Sys Rev Pharm 2021; 12(4): 196-198
A multifaceted review journal in the field of pharmacy
E-ISSN 0976-2779 P-ISSN 0975-8453

Short Communication

Use of Different Antibiotics for the Prophylaxis of Infective Endocarditis in Dentistry

Moazza Latif[1], Javeria Noor[2], Muqaddas Shahzad Qazi[3]

[1]DHQ Teaching hospital Gujranwala, Pakistan
[2]Department of Dentistry, University medical and dental collage, Faisalabad, Pakistan
[3]House Officer, Jinnah Hospital Lahore, Pakistan

Article History: *Submitted: 07.05.2021* *Accepted: 12.05.2021* *Published: 19.05.2021*

*Correspondence:
Moazza Latif, DHQ Teaching hospital Goujranwala, Pakistan E-mail: na8769563@gmail.com

INTRODUCTION

Infective endocarditis (IE) is an infection of the endocardium (particularly the valve leaflets) with a yearly incidence of 3-10 per 100,000 (Senthilkumar S, *et al.*, 2010; Gould FK, *et al.*, 2012; Durack DT, *et al.*, 1994) and is characterised by the development of infected heart valve vegetations. Prognosis is poor with an in-hospital mortality of 15-20%, rising to approximately 30% at 1 year (Senthilkumar S, *et al.*, 2010; Gould FK, *et al.*, 2012; Durack DT, *et al.*, 1994). Prolonged high-dose intravenous antibiotics are the mainstay of treatment, but surgery (valve repair or replacement) is required in 40-50% of cases (Senthilkumar S, *et al.*, 2010; Gould FK, *et al.*, 2012; Durack DT, *et al.*, 1994). Morbidity is high in those who survive, with a significant risk of re-infection or relapse, as well as progressive deterioration in valve function leading to heart failure and the need for further medical and surgical intervention.

Infective endocarditis (IE) is an uncommon but potentially devastating disease, with an estimated annual incidence ranging from 2 to 7.9 per 100,000 individuals per year and a short-term mortality of 10% to 30%. Infective endocarditis is rare in children but potentially carries high mortality and morbidity. Few data exist regarding surgical therapy and the associated outcomes in children with infective endocarditis (Gotsman I, *et al.*, 2007). Through the breakdown of mucocutaneous barriers and induction of bacteremia, dental therapy and other invasive procedures have been linked to seeding of heart valves and the development of IE. Since the publication of the American Heart Association (AHA) guidelines in 1955, it has been conventionally considered appropriate to prevent IE by prophylactic administration of antibiotics before procedures believed to cause bacteremia (Senthilkumar S, *et al.*, 2010). However, the evidence supporting the effectiveness of antibiotic prophylaxis was poor, deriving solely from animal studies, case series, and assessments of bacteremia risk. Notably, the AHA guidelines in 1997 did acknowledge that most IE cases are not attributable to bacteremia resulting from certain invasive procedures, but rather random bacteremia from routine daily activities such as tooth brushing or chewing (Gould FK, *et al.*, 2012), and thus suggesting that prophylaxis may only prevent a small number of cases of IE. These guidelines also recognized the potential adverse effects and medical-legal risks associated with prophylaxis. In the absence of a robust evidence base, growing doubts with respect to this widely accepted practice led to a major revision of the AHA guidelines in 2007, narrowing the indications for antibiotic prophylaxis to a smaller population of at-risk individuals (Durack DT, *et al.*, 1994). Furthermore, the 2008 guidelines from the National Institute of Health and Clinical Excellence (NICE) recommended that antibiotic prophylaxis be abandoned in most situations (Weinberger I, *et al.*, 1990).

OBJECTIVES

The main objective of the study is to find the use of different antibiotics for the prophylaxis of Infective endocarditis in dentistry (Raju TI, *et al.*, 2013).

MATERIALS and METHODS

This cross sectional study was conducted in DHQ teaching hospital, Gujranwala during June 2019 to June 2020. The data was collected from both male and female patients who underwent different dental procedures.

Inclusion criteria

All suspected patients diagnosed with IE were considered eligible and were enrolled.

Exclusion criteria

- Eligible patients who could not be contacted for history were excluded.
- Any samples with damaged blood culture bottles or tissue in unsterile container were rejected and not included in the study.

