



Case Series

Systemic Complications of Streptococci in Chronic Tonsillitis: Case Series

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Abstract	Manuscript Information
<p>Streptolysin O is one of the toxins produced from Group A Beta Hemolytic Streptococcal (GABHS) infection. In the human body infected with GABHS will produce a natural antigen, namely anti-Streptolysin titer O (ASTO).^[1] Throat culture is performed to determine the presence of group A Streptococci in the upper respiratory tract. Throat cultures have a sensitivity of about 90% - 95% in detecting the presence of GABHS. The purpose of writing this case report is to provide knowledge to peers about systemic complications resulting from Streptococcal infection in tonsillitis. It has been reported in all five cases mentioned above with an increase in ASTO titer >200 IU/ml. Of the five patients experienced complications due to Streptolysin toxin, endophthalmitis, rheumatoid arthritis and endocarditis. While from the examination of tonsil culture found <i>Candida</i> sp., <i>Enterococcus faecalis</i>, <i>Enterobacter aerogenes</i>.</p>	<ul style="list-style-type: none"> ▪ ISSN No: 2583-7397 ▪ Received: 07-02-2023 ▪ Accepted: 04-03-2023 ▪ Published: 07-03-2024 ▪ IJCRM: 3(2);2024:16-19 ▪ ©2024, All Rights Reserved ▪ Plagiarism Checked: Yes ▪ Peer Review Process: Yes
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Keyword: GABHS, Streptococci, ASTO, Tonsillitis

Introduction

Streptolysin O is one of the toxins produced from group A beta hemolytic Streptococcal infection (GABHS). In the human body infected with SBHGA will produce a natural antigen, namely anti-Streptolysin titer O (ASTO).^[1] Throat culture is performed to determine the presence of group A Streptococci in the upper respiratory tract. Throat cultures have a sensitivity of about 90% to 95% in detecting the presence of SBHGA.2 Tonsillitis is a common disorder in children and slightly reduced in older age groups. The historical prevalence of chronic tonsillitis is 11.7% with significant predominance in female cases over males.1 the organisms that most commonly cause tonsillitis are beta hemolytic Streptococcal bacteria, *Staphilococcus aureus*,

Haemophilus influenza, *Klebsiella*, *Streptococcal pneumonia*. Of all such types, only GABHS, the organism shows systemic complications with the rheumatic form of heart disease, glomerulonephritis, arthritis diseases of the eye, etc. But SBHGA is only responsible for about 5-15% of all throat pain.^[1,2] The purpose of writing this case report is to educate peers about the systemic complications that Streptococcal infection causes in tonsillitis.

Case Description

Case 1

A 17-year-old man was treated with major complaints of left eye pain, red and many tears shortly after swimming in a public

swimming pool and swelling of the eyelids. Blood tests obtained ASTO 400 levels. On examination of the throat, T1-T1 tonsils are obtained, the crypt is dilated +/+, then a throat swab is performed. After the patient performed a tonsillectomy, the tonsil tissue (figure 2). The result of post-tonsillectomy culture is *Candida* sp. The patient also performed a culture examination on the hypopion, the base of the vitreous wound and urine, but no germ growth was found. On blood tests, the patient's VDRL and TPHA were negative.



Fig 1: Patient profile



Fig 2: Tonsils after tonsillectomy

Case 2

A 21-year-old man was treated with complaints of both knee pain, swelling, and stiffness (fig.4). The patient also complained of high fever accompanied by red rashes all over the body and severe knee pain.



A



B

Fig 4: Physical examination

A: Both elbows are swollen. B: Both knees are swollen due to arthritis.

Then the patient carried out a blood test obtained ASTO levels of 800 IU / ml. The patient also underwent echocardiography examination and obtained LV diastolic dysfunction grade II. On examination of the throat obtained tonsils T1-T1, dilated crypts +/+, deditus -/-, hyperemic -/-. Post-tonsil tissue tonsillectomy is then carried out culture examination; the growth of *Enterococcus faecalis* germs is obtained.

Case 3

A 28-year-old woman (fig.6) was treated complaining of swallowing pain. Then the ASTO titer was examined and an ASTO titer increase of 1600 IU / ml was obtained. On examination of the throat obtained tonsils T3-T3, there are dilated crypts +/+, deditus -/-, hyperemic -/-. In these patients

there were no complications, and no tonsil culture examination was performed.



