Short Communication

Use of clinical clue to diagnose anaerobic infection among patients with oral and maxillofacial infections

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Increase in life threatening oral facial infection despite the use of antimicrobial among patients attending muhimbili national Hospital, Tanzania has made it imperative to investigate bacteria causing infections. However, comprehensive anaerobic bacteriology of clinical specimens is expensive and time consuming procedure. This study aim therefore at providing information on the use of clinical clue, to diagnose anaerobic infection among patients with oral and maxillofacial infections. A hospital based descriptive cross-sectional study was conducted on Seventy participants (age between 19 to 70yrs) among patients, attening department of oral and maxillofacial surgery of the Muhimbili national hospital in Dar es Salaam, Tanzania over a period of eight months. Study participants were interviewed using a prepared questionnaire.Special clinical form was used to check for clinical presentation of the lesion .The specimen were collected and transported in anaerobically prereduced transport medium for processing in the laboratory isolation and identification which were done employing standard bacteriologic techniques. Antibiotic sensitivity testing for isolates was, detected following the guidline of clinical and laboratory standards. 70% of patient was presented with one or more clinical sign of anaerobic infection and their entire clinical sample obtained yielded growth of anaerobes.This study revealed the need for clinicians to consider pointers of anaerobic infections, whenever clerking patients with oral and maxillofacial infections.

Key words: Anaerobes, oral and maxillofacial infection, clinical clue.

INTRODUCTION

Infections caused by anaerobic bacteria are common and may be serious and life-threatening (Manyahi et al., 2014). Oral facial infections remain a major problem in Oral and maxillofacial field in spite of the availability of potential useful antibiotics (Simon and Matee, 1999; Holmstrup et al., 2003; Lin et al., 2016).

Microbiology of oral facial infection has been widely studies and the reports shows that, various form of aerobic and anaerobic microorganism have been isolated (Simo et al., 1998; Jose et al., 2013). Treatment of oral

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facial infection as in most instances, require the use of empiric antibiotic whereby clinicians approach to the management relies on the knowledge of the likely microorganism that may cause an infection in a particular site and availability of antibiotic as per national guideline, to the rational choice of antibiotic therapy in that particular region (Ndukwe et al., 2007).

In severe forms of orofacial infections like necrotizing fasciitis, deep space infection and osteomyelitis, culture studies involving both aerobic and anaerobic bacteriology are desirable to provide information on the likely pathogenic organisms, causing disease which are likely antibiotic sensitivity (Brook, 2009; Rishi et al., 2015). Unfortunately routine clinical microbiology especially anaerobic bacteriology is expensive and requires special facilities and expertise to perform, which is not readily available in many hospitals in the developing countries even in large referral hospitals. Studies to determine presence of anaerobes and various conditions which are likely to be isolated, can be of help in providing a guide to clinician for making rational decision over the choice of antibiotic, in the management of these infections especially in areas with limited diagnostic facilities.

This study therefore aims at, providing information on the use of clinical clue to diagnose anaerobic infection among patients with oral and maxillofacial infections.

MATERIAL AND METHODS

This was a descriptive cross-sectional hospital based study, which was approved by ethic committee of Muhimbili university of Health and allied sciences. A written consent was obtained from all the patients or a legal relative of a patient.

Patient recruitment

Study was conducted in the Department of Oral and Maxillofacial Surgery of Muhimbili National hospital which is the largest referral, consulting and teaching hospital in Dar-es-salaam, Tanzania in association with Microbiology teaching Laboratory of Muhimbili University of Health and allied sciences. Seventy patients who had conditions such as Dental abscess, Infected Socket, Ludwig's angina and necrotising fasciitis were included in our study.

Interview was conducted using a structured standard questionnaire to obtain information regarding age, sex, the presenting symptoms, duration of the condition and medical history. A special clinical form was used to record the presenting clinical signs and infection characteristic of the lesion.

Bacteriological study

Pus samples were collected aseptically by aspirating the lesions, using sterile syringe during the incision and drainage or wound dressing. After aspirating, the specimen was immediately inoculated in a special anaerobic transport media (BD curl anaerobic Transport) to the laboratory within 20 min, processed for culture as early as possible within 2 h (Brook et al.,1996; Sara et al., 2015). The culture and sensitivity were conducted for the clinical specimens, obtained from the patient before initiation of any antibiotic therapy . Sample not suitable for culture such as contaminated or those that did not meet the criteria such as exposure to antibiotic was discarded.

Specimen processing and Identification

Direct smear formed a crucial role in the processing of specimen, by giving preliminary diagnosis of infection. Gram stain was done followed by examination under a microscope, using oil immersion (100 × magnification), pus cells, bacteria cells and other characteristics such as fine slender, minute, pleomorphic features which were appreciated.

Blood agar containing kanamycin and vancomycin (BD0403 CDC 5% sheep blood agar for anaerobes) was used (5µg metronidazole and 10 µg penicillin discs and 10 µg Gentamycin was placed for presumptive recognition of anaerobes and the media was incubated in anaerobic jar in atmosphere generated) using BD commercial gas generating kit in accordance with manufacturer's instructions. Plates were examined after 48 h.

Isolates were identified based on microscopic characteristics, aerotolerance test, colonial characteristic and biochemical tests (Flynn et al., 2007). Antimicrobial susceptibility pattern of isolated bacterial pathogens was conducted by agar diffusion method and E-test according to CLSI guideline for anaerobic susceptibility testing.

