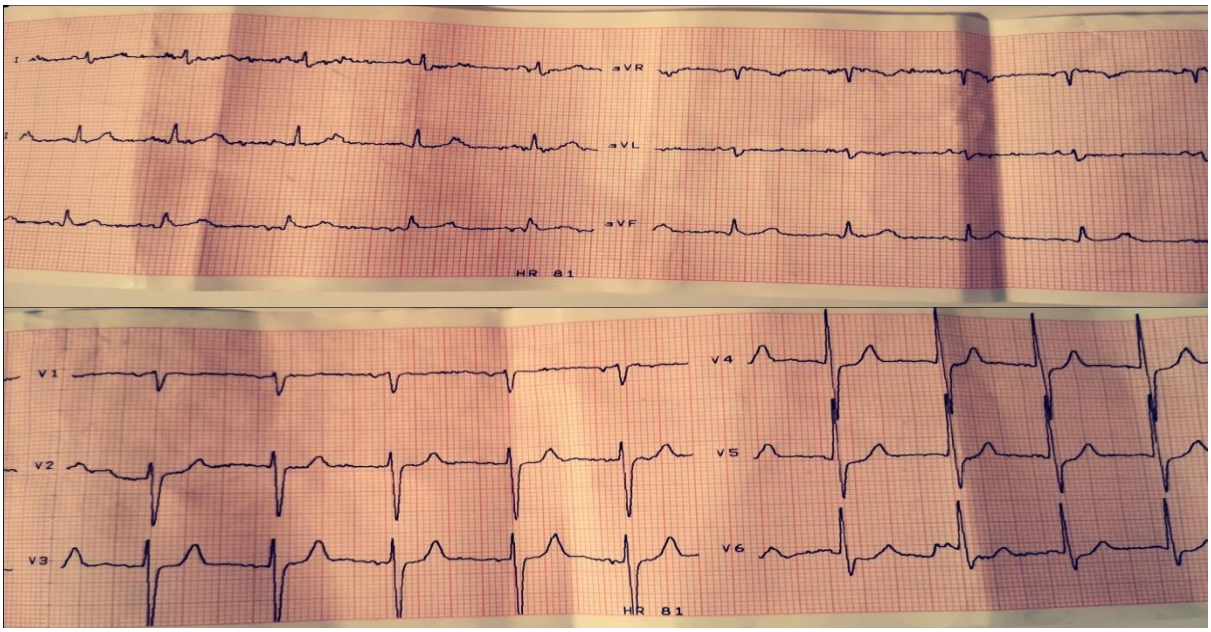

Figura 2. EKG zapis sa nespecifičnim promenama za infarkt miokarda

Pod dijagnozom akutnog koronarnog sindroma (AKS) transportovan je uz monitoring vitalnih funkcija do dežurnog kardiologa Urgentnog centra. Hospitalno urađene laboratorijske analize pokazuju povišene vrednosti troponina T (62 ng/l, potom 141 ng/l) i D dimera (1,18 mg/l). Zbog povišene vrednosti D dimera rađena je multislajsna komjuterizova tomografija (MSCT) plućne arterije koja opisuje nehomogenu opacifikaciju segmentnih grana za donji režanj obostrano što može odgovarati PE.

EKG na prijemu opisan bez promena dinamike.

Kontinuiranim praćenjem, uočene su rastuće vrednosti troponina T vrednosti (310, 2628, 1507 ng/l) i kreatin kinaze (934, 1228 U/l). Drugi parametri laboratorijskog ispitivanja koji su bili izvan granica referentnih vrednosti: fibrinogen 4,7 g/l; holesterol (ukupan) 5,85 mmol/l; holesterol HDL 1,48 mmol/l; holesterol LDL 3,43 mmol/l; trigliceridi 2,06 mmol/l, aspartat aminotransferaza AST 69, 89 U/l; alanin aminotransferaza (ALT) 28, 148 U/l; laktat dehidrogenaza (LDH) 652 u/l. Ostali parametri kompletne krvne slike i biohemije bili su u granicama referentnih vrednosti.

Urađena je selektivna koronarografija kojom je viđeno da je glavno stablo distalno suženo do 50%; prednja leva silazna arterija (LAD) je od ostijuma sužena 70-90%, kalcifikovana i bez angiografski značajnih stenoza u medijalnom i distalnom segmentu koji su difuzno izmenjeni, TIMI 3 protok; cirkumfleksna arterija (CX) je ostijalno sužena 50-60%; tupa marginalna grana (OM) subokludirana velikog dijametra; desna koronarna arterija (RCA) je bez angiografski značajnih stenoza u proksimalnom delu, u medijalnom stenoza 70-90% i distalnom segmetnu 50-60%, kalcifikovana i urednog TIMI 3 protoka.

Ehokardiografskim pregledom srca nisu uočene abnormalnosti kontraktilnosti zidova. Kolor dopler (CDS) krvnih sudova donjih ekstremiteta pokazuje da su obostrano sve duboke i površinske vene bez znakova tromboze. CDS karotidnih i vertebralnih arterija: bez morfološki i hemodinamski značajnih promena na karotidnim arterijama. Obostrano bifurkacija i unutrašnja karotidna arterija sa mešovitim plakovima i stenozama 30-35%.

