

An Evaluation of Antibiotic Therapy in Pediatric Dentistry Outpatients.

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Received: August 2016

Accepted: September 2016

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ABSTRACT

Background: Antibiotics are commonly used on presumptive basis in treating oro-dental infections in children. These are sparse studies on patients of antibiotics usage including information on choice, processed, outcome assessment. Present study was precisely an assessment of antimicrobial therapy in Pedodontics outpatients of our university hospital focusing on clinical and laboratory application in management. The practical difference in antibiotics usage is described and rationally aspect is discussed. **Methods:** The study was carried out in pediatric dentistry outdoor patients, faculty of Dental Science, B.H.U, from March 2015 to May 2016 under routine care of Pediatric Dentistry Department. Pediatric age group (3 to 14 years) patients with oral and dental problem requiring use of antimicrobial drug were selected for study. **Results:** It is clear from above that all three regimen significantly decrease salivary bacterial counts. Oro dental pain/toothache decrease after treatment with cefixime. **Conclusion:** Antimicrobial chemotherapy of pediatricoro-dental infection is by subjective decision not by definitive microbiological diagnosis.

Keywords: Oral Hygiene, Antibiotics, Pediatric Dentistry.

MATERIALS AND METHODS

INTRODUCTION

Antibiotic therapy evolved since the world war and became important curative and preventive measure against variety of infection. Over the years, different metabolic peculiarities of micro-organisms were targeted. This approach is now virtually saturated, with little scope of discovering new unknown sites of microbial metabolism. Current research thus focuses on better use of available antimicrobial agents rather than discovery of additional new agents.^[1]

In medical practice antibiotic prescription is made on the basis of clinical diagnosis and presumed causative organism. In case of oro-dental infection, the focus of antibiotic therapy is not on particular organism. Very special microbial flora of oral cavity becomes virulent under conditions of poor hygiene and reduced host resistance to infection.^[2] As a result the antibiotic prescription is largely empirical. Present study was conducted objectively examine parameters of outcome of Antimicrobial therapy used by dentist in pediatric age group.

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The study was carried out in pediatric dentistry outdoor patients, faculty of Dental Science, B.H.U, from March 2015 to May 2016 under routine care of Pediatric Dentistry Department. The study is purely observational, supplemented with specific laboratory investigation and information generated via interview. The study protocol was approved by institute ethical committee. For including patients in the study written consent were taken from patient's parents. Parents were explained of the study and its purpose and that information concerning the patient will be kept confidential. Pediatric age group (3 to 14 years) patients with oral and dental problem requiring use of antimicrobial drug were selected for study. The chief complain and clinical examination of oro-dental cavity was performed. Mostly patients complained of dental pain/toothache, gingival swelling, bleeding gum, foul smelling mouth and others. These complaints associated with clinical diagnoses of dental carries, gingivitis, root stump and dental abscess. At initial assessment, information was collected on patient age, gender, weight and height. Body mass index was calculated as weight in KG /height in metre. Patients were managed mostly on antimicrobial therapy or some with surgical intervention. Patients were asked to define their level of pain and discomfort by grading it. Absent (no pain), mild pain (tolerable, and not

hindering oral mechanics), moderate pain (significant pain interfering with eating), severe pain (causing withdrawal from ordinary routine). Patient were examined for their gingival/gum swelling and it was graded as:^[3] Absent (no sign of swelling of gum), mild swelling (swelling confined to the inter dental papillae), moderate swelling (swelling involving papillae and marginal gingival).sever swelling (swelling over three quarter or more of crown).Laboratory investigation included total salivary bacterial counts .It was done by serial 10 fold dilution using agar pour plate method in Microbiology department.

Saliva Collection Procedure and Storage

Whole saliva sample (1 to 2 ml) was collected by passive drool method by using falcon tube. Saliva collection was done by sitting or recombinant position without stimulation. Before the collection, the subject did not eat and drink anything for 1 hour .The subject were instructed to not cough up and mix sputum in the sample. All samples were collected between 8am to 11am. Saliva sample was sent to laboratory immediately after collection where it was refrigerated as stored with due care till consequent examination.

Lab processing and counting of bacterial colony

The patients were sequentially allocated to group A, B and C. Each group had 50 patients with clinical diagnosis as dental carries, gingivitis, and root stumped.^[4] Cefixime was given to group A with dose of 100mg 12houly orally. Doxycycline was given to group B with dose of 100mg 12 hourly orally. Levofloxacin was given to group C with dose of 100mg 12 hourly orally.^[5]

RESULTS

Table 1 show salivary bacterial count after 10 fold dilution method before treatment and after treatment in various antibiotics regimen.

