

## Original Research

### Assessment of antibiotic prophylaxis practice for dental procedures in children with congenital heart disease

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#### ABSTRACT:

**Background:** Infective endocarditis (IE) is a disease with high morbidity and mortality. The present study was conducted to assess pattern of antibiotic prophylaxis practice for dental procedures in children with congenital heart disease. **Materials & Methods:** 52 patients of congenital heart disease referred to pediatric department of both genders were included. Type of antibiotic prescribed prior to dental procedure, reason for referral for congenital heart disease to the department, type of heart condition was recorded. **Results:** Out of 52 patients, males were 32 and females were 20. Source of referral was doctor in 35, dentist in 11 and general practitioner in 6. Reason for referral was routine dental assessment in 23, before cardiac operation in 24, dental caries problem in 3 and other problems in 2 cases. Type of heart condition was acyanotic CHD in 36, cyanotic CHD in 10 and repaired CHD with residual defects in 4 and previous IE in 2. The difference was significant ( $P < 0.05$ ). Types of antibiotics prescribed was ampicillin in 32%, amoxicillin/ clavulanic acid in 30%, amoxicillin in 24% and cephalexin or clindamycin in 14%. The difference was significant ( $P < 0.05$ ). **Conclusion:** Types of antibiotics given to the patients prior to dental procedure was Ampicillin, amoxicillin/ clavulanic acid, Amoxicillin and Cephalexin or clindamycin. **Key words:** Acyanotic CHD, Amoxicillin, Infective endocarditis

Received: 12 July, 2022

Accepted: 17 August, 2022

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**This article may be cited as:** Nisar R, Tiwari P, Kumar V. Assessment of antibiotic prophylaxis practice for dental procedures in children with congenital heart disease. J Adv Med Dent Sci Res 2022;10(9):74-77.

#### INTRODUCTION

Approximately one-half of the 2 million cases of nosocomial infection that occur each year in the United States are associated with indwelling devices, and, in most cases, the cost of treating a device-related infection far exceeds the cost of initial placement. These infections can result in prolonged antibiotic treatment, surgical removal or replacement of a device, disfigurement, disability, psychological trauma and death.<sup>1</sup>

Infective endocarditis (IE) is a disease with high morbidity and mortality. Thus, antibiotic prophylaxis for heart patients before invasive procedures (all dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa) has been the primary method advocated for preventing IE.<sup>2</sup> Despite advances in diagnosis, antimicrobial therapy, and treatment of complications, bacterial endocarditis continues to be responsible for substantial morbidity and mortality.<sup>3</sup> The main complications deriving from

bacterial endocarditis are valvular destruction, heart failure, and emboli, requiring cardiac surgical treatment within 3 mos for almost 30% of patients.<sup>4</sup> Streptococci, particularly the viridans group, continue to be the bacteria most frequently involved in bacterial endocarditis, affecting native cardiac valves, which, in most cases, presents with a subacute clinical course.<sup>5</sup> These diverse antibiotic guidelines may be a cause of confusion among dental practitioners regarding which guideline to use, the type, dosage and duration of antibiotics, as well as concerns about dental procedures inducing the highest probability of bacteremia and also the type of heart conditions requiring antibiotic prophylaxis.<sup>6,7</sup> The present study was conducted to assess pattern of antibiotic prophylaxis practice for dental procedures in children with congenital heart disease.

#### MATERIALS & METHODS

The present study comprised of 52 patients of congenital heart disease referred to pediatric

department of both genders. Parental written consent for the participation in the study was obtained. Data such as name, age, gender etc. was recorded. Type of antibiotic prescribed prior to dental procedure, reason for referral for congenital heart

disease to the department, type of heart condition was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

|                  |              |                |
|------------------|--------------|----------------|
| <b>Total- 52</b> |              |                |
| <b>Gender</b>    | <b>Males</b> | <b>Females</b> |
| Number           | 32           | 20             |