Data collection

We identified suspected IE patients from samples submitted at the clinical lab: all blood and relevant tissue samples that were received with history suggestive of endocarditis were enrolled and verbal consent obtained for it. We followed blood/tissue culture to determine the microbiological and antimicrobial susceptibility profile of all recruited patients. Details of patient's clinical and microbiological profile were collected prospectively and entered in the predefined data collection form.

Statistical analysis

The data was collected and analysed using SPSS version 19. All the values displayed in mean and standard deviation.

RESULTS

The data was collected from 100 IE patients. Mean age of patients was 34.84 years with 72.1% being males. Adult representation was 84.6% and 15.4% were below 16 years. Using the MoDC 65.4% (n=50) were identified as "definite cases of infective endocarditis" rest fell in the "possible case" (Bor DH, *et al.*, 2013). Cultures were sent on all 104 enrolled patients. Approximately 35% (n=36) of patients were admitted at AKUH and were followed up for clinical outcomes. Blood culture samples for laboratory diagnosis only, were received for 82.7% of the enrolled cases. Of these, 47.6% cases had 3 sets, while 14.6% had 2 sets of blood culture samples (Table 1).

Table 1: Microbiological profile and antibiotic resistance pattern of isolates from patient with infective endocarditis received at the AKUH clinical laboratory (n=100)

Microorganism	Total number cases n=100(%)	Percent resistance of antibiotic for the species									
		CN	CI	ER	PE	VA	CH	OX	CP	AM	CR
Gram positive organism	68(65.4)	-	-	-	-	-	-	-	-	-	-
Staphylococcus species	24(23.1)	-	-	-	-	-	-	-	-	-	-
•*S. aureus*	18(17.3)	27	22.2	50	100	0	0	77	44.4	-	-
MSSA	4(3.8)	-	-	-	-	-	-	-	-	-	-
MRSA	14(13.5)	-	-	-	-	-	-	-	-	-	-
•CONS	6(5.8)	16.6	16.6	33.3	100	0	0	83.3	60	-	-
Streptococcus species	36(34.7)	NP	20	40	14.2	0	-	-	-	-	2.8
•*S. pneumoniae*	2(1.9)	-	-	-	-	-	-	-	-	-	-
•*S. mitis*	8(7.7)	-	-	-	-	-	-	-	-	-	-
•*S. oralis*	5(4.8)	-	-	-	-	-	-	-	-	-	-
•*S. sanguis*	3(2.9)	-	-	-	-	-	-	-	-	-	-
•*S. viridans*	3(2.9)	-	-	-	-	-	-	-	-	-	-
•*S. milleri*	1(1.0)	-	-	-	-	-	-	-	-	-	-
•*S. bovis*	3(2.9)	-	-	-	-	-	-	-	-	-	-
•Streptococcus species	5(4.8)	-	-	-	-	-	-	-	-	-	-
•*Granulicatella adiacens*	1(1.0)	-	-	-	-	-	-	-	-	-	-
•*Aerococcus viridans*	2(1.9)	-	-	-	-	-	-	-	-	-	-
•*Gemella haemolysan*	1(1.0)	-	-	-	-	-	-	-	-	-	-
Enterococcus species	4(3.8)	-	50	50	0	25	-	-	-	-	-
Corynebaterium species	4(3.8)	0	0	-	0	25	0	-	-	-	-
Gram negative organism	3(2.9)	-	-	-	-	-	33.3	-	-	-	-
Fungus	3(2.9)										
Candida albicans, Aspergillus niger, Fusarium species											
Culture negative cases	30 (28.8)										