Indikovana je hirurška revaskularizacija miokarda. Hospitalizovan 7 dana.

Terapija pri otpustu iz bolnice: acetilsalicilna kiselina 1x100mg, tikagrelor 2x90mg, pantoprazol 40mg ujutru, rosuvastatin 20mg uveče, izosorbidmononitrat 20mg dva puta dnevno, trimetazidin 35mg dva puta dnevno, diazepam 2,5mg dva puta dnevno, gliceriltrinitrat sublingalni sprej po potrebi.

Diskusija

Simptomi AIM i PE se često preklapaju i bez karakterističnih EKG promena je otežana prehospitalna diferencijalna dijagnoza bola u grudima, kada je anginozni bol jedini simptom bolesti. Prema populacionom registru za AKS Instituta za javno zdravlje Srbije Batut [6], broj novih slučajeva AIM u 2020. godini iznosio je 16.837, dok je broj umrlih bio 4.253 što predstavlja stopu mortaliteta od 61,6 (na 100.000 među svim uzrastima). Prema navedenim podacima jasno je da AIM ima izuzetan javnozdravstveni značaj u RS, te se ulažu napori u ranoj detekciji ove bolesti još na vanhospitalnom nivou. Međutim, dijagnoza AIM na ovom nivou zdravstvene zaštite nije uvek moguća zbog nespecifičnosti simptoma i kliničkog nalaza.

Prema četvrtoj univerzalnoj definiciji AIM, dijagnoza ove bolesti se postavlja na osnovu kliničkih pokazatelja akutne ishemije miokarda, detekcije porasta vrednosti troponina za najmanje jednu jedinicu iznad 99-og percentila referentnog intervala, i barem jednog od sledećih kriterijuma: simptomi ishemije miokarda; nove ishemijske promene ili nastanak patoloških Q-zubaca na EKG-u; ultrazvučni dokaz gubitka vitalnog miokarda ili nova regionalna abnormalnost zida miokarda u obrascu konzistentnim sa ishemijskom etiologijom; identifikacija koronarnog tromba angiografijom ili obdukcijom [7]. Zato, dokazati AIM na pretkliničkom nivou može biti veliki izazov ukoliko, kao kod našeg pacijenta, nema značajnih ishemijskih promena na EKG-u, a gotovo nemoguć ukoliko nema promena dinamike EKG-a. Ispoljena simptomatologija AIM može imati širok spektar diferencijalnih dijagnoza. Jedna od njih je i PE, čije EKG promene izuzetno variraju, od sinusne tahikardije kao najčešći EKG nalaz, preko devijacija električne ose u desno, kompletnog ili inkompletnog bloka desne grane, inverzije T talasa, S1Q3T3 obrasca, i najređe EKG prezentacije ST elevacije [8].

Uprkos niskoj prediktivnoj vrednosti, neke studije sugerišu da vrednost D dimera pomaže u diferencijalnoj dijagnozi PE i AIM [9]. Kod našeg pacijenta iako se na osnovu vrednosti D dimera i nalaza MSCT plućne arterije posumnjalo na PE, selektivna koronarografija i trend porasta troponina T potvrdili su dijagnozu AIM, nakon čega je indikovana hirurška revaskularizacija miokarda.

Kako je tokom fizikalnog pregleda uočena i SSH na distalnom delu nokatne ploče palca, nameće se pitanje da li SSH može biti jedan od kliničkih znakova AIM i PE.

Značaj SSH je inicijalno doveden u vezu sa infektivnim endokarditisom čije je prisustvo u toku bolesti prvi opisao Horder 1920 [3]. Posmatrajući pacijente sa infektivnim endokarditisom došao je do zaključka da se u toku bolesti stvara mnoštvo arterijskih mikroembolusa koji izazivaju infarkte mnogih organa, te se sledstveno kao njihova manifestacija na noktima vide SSH, sa ili bez promena na koži. Navodi da i bez karakteristične simptomatologije infektivnog endokarditisa jednostavnim pregledom noktiju kliničar može posumnjati na infektivni endokarditis.

Dalja istraživanja o etiopatogenezi dovela su do sukoba između teorija hemoragijskog i mikroembolusnog/trombotičkog porekla SSH [10]. Međutim, retke su studije koje su se bavile komorbiditetom SSH i drugim kliničkim entitetima. Po Horderu, 86% ispitivanih pacijenata sa potvrđenim arterijskim embolusom je imalo SSH [3].

Sistemske bolesti u okviru kojih su opisane SSH su: antifosfolipidni sindrom, sistemski eritemski lupus, polyarteritis nodosa, psorijaza, pemphigus vulgaris, sistemska amiloidoza [11], poliangitis [12]. Upotreba nekih lekova dovodi do stvaranja SSH: terbanafin, kabozantinib, sunitinib, grizeofulvin [9]. Interesantan članak objavljen 2021. prikazuje mlađu ženu sa SSH i infarktom mozga kao neobičnu prezentaciju sarkoidoze [13].

