Upper Respiratory Tract Infection in Thai Adults: Prevalence and Prediction of Bacterial Causes, and Effectiveness of Using Clinical Practice Guidelines

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Background: *Antibiotics are over-prescribed for Upper Respiratory tract Infection (URI). Uncertainty in differentiating bacterial from viral infection is the main reason for this practice. More evidence is needed to encourage proper use of antibiotics for URI.*
Objectives: *1) To determine the prevalence of Group A β-hemolytic Streptococci (GAS) in adults with URI and clinical features associated with GAS infection. 2) To evaluate the effectiveness of management of adults with URI using the Clinical Practice Guideline (CPG).*
Material and Method: *A prospective study was conducted on adult out-patients with URI at Siriraj Hospital from April to October 2004. Throat swab cultures were performed in all participants. Patients were assessed and managed according to CPG adapted from principles of appropriate antibiotic use for treatment of acute upper respiratory tract infections in adults endorsed by the Centers for Disease Control and Prevention, USA. Clinical outcomes were evaluated by telephone interviews.*
Results: *Out of 292 patients enrolled, 55.5% had non-specific URI/common cold, 32.2% had pharyngitis/tonsillitis, 11% had acute bronchitis and only 1.4% had acute sinusitis. The overall prevalence of GAS infection was 7.9%. GAS was isolated in 16% of the patients with pharyngitis/tonsillitis; and only 3.7% and 3.1% of the patients with non-specific URI/common cold and acute bronchitis respectively. Clinical manifestations associated with GAS were: 1) fever ($T \geq 37.8$ C), 2) exudate on the pharynx or tonsil, 3) tender cervical lymphadenopathy, and 4) absence of cough. The presence of ≤ 3 of 4 criteria had high negative predictive value of 94.2%. None of the patients with non-specific URI/common cold, acute bronchitis and acute sinusitis had ≥ 3 of 4 criteria. The clinical responses were not significantly different between those who received or did not receive antibiotics. Most of the patients had good clinical response by day 7.*
Conclusion: *The prevalence of GAS infection in adults with URI was 7.9%. The clinical features of $T \geq 37.8$ C, exudate on pharynx or tonsil, tender cervical lymphadenopathy, and absence of cough were significantly found in the patients with GAS infection. Management of adults with URI using the CPG was effective and safe.*

Keywords: *Upper respiratory tract infection, Adult, Clinical practice guidelines*

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Upper Respiratory tract Infection (URI) is a common ailment in individuals presented to general medical practitioners. The causative agents of URI include viruses, bacteria and atypical pathogens. Antibiotic treatment benefits only those patients with Group A β-hemolytic Streptococci (GAS) infection who might subsequently suffer from acute rheumatic fever. No compelling data on antibiotic treatment of patients with URI other than GAS are beneficial. The prevalence of GAS in adults with sore throats in Thailand previously described was 11.4%[1]. Nevertheless, most physicians prescribed antibiotics for URI. Antibiotics were used in 80% of adults with URI in the ambulatory care service of the social security program at Siriraj Hospital[2]. This practice is considered inappropriate, consuming

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health care resources, causing adverse drug reactions and leading to antibiotic resistance. The main reason why physicians prescribe antibiotics for URI is an uncertainty in discriminating GAS infection from other pathogens.

Among a number of clinical decision rules of GAS, the Centor criteria have been the most widely used[3]. This clinical decision rule has four clinical features i.e. tonsillar exudates, tender anterior cervical lymphadenopathy, fever, and absence of cough. These criteria have a high negative predictive value and low positive predictive value, especially at a low prevalence of GAS. For example, if the prevalence of GAS is 10%, the probability of GAS infection is 8% or less for the patient with less than 3 out of 4 criteria[4]. Thus, it is very useful to exclude the patients who do not need antibiotic treatment. The CPG for appropriate antibiotic use for treatment of acute respiratory tract infection in adults was developed to dissuade physicians from routinely prescribing antibiotics for URI[5-13]. After the CPG, adapted from principles of appropriate antibiotic use for treatment of acute upper respiratory tract infections in adults endorsed by the Centers for Disease Control and Prevention, USA had been implemented in Thai adults, antibiotic prescribing was reduced from 74% to 44%[2]. Nevertheless, 44% of antibiotic therapy for URI is still high. The local information about prevalence and clinical predictors are needed to assure and encourage physicians to reduce antibiotic prescriptions.