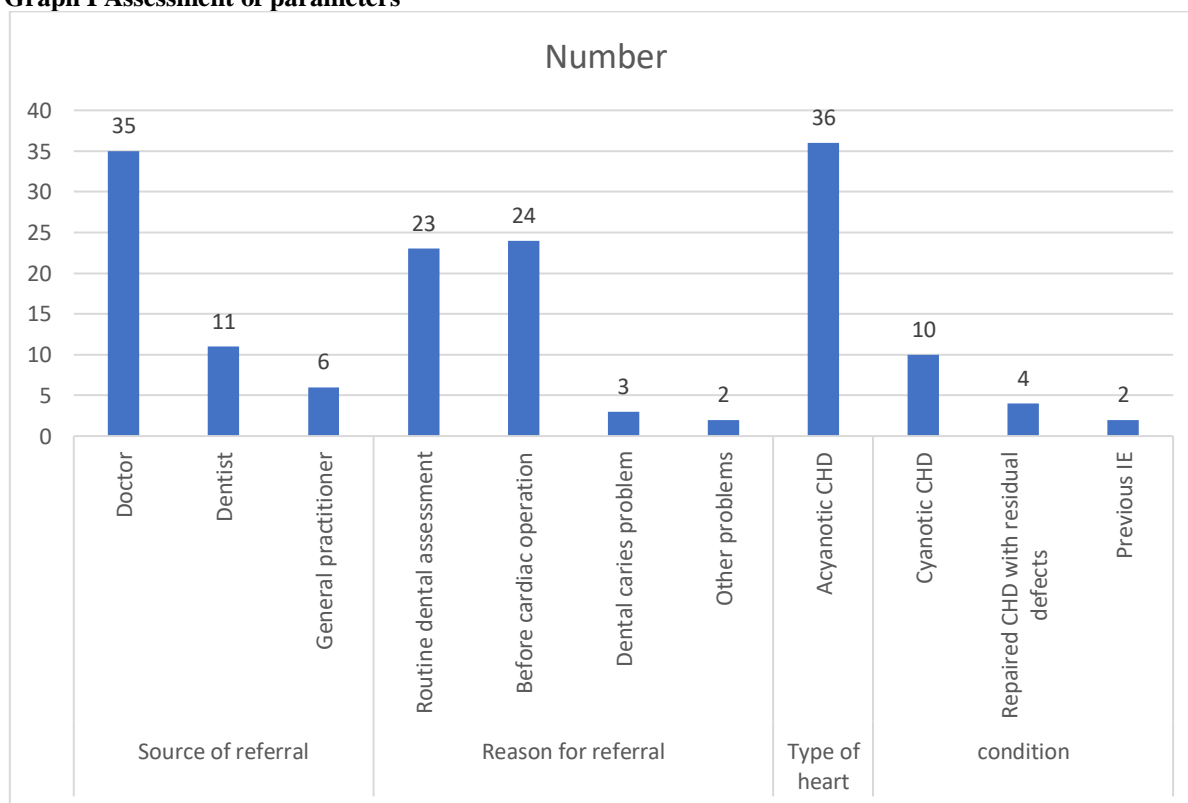
Table I shows that out of 52 patients, males were 32 and females were 20.

**Table II Assessment of parameters**

| Parameters              | Variables                          | Number | P value |
|-------------------------|------------------------------------|--------|---------|
| Source of referral      | Doctor                             | 35     | 0.01    |
|                         | Dentist                            | 11     |         |
|                         | General practitioner               | 6      |         |
| Reason for referral     | Routine dental assessment          | 23     | 0.05    |
|                         | Before cardiac operation           | 24     |         |
|                         | Dental caries problem              | 3      |         |
|                         | Other problems                     | 2      |         |
| Type of heart condition | Acyanotic CHD                      | 36     | 0.04    |
|                         | Cyanotic CHD                       | 10     |         |
|                         | Repaired CHD with residual defects | 4      |         |
|                         | Previous IE                        | 2      |         |

Table II, graph I shows that source of referral was doctor in 35, dentist in 11 and general practitioner in 6. Reason for referral was routine dental assessment in 23, before cardiac operation in 24, dental caries problem in 3 and other problems in 2 cases. Type of heart condition was acyanotic CHD in 36, cyanotic CHD in 10 and repaired CHD with residual defects in 4 and previous IE in 2. The difference was significant (P< 0.05).