Opisan je i slučaj SSH kao mogućeg znaka gastrointestinalnog maligniteta [14], kao i onaj gde su SSH i neurološki ispad u vidu kvadrantanopsije bili prvi jasni znaci nebakterijskog trombotičkog endokarditisa koji je bio posledica metastaza karcinoma egzokrinog pankreasa [15].

Jedan od prikaza slučaja koji je objedinio SSH kao klinički znak i PE bio je kod pacijentkinje koja je prezentovana sa simptomima kašalja, povišene temperature, hemoptizija a inspekcijom uočljivim promenama u vidu SSH (CT je pokazao bilateralne nodule u plućima, infarkte slezine i plućnu emboliju, a laboratorijskim pretragama je ustanovljeno da pacijentkinja boluje od granulomatoze sa poliangitisom) [16].

Udruženost SSH sa AIM i PE kao kod našeg pacijenta ostaje raritet.

Bez daljih laboratorijskih pretraga nemoguće je precizno definisati uzrok nastanka pojave SSH kod našeg pacijenta. U patogenezi nastanka SSH jedina pretpostavka može biti da je nepoznati klinički entitet u ovom slučaju doveo do stvaranja embolusa/tromba i sledstvenih SSH na mikro, a AIM i PE na makro nivou (embolusna/trombotička etiopatogeneza). Sa druge strane, ne može se potpuno isključiti ni mogućnost mehaničke traume koja bi izazvala SSH (što bi bilo u okviru hemoragijske etiopatogeneze), pa bi tako ovaj klinički znak bio puka koincidencija već nejasnog istovremenog AIM i PE kod ovog pacijenta.

U nedostatku ciljanih kliničkih i epidemioloških studija, ostaje nejasno kako postaviti dijagnozu SSH i da li je treba lečiti ili ne [9].

Zaključak

Ukazuje se potreba za studijom koja bi detaljno definisala uzročno-posledične veze između SSH sa AIM i PE. Takva veze bi na pretkliničkom nivou bila od signifikantnog značaja, pogotovo u državama poput RS koje imaju veliki javnozdravstveni problem sa kardiovaskularnim bolestima. Prisustvo SSH dokazano jednostavnim i brzim pregledom nokatnih ploča prstiju šake pacijenta koji ima simptome AKS/PE bez značajnih promena na EKG-u, bi potencijalno moglo da pomogne u bržem postavljanju diferencijalne dijagnoze bola u grudima. Takođe, na kliničkom nivou bi pojavljivanje znaka SSH zahtevalo dalju evaluaciju pacijenta zbog mogućih skrivenih komorbiditeta.

Sukob interesa: autori izjavljuju da nema sukoba interesa.

Literatura

1. Gulati M, Levy PD, Mukherjee D, Amsterdam E, Bhatt DL, Birtcher KK, et al. 2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR guideline for the evaluation and diagnosis of chest pain: executive summary: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2021;144:e336–e367. doi: 10.1161/CIR.0000000000001030.
2. Haber R, Khoury R, Kechichian E, Tomb R. Splinter hemorrhages of the nails: a systematic review of clinical features and associated conditions. International Journal of dermatology. 2016; 55(12): 1304-1310. https://doi.org/10.1111/ijd.13347
3. Horder T, Libman E, Poynton FJ, Coombs C, Gow AE, Starling HJ, et al. Discussion On The Clinical Significance And Course Of Subacute Bacterial Endocarditis. The British Medical Journal.1920;*2*(3113): 301–311. http://www.jstor.org/stable/20425049.
4. Young J, Mulley G. Splinter haemorrhages in the elderly. Age Ageing 1987; 16: 101–104. doi: 10.1093/ageing/16.2.101.PMID: 3577946.
5. Schwiebert R, Baig W, Wu J, Sandoe ATJ. Diagnostic accuracy of splinter haemorrhages in patients referred for suspected infective endocarditis. Heart. Published Online First: 16 July 2022. doi: 10.1136/heartjnl-2022-321052.
6. Institut za javno zdravlje Srbije dr Milan Jovanović Batut. Registar za akutni koronarni sindrom u Srbiji, izveštaj br. 15. Incidenca i mortalitet od akutnog koronarnog sindroma u Srbiji 2020. Beograd, 2021.
7. Eckner D, Pauschinger M, Ademaj F, Martinovic K. Klinische Bedeutung der 4. Universellen Definition des Myokardinfarkts [Clinical implications of the fourth universal definition of myocardial infarction]. Herz. 2020;45(6):520-527. German. doi: 10.1007/s00059-020-04948-6. PMID: 32514585.
8. Stefanović I, Tamburkovski V, Kašćak J, Anđelić S. EKG slika plućne embolije ili pseudo infarktnog obrasca. Halo 194. 2021; 27(3): 91-95. DOI: 10.5937/halo27-34539.
9. Kim JY, Kim KH, Cho JY, Sim DS, Yoon HJ, Yoon NS, et sl. D-dimer/troponin ratio in the differential diagnosis of acute pulmonary embolism from non-ST elevation myocardial infarction. Korean J Intern Med. 2019;34(6):1263-1271. doi: 10.3904/kjim.2018.153. PMID: 30685960.