The objectives of the present study were to determine the prevalence of GAS in adults with URI and clinical features associated with GAS infection and to evaluate the effectiveness of management of adults with URI using the Clinical Practice Guideline (CPG).

Material and Method

Patients

The present study was approved by the Ethics Committee on Human Research of the Faculty of Medicine Siriraj Hospital, Mahidol University. The present study was conducted in an ambulatory care service of the social security program at Siriraj Hospital in Bangkok over a period of 7 months, from April to October 2004. The authors enrolled adults aged 15 to 65 years with acute episodes of URI. The URI was defined as the presence of any symptoms of sore throat, rhinorrhea or cough, with or without fever. Exclusion criteria included other concomitant infection, chronic respiratory disease (e.g. COPD, asthma, chronic bronchiectasis, chronic sinusitis), immune suppressed conditions (steroid use, AIDS, malignancy), serious co-morbid diseases, and previously received systemic antibiotic therapy within 1 week.

Evaluation and management of the patients

History and clinical findings were recorded in case record forms. Throat swab cultures were obtained from all enrolled subjects. Patients were evaluated and classified in 4 categories according to the prominent clinical features:

1) non-specific URI/common cold/ rhinitis,

2) acute pharyngitis/ tonsillitis/ pharyngotonsilitis,

3) acute sinusitis/rhinosinusitis, and

4) acute bronchitis.

The treatments followed the CPG adapted from principles of appropriate antibiotic use for treatment of acute upper respiratory tract infections in adults endorsed by the Centers for Disease Control and Prevention, USA[5-13]. Each patient received appropriate symptomatic and supportive treatment such as antipyretics, analgesics, antitussives and decongestants. An antibiotic was given to the patients with pharyngitis/tonsillitis/pharyngtonsillitis if at least 3 of the 4 clinical features (fever, tonsillar exudates, tender anterior cervical lymphadenopathy, and no cough) were present or the patient with severe acute sinusitis/rhinosinusitis or patients with acute sinusitis/rhinosinusitis whose symptoms did not improve within 7 days. Penicillin V or amoxicillin was recommended as a first choice and erythromycin was suggested as an alternative treatment in case of penicillin allergy. The clinical course, possible complications, and unnecessary antibiotics were explained to the patient. All patients were interviewed by telephone about the clinical outcomes and additional treatments one week after the hospital visit. The patients whose throat swab cultures grew GAS, non-GAS, *S. pneumoniae*, or *K. pneumoniae* were asked to have a reculture at least 2 weeks after completion of the treatment and had no symptoms in order to discriminate colonization from infection. All patients with GAS infection were checked for symptoms related to acute rheumatic fever 2 months after the episode of sore throat.

Throat swab culture procedures

Throat swabs were obtained by rubbing the posterior pharynx and both tonsillar fossa with a cotton swab, then immediately inoculated on a 5% blood agar plate before transportation to the laboratory. The plate was incubated at 35 C in an atmosphere of 4% to

7% CO2, for 16-24 hrs. Gram stains and subcultures were performed for any predominant colonies (particularly with a b-hemolytic pattern on sheep blood agar). For b-hemolytic streptococci, a bacitracin disk (Oxoid, UK) test was used to differentiate group A from others. Identification of becitracin negative b-hemolytic streptococci was performed by a conventional rapid agglutination test for identification of Lanfield group A, B, C, D, F and G streptococci (REMEL Streptexb, USA). For b-hemolytic streptococci, an optochin disk (Oxoid, UK) was used for isolation of S. pneumoniae. For gram-negative bacteria, biochemical tests were used for identification. Antibiotic susceptibility was also performed by standard the NCCLS disk diffusion method[14].

