

Reversibility of Antibiotic Resistance in an Orphanage of Children with AIDS in Cambodia

A. Shahum (Andrea Shahum)¹, V. Sladeckova (Veronika Sladeckova)^{2,6}, J. Benca (Juraj Benca)^{3,6}, V. Krcmery (Vladimir Krcmery)^{4,6}, N. Sternnberg (Nikolai Sternnberg)⁶, Z. Dudova (Zuzana Dudova)^{2,6}, A. Liskova (Anna Liskova)^{4,5}, M. Mikloskova (Monika Mikloskova)⁶, M. Bencova (Martina Bencova)^{2,3}, H. L. H. Cheng Hoin (Hoy Leang Hoinand Cheng Hoin)⁶, J. Srenkel (Julius Srenkel)⁶, H. Dohalova (Hana Dohalova)⁶, J. Vallova (Jana Vallova)⁶ and C. Muss (Claus Muss)⁷

Original Article

¹ Medical University of North Carolina at Chapel Hill, USA

² St. Maximilian Colbe House of St. Elizabeth University (SEU), Phnom Penh, KH

³ House of Family Sihanoukville of SEU, KH

⁴ Institute of Microbiology of St. Elisabeth University, Bratislava, SK

⁵ Ref. Lab. For ATB Resistance, Nitra, SK

⁶ Slovak Tropical Institute and St. Elizabeth University (SEU) PhD. Program, Bratislava, SK

⁷ IGAP Institute Vienna, Austria, Währinger Str. 63, A-1090 Wien, AT

E-mail address:

jose.suvada@gmail.com

Reprint address:

Jozef Suvada

St. Charles de Foucault Center

Beirut, LB

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Michael Costello, MA, MBA, J.D.

University of Scranton School of professional studies, USA

Daniel J. West, Jr. Ph.D, FACHE

University of Scranton

Department of Health Administration and Human Resources, USA

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Abstract:

Orphans and street children together with crime and poverty represent significant causes for social pathology in developing countries. The aim of this paper is to compare resistance patterns of ATB resistant bacteraemia on admission, and after a 10-15 years stay in closed social facilities – Houses for Orphans, in Cambodia. Reversibility of ATB resistance has been noted after a 10-15 years stay due to significant improvement of their immune system due to 90 – 100% adherence to antimicrobial therapy (ARV) against their HIV infection.

Conflict of interest:

The authors whose names are listed in the title of the article certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, or other equity interest), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Introduction

According to UNICEF statistics, around 100 million children are living on the streets around the world. The majority of them, condemned in extreme poverty, are living in Sub-Saharan Africa and Southeast Asia. Just in Cambodia, there are an estimated 20,000 children living and begging on Phnom Penh's streets. Street children are at significantly higher risk of abuse, neglect, exploitation and criminal activities. Their poor nutritional status and vitamin deficiency are background for many infectious diseases, including RTI, diarrhea and parasites. Poor management of infectious diseases can contribute to antimicrobial resistance, especially in countries where antibiotics are widely accessible without prescription. The highest burden of malnutrition, infectious diseases and mortality is for HIV positive children from socially disadvantaged environments. (1-5)

The aim of this paper is to compare resistance patterns of ATB resistant bacteraemia on admission to the facility and 10 to 15 years after the admission. The study has been conducted at two houses for HIV positive children, one in Phnom Penh and the other in Sihanoukville.

Patient and Methods

In total, 149 HIV positive children aged 6 to 18 years living in orphan houses were included in the study. 120 children (80%) are on first line treatment with either Nevirapine or Efavirenz. 29 children were receiving second line treatment of ARV. When there was an occurrence of respiratory tract infection, samples of sputum and oropharynx swabs were analyzed for pathogen identification and resistance to antimicrobials. With occurrence of resistant bacteria, the colonizing of infected respiratory tracts was analyzed and compared with chi-squared test for statistical analysis in univariate model.

Results and Discussion

Initially, all pathogens found, had very high resistance to antimicrobial agents. On admission 90% of all *S. aureus* were MRSA; 75% pneumococci were penicillin-resistant; 66% of *S. pyogenes* were erythromycin-resistant. After 10-14 years of HAART, resistance decreased to about 25-33% in previously mentioned pathogens. The change of

Conclusion

Antibiotic resistance in street children with HIV in Cambodia is high and decrease with proper ARV administration; improved nutrition; safe environments. Therefore environment, nutrition and compliance to ARV remain the biggest challenges for reaching sustainable development targets.

Table 1 Comparison of ATB resistance to respiratory tract isolates in orphans with AIDS before and after ART treatment.

	On admission	2016
<i>S. aureus</i> / MRSA	90%	25%
<i>S. pneumoniae</i> ./ PRP	75%	25%
<i>S. pyogenes</i> ./ERY-SP	66%	33%
Enterobacteriaceae/ ESBC	70%	55%
<i>Candida</i> Spp	70%	45%
<i>PS.aeruginosa</i> spp/CTAZ-R	90%	55%
<i>Acinetobacter</i> spp / CTA-R	90%	45%

resistance was most significant in *S. aureus* and *S. pyogenes*, where resistance to the majority of antimicrobials decreased by 50 - 70%. The rate of resistance with gram-negative bacteria was similar: for example, 70-90% of all enterobacteria were producing betalactamase with extended spectrum (ESBL) and were resistant to third generations of cephalosporines; 75% of all candida species were initially resistant to fluconazole (Table 1.) The decrease in resistance was 20-40%. The reversibility of ATB resistance has been noted 10-14 years after admission, probably due to significant improvement of their immune systems and to 90-100% adherence to antimicrobial therapy. Conditions of environment and nutrition are probably also significant factors (3-5); these hypotheses, however, need more research.

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