10. Gao J, Shen C, Ko R, Guo Y, Shen X, Cui Y, Yang C. Clinical Observation and Follow-Up of Subungual Splinter Hemorrhages of Toenails in Chinese Adults. Indian J Dermatol. 2020; 65(1):11-16. doi: 10.4103/ijd.IJD_193_18. PMID: 32029933.
11. Litaiem N, Chabchoub I, Gara S, Slouma M, Hamdi MS, Zeglaoui F. Nail changes in systemic amyloidosis. Clin Case Rep. 2021 Aug 21;9(8):e04685. doi: 10.1002/ccr3.4685. PMID: 34457298; PMCID: PMC8380092.
12. Laurent C , Dion J, Régent A. Splinter haemorrhages, splenic infarcts, and pulmonary embolism in granulomatosis with polyangiitis. Vasc Med. 2019; 24(3): 263-264. DOI: 10.1177/1358863X18807541. PMID: 30426847.
13. Ayub S, Hawari R, Mahmood-Rao H. Splinter haemorrhages and brain infarcts as an unusual presentation of sarcoidosis. BMJ Case Reports CP. 2021;14:e238663.
14. Santhakumar C, Faddoul C, Barker R, Facer R, Limaye S. Lesson of the month 1: Splinter haemorrhages as a pointer to gastrointestinal malignancy. Clin Med (Lond). 2016;16(2):199-200. doi: 10.7861/clinmedicine.16-2-199. PMID: 27037395.
15. Chunhamaneewat N, Maraj S, Borate U, Figueredo VM. A 28-year-old woman with headache, blurred vision, and splinter hemorrhages. Am J Med Sci. 2009; 338(6):493. doi: 10.1097/MAJ.0b013e3181aa508b. PMID: 19710598.
16. Laurent C, Dion J, Régent A. Splinter haemorrhages, splenic infarcts, and pulmonary embolism in granulomatosis with polyangiitis. Vasc Med. 2019; 24(3): 263-264. doi: 10.1177/1358863X18807541. PMID: 30426847.

CASE REPORT

SPLINTER HAEMORRHAGES AS POSSIBLE SIGNS OF MYOCARDIAL INFARCTION OR PULMONARY EMBOLISM

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ABSTRACT

Introduction/Objective Subungual splinter haemorrhages (SSH) are a common non-specific clinical sign which is easy to recognize. They can occur in conjunction with many medical conditions of various significance. They present as painless black longitudinal lines towards the distal part of the nail bed. The objective of this article is to present a patient with newly acquired chest pain, a differential diagnostic dilemma between acute myocardial infarction (AMI) and pulmonary embolism (PE) whose fingers show signs of SSH.

Case report An emergency medical team (HMP) was dispatched to a location where a 58-year-old man was experiencing chest pain. They found the patient in a sitting position, reporting sudden onset of stabbing chest pain with no propagation and lasting a few hours. He stated that he had never before had similar symptoms. Upon examination, the patient was afebrile, hypertensive (180/100 mmHg), mildly tachycardic (84/min), and blood oxygen saturation was within normal limits (97% on room air). ECG: sinus rhythm, left axis deviation, S1 in D1, ST elevation ≤ 1mm in D2, D3 and aVF, ST depression from V4 to V6. The physical examination revealed SSH located on the nail beds of the hands distally. The patient was transported to cardiology where he was continuously monitored. Rising values of troponin T (310, 2628, 1507 ng/l) and creatine kinase (934, 1228 U/l) were noted. However, based on the rising values of D dimer and pulmonary artery multislice computer tomography (MSCT) findings, there were reasons to consider the possibility of pulmonary embolism (PE) as well.

Conclusion Future research should aim at defining the connection between SSH and AMI and/or PE. This would be crucial in making a prehospital diagnosis, especially in countries that have huge cardiovascular disease public health problems, such as ours. A quick and simple exam of nailbeds on the hands of patients with symptoms of AMI/PE, but without significant ECG findings, could help with the differential diagnosis if SSH were found to be present.

Keywords: Subungual splinter haemorrhage, myocardial infarction, pulmonary embolism

UPUTSTVO AUTORIMA ZA PRIPREMANJE RADA

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Na sledećoj (trećoj) stranici priložiti kratak sadržaj na engleskom jeziku (Abstract) sa ključnim rečima (Key words), i to za radove u kojima je obavezan kratak sadržaj na srpskom jeziku, koji treba da ima 200-300 reči. Apstrakt na engleskom treba da ima istu strukturu kao i kratak sadržaj na srpskom.

Tekst članka

Originalni rad treba da ima sledeće podnaslove: uvod, cilj rada, metod rada, rezultati, diskusija, zaključak, literatura.

Prikaz bolesnika čine: uvod, prikaz bolesnika, diskusija, zaključak, literatura. Ne treba koristiti imena bolesnika, inicijale ili brojeve istorija bolesti, naročito u ilustracijama.