Sample size estimation and Statistic analysis

The sample size of at least 200 participants was based on the estimation of the prevalence of GAS of 5% $\pm$ 3% with 5% type I error. Data entry and statistical analyses were carried out by using SPSS software version 11.2. The Chi-Square or Fisher's exact test was used to compare categorical variables. A logistic regression model was used to predict the clinical manifestations associated with GAS infection. A p-value of less than 0.05 was considered significant.

Results

Two hundred and ninety two patients were enrolled and 204 (69.9%) were females while 88 (30.1%) were males. The mean age was 32.9 years. One hundred and sixty two (55.5%) had non-specific URI/common cold, 94 (32.2%) had pharyngitis/tonsillitis, 32 (11%) had acute bronchitis and only 4 (1.4%) had acute sinusitis. The throat swab culture results are shown in Table 1. The potential pathogenic bacteria were isolated from 87 patients (29.8%). An overall prevalence of GAS was 7.9%. GAS was isolated in 16% of the patients with pharyngitis/tonsillitis; and only 3.7% and 3.1% of the patients with non-specific URI/common cold and acute bronchitis respectively. The clinical features associated with positive culture are shown in Table 2. The clinical features significantly associated with GAS in the throat were T $\geq$ 37.8 C, exudate on the pharynx or tonsil, tender cervical lymphadenopathy, and absence of cough. The accuracy of the clinical criteria for GAS infection is shown in Table 3. The positive predictive value of having > 3 criteria in diagnosis of GAS infection in all patients was 43.8%, whereas the negative predictive value was 94.2%. The positive predictive value of having > 3 criteria in diagnosis of GAS infection in patients with pharyngitis/tonsillitis was also

Table 1. Throat swab culture results

	Non-specific URI/ common cold N (%)	Pharyngitis/ Tonsillitis N (%)	Acute bronchitis N (%)	Sinusitis N (%)	Total
Normal Flora	123 (75.9)	55 (58.5)	24 (75.0)	3 (75)	205 (70.2)
Group A b-Hemolytic Streptococcus	6 (3.7)	15 (16.0)	1 (3.1)	1 (25)	23 (7.9)
Non group A b-Hemolytic Streptococcus	11 (6.8)	11 (11.7)	5 (15.6)	0	27 (9.2)
Streptococcus group C	2	2	2	0	6
Streptococcus group D	3	2	0	0	5
Streptococcus group F	1	0	0	0	1
Streptococcus group G	3	7	2	0	12
Streptococcus non group A, B, C, D, F, G	2	0	1	0	3
Staphylococcus aureus	1 (0.6)	1 (1.1)	0	0	2 (0.7)
Coagulase-negative Staphylococcus	3 (1.9)	1 (1.1)	0	0	4 (1.4)
Klebsiella pneumoniae	19 (11.7)	9 (9.6)	0	0	28 (9.6)
Hemophilus influenzae	0	1 (1.1)	0	0	1 (0.3)
Streptococcus pneumoniae	1 (0.6)	1 (1.1)	3 (9.4)	0	5 (1.7)
Enterobacter sp.	0	1 (1.1)	0	0	1 (0.3)
Proteus mirabilis	0	1 (1.1)	0	0	1 (0.3)
Total	162 (55.5)	94 (32.2)	32 (11.0)	4 (1.4)	292

Note: There were 5 patients who grew more than 1 bacteria i.e. GAS and *Klebsiella pneumoniae*, Streptococcus gr. C and Streptococcus gr. D, Streptococcus gr. C and Streptococcus gr. G, Streptococcus gr. G and *Klebsiella* sp., *Enterobacter* sp. and coagulase-negative Staphylococcus