Statistical analysis

The statistical analysis was performed using descriptive methods. The results were expressed as per percentages for analysis of various data. Calculations were performed using SPSS 10.0. Parametric data were presented as mean +/- SD.

RESULTS

A total of 70 patients with different oral and maxillofacial infections were included in this study. Among them 41 were male (58.5%) and 29 were female (41.5%) females. Their mean age was 32 years. Thirty-seven 37(53%) of cases were dental abscesses followed by Ludwig's angina 12(17%).

Thirteen 13(19%) had necrotising fasciitis and infected socket 8(11%). Pointers of anaerobic infection noted were, foul smelling 30 (43%), necrotising gangrenous tissue 12 (17%), free gas in tissue 5 (7%) and gas discolouration exudates 8 (11%).

Disease outcome was that, 5 (7%) of the patients died in the first week of admission to hospital, after sample was collected (Table 1).

Organism isolated from different clinical conditions

Among different clinical sample processed for bacteriology, majority of obligate anaerobes were seen in conditions like Ludwig's angina 6 (42%) and Necrotising fasciitis 4 (36%). Majority of facultative anaerobes were isolated from dental abscess 23 (72%) whereas, a mixture of anaerobes and facultative anaerobes were obtained from all the conditions, except infected socket (Table 2).

Table 1. Clinicalpresentation   of oralfacial infections.

Type of Infection	No	%
Ludwig's angina	12	17
Dental abscess	37	53
Necrotizing fasciitis	13	19
Infected socket	8	11
Pointer of anaerobic infection		
Foul smelling discharge	30	43
Necrotizing gangrenous tissue	12	17
Free gas in tissue	5	7
Black discolouration exudates	8	11
Disease outcome		
Death	5	7
Survival	65	93

Table 2. Type of organism that were isolated from different clinical conditions.

Clinical condition	No of sample	+ve obligate anaerobes	+ve facultative anaerobes	+ve obligate& facultative anaerobes
Ludwig's angina	14	6 (42%)	3 (21%)	5 (35.7%)
Dental abscess	32	2 (6%)	23 (72%)	7 (22%)
Necrotising fasciitis	11	4 (36%)	1 (9%)	6 (54%)
Infected socket	8	3 (37%)	5 (62%)	0

Table 3. Antimicrobial sensitivity patterns of bacterial isolates.

Organism Isolated	Organism isolated	Sensitive Class of antibiotic
Ludwig's angina	GPC + GNR ± anaerobes	Penicillins;cephalosporins,clindamycin,Mettronidazole
Dental abscess	GPC + GNR ± anaerobes	Penicillins;cephalosporins,clindamycin,Mettronidazole
Necrotising fasciitis	GPC + GNB obligate anaerobes	Clindamycin; metronidazole, Penicillins, carbapenem
Infected socket	Aerobic GPC GPC + GNR ± anaerobes	Penicillins; first-generation cephalosporins cephalosporin, carbapenem

Antimicrobial sensitivity patterns of bacterial isolates

Table 3 shows the antibiotic sensitivity pattern of bacterial isolates. Majority of these organisms were susceptible to β-Lactam and β-lactamase inhibitor antibiotics such as Penicillin, Clindamycin, Metronidazole, Cefalosporin and Carbapenem.

DISCUSSION

This hospital based study aimed at investigating use of anaerobic pointer, in diagnosis of oral and maxillofacial infections among patient at Muhimbili National Hospital, Dar-es-salaam, Tanzania . Bacteriological studies of etiological agents of orofacial infections especially anaerobes are very limited therefore, routinely bacteriological study to patients with severe infections is not done and hence treatment given, using broad spectrum antibiotic may not all the time delay healing or give good results. In this study, seventy percent (70%) of the patients presented with either one or more of the pointers of anaerobic infection, that is, foul smelling discharge, necrotizing gangrenous tissue, free gas in tissues and black discolouration of all their culture results showed presence of either one or more anaerobic bacteria hence this is in agreement with various study which report that, presence of clinical clue of anaerobic infections in patient although not specific when present can be suggestive of anaerobic infections (Robertson and

Smith, 2009; Akinkunmi et al., 2014).

During the study 5 (7%) died few days after admission before culture results were out, this mean that use of clinical clue to diagnose serious infection is very much recommended. Anaerobic organisms were isolated in most cases which means infection due to anaerobes have increased in comparison to past reports and therefore, this is very much important to utilise the clinical clue. In diagnose, these infections especially in areas is limited in anaerobic bacteriology practises.

Of the four main clinical conditions diagnosed, Ludwig's agina and necrotizing fasciitis were leading in the number of obligate anaerobes isolated. This could be explained by the fact that, the two conditions are at late stages of odontogenic infections and therefore, clinician should be very much considering in the combination therapy while treating such cases. Organisms causing oral facial infections are sensitive to various classes of antibiotics such as β-Lactam and β-lactamase inhibitor hence rationale use of these drugs in treating those infections can be beneficial to patients.

Conclusion

Obligate Anaerobes were isolated from patient who had clinical signs of anaerobic infections at Oral and maxillofacial department of Muhimbili National Hospital, Dar-es-Salaam, Tanzania. Use of anerobic pointers in managing orofacial infections is important especially in areas where culture and sensitivity cannot be easily done.

CONFLICT OF INTERESTS

The author(s) have not declared any conflict of interest.

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