Research Article

Evaluation of rationality, efficacy and tolerability of antimicrobials prescribed for acute pharyngitis at a teaching hospital in India

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Abstract

Objective: To evaluate rational drug use in acute pharyngitis and to assess efficacy and tolerability of antimicrobials used for acute pharyngitis in a tertiary care hospital. **Materials and Methods:** This is a descriptive and observational study, observed participants without providing any interventions related to treatment prescribed and then results are presented descriptively. Patients were grouped based on aetiology of acute pharyngitis, determined by Centor score and data were obtained from medical records, interviews and results of follow-up visits, data were analysed descriptively to conclude event of irrational use of drugs, proportion of antibiotic prescriptions and impact of irrational use of drugs in pharyngitis. The results were depicted in the form of tables and figures. Microsoft word and excel are used to generate figures and tables. Patient compliance to the prescribed medications was assessed by pill count method/recovering empty packets. **Results:** As much as 80% acute pharyngitis patients received antibiotics, but only 8% of patients showed indications warranting their use. In this study, the appropriate duration of treatment was only found in 0.5% of patients, most (50%) received antibiotics for 5 days, it was found that corticosteroids were prescribed to about 20 of patients, furthermore, result of follow-up showed that 50% patients adhered to regimen of antibiotics prescribed by doctors and 40% did not comply, adverse effects of therapy were reported in 20(25%) patients who receive an antibiotic, majority of patients experienced side-effects in the form of dizziness, heartburn, headache and diarrhoea. **Conclusion:** Acute pharyngitis is expected to be main cause of inappropriate use of antibiotics in clinical practice, cautious and judicious use of antibiotics will reduce burden of multi-drug resistance and thereby enabling better patient management and limiting resultant morbidity, there is a need to increase awareness of use of standard treatment guidelines to encourage rational drug utilization.

Keywords: Pharyngitis, Centor score, Amoxicillin, antibiotics, antimicrobials, rational drug use

Introduction

Pharyngitis is inflammation of mucous membranes of pharynx, presenting commonly with sore throat, malaise, fever, cough and nasal congestion, which is usually treated with simple therapy directed at symptomatic relief. It can be (Gerber, 2008) acute, recurrent or chronic. Recurrent pharyngitis is more than 3 episodes of acute pharyngitis within 12 months of period with positive laboratory (Short, 2011) report. Chronic pharyngitis is a chronic inflammatory condition of pharynx, characterized by hypertrophy of mucosa, seromucinous (Dhingra, 2010) glands and sub epithelial lymphoid follicles.

Acute pharyngitis, which is part of acute respiratory tract infections, accounts (Shaikh et al., 2010) for an estimated 2–5% of (Vincent et al., 2004) patient visits to health facilities. It is commonly caused by viruses (40–60%) and bacteria (5–40%). Streptococcus pyogenes is the most common pathogen found in patients (Snow et al., 2001) suffering acute pharyngitis due to bacteria. Thus, antibiotic therapy is generally not recommended, and this disease can heal even without intervention. Identifying the cause of acute pharyngitis is a key point in determining the optimal treatment for the patient.

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Inappropriate drug use may also lead to increased cost of medical care, antimicrobial resistance, adverse effects and patient mortality (WHO, 1977). Therefore, to improve quality and efficiency of drug therapy, it is necessary to have a thorough understanding (Grace et al., 2006) of existing patterns of therapy, magnitude of ways in which such therapy (Jain et al., 2001) departs from optimal practice, and factors (clinical, psychological, economic, and cultural) that underlie these patterns (Gaash et al., 2008).

The International Network for the Rational Use of Drugs (INRUD) was established in 1989 to promote the rational use of drugs in developing countries (Laposte et al., 1983). Various indicators were developed by INRUD in collaboration with WHO that provided objective indices to allow for assessment of drug- use practices. Therefore, it is imperative to evaluate and monitor the drug utilization patterns (Van et al., 2010) from time to time, to enable suitable modifications in prescribing patterns to increase the therapeutic benefit and decrease the adverse effects to optimize the medical services for the patients (Prudhomme et al., 2005).

World Health Organization (WHO) defines drug utilization as marketing, distribution, prescribing, and use of drugs in society, with special emphasis on resulting medical, social and economic consequences (WHO, 2001).

The present study was taken up, to evaluate rational drug use in acute pharyngitis and to assess efficacy and tolerability of antimicrobials used in study.

Materials and methods

Study was undertaken in collaboration with department of ENT at Government hospital, Kakinada, conducted for a period of 3 months.

Institutional ethical committee clearance was not required because it was an observational study. There was no intervention in treatment protocol or treatment regimen. This is a descriptive and observational study, observed participants without providing any interventions related to treatment prescribed and then results are presented descriptively.

Patients with acute pharyngitis aged >3 years are included and patients who were lost to follow-up or have comorbidity with other infectious diseases requiring antibiotic therapy are excluded from the study.

Patients were grouped based on aetiology of acute pharyngitis, determined by Centor score and data were obtained from medical records, interviews and results of follow-up visits.

Data from medical records include patient's identity, diagnosis, history and treatment of acute pharyngitis, interviews were conducted to determine initial condition of the patient, follow-up visits were performed seven days later to evaluate outcome of therapy, compliance, and impact of treatment.

Rationality of drug use is defined by prescribing indicators that consist of appropriate indication, drug selection, dosage, route, intervals, duration of administration, assessment of patient's condition, and patient compliance and outcome of therapy was assessed by the patient's condition in the last visit compared to their initial condition.

Data were analysed descriptively to conclude event of irrational use of drugs, proportion of antibiotic prescriptions and impact of irrational use of drugs in pharyngitis. The results were depicted in the form of tables and Figures. Microsoft word and excel are used to generate figures and tables. Patient compliance to the prescribed medications was assessed by pill count method/recovering empty packets.