Table 2. Clinical manifestations associated with patients with GAS infection

Clinical Feature	GAS n = 23	Others			p value	RR (95%CI)
		non GAS n = 27	*Klebsiella* sp. n = 28	Flora n = 205		
History of fever	20 (87.0)	19 (70.4)	15 (53.6)	143 (69.8)	0.153	2.60 (0.79-8.53)
Temperature ≥ 37.8 C	10 (43.5)	7 (25.9)	3 (10.7)	33 (16.1)	0.004	3.31 (1.53-7.16)
Sore throat	20 (87.0)	21 (77.8)	25 (89.3)	190 (92.7)	0.430	0.62 (0.2-1.96)
Coryza	13 (56.5)	14 (51.8)	19 (67.8)	150 (73.2)	0.194	0.54 (0.25-1.19)
Cough	13 (56.5)	17 (63.0)	21 (75.0)	163 (79.5)	0.038	0.40 (0.18-0.88)
Myalgia	9 (39.1)	5 (18.5)	4 (14.3)	47 (22.9)	0.096	2.16 (0.98-4.77)
Injected pharynx	23 (100.0)	22 (81.5)	25 (89.3)	188 (91.7)	0.235	
Exudates	6 (26.1)	3 (11.1)	2 (7.1)	4 (2.0)	0.001	6.09 (2.78-13.31)
Tender cervical lymph nodes	8 (34.8)	5 (18.5)	3 (10.7)	20 (9.8)	0.006	3.36 (1.52-7.41)

Table 3. Accuracy of ≥ 3 clinical features* for the diagnosis of GAS infection in adults with URI

Study Group	Sensitivity	Specificity	Positive predictive value	Negative predictive value
All patients	30.4%	96.7%	43.8%	94.2%
Patients with pharyngitis/tonsillitis	46.7%	88.6%	43.8%	89.7%

* temperature >37.8 C, absence of cough, exudate, tender cervical lymphadenopathy

Table 4. Antibiotic use and clinical response on day 7 after hospital visit

	GAS n = 23	Others			
		Non-GAS n = 25	*K. pneumoniae* n = 28	Flora n = 205	
Received antibiotics	15/23 (65.2%)	10/25 (40%)	8/28 (28.5%)	51/205 (24.8%)	
Good response* on day 7	18/20* (90%)	13/21** (61.9%)	20/25** (80%)	147/161* (91.3%)	
with ATB	12/12 (100%)	p = .15	5/8 (62.5%)	p = 1.0	6/7 (85.7%) p = 1.0	38/41 (92.7%) p = 1.0
without ATB	6/8 (75%)		8/13 (61.5%)		14/18 (77.8%)	109/120 (90.8%)

* disappearance of all symptoms
** number of patients who could be followed up in each group

43.8% since none of the patients with common cold, acute bronchitis and acute sinusitis had > 3 criteria. Antibiotics were prescribed to 30.1% of the patients while only 6.9% of patients met the criteria for antibiotic use in the CPG (16 cases who met ≥ 3 clinical criteria, and 4 cases of severe sinusitis). Only 3.7% of the patients diagnosed of having a common cold received antibiotics whereas those with diagnoses of pharyngitis/tonsillitis, acute bronchitis and acute sinusitis received antibiotics in 75.5%, 25% and 75%, respectively. Prescription of antibiotics and clinical response of the patients are shown in Table 4. Antibiotics were prescribed in higher proportion for GAS infected patients (65.2%) than for culture-negative patients (24.8%). Klebsiella sp. was found in the throat of 9.5% in adults with URI. Some of these patients were healthcare personnel. Most patients had a good clinical response on day 7(80-91%), except in the group of non-

Table 5. Results of repeated throat culture after recovery

	GAS	Non-GAS	*K. pneumoniae*	*S. pneumoniae*
No. of patients who had repeated culture/Total	17/23	15/25	22/28	4/4
Repeated culture results				
Normal flora	14 (82.4%)	15 (100%)	6 (27.3%)	4 (100%)
Same organism	0	0	15 (68.2%)	0
Other organism	3 (17.7%)	0	1 (4.5%)	0

GAS infections, which had a lower rate of good response (62%). The clinical response in the patients receiving antibiotics was not significantly different from those who did not receive antibiotics no matter what the causative agents were. None of the patients with GAS developed any symptoms related to acute rheumatic fever during 2 months after the sore throat episode. The re-cultures were performed in 58 patients after their recovery of URI symptoms and only *K. pneumoniae* was persistently found in the majority of subjects (68%) as shown in Table 5.