Pregled iz literature čine: uvod, odgovarajući podnaslovi, zaključak, literatura. Prvoimenovani autor metaanalize i preglednog rada mora da navede bar pet autocitata (kao autor ili koautor) radova publikovanih u časopisima s recenzijom. Koautori, ukoliko ih ima, moraju da navedu bar jedan autocitat radova takođe publikovanih u časopisima s recenzijom.

Podaci o korišćenoj literaturi u tekstu označavaju se arapskim brojevima u uglastim zagradama – npr. [1, 2], i to onim redosledom kojim se pojavljuju u tekstu.

Obim rukopisa. Celokupni rukopis rada – koji čine naslovna strana, kratak sadržaj, tekst rada, spisak literature, svi prilozi, odnosno potpisi za njih i legenda (tabele, fotografije, grafikoni, sheme, crteži), naslovna strana i kratak sadržaj na engleskom jeziku – mora iznositi za originalni rad, saopštenje, pregled iz literature i vodič kliničke prakse do 5.000 reči, za prikaz bolesnika do 2.000 reči, za rad iz istorije medicine do 3.000 reči, za rad za praksu do 1.500 reči; radovi za ostale rubrike moraju imati do 1.000 reči.

Provera broja reči u dokumentu može se izvršiti u programu Word kroz podmeni Tools–Word Count ili File–Properties–Statistics.

Uvod. Navesti hipotezu (ukoliko postoji) i ciljeve rada koji iz nje proističu. Ukratko izneti razloge za studiju ili posmatranje.

Navesti samo strogo relevantne podatke iz literature i ne iznositi opširna razmatranja o predmetu rada. Ne iznositi podatke ili zaključke iz rada o kome se izveštava.

Metode. Jasno opisati kako ćete i na koji način sprovesti istraživanje (intervju, anketni upitnik, itd), mesto sprovođenja veličinu uzorka i u kom vremenskom periodu je istraživanje ssprovedeno. Opišite način izbora metoda posmatranja ili eksperimentnih metoda (ispitanici ili eksperimentne životinje, uključujući kontrolne). Odrediti uključujuće i isključujuće kriterijume za odabir ispitanika. Identifikovati metode, aparaturu (ime i adresa proizvođača u zagradi) i proceduru dovoljno detaljno da bi se drugim autorima omogućilo ponavljanje rezultata. Za uhodane metode, uključujući i statističke, navesti samo podatke iz literature. Dati podatak iz literature i kratak opis za metode koje su publikovane, ali nisu dovoljno poznate. Opisati nove ili značajno modifikovane metode, izneti razlog za njihovo korišćenje i proceniti njihova ograničenja. Tačno identifikovati sve primenjene lekove i hemikalije, uključujući generičko ime, doze i načine primene (im, per os, iv, sc, ip, itd). Ne koristiti komercijalna imena lekova i drugih preparata.

Etika. Kada se izveštava o eksperimentu na ljudima, naglasiti da li je procedura sprovedena u skladu sa etičkim standardima Komiteta za eksperimente na ljudima ili sa Helsinškom deklaracijom iz 1975., revidiranom 1983. Obavezna je i saglasnost nadležnog etičkog komiteta. Ne iznositi imena, inicijale ili bolničke brojeve ispitanika, naročito ukoliko je materijal ilustrovan. Kod eksperimenata naznačiti da li su poštovani principi o zaštiti životinja po propisima i zakonu.

Statistika. Detaljno opisati statističke metode da se dobro informisanom čitaocu omogući da proveri iznesene rezultate. Kada je moguće, kvantifikovati nalaze i prikazati ih uz odgovarajuće pokazatelje greške (kao npr. SD, SE ili granice poverenja). Izbegavati oslanjanje samo na statističko testiranje hipoteze, kao što je vrednost p, što ne daje značajne kvantitativne informacije.

Prodiskutovati prihvatljivost subjekata eksperimenta. Izneti detalje o randomizovanju (metodi slučajnog izbora). Opisati metode za slepo ispitivanje, izneti broj zapažanja. Izve-stiti o gubicima kod zapažanja (kao npr. bolesnici koji otpadnu iz kliničkog ispitivanja). Podaci iz literature za dizajn studije i statističke metode treba, ako i kada je moguće, da budu standardni radovi radije nego članci u kojima je to prvi put objavljeno.

Naglasiti ako je primenjen neki kompjuterski program koji je u opštoj upotrebi. Opis statističkih metoda treba smestiti u poglavlje Metode. Kada se sumiraju rezultati u poglavlju Rezultati, naglasiti kojom statističkom metodom su analizovani. Tabele i slike ograničiti na one koje su neophodne da bi se objasnili i podržali stavovi u radu. Grafikone treba koristiti umesto tabela sa mnogo podataka. Ne duplirati prikazivanje podataka grafikonom i tabelom. Definisati statističke termine, skraćenice i većinu simbola.

Rezultati. Rezultate prikazati logičkim redosledom u tekstu, tabelama i ilustracijama. U tekstu ne ponavljati sve podatke iz tabela ili ilustracija; naglasiti ili sumirati samo značajna zapažanja.