DISCUSSION

IE remains to be an uncommon disease with sporadic incidence, yet a serious entity in modern medicine, as its diagnosis requires a high degree of suspicion and treatment involves a holistic approach. Although there has been a notion that the incidence of IE has increased in recent years, contemporary population-based data have been lacking to support this opinion (Takayama Y, *et al.*, 2010). Guidelines from most professional societies, such as American Society for Microbiology (ASM) and Infectious Disease Society of America (IDSA), recommend that adult patient with suspected IE must be investigated by drawing at least 3 blood culture sets with appropriate volume. In our study population only 47.3% of total patients recruited had 3 sets of blood culture. Inaccessibility to health facilities, increasing diagnostic cost and lack of awareness are factors that often contribute to poor compliance to these essential pre-analytical components of blood culture analysis in Pakistan. We found Streptococcus group of bacteria to be the most frequently isolated organisms from blood and tissue cultures in both groups (Mügge A, *et al.*, 1989). These findings are similar to those published by other groups nationally and from neighboring countries like China, India as well as internationally. Although Streptococci seem to predominate in developing regions, most western and developed parts of the world report S. aureus as the predominant causative agent of IE (Yuan SM, 2014).

Human brucellosis is common in Pakistan in patients with risk factors such as animal exposure, use of unpasteurized milk etc. Blood cultures positive for patients suffering from Brucella infections are often reported from this lab, however none of the cultures in this study yielded Brucella sp., as a cause of endocarditis (Ahmad A, *et al.*, 2017). This could be because of selection bias of our patients as most of the samples recruited in the study were from patients under cardiac care. In addition, we had limitation of non-availability of methods such as PCR and serological analysis (Jafar TH, *et al.*, 2013).

CONCLUSION

It is concluded that Infective endocarditis remains a constant source of menace in medical practice, with associated morbidity and mortality. Infective endocarditis prophylaxis for dental procedures should be recommended only for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from infective endocarditis.

REFERENCES

1. Senthilkumar S, Menon T, Subramanian G. Epidemiology of infective endocarditis in Chennai, South India. Indian J Med Sci. 2010; 64(4): 187-191.
2. Gould FK, Denning DW, Elliott TSJ, Foweraker J, Perry JD, Prendergast BD *et al.* Guidelines for the diagnosis and antibiotic treatment of endocarditis in adults: A report of the working party of the British society for antimicrobial chemotherapy. J Antimicrob Chemother. 2012; 62(2): 269-289.
3. Durack DT, Phil D, Lukes AS, Bright DK. New criteria for diagnosis of infective endocarditis: Utilization of specific echocardiographic findings. Am J Med. 1994; 96(2): 200-209.
4. Gotsman I, Meirovitz A, Meizlish N, Gotsman M, Lotan C, Gilon D. Clinical and echocardiographic predictors of morbidity and mortality in infective endocarditis: The significance of vegetation size. ISR MED ASSOC J. 2007; 9(5): 365-369.

5. Weinberger I, Rotenberg Z, Zacharovitch D, Fuchs J, Davidson E, Agmon J. Native valve infective endocarditis in the 1970s versus the 1980s: Underlying cardiac lesions and infecting organisms. Clin Cardiol. 1990; 13(2): 94-98.
6. Raju TI, Solanki R, Patnaik AN, Barik RC, Kumari NR, Gulati AS. Brucella endocarditis-a series of five case reports. Indian Heart J. 2013; 65(1): 72-77.
7. Bor DH, Woolhandler S, Nardin R, Brusch J, Himmelstein DU. Infective endocarditis in the U.S., 1998-2009: A nationwide study. PLoS ONE. 2013; 8(3): e60033.
8. Takayama Y, Okamoto R, Sunakawa K. Definite infective endocarditis: clinical and microbiological features of 155 episodes in one Japanese University Hospital. J Formos Med Assoc. 2010; 109(11): 788-799.
9. Mügge A, Daniel WG, Frank G, Lichtlen PR. Echocardiography in infective endocarditis: Reassessment of prognostic implications of vegetation size determined by the transthoracic and the transesophageal approach. J Am Coll Cardiol. 1989; 14(3): 631-638.
10. Yuan SM. Right-sided infective endocarditis: Recent epidemiologic changes. Int J Clin Exp Med. 2014; 7(1): 199-218.
11. Ahmad A, Iram S, Hussain S, Yusuf NW. Diagnosis of paediatric sepsis by automated blood culture system and conventional blood culture. The J Pak Med Assoc. 2017; 67(2): 192-195.
12. Jafar TH, Haaland BA, Rahman A, Razzak JA, Bilger M, Naghavi M, *et al.* Non-communicable diseases and injuries in Pakistan: Strategic priorities. Lancet. 2013; 381(9885): 2281-2290.