

Isolation of some microorganisms from Iraqi patients with acute maxillary sinusitis.

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Summary:

Background: Maxillary sinusitis is one of the most common infections of humans. Sinusitis can be defined as an inflammation of the membrane lining of any sinus, especially one of the paranasal sinuses.

Objective: To determine the causative microorganisms of acute maxillary sinusitis.

Patients: Forty five acute sinusitis patients were involved in the present study.

Methods: Sampling methods were per-oral nasopharyngeal swabs.

Results: *Haemophilus* species, *Streptococcus pneumoniae* (*S.pneumoniae*) and *Moraxella catarrhalis* (*M.catarrhalis*) were the most frequent isolates.

Conclusion: The most causative agents of acute maxillary sinusitis were bacterial isolates, which were *Haemophilus* species followed by *S.pneumoniae* and *M.catarrhalis*. the incidences of acute sinusitis were more common at patients' age (20-29 years old) groups.

Keywords: Acute sinusitis, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Haemophilus* species, nasopharyngeal swab.

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Introduction:

Acute sinusitis is a short-term condition that responds well to antibiotics and decongestants. Upper respiratory tract infections may be complicated in (0.5 to 5%) of cases by acute sinusitis⁽¹⁾. Adult experience an average of two to three upper respiratory tract infections per year, therefore sinusitis is a relatively common affliction⁽²⁾. Identification of sinusitis is important, because the infection in a closed space carries a risk of complication and may warrant an active therapeutic approach, including drainage of secretions and administration of antimicrobial agents^(3; 4; 5; 6). Radiological examination (by CT-scan) is the most reliable method of diagnosing maxillary sinusitis^(3; 7).

Aspiration is important for the demonstration of secretions in the sinus⁽⁸⁾ and for the identification of the specific etiology of microorganism by culture, which may be useful as a guide for antimicrobial therapy⁽⁹⁾. The role of anaerobes (*Bacterioides*, *Peptostreptococcus*, *Fusobacterium* and *Viellonella* species) in chronic and dentogenic sinusitis is well established^(10; 11; 2), but their occurrence in acute maxillary sinusitis is less clear^(8; 12).

Patients and Methods

This study consists of forty five patients, attending the Ear, Nose, and Throat (ENT) outpatient clinic at Baghdad Teaching Hospital during the period from February through August 2004. Age range of the patients was from 7-82 years with mean age 28 years. Diagnosis of sinusitis were done by ENT specialist (through clinical and radiological examination (X-Ray &/or CT-scan)). Patient under antibiotic treatment or had stopped antibiotic therapy less than one week were excluded from this study.

Forty five apparently healthy individuals were randomly chosen as a control. The healthy control age approximately match with those of acute sinusitis group; from each member of patients and control group a nasopharyngeal swab was taken.

These swabs were collected by ENT specialist to avoid possible contamination. Swabbing were done through the mouth (per-oral) by using flexible fine-wired swab which can be bent at its tip and placed directly onto pus as it drains from middle meatus⁽¹³⁾.

Methods for cultivation and identification of microorganisms were based on microscopical examination, cultural morphology, biochemical tests and by diagnostic discs⁽¹⁴⁾. Some bacterial isolates were diagnosed or confirmed by using commercially available API (Analytic profile index) systems like API 20E and API NH⁽¹⁵⁾.

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Results

Patients group:

The total isolates were (108) bacterial species, no fungi were isolated from acute sinusitis patients. The bacterial isolates were; *Haemophilus* species 30 isolates (25%); *S.pneumoniae* 23 isolates

(19%); *Staphylococcus aureus* (*S.aureus*) 21 isolates (17%); *Moraxella catarrhalis* (*M.catarrhalis*) 18 isolates (15%); **Coagulase –ve staphylococci** 16 isolates (13%); **Streptococcus viridans group** 11 isolates (9%). See figure (1).

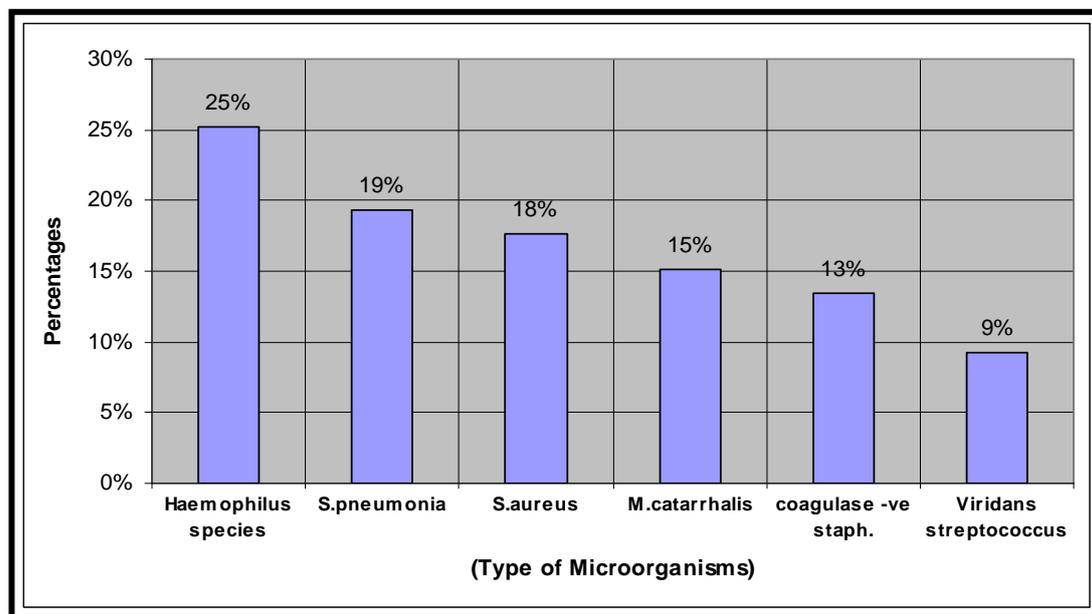


Fig. (1): Percentages of microorganisms isolated from acute sinusitis patients.