Table 1: Bacterial Count.

| Regimens group | Bacterial count before treatment | Bacterial count before treatment | Significant |
|----------------|----------------------------------|----------------------------------|-------------|
| A | 75.90±72.811 | 32.56±29.129 | 0.0001 |
| B | 66.1±37.881 | 24.98±13.50 | 0.0001 |
| C | 68.92±44.434 | 37.74±23.58 | 0.0001 |

It is clear from above that all three regimen significantly decrease salivary bacterial counts.

Table 2: Effect of Cefixime on Oro-Dental Pain.

| Before treatment | After treatment | | | |
|------------------|-----------------|------|-----------|--------|
| | Absen t | Mild | Moder ate | Severe |
| Absent | 0 | 0 | 0 | 0 |
| Mild | 16 | 10 | 6 | 0 |
| Moder ate | 19 | 2 | 15 | 2 |

| | | | | | |
|--------|----|---|----|---|---|
| Severe | 15 | 0 | 10 | 3 | 2 |
|--------|----|---|----|---|---|

Oro dental pain/toothache decrease after treatment with cefixime.

Table 3: Effect Of Cefixime On Gum/gingival swelling.

| Before treatment | After treatment | | | |
|------------------|-----------------|------|----------|--------|
| | Absent | Mild | Moderate | Severe |
| Absent | 0 | 0 | 0 | 0 |
| Mild | 16 | 11 | 5 | 0 |
| Moderate | 16 | 3 | 10 | 3 |
| Severe | 18 | 0 | 11 | 5 |

Comment: Gingival swelling reduces very significantly after treatment with Cefixime.

Table 4: Effect of Doxycycline on Oro- Dental Pain.

| Before treatment | After treatment | | | |
|------------------|-----------------|------|----------|--------|
| | Absent | Mild | Moderate | Severe |
| Absent | 0 | 0 | 0 | 0 |
| Mild | 17 | 13 | 4 | 0 |
| Moderate | 19 | 4 | 15 | 0 |
| Severe | 14 | 2 | 10 | 2 |

Oro-dental pain /toothache reduce significantly after treatment of doxycycline.

Table 5: Effect of Doxycycline on Gum/Gingival Swelling.

| Before treatment | After treatment | | | |
|------------------|-----------------|------|----------|--------|
| | Absent | Mild | Moderate | Severe |
| Absent | 0 | 0 | 0 | 0 |
| Mild | 15 | 12 | 3 | 0 |
| Moderate | 20 | 5 | 15 | 0 |
| Severe | 15 | 3 | 10 | 2 |

Gum /gingival swelling reduces very significantly after treatment Of doxycycline.

Table 6: Effect of Levofloxacin on oro-dental Pain.

| Before treatment | After treatment | | | |
|------------------|-----------------|------|----------|--------|
| | Absent | Mild | Moderate | Severe |
| Absent | 0 | 0 | 0 | 0 |
| Mild | 15 | 10 | 5 | 0 |
| Moderate | 15 | 2 | 8 | 5 |
| Severe | 20 | 0 | 0 | 10 |

Oro dental pain decreases after treatment with levofloxacin but not significantly.

Table 7: Effect of Levofloxacin On Gum/Gingival Swelling.

| Before treatment | After treatment | | | |
|------------------|-----------------|------|-----------|--------|
| | Absent | Mild | Moder ate | Severe |
| Absent | 0 | 0 | 0 | 0 |
| Mild | 18 | 6 | 12 | 0 |
| Moder ate | 14 | 0 | 8 | 6 |
| Severe | 18 | 0 | 0 | 10 |

Gingival/gum swelling reduces also but not significantly after treatment with Levofloxacin.

DISCUSSION

Antibiotics are in use in dentistry for treatment of oro-dental infection. However, there is increase in antibiotics resistance in infection of oral cavity. The latter suggests some inappropriate practice involving in adequate sub optimal resistance.^[6] The guideline on antibiotics use from faculty of general of dental practice [U.K.2012] suggests prescription to include.^[7]

- The appropriate antibiotics for clinical case .
- The correct dose.
- The correct frequency.
- The correct duration.
- For correct clinical indication.