Fig 5: Tonsil tissue after tonsillectomy

Case 4

The 41-year-old man (Figure 8) was treated with complaints of painful and swollen left ankle joints. On examination of normal uric acid levels, and an increase in ASTO 400 levels and qualitative CRP positive was obtained. On examination of the throat obtained tonsils T1-T1, dilated crypts +/+, deditus -/-, hyperemic -/-. On echocardiography examination, the patient was diagnosed with heart abnormalities, with the results of concentric LVH echocardiography, good LV global contractility with 75% LVEF (biplane), LV grade 2 diastolic function, AR mild-moderate, MR moderate, MS moderate. Then the patient is also done throat swab to determine the focal of infection. The results of a throat swab, found germs *Enterobacter aerogenes*.



Fig 6: Physical examination of the oropharynx

Case 5

A 14-year-old man was treated with the main complaint of a swollen right knee getting bigger and bigger (Fig.7). The patient had a blood test, and an increase in ASTO 400 levels was obtained. On examination of the throat obtained tonsils T1-T1, crypt dilated +/+. The result of post-tonsillectomy culture is *Enterococcus faecalis*.



A



B

Fig. 7. A: Physical examination of the fifth patient who had swelling in both knees. **B:** X-ray photos show the impression: supra and infra patellar fat pad and poplitea fat pad appear blurred (suspicious of joint effusion images)

Discussion

Streptolysin O (SLO) causes a beta zone hemolysis around SBHGA on blood agar media. The toxin attaches to the cholesterol membrane of eukaryotic cells, forming cholesterol toxin aggregates that play a role in cell lysis through colloid-osmotic mechanisms. Streptolysin S is thermolabile and not antigenic. [3] Streptococcal pyogenic exotoxins (SPE), formerly called erythrogenic toxins, are responsible for rash & scarlet fever. There are three known antigenic components, SPE A, B, C. this toxin can also cause fever, organ damage and lethal shock in animals. Group A (*S. pyogenicus*) is one of the important things pathogenesis in humans. They cause disease by three mechanisms. [1,3,4]

- Pyogenic inflammation, which is locally induced at the location of the organism in tissues.
- Exotoxic production, which can cause widespread systemic symptoms in areas of the body where no organism is present, and immunology, which occurs when antibodies fight components and
- Immunology, which occurs when antibodies fight components of a cross-reaction of organisms with normal tissue or immune complex, forms that damage normal tissue (heart muscle, kidneys, joint muscles, etc.)

Group A organisms produce five important toxins and hemolysis. Streptolysin O is one of them and a natural antigen. So antibodies to it are increased ASO after group A Streptococcal infection. An increase in serum ASO titer is possible after infection with SBHGA, in any part of the body, although adenoids can be a place to attach to this pathogen. [1]

Complications caused by Streptolysin O

Acute Rheumatic Fever (ARF) / Acute rheumatic fever [5, 6, 7]

Rheumatic fever is a slowly occurring inflammation, is a non-suppurative sequelae of tonsillopharyngitis due to SBHGA. In the classical form the other is acute, with febrile and mostly self-limited. In poor areas, ARF is often found and constitutes the majority of heart disease in children and young adults. The pathogenesis of ARF remains unclear. Up-to-date evidence supports immune mechanisms. Humoral and cellular immune responses to rheumatogenic antigens of SBHGA are suspected of cross-reaction with antigens from host tissues of similar structure. Pathological forms of ARF include; inflammatory

lesions of the connective tissue of the heart may occur pericarditis, myocarditis and endocarditis. The heart valves when affected by this disorder are first edema and inflammation of the valves and chordate tendinea. When cured the valve will become thick and deformity, chordate tendinea shortened, fusion of the commissure of the valve occurs. These changes result in polar stenosis insufficiency. The mitral valve is most affected, which is 75-80% of cases. Aortic valve at 30%, tricuspid and pulmonary valves at less than 5%.

ARF is most common in children aged 5-15 years, rarely under the age of 4 years and over the age of 40 years. Symptoms and signs often appear 1-3 weeks after SBHGA tonsillopharyngitis infection. Determination of diagnosis with Jones' revised 1992 criteria remains useful. Approximately one-third of children suffering from ARF will experience chronic sequelae, in the form of rheumatic heart disease (RHD), especially affecting the mitral valve, with a frequency of 75-98%. In developed countries rheumatic mitral stenosis (RMS) occurs 5-10 years after acute episode RF, but in developing countries, especially in Asia Africa, the clinical course of RMS is faster and more severe, in patients aged 15 years. In this case, the second, fourth and fifth patients were diagnosed with rheumatoid arthritis.