Discussion

GAS is the only major pathogen of concern in patients with URI because of its potential harmful consequences. The prevalence of GAS in adults with URI found in the present study was 7.9%. This observation was comparable to reports from other parts of the world[11]. Other significant bacteria cultured from the throats in the present study were non-GAS and *Klebsiella* sp. Non-GAS was isolated in 9.2% of which group G streptococci was the most prevalent (4.1%). Patients with non-GAS pharyngitis were difficult to differentiate from those with GAS pharyngitis, as previously described[15]. *Klebsiella* sp. has seldom been mentioned as a causative agent of URI in China and Japan[16-18] but there was no strong evidence of clinical significance. The present study found a high prevalence of *Klebsiella* sp. in the throats of 9.5% in adults with URI. It is very likely that *Klebsiella* sp. was a transient or persistent colonizer because most of the patients still had the same organisms on repeated cultures and they had clinical responses without any specific treatment of *Klebsiella* sp. infection. Some of them were healthcare personnel; this could be the reason for having *Klebsiella* sp. colonization in their throat. URI is a self-limited disease in nature that lasts for 2 weeks. Ninety percent of the patients usually improve within 7 days with symptomatic treatment**.** Antibiotics are beneficial only in patients with GAS infection. There is no compelling data for antibiotic treatment for those who do not have GAS. Systematic reviews on antibiotic treatment for patients with a sore throat[19] and acute bronchitis[20] were recently published. The relative benefits of antibiotic treatment for a sore throat include preventing non-suppurative complications, acute rheumatic fever, and shortening the duration of symptoms by about 16 hours. The magnitude of benefits in acute bronchitis is similar to that of the harm from potential adverse effects from antibiotics. Moreover, recent guidelines endorsed by the Centers for Disease Control and Prevention[5-13] and the Infectious Diseases Society of America[15] recommend antibiotic treatment for only suspected GAS pharyngitis patients.

Penicillin is recommended as the antibiotic of choice for the treatment of GAS based on the efficacy in eradication, appropriate spectrum, and low cost. Practically, penicillin is problematic in terms of compliance due to frequent administration and its unpleasant taste. Furthermore, penicillin treatment failure has been increasingly reported[21-23]. Therefore, other new antibiotics have been widely used: amoxicillin-clavulanate, new macrolides, and oral cephalosporins[24-30]. Although many studies on these drugs established an equivalence or superiority on bacterial eradication as well as clinical cure rate and ease of administration, most authorities and guidelines still do not recommend them for initial therapy due to their broad spectrum leading to high resistance pathogens and their relatively high cost[31]. Amoxicillin is an alternative to penicillin V with the following advantages: 1) it is as effective as penicillin V with an easier administration[32], 2) it is more effective than penicillin against pathogens causing otitis media, a concerning complication of URI, and 3) it has a narrower spectrum and is less expensive than the newer drugs. Nowadays, general practitioners and patients are more familiar with amoxicillin than penicillin V. In the present study, amoxicillin was chosen instead of penicillin V for the aforementioned reasons. However, it should be kept in mind that penicillin V is still effective for GAS infection because there has been no report on GAS resistance to penicillin.

Several methods for determining the likelihood that a patient with URI has GAS infection are available. Prediction by clinical features, a rapid antigen test (RAT) and throat swab culture were used for this purpose. Recent systematic reviews and clinical guidelines[10,15] have recommended several strategies for the diagnosis and management of patients with URI. A practice guideline endorsed by the CDC[10] has proposed that patients with an intermediate or high probability based on the clinical predictors (presence of $\geq$ 3 Centor criteria) could be empirically treated with antibiotics. More rigid guidelines from the IDSA[15] recommend antibiotics only if there is a positive RAT or throat swab culture because empirical treatment for all patients with $\geq$ 3 Centor criteria results in an unacceptable antibiotic over-exposure in 50% of URI patients.