Diskusija. Naglasiti nove i značajne aspekte studije i zaključke koji iz njih slede. Ne ponavljati detaljno podatke ili drugi materijal koji je već prikazan u uvodu ili rezultatima. U diskusiju uključiti implikacije nalaza i njihova ograničenja uključujući i one za buduća istraživanja. Posmatranja dovesti u vezu sa drugim relevantnim studijama, u načelu iz poslednje tri godine, a samo izuzetno i starijim. Povezati zaključke sa ciljevima rada, ali izbegavati kategorične tvrdnje i zaključke koje podaci iz rada ne podržavaju u potpunosti. Izbegavati isticanje primata u nečemu i aluzije na rad koji nije dovršen. Izneti nove hipoteze kada je to opravdano, ali ih jasno naznačiti kao takve. Kada je to primereno, mogu se uključiti i preporuke.

4. Zahvalnost

Iza diskusije, a ispred literature, kada je to potrebno, izneti u jednoj ili više rečenica (a) doprinos osobe kojoj treba odati priznanje, ali koja ne zaslužuje koautorstvo, kao npr. podrška šefa odeljenja; (b) zahvalnost za tehničku pomoć; (v) zahvalnost za finansijsku i materijalnu pomoć, uz naznačavanje vrste pomoći itd.

5. Literatura

Spisak referenci je odgovornost autora, a citirani članci treba da budu lako pristupačni čitaocima časopisa. Stoga uz svaku referencu obavezno treba navesti DOI broj članka (jedinstvenu nisku karaktera koja mu je dodeljena) i PMID broj ukoliko je članak indeksiran u bazi PubMed/MEDLINE. Podatke iz literature treba numerisati onim redosledom kojim se pojavljuju u tekstu. Broj reference ne bi trebao da bude veći od 30 osim u pregledu literature u kojem je dozvoljeno da ih bude do 50. Većina citiranih naučnih članaka ne treba da bude starija od 5 godina. Izbegavati korišćenje apstrakta kao reference, a apstrakte od dve godine ne citirati. Identifikovati reference u tekstu, tabelama i legendama arapskim brojevima u zagradi [1]. Svi podaci o citiranoj literaturi moraju biti tačni. Preporuka je da se ne citiraju radovi iz časopisa koje ne indeksiraju Current Contents, Index Medicus (Medline) ili Excerpta Medica.

Svi radovi, bez obzira na jezik izvora, citiraju se na engleskom jeziku, uz navođenje izvornog jezika u zagradi iza naslova (npr. In Serbian, In Russian, In German, in French, itd.) Koristiti stil citiranja, kao u navedenim primerima, koji se koristi u Index Medicus-u. Ne prihvata se citiranje apstrakata, sekundarnih publikacija, usmenih saopštenja, nepublikovanih radova, službenih i poverljivih dokumenata. Mogu se prihvatiti citati radova koji su prihvaćeni za štampu, ali još nisu objavljeni. Naznačuje se časopis i dodaje „in press“.

Primeri ispravnog oblika referenci:

Članci u časopisima

(1) Standardni članak u časopisu (navesti sve autore, ali ako broj prelazi šest, navesti šest i dodati et al (i dr.)

Jurhar-Pavlova M, Petlichkovski A, Trajkov D, Efinska-Mladenovska O, Arsov T, Strezova A, et al. Influence of the elevated ambient temperature on immunoglobulin G and immunoglobulin G subclasses in sera of Wistar rats. Vojnosanit Pregl. 2003; 60(6): 657–12.

(2) Organizacija kao autor

The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. Med J Aust. 1996; 164: 282–4.

(3) Bez autora

Cancer in South Africa [editorial]. S Afr Med J 1994; 84: 15.

(4) Volumen sa suplementom

Tadić V, Ćetković S, Knežević D. Endogenous ooids release: an alternative mechanism of cyanide toxicity? Iugoslav Physiol Pharmacol Acta. 1989; 25 Suppl 7: 143–4.

(5) Sveska sa suplementom

Dimitrijević J, Đukanović Lj, Kovačević Z, Bogdanović R, Maksić Đ, Hrvačević R, et al. Lupis nephritis: histopathologic features, classification and histologic scoring in renal biopsy. Vojnosanit Pregl. 2002; 59 (6 Suppl): 21–31.

6) Volumen sa delom (Pt)

Ozben T, Nacitarhan S, Tuncer N. Plasma and urine sialic acid in non- insulin dependent diabetes mellitus. Ann Clin Biochem 1995; 32 (Pt 3): 303–6.

(7) Sveska sa delom

Poole GH, Mills SM. One hundred consecutive cases of flap lacerations of the leg in ageing patients. N Z Med J. 1994; 107 (986 Pt 1): 377–8.

(8) Sveska bez volumena

Turan I, Wredmark T, Fellander-Tsai L. Arthroscopic ankle arthrodesis in rheumatoid arthritis. Clin Orthop. 1995; (320): 110–4.

(9) Bez volumena i sveske

Browell DA, Lennard TW. Immunologic status of the cancer patient and the effects of blood transfusion on antitumor responses. Curr Opin Gen Surg. 1993: 325–33.