Endophthalmitis [8,9]

Endophthalmitis infections can be classified into 2 groups, namely exogenous and endogenous. The first form of occurrence is after undergoing eye surgery, penetrating trauma, corneal ulcer. The second form is rare and commonly called metastatic endophthalmitis. Metastatic endophthalmitis represents 5.5-30% of all cases of endophthalmitis. Endogenous endophthalmitis is at risk in patients undergoing invasive procedures such as hemodialysis, catheter insertion, etc. Or patients infected on other parts of the body, such as endocarditis, urinary tract infections, aritis, pyelonephritis, tonsillitis, pneumonia, etc.

Group B streptococci (GBS), are generally isolated from the lower gastrointestinal tract of adults and part of the genital tract in pregnant women. It is a known pathogen in neonates and postpartum patients. Group B Streptococcal infection can cause serious illness in adults such as in neonates. Adults with group B streptococcal infection often suffer from diabetes mellitus, malignancy, or liver disease. Frequent clinical manifestations of GBS infection are decubitus ulcers, cellulitis, pneumonia, pyelonephritis, bacteremia and endocarditis in adults. The organism is carried from the primary focal infection to the retinal or uvea circulation by hematogenous disseminate. The organism passes through the blood barrier of the eye and invades the tissues of the eye. In this case, the first patient suffers from suspected endophthalmitis of the tonsils as primary focal infection.

ASTO and culture

To determine the career of the upper respiratory tract in patients, different modalities of investigation are recommended in the literature. Conducting throat swab cultures and serum ASO titers is the most important thing to do. ASTO is the most frequently examined antibody response in serological tests to confirm

streptococcal infection, and aids in diagnosis in rheumatic fever. ASTO is useful for diagnosing streptococcal infections and their complications, following up, and assessing the effectiveness of therapy. ASTO is also helpful when throat culture techniques are not effective or when the patient has received antibiotics. Since underprivileged people cannot obtain other tests, such as throat cultures, ASTO is one of the tests available to diagnose streptococcal infections. Significant findings suggest that positive ASTO results can be used in association with throat culture to identify the carrier of group A streptococci required for this case. The findings indicated that 11% of the participants had significant ASTO levels above 200 IU. ^[1,2,4,10] In these four patients, blood tests were carried out and ASTO levels were found to be more than 200 IU. In the first patient, ASTO 400 IU was obtained, the second patient was 800 IU, the third was 400 IU and the fourth was 400 IU.

Throat culture is a standard examination to determine the presence of group A Streptococci in the upper respiratory tract and to confirm the clinical diagnosis. If performed correctly, cultures of the throat swab can provide approximately 90% - 95% sensitivity in detecting the presence of group A hemolytic beta streptococci. In addition, a false-negative result appears if the patient has received antibiotics shortly before or on throat culture examination. ^[1,2,4,10] In this case report, all patients were examined for throat culture, where the first patient was found to be *Candida sp.*, the second and fourth patients *Enterococcus faecalis*, the third patient *Enterobacter aerogenes* (appendix 1). This case report is consistent with previous research, which stated that diagnostic tests of surface swabs on tonsils, as culture specimens to determine the organism responsible for tonsillitis are quite good. In this study, the validity of ASO titers was calculated. The sensitivity of the test was 100%, the specificity was only 12%, and the positive predictive value was 17.8%. The specificity and positive predictive value of ASO titers is very low. So this is not a valid test to identify the presence of SBHGA, specifically only on the tonsils (table 1). ^[1]

Table 1: Comparison between ASO titer and core culture I ASO titer FNA tonsil core.

Titer ASO	FNA core tonsil		Total
	Positif SBHGA	Negatif SBHGA	
Positif (>200 IU/ml)	8	37	45
Negatif (≤200 IU/ml)	0	5	5
Total	8	42	50

Conclusion

It has been reported in the four cases mentioned above with an increase in ASTO titer >200 IU/ml and a culture examination of the throat swab has been carried out. Of the five patients mentioned above, four patients experienced complications due to Streptolysin toxin, namely: endophthalmitis in the first patient and rheumatoid arthritis in the second, third and fourth patients. While from the examination of tonsil culture of the first patient, found *Candida sp.*, the second and fourth patients *Enterococcus faecalis*, the third patient *Enterobacter aerogenes*. Blood cultures, urine cultures and other tissue cultures do not get

SBHGA, this can be because the patient has received antibiotics shortly before or during the culture examination

Conflict of Interest: There is no conflict of interest

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