A cost-effectiveness analysis revealed that in an endemic situation, treating all patients with oral penicillin was the most cost-effective if the prevalence of positive throat culture for GAS rate was 20% or more[33]. Therefore it is obvious that antibiotics are not cost-effective for treating all patients with nonspecific URI/common cold or acute bronchitis in the presented population because the prevalence of having GAS is less than 5%. For the patients with pharyngitis/tonsillitis, the prevalence of GAS was 16% which was still below the 20% threshold for treating all patients. Therefore, clinical prediction rules become necessary in order to prescribe an antibiotic only to the patient who has a high probability of having GAS infection. Out of 94 patients with pharyngitis, 16 (17%) had > 3 clinical criteria and the probability of having GAS was 43.8% which is higher than 20% and such a patient should be treated with an antibiotic. None of the patients with nonspecific URI/common cold had >3 clinical criteria an antibiotic should not be given. Another cost-effectiveness analysis was performed for observation without testing or treatment, empirical treatment with penicillin on those patients with $\geq$ 3 of Centor criteria, throat culture, RAT followed by culture, and RAT alone, then treat with antibiotics in only test-positive patients[34]. The results revealed that the cost-effectiveness was dependent on the prevalence of GAS and probability of anaphylaxis. Observation without testing or treatment was the least expensive strategy when prevalence was less than 6%. Empirical treatment without testing was neither the most effective nor the least expensive strategy, except when the prevalence was more than 71%. At the prevalence of 6 to 20%, the culture strategy dominated in effectiveness and less cost. However there are some limitations for several aforementioned strategies in Thailand. RAT is not widely available and throat culture is impractical due to its limited facility. Thus, the empirical treatment based on reliable clinical criteria is still the mainstay strategy in a limited resource setting. The present study demonstrated that the clinical criteria were somewhat applicable to adults with URI in the present series. The presence of $\geq$ 3 criteria had a sensitivity of 30.4%, specificity of 96.7%, positive predictive value of 43.8%, and negative predictive value of 94.2%. These findings indicate that if the patient had less than 3 criteria, the probability of having GAS in the throat was less than 6% for overall patients and it was 10% for patients with pharyngitis/tonsillitis and the patient should not receive antibiotics. This information will dissuade physicians to give too many antibiotics for URI.

The present study confirmed that most patients had good clinical responses within a week. A few patients who received and did not receive antibiotic subsequently had sinusitis. Most cases of sinusitis are caused by viral or non-infectious process[9]. Thus, this complication might not be prevented by antibiotics. None of the presented patients had suppurative complications. Regarding acute rheumatic fever, none of the patients with GAS in the present study had developed symptoms related to acute rheumatic fever within 2 months after a sore throat. According to the good clinical response rate, low consequence rate and no evidence of acute rheumatic fever, it was shown that the evidence-based CPG is safe as well as effective under real practical situations.

Ideally, the antibiotic prescription rate for healthy adults with URI should not exceed 10%, since prevalence of GAS is not more than 10%. The present study found that only 7.9% of patients were indicated for antibiotics according to the CPG, while antibiotics were given to 30% of the subjects. The reasons for excessive antibiotic use beyond the indication were the patient's expectation and physician's reluctance. Physician and patient education are important in order to reduce an excessive use of antibiotics in a common self-limited illness. Many interventions on physician education have been successful[2,35]. Effectiveness of intervention on patient education has been previously demonstrated[36]. The multifaceted interventions for both physicians and patients appear to hold greater promise[36,37].