In order to prevent incorrect use of antibiotic and development of resistance,^[8] correct microbiological diagnosis is imperative. Total salivary bacterial count before and after treatment was sole means of assessing the efficacy of prescribed antibiotics drug. Salivary bacterial count may represent the environment of focus of infection. Dental microbes are known to form plaque, the adhering film on infective site. This film or plaque is community of multiple organ is mashie are mutually symbiotic. It is unreasonable to expect diagnosis of singular culprit organism in oro-dental disease, therefore.

Criteria for Selection of Antibiotics in Pediatric Dentistry

1. Antibiotics should act on oral bacteria like streptococci, enterococci, actinomyces, bacterioides staphylococci and etc.
2. Antibiotics should act on gram positive and gram negative cocci and bacilli and some bacterioids^[9]
3. It should be broad spectrum because oral cavity has many type of micro-organism.
4. Antibiotics should have good oral secretion in saliva to act on micro-organism.
5. Antibiotics should have good oral absorption and secretion.

The preference for prescription of antibiotics in dental practice, at this place were cefixime, doxycycline, and levofloxacin. The use of antibiotics in dental practice as seen in present study is characterized by empirical decision based on epidemiological knowledge. Use of Metronidazole for treating anaerobes in children may not be tolerated. In children Cefixime use avoids the need of Metronidazole as it is also effective against the anaerobes. Cefixime is an antibiotic with broad spectrum and resistant to beta-lactamase. It has very reasonable treatment safety profile especially in children. Doxycycline also has particularly broad antimicrobial spectrum of the tetracycline without risk of toxicity in

children with renal function decline. Rickettsia, Chlamydia, Mycoplasma and such others organisms are susceptible to Doxycycline. There was no defined basis for choosing Doxycycline prescription. This was mostly subjective decision of the dentist. Levofloxacin, a fluoroquinolone is also broad spectrum antimicrobial, effective against gram positive and gram negative bacteria, Chlamydia and Mycoplasma etc. The group of fluoroquinolone is particularly less susceptible to the development of resistance and bactericidal efficacy. Overall efficacy profile of selected antimicrobial agents appears good and there has been 100% clinical and bacteriological successful outcome. Patient were simultaneously also being instructed for appropriate oral hygiene that included warm saline wash and chlorohexidine antiseptic mouthwash.

Summary

- Highly effective antimicrobial agents were chosen and administered in appropriate doses for oro-dental infection in children. There were no objective microbiological diagnosis but only by empirical clinical decision, antibiotics prescribed. In all instances antibiotic prescription were only for three days which is not convincing as five day to one week antibiotic therapy in usual scenario. There was successful clinical and bacteriological outcome of the employed antibiotic therapy.
- Along with antibiotic therapy, the patients were instructed on oro-dental hygiene that include warm saline and chlorohexidine mouth wash. There is no means to assess separate contribution of the antibiotic regimen and the hygienic treatments in the study.
- Laboratory investigation as blood count, Erythrocyte sedimentation rate [ESR], liver function test [LFT], kidney function test [KFT] etc was not sought in dental treatment decision making. There is no customary practice of seeking microbiological diagnosis of pathogen and their antimicrobial sensitivity patterns.
- Prominent difference in dental, antibiotic prescription practices in contrast usual practice in clinical medicine became obvious.
- Antibiotic regimens are shorter in duration.
- There was no instance of combination antibiotic therapy.
- The treatment of oro-dental infection also has antibacterial role of saliva and adjunct Antiseptic mouth washes.
- The net outcome of antibiotic therapy of oro-dental infection as observed in present study was highly successful both in clinical and bacteriological respects.

CONCLUSION

Antimicrobial chemotherapy of pediatricoro-dental infection is by subjective decision not by definitive microbiological diagnosis. Cefixime, Doxycycline, and Levofloxacin were broad-spectrum agents used alone essentially by subjective clinical choice. Treatment regimen of three days is empirically practiced. Supportive laboratory investigations for infection management are not routine in dental practice. Clinically and by salivary bacterial counting the anti-infective treatment was successful. To reduce contribution to the worldwide problem of antimicrobial resistance, dentist requires clear guideline of appropriate prescribing antibiotic. The successful outcome, despite essentially empirical approach in dental treatment of infection is subject for further detailed understanding with large epidemiological, clinical and laboratory research.

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How to cite this article: Mauvya RS, Srivatava VK, Pandey BL. An Evaluation of Antibiotic Therapy in Pediatric Dentistry Outpatients. Ann. Int. Med. Den. Res. 2016; 2(6):DE42-DE45.

Source of Support: Nil, **Conflict of Interest:** None declared