**Graph I Assessment of parameters**



**Table III Types of antibiotics given to the patients prior to dental procedure**

| Types of antibiotics        | Percentage | P value |
|-----------------------------|------------|---------|
| Ampicillin                  | 32%        | 0.05    |
| amoxycillin/clavulanic acid | 30%        |         |
| Amoxycillin                 | 24%        |         |
| Cephalexin or clindamycin   | 14%        |         |

Table III shows that types of antibiotics prescribed was ampicillin in 32%, amoxycillin/ clavulanic acid in 30%, amoxicillin 24% and cephalixin or clindamycin in 14%. The difference was significant ( $P < 0.05$ ).

## DISCUSSION

Antibiotic prophylaxis guidelines remain consensus-based, and there is scientific evidence of the efficacy of amoxicillin in the prevention of bacteremia following dental procedures.<sup>8</sup> Endocarditis is the result of the interaction among host factors that predispose the endothelium to infection, transient bacteremia, and tissue tropism and virulence of the circulating bacteria.<sup>9</sup> The pathogenesis of endocarditis can be divided into five stages: injury of the endothelial surface of the valve, formation of a sterile thrombus composed of platelets and fibrin, adherence of bacteria, microcolony formation by the bacteria, and vegetation biofilm maturation and embolization.<sup>10</sup> The present study was conducted to assess pattern of antibiotic prophylaxis practice for dental procedures in children with congenital heart disease.

We found that out of 52 patients, males were 32 and females were 20. Source of referral was doctor in 35, dentist in 11 and general practitioner in 6. Sharif et al<sup>11</sup> in their study there were 210 patients; 69.5% had acyanotic CHD, 21.9% cyanotic CHD, 6.7% repaired CHD with residual defects, and 1.9% with previous infective endocarditis. Slightly more than 58% were referred from government doctors (pediatric cardiologist and National Heart Institute). The common cause for referral was dental assessment (47.6%). Antibiotics were prescribed to 23.3% (49/210) patients, of which, 34.7% was given ampicillin or amoxicillin/ clavulanic acid. About 96% of cyanotic heart cases undergoing invasive dental procedures were prescribed antibiotic prophylaxis. Almost 31% were prescribed with antibiotic prophylaxis even though it was not indicated

We found that reason for referral was routine dental assessment in 23, before cardiac operation in 24, dental caries problem in 3 and other problems in 2 cases. Type of heart condition was acyanotic CHD in 36, cyanotic CHD in 10 and repaired CHD with residual defects in 4 and previous IE in 2. Dajani et al<sup>12</sup> determined the level of knowledge and understanding of these multiple antibiotic guidelines among hospital orthodontists in the UK, it was found that compliance with preferred clinical practice is noticeably compromised when complex conflicting guidelines from either different national or international authoritative bodies exist for the IE guidelines. These results have shown that lack of guideline standardization results in sub-optimal clinical practice as a result of generalized confusion, and they recommended guideline convergence

We observed that types of antibiotics prescribed was ampicillin in 32%, amoxycillin/ clavulanic acid in 30%, amoxycillin in 24% and cephalixin or clindamycin in 14%. Following the last American Heart Association guidelines, bacterial endocarditis prophylaxis for dental procedures should be recommended only for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from bacterial endocarditis. These cardiac conditions are: prosthetic cardiac valve, previous bacterial endocarditis, congenital heart disease (unrepaired defect, completely repaired defect during the first 6 months after the procedure, and repaired defect with residual alterations), and cardiac transplantation recipients who develop cardiac valvulopathy.<sup>13</sup> The American Heart Association recognized the impossibility of predicting which dental procedures could be responsible for causing bacterial endocarditis. The treatments associated with gingival bleeding—in which antibiotic prophylaxis was recommended—included scaling, and among the procedures in which prophylaxis was not indicated were included the adjustment of orthodontic appliances and the exfoliation of primary teeth.<sup>14</sup> The limitation the study is small sample size.

## CONCLUSION

Authors found that types of antibiotics given to the patients prior to dental procedure was Ampicillin, amoxycillin/ clavulanic acid, Amoxycillin and Cephalexin or clindamycin.

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