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การติดเชื้อที่ระบบการหายใจช่วงบนในผู้ใหญ่: ความชุกของแบคทีเรียที่เป็นสาเหตุ ลักษณะทางคลินิก และประสิทธิผลของการดูแลรักษาด้วยแนวทางเวชปฏิบัติ

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ที่มา: *ผู้ป่วยที่มีการติดเชื้อที่ระบบการหายใจช่วงบนมักได้รับการรักษาด้วยยาต้านจุลชีพมากเกินความจำเป็น เนื่องจากการติดเชื้อส่วนใหญ่เกิดจากไวรัสแต่ผู้ให้การรักษามักไม่สามารถแยกการติดเชื้อไวรัสจากการติดเชื้อแบคทีเรียได้*

วัตถุประสงค์: *เพื่อทราบความชุกของการติดเชื้อแบคทีเรีย group A β-hemolytic streptococci (GAS) ในผู้ใหญ่ที่มีการติดเชื้อที่ระบบการหายใจช่วงบนและลักษณะทางคลินิกที่สัมพันธ์กับการติดเชื้อแบคทีเรียดังกล่าว รวมทั้งทราบประโยชน์ของการใช้แนวทางเวชปฏิบัติในการรักษาผู้ป่วยดังกล่าว*

วัสดุและวิธีการ: *ผู้ใหญ่ที่มีอาการของการติดเชื้อที่ระบบการหายใจช่วงบนและมารับการตรวจรักษาที่โรงพยาบาลศิริราชระหว่างเดือนเมษายนถึงตุลาคม พ.ศ. 2547 ได้รับการสอบถามอาการ ตรวจร่างกาย เพาะเชื้อจากคอหอย และได้รับการรักษาตามแนวทางเวชปฏิบัติการใช้ยาต้านจุลชีพสำหรับผู้ใหญ่ที่มีอาการของการติดเชื้อที่ระบบการหายใจช่วงบนของศูนย์ควบคุมและป้องกันโรค ประเทศสหรัฐอเมริกา ผู้ป่วยได้รับการติดตามผลการรักษาโดยการสอบถามทางโทรศัพท์ภายหลังมาตรวจรักษา 7 วัน*

ผลการศึกษา: *ผู้ป่วยจำนวน 292 คนมีกลุ่มอาการต่าง ๆ ดังนี้ หวัดธรรมดาร้อยละ 55.5, คอหอยอักเสบ/ทอนซิลอักเสบร้อยละ 32.2, หลอดลมอักเสบเฉียบพลันร้อยละ 11 และโพรงจมูกอักเสบร้อยละ 1.4 ความชุกของการตรวจพบเชื้อ group A β -hemolytic streptococci (GAS) จากคอหอยเป็นร้อยละ 7.9 โดยโรคคอหอยอักเสบ/ทอนซิลอักเสบพบร้อยละ 16 ส่วนหวัดธรรมดา และหลอดลมอักเสบเฉียบพลันพบเพียงร้อยละ 3.7 และ 3.1 ตามลำดับ ลักษณะทางคลินิกที่สัมพันธ์กับการติดเชื้อ GAS ได้แก่ ไข้, exudates ที่คอหอยหรือทอนซิล, ต่อมน้ำเหลืองที่บริเวณคอโต และกดเจ็บ และไม่มีอาการไอ หากผู้ป่วยมีลักษณะดังกล่าวน้อยกว่า 3 อย่างจะมีโอกาสไม่ติดเชื้อ GAS สูงร้อยละ 94.2 และ ไม่ควรได้รับยาต้านจุลชีพ ผู้ป่วยกลุ่มอาการหวัดธรรมดา, หลอดลมอักเสบเฉียบพลันและโพรงจมูกอักเสบเฉียบพลันทุกรายมีลักษณะทางคลินิกดังกล่าวน้อยกว่า 3 อย่าง ผู้ป่วยส่วนมากอาการดีขึ้น หรืออาการหายไปภาย 7 วัน หลังการตรวจรักษาไม่ว่าจะได้รับการรักษาด้วยยาต้านจุลชีพหรือไม่ก็ตาม*

สรุป: *ผู้ใหญ่ที่มีการติดเชื้อที่ระบบการหายใจช่วงบนตรวจพบเชื้อ group A β -hemolytic streptococci จากคอหอยเพียงร้อยละ 7.9 และการใช้แนวทางเวชปฏิบัติในการวินิจฉัยและการรักษาผู้ป่วยดังกล่าวด้วยยาต้านจุลชีพมีประโยชน์และปลอดภัย*