(10) Paginacija rimskim brojevima

Fisher GA, Sikic BI. Drug resistance in clinical oncology and hematology. Introduction. Hematol Oncol Clin North Am. 1995 Apr; 9 (2): xi–xii.

Knjige i druge monografije

(11) Pojedinac kao autor

Ringsven MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.

(12) Urednik (editor) kao autor

Balint B, editor. Transfusiology. Beograd: Zavod za udţbenike i nastavna sredstva; 2004 (In Serbian).

(13) Poglavlje u knjizi

Mladenović T, Kandolf L, Mijušković ŢP. Lasers in dermatology. In: Karadaglić Đ, editor. Dermatology (In Serbian). Beograd: Vojnoizdavački zavod & Verzal Press; 2000. p. 1437–49.

(14) Zbornik radova sa kongresa

Kimura J, Shibasaki H, editors. Recent advances in clinical neurophysiology. Proceedings of the 10th International Congress of EMG and Clinical Neurophysiology; 1995 Oct 15–19; Kyoto, Japan. Amsterdam: Elsevier; 1996.

(15) Rad iz zbornika

Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6–10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561–5.

(16) Disertacija

Knežević D. The importance of decontamination as an element of complex therapy of poisoning with organophosphorous compounds [dissertation]. Belgrade: School of Veterinary Medicine; 1988 (In Serbian).

Ostali publikovani materijali

(17) Novinski članak

Vujadinović J. The inconsistency between federal and republican regulation about pharmacies. In between double standards (In Serbian). Borba 2002 February 28; p. 5.

(18) Rečnici i slične reference

Kostić AĐ. Multilingual Medical Dictionary. 4th Edition. Beograd: Nolit; 1976. Erythrophobia; p. 173–4.

Neobjavljeni materijal

(19) U štampi (in press)

Pantović V, Jarebinski M, Pekmezović T, Knežević A, Kisić D. Mortality caused by endometrial cancer in female population of Belgrade. Vojnosanit Pregl. 2004; 61 (2): in press. (In Serbian)

Elektronski materijal

(20) Članak u elektronskom formatu

Morse SS. Factors in the emergence of infectious disease. Emerg Infect Dis [5serial online].1995 Jan–Mar. Dostupno na URL: http://www.cdc.gov/ncidod/EID/eid/htm

(21) Monografija u elektronskom formatu

CDI, clinical dermatology illustrated [monograph on CD-ROM]. Reeves JRT, Maibach H. CMEA Multimedia Group, producers. 2nd ed. Version 2.0. San Diego: CMEA; 1995.

(22) Kompjuterska datoteka

Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational Systems; 1993.

PRILOZI

Tabele. Tabele se označavaju arapskim brojevima po redosledu navođenja u tekstu, sa nazivom na srpskom ili engleskom jeziku. Naslo v treba o tkucati iznad tabele, a objašnjenj a ispod nje . Tabele crtati isključivo u programu Word, kroz meni Table–Insert–Table, uz definisanje tačnog broja kolona i redova koji će činiti mrežu tabele. Desnim klikom na mišu – pomoću opcija Merge Cells i Split Cells – spajati, odnosno deliti ćelije. Koristiti font Times New Roman, veličina slova 12 pt, sa jednostrukim proredom i bez uvlačenja teksta. Korišćene skraćenice u tabeli treba objasniti u legendi ispod tabele.

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Korišćene skraćenice na grafikonu treba objasniti u legendi ispod grafikona.

Sheme (crteži). Sheme raditi u programu Corel Draw ili Adobe Ilustrator (programi za rad sa vektorima, krivama). Svi podaci na shemi kucaju se u fontu Times New Roman, veličina slova 10 pt.

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A manuscript should consist of 1) Title Page, 2) Abstract with Keywords, 3) Text, 4) Acknowledgements (optional), 5) References. Pages should be numbered consequently in the top or bottom right-hand corner, commencing with the Title Page.

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a) The title should be short, clear and informative, should not contain abbreviations and should correspond to the content of the paper. Subtitles should be avoided.
b) Full names and surnames of the authors, together with years of birth are to be given
c) Official names and places of authors‟ institutions, in order corresponding to the indexed numbers of the authors
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A review article and current topic include: Introduction, corresponding section headings, Conclusion, References. The firstly named author of a review article should cite at least five auto-citations (as the author or co-author of the paper) of papers published in peer-reviewed journals. Co-authors, if any, should cite at least one auto-citation of papers also published in peer-reviewed journals.

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Introduction. A hipothesis (if there is one) and the aims of the work deriving from that hipothesis should be noted. A brief argumentation of the reasons for the study or research should be given. Only strictly relevant literature data should be specified here, without detailed discussions of the subject of the work. Do not disclose the data or the results from the paper.

