



Research Article

PREVALENCE OF GROUP A *STREPTOCOCCUS* (GAS) CAUSING SORE THROAT IN PATIENTS ATTENDING TERTIARY CARE HOSPITAL OF WESTERN ODISHA

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Abstract- Back ground -Group A *Streptococcus* (GAS) is one of the most common cause of pharyngitis. It may lead to rheumatic heart disease as complication. Prevalence of GAS pharyngitis in India is 4.2-13.7%. A study was conducted to find out prevalence of Group A *Streptococcus* causing sore throat in patient attending a tertiary care hospital of Western Odisha. Materials & method- Throat swabs of 350 patients presenting with sore throat were collected aseptically and culture was done as per standard protocol. *Streptococcus pyogenes* was identified with the help of colony morphology, bacitracin disc (0.04U) and group A specific antisera. Blood sample was collected from all culture positive patients and was tested for ASO test. GAS pharyngitis was considered only when patient was positive in both culture and ASO test. Antibiotic sensitivity test was performed as per CLSI guideline. Result-Prevalence of Group A *Streptococcus* in sore throat patients was 6%. Most of the positive cases were found in rainy season and in young (<30 yrs) patients of female sex. Penicillin and Amoxy clav showed 100% sensitivity against GAS and Erythromycin was 86% sensitive. Levofloxacin showed high resistance rate (43%). Conclusion- Prevalence of GAS in Western Odisha was lower than most of the studies in India. Penicillin and Amoxycillin were still 100% sensitive against GAS.

Keywords- *Streptococcus*, Pharyngitis, Prevalence, Odisha

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Introduction

Streptococcus pyogenes is a catalase negative gram-positive organism which belongs to Group A of lancefield classification. It produces different pyogenic infections ranging from pyoderma to pharyngitis [1]. More than 225 pathogens including 200 viruses can produce sore throat but still GAS is the commonest bacterial pathogen causing sore throat in developing country [2,3]. Rheumatic fever and Rheumatic heart disease are the immunological complications of GAS pharyngitis. Every year 600 million GAS pharyngitis cases take place all over the world among people aged over 4 years. [1] Prevalence of GAS pharyngitis and carriage rate vary from 9 to 34.1%. In India prevalence of GAS pharyngitis is 4.2 to 13.7% [4,5] and carriage rate is 11.2-34% [6]. Rheumatic heart disease, one of the dreadest complication of GAS pharyngitis had declined in many part of the world in post world war II due to primary and secondary preventive strategy [7]. but still it is a public health problem in developing country like India. Fever, sore throat, headache, myalgia are the common symptoms of GAS pharyngitis. Most specific signs are diffuse redness of the tonsil, petechial mottling with or without lymphadenitis and follicular exudates etc [2,3]. If antibiotic is initiated within 9 days of fever onset complication is unlikely [8]. Penicillin is the drug of choice in GAS pharyngitis. In Penicillin allergic patient we can use macrolide like erythromycin/ Azithromycin or Amoxycillin or tetracycline [8]. Antibiotic susceptibility varies in different geographical area. Epidemiological data about GAS pharyngitis is limited in India including state of Odisha. Keeping it in mind we have conducted a research to find out prevalence of GAS in sore throat patients attending a tertiary care hospital of Western Odisha.

Materials and method

Study design- cross sectional descriptive study.

Study area-Department of Microbiology, Hitech Medical College, Rourkela, India

Study duration- 1 year (Jan 2019 to Dec 2019)

Inclusion criteria- Patients of any age with sore throat with fever or inflamed/exudative tonsil.

Exclusion criteria- denial of consent and sign of Lower respiratory tract infection.

Specimen collection- With a tongue depressor and sterile swab stick sample was collected from posterior wall of pharynx or inflamed tonsil by the experienced technician. Blood was collected in plain tube for ASO test.

Specimen processing- throat swab was transported immediately to the microbiology laboratory and inoculated on the 5% blood agar. Then the media was incubated in the incubator at 35° for 24 hrs. Next day media was observed for small beta haemolytic colony. Any such type colony was tested for catalase test. If catalase test was negative and organism was Gram positive cocci on gram stain it was tested for Bacitracin disc (0.04 U) sensitivity. If the organism was Bacitracin sensitive (any zone size) [9] it was suspected as Group A *Streptococcus*. Confirmation was done using Group A specific antiserum. Blood was centrifuged to get serum. Serum was tested for ASO test (Tulip Diagnostic) GAS pharyngitis was defined as clinically suspected patient who was positive for both culture and ASO test. Culture positive but ASO test negative patient was considered as carrier of GAS. Antibiotic sensitivity test was performed as per CLSI guideline [9].

Data analysis: SPSS version 17 was used for data analysis.