Control group:

The total isolates were (81) microorganisms which include: **Coagulase –ve staphylococci** 26 isolates (32%); *S.aureus* 20 isolates (25%); **Viridans streptococcus group** 13 isolates (16 %); *Haemophilus* species 7 isolates (9%); *Escherchia*

coli (*E.coli*) 5 isolates (6%); *S.pneumoniae* 4 isolates (5%); **Beta-haemolytic streptococci** 3 isolates (4%); and *M.catarrhalis* 3 isolates (4%). Statistical differences was found between acute sinusitis & control results (P value = 0.034334). See figure (2).

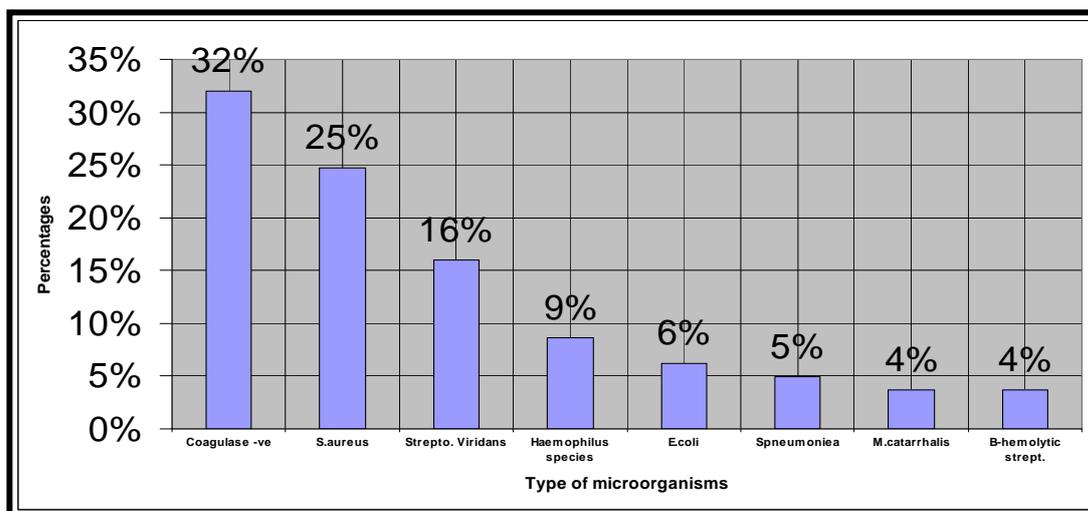


Fig. (2): Percentages of microorganisms isolated from control group.

Discussion

Many earlier studies dealing with microbiological etiology of community-acquired sinusitis have been compromised by technical problems, beginning from specimen collection to the final steps of identification of the microorganisms, especially the fastidious ones such as *Haemophilus* species and anaerobic bacteria^(10; 16; 17)

The present results are in agreement with other studies done by Kinman *et al.*,⁽¹⁸⁾; Van Cauwenberg *et al.*,⁽⁶⁾; Hannel *et al.*,⁽¹⁹⁾ and Hannel *et al.*,⁽²⁰⁾. Other studies reported that *S.pneumoniae* was the most predominant pathogen in acute sinusitis followed by *Haemophilus species*^(21; 22; 23; 24; 25), while Pfaller *et al.*,⁽²⁶⁾ reported that *M.catarrhalis* was the most common isolate followed by *Haemophilus species* and *S.pneumoniae*. The variation in the causative agent of acute sinusitis could be explained by either due to the effect of antibiotic therapy on eliminating the sensitive *S.pneumoniae* allowing for the increasing predominance of *Haemophilus species*⁽²⁷⁾ or may these wide variations of the causative agents of maxillary sinusitis be connected with microorganisms' geographical distribution⁽²⁸⁾. Fungal growth from nasopharyngeal swabs in the present study was negative and this totally coincides with most previous studies done by Brown *et al.*,⁽²³⁾; Gwaltney,⁽²⁴⁾ & Hannel *et al.*,⁽¹⁹⁾.

The present work finds that highest incidence of acute sinusitis were at age group (20-29) years and these findings are more or less similar to the findings reported by Lindbaek *et al.*,⁽²⁵⁾ and this probably could be explained by many reasons such as this age group is more exposed to environmental factors such as allergens, climate and temperature changes, air pollution...etc. and represents the active age group, whom they have the chance of person-to-person transmission.

Control results are in agreement with that of Hannel *et al.*,⁽¹⁹⁾; this indicated the presence of nasopharyngeal normal flora which includes some of causative agents of acute sinusitis such as *Haemophilus species* and *S.pneumoniae*. This findings are in agreement with Gwaltney⁽²⁹⁾ who stated that acute bacterial sinusitis are due to secondary bacterial infection after viral rhinosinusitis, and possibly as a results of nose blowing which capable of propelling nasal fluid, which contains normal flora, into sterile sinus cavity producing a good opportunity for bacterial sinusitis.

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