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Ethical approval. When reporting on experiments on humans, it should be emphasized if the procedure was done in accordance with the Declaration of Helsinki and Recommendation for Conduct of Clinical Research from 1975, revised in 1983. The compliance of the authorized ethics committee is also obligatory. Names, initials or patients‟ card numbers should never be

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Statistics. A detailed account of statistical methods used should be given in order to enable a well informed reader to check the results. Whenever possible, quantify the results and also state the corresponding statistical flaw index (e.g. SD, SE or credibility borders). Avoid relying only on statistical testing of the hypothesis, such as r value, which does not provide relevant quantitative data. Always discuss the plausibility of experiment subjects. Give details on randomization (random choice method). Describe the methods used in blind experiments, specify the number of observations. Report on the number of failed observations (such as when patients drop out of clinical research). If and whenever possible, reference literature data for study design and statistical methods should be standard works rather than articles in which these data were first published.

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Results. Results should be reported in logical sequence throughout the text as well as in tables and illustrations. Do not repeat all the data from the tables or illustrations in the text; emphasize or summarize only significant observations.

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4. Acknowledgments

After Discussion and before Reference, when needed, the following acknowledgments can be added in one or more sentences (a) contribution of an individual who needs to be recognized and awarded but does not deserve co- authorship, e.g. support of the head of department; (b) acknowledgment for technical support; (c) acknowledgment for financial and material support, underlying type of support etc.

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(2) Organization (Institution) as author

The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. Med J Aust. 1996; 164: 282–4.

(2) No author
Cancer in South Africa [editorial]. S Afr Med J. 1994; 84: 15.

(4) Volume with supplement
Tadić V, Ćetković S, Knežević D. Endogenous opioids release: an alternative mechanism of cyanide toxicity? Iugoslav Physiol Pharmacol Acta. 1989; 25 Suppl 7: 143–4.

(5) Tome with supplement
Dimitrijević J, Đukanović Lj, Kovačević Z, Bogdanović R, Maksić Đ, Hrvačević R, et al. Lupis nephritis: histopathologic features, classification and histologic scoring in renal biopsy. Vojnosanit Pregl. 2002; 59 (6 Suppl): 21–31.

6) Volume with part (Pt)
Ozben T, Nacitarhan S, Tuncer N. Plasma and urine sialic acid in non-insulin dependent diabetes mellitus. Ann Clin Biochem. 1995; 32 (Pt 3): 303–6.

(7) Tome with part
Poole GH, Mills SM. One hundred consecutive cases of flap lacerations of the leg in ageing patients. N Z Med J. 1994; 107 (986 Pt 1): 377–8.

(8) Tome without volume
Turan I, Wredmark T, Fellander-Tsai L. Arthroscopic ankle arthrodesis in rheumatoid arthritis. Clin Orthop. 1995; (320): 110–4.

(9) No volume and tome
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(10) Pagination in Roman numerals
Fisher GA, Sikic BI. Drug resistance in clinical oncology and hematology. Introduction. Hematol Oncol Clin North Am. 1995 Apr; 9 (2): xi–xii.

Books and other monographs

(11) Single author
Ringsven MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.

(12) Editor as author
Balint B, editor. Transfusiology. Beograd: Zavod za udţbenike i nastavna sredstva; 2004 (In Serbian).

(13) Book chapter
Mladenović T, Kandolf L, Mijušković ŢP. Lasers in dermatology. In: Karadaglić Đ, editor. Dermatology (In Serbian). Beograd: Vojnoizdavački zavod & Verzal Press; 2000. p. 1437– 49.

(14) Congress proceedings
Kimura J, Shibasaki H, editors. Recent advances in clinical neurophysiology. Proceedings of the 10th International Congress of EMG and Clinical Neurophysiology; 1995 Oct 15–19; Kyoto, Japan. Amsterdam: Elsevier; 1996.

(15) Paper from congress proceedings
Bengtsson S, Solheim BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics; 1992 Sep 6–10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561–5.

(16) Dissertation
Knežević D. The importance of decontamination as an element of complex therapy of poisoning with organophosphorous compounds [dissertation]. Belgrade: School of Veterinary Medicine; 1988 (In Serbian).

Other publications

(17) Newspaper article
Vujadinović J. The inconsistency between federal and republican regulation about pharmacies. In between double standards (In Serbian). Borba 2002 February 28; p. 5.

(18) Dictionaries and similar references
Kostić AĐ. Multilingual Medical Dictionary. 4th Edition. Beograd: Nolit; 1976. Erythrophobia; p. 173–4.

Unpublished work

(19) in press
Pantović V, Jarebinski M, Pekmezović T, Knežević A, Kisić D. Mortality caused by endometrial cancer in female population of Belgrade. Vojnosanit Pregl. 2004; 61 (2): in press. (In Serbian)

Electronic references

(20) Article in electronic form
Morse SS. Factors in the emergence of infectious disease. Emerg Infect Dis [5serial online]1995 Jan–Mar. Available at URL: http://www.cdc.gov/ncidod/EID/eid/htm

(21) Monograph in electronic form
CDI, clinical dermatology illustrated [monograph on CD-ROM]. Reeves JRT, Maibach H. CMEA Multimedia Group, producers. 2nd ed. Version 2.0. San Diego: CMEA; 1995.

(22) Electronic database
Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational Systems; 1993.

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