Result

Total 350 samples were collected. Among 350 samples 30 samples were culture positive for GAS and 21 patients were found positive for both Culture and ASO test. Prevalence of GAS pharyngitis was 6% (21/350). Age distribution of confirmed cases was depicted in [Fig-2]. Seasonal distribution (month wise) of positive cases was showed in [Fig-3]. Sex distribution was showed in [Fig-4]. Antibigram was showed in [Fig-5].

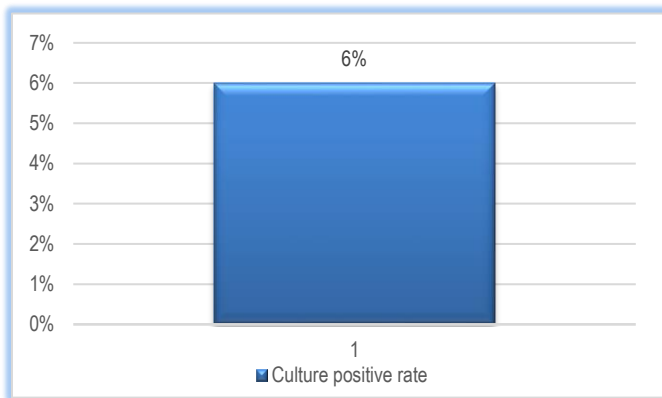


Fig-1 Prevalence of GAS pharyngitis

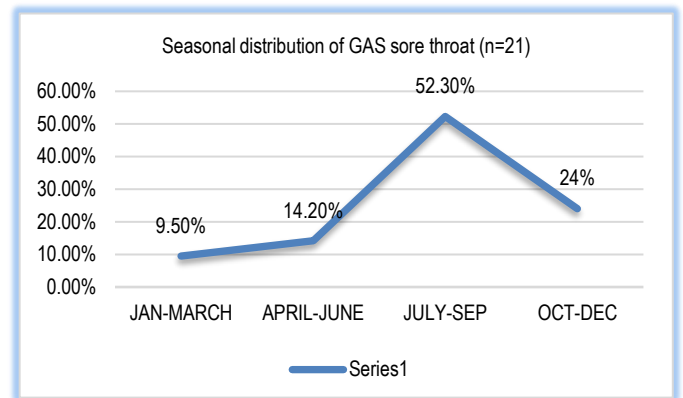


Fig-3 Season wise distribution of positive cases

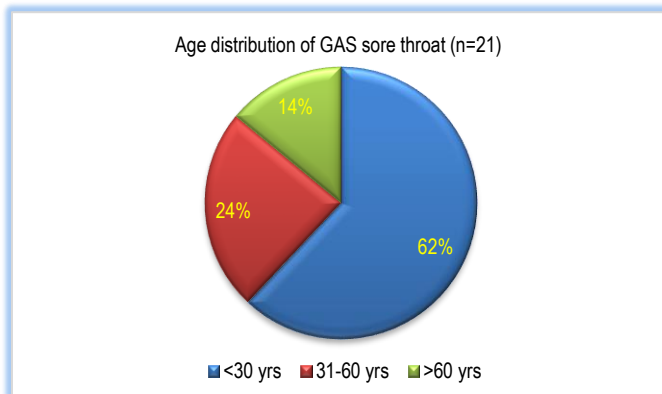


Fig-2 Age distribution of GAS pharyngitis patients

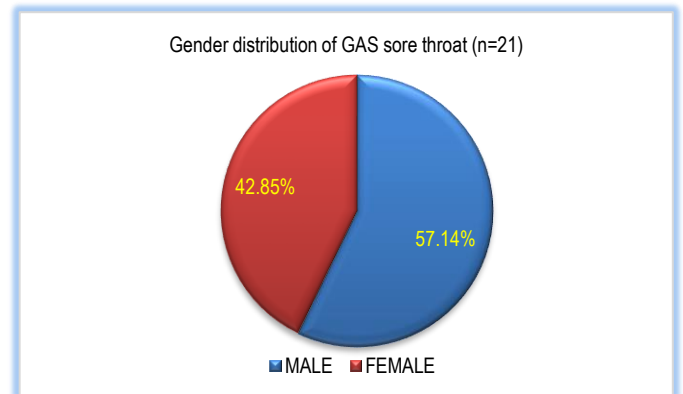


Fig-4 Sex distribution of positive cases

Discussion

Mere isolation of *Streptococcus pyogenes* from throat swab in patient with sore throat does not confirm diagnosis of GAS pharyngitis. Patient who are asymptomatic carrier of Group A *Streptococcus* can present like GAS pharyngitis in acute viral infection. So, demonstration of immune response against GAS is important for diagnosing GAS pharyngitis as per study done by Oliver *et al.*, [10] in Australia. Hence only those who were positive in culture as well as in ASO test were considered as GAS pharyngitis patients in our study.

In our study prevalence of GAS pharyngitis was 6% which was higher than Rotta *et al.*, (3.9%, Europe) [11] but lower than Tesfaw *et al.*, (11.3%, Ethiopia) [1], Sarkar *et al.*, (13.6%, Varanasi) [4], Koshi *et al.*, (10%, South India) [5], Gupta *et al.*, (13.7%, Delhi) [6], and most of the studies done in Africa and South America (17%-58%) [12-15]. In Uganda also Irena *et al.*, [16] had reported 16% prevalence of GAS. GAS prevalence in Western Odisha was lower than most of the developing countries but higher than developed countries.

Among positive patient's slight female preponderance (57.14%) was seen compared to male (42.85%) in our study although it was not statistically significant ($p > 0.05$). This finding was in agreement with studies done in India [17, 18] and with one international study [1]. But study in Varanasi by Sarkar *et al.*, [4] had reported that there was no sex predilection in GAS pharyngitis. In our study most of the positive cases (62%) came from young age group (<30%) which was in agreement with the study by Nandi *et al.*, [8] in Chandigarh. It had also reported that peak incidence of GAS pharyngitis occurs in 5-10 years age group. Couwenberge *et al.*, had reported the same in United states of America [19]. In our study highest no of positive cases (52.30%) were found in rainy season (July-Sep) followed by winter season (24%). It was a similar finding with Nandi *et al.*, [8] which had reported bimodal (Rainy season and Winter) peak of incidence of GAS sore throat in Chandigarh.

In contrast Sarkar *et al.*, [4] had reported highest no of cases in Varanasi in Winter season. But in Europe and Africa [11, 20] highest incidence was found in Autumn. In India including Odisha during rainy season children mostly live in crowded condition in home becoming more susceptible to GAS pharyngitis [8]. In antibiotic susceptibility test amoxycillin, penicillin and ampicillin were 100% sensitive. It was in agreement with Tesfaw *et al.*, [1] and Bharadwaz *et al.*, [21].

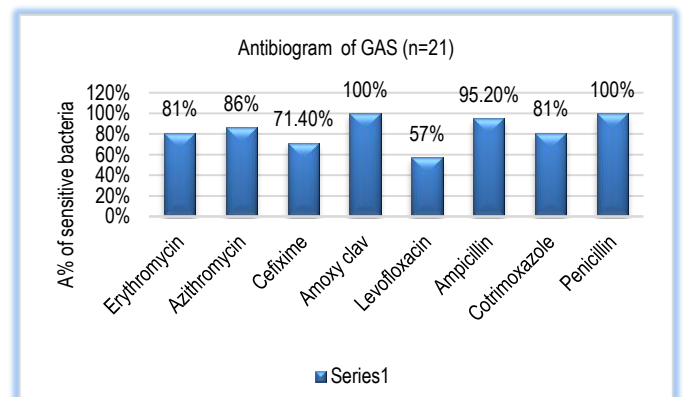


Fig-5 Antibiogram of GAS isolated from throat swab

Erythromycin was 19% resistant and Azithromycin was 14% resistant. Bharadwaz *et al.*, [21] had reported 28% resistant rate in erythromycin in New Delhi. Dhanda *et al.*, (North India) [22] had reported 2.6% and Brown *et al.*, (Europe) [23] had reported 10.8% resistant rate of erythromycin. Increasing resistance rate of Macrolide against GAS was alarming as it was the drug of choice for GAS in Penicillin allergic patients. Asmah *et al.*, [24] had reported only 1% resistance rate of fluoroquinolones against GAS in Europe but we had found very high resistant rate of Levofloxacin against GAS. It might be due to wide spread use of fluoroquinolones for different infective conditions in our country.

Conclusion

In our study GAS pharyngitis prevalence was lower compared to another Indian and International studies. Incidence of GAS pharyngitis was more in rainy season and in young females. Penicillin was 100% sensitive against GAS. Macrolide was little bit less sensitive (86%). Fluoroquinolones was the worst drug to use due to high resistance rate (43%).

Application of Research: This study is depicting the epidemiological scenario of Group A Streptococcal pharyngitis/sore throat in Western Odisha. It will help to control and prevent Group A Streptococcal pharyngitis/sore throat.

Research category: Medical Microbiology

Abbreviations: GAS: Group A *Streptococcus*

ASO: Anti streptolysin O, CLSI: Clinical and Laboratory standard Institute

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****Principal Investigator or Chairperson of research: Dr Shuvankar Mukherjee**

Institute: Hitech Medical College, Rourkela, 769004, Odisha, India

Research project name or number: Clinical case study

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Department of Microbiology, Hitech Medical College, Rourkela, 769004, Odisha, India

Conflict of Interest: None declared

Ethical approval: Ethical approval taken from Department of Microbiology, Hitech Medical College, Rourkela, 769004, Odisha, India.

Ethical Committee Approval Number: Nil

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