Observations and results

Out of 100 study subjects, 52 were male and 48 were female. Majority of the subjects were between 15-50 years. All the subjects presented with sore throat, 50% with fever, and 10% with headache, 10% running nose, 8% with nasal obstruction, 5% with cough, and majority of the subjects (80%) had more than one symptom.

The patients were grouped based on the aetiology of acute pharyngitis. In this study, a modified Centor score, which also considers the patient's age, was calculated for all patients who met the inclusion criteria.

Table 1. Modified Centor scoring system points

Criteria	Points scored
Absence of cough	1
Swollen tender anterior cervical nodes	1
Temperature >100.4 F	1
Tonsillar exudates	1
Age <15	+1
Age >44	-1

Table 2. Guidelines for management

-1,0 or 1 point	No antibiotic or throat culture necessary
2 or 3 points	Should receive throat culture and treat with an antibiotic if culture is positive
4 or 5 points	Consider rapid strep testing and or culture (risk of strep. Infection is >50%)

Table 3. Modified Centor scoring system and risk of streptococcus infection for acute pharyngitis patients in this study

Centor	Risk of streptococcus infection	Number of patients	Percentage
<0	1-2.5%	30	30%
1	5-10%	20	20%
2	11-17%	32	32%
3	28-35%	10	10%
>4	51-53%	8	8%

Table 4. Causes of Acute pharyngitis for patients in this study based on throat cultures

Aetiology	Number of patients	Percentage
Bacteria	30	30%
Virus	50	50%
Cannot be determined	20	20%
Total patients	100	

Table 5. Drugs prescribed to acute pharyngitis patients in this study

Drugs	Number of patients	Percentage
Amoxicillin+clavulanic acid	40	50%
Cefpodoxime+clavulanic acid	30	37.5%
Cefixime	3	3.75%
Cefuroxime axetil	2	2.5%
Ciprofloxacin	2	2.5%
Azithromycin	2	2.5%
Cotrimoxazole	1	1.25%

Patients with a score of zero or 1 was at very low risk (<10%) of Streptococcal pharyngitis, and those with a score of 4 or higher were at high risk (>50%). Patients with a score of 2–3 should be tested using rapid antigen detection test (RADT) or throat culture, with positive results warranting antibiotic therapy. However, in clinical practice, these tests are not performed due to limited facilities.

Co-amoxiclav (fixed dose combination of amoxicillin and clavulanic acid) was most commonly used antibiotic and other Antimicrobials used were cefpodoxime+clavulanic acid, cefixime, cefuroxime, azithromycin, ciprofloxacin and Cotrimoxazole.

Symptomatic drugs prescribed include corticosteroids (dexamethasone, prednisone), analgesic-antipyretics (paracetamol), expectorants-mucolytic (Bromhexine, ambroxol,), antihistamines (chlorpheniramine maleate, cetirizine, loratadine), nonsteroidal anti-inflammatory drugs(NSAIDs) (diclofenac, ibuprofen, mefenamic acid, piroxicam), antacid-antiemetics (Omeprazole, Rabeprazole, domperidone, metoclopramide) and vitamins.

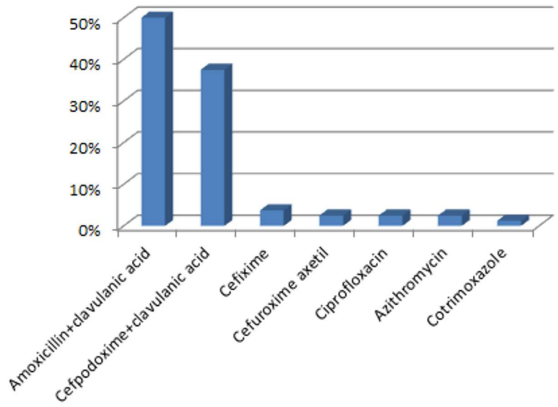

Figure 1. Bar diagram showing antimicrobials prescribed to study patients in percentage

Table 6. Concomitant medications used in this study

Drugs	Number of patients
Antihistaminics	50
Analgesic-Antipyretics	50
Expectorants-Mucolytics	45
Antacid-antiemetics	55
Multivitamins	58
Corticosteroids	20

As much as 80% acute pharyngitis patients received antibiotics, but only 8% of patients showed indications warranting their use. Thus, there was 72% overprescribing of antibiotics in treatment of acute pharyngitis.

Duration of antibiotic administration for acute pharyngitis is 6–10 days for adults and 10 days for children. In this study, the appropriate duration of treatment was only found in 0.5% of patients, most (50%) received antibiotics for 5 days, it was found that corticosteroids were prescribed to about 20 of patients

A total of 40 patients (50%) who received antibiotics showed improvement, while 20 patients (25%) still had complaints, and 2 patients (2.5%) condition worsened. 2 patients (10%) who did not receive antibiotics showed improved health, while another 2 patients (10%) still had complaints, and 1 patient's (5%) health worsened.

Furthermore, result of follow-up showed that 50% patients

adhered to regimen of antibiotics prescribed by doctors and 40% did not comply. Reasons for non-compliance included forgetting to take antibiotics and stopping altogether.

Adverse effects of therapy were reported in 20(25%) patients who receive an antibiotic, majority of patients experienced side-effects in the form of dizziness, heartburn, headache and diarrhoea.

Table 7. Adverse effects of therapy in patients receiving antibiotics

Adverse effects	Number of patients
Dizziness	8
Heart burn	4
Headache	2
Diarrhoea	2
Abdominal pain	4

Discussion

Antibiotics are indicated only for patients suffering from acute pharyngitis caused by bacteria, antibiotic therapy may be considered in patients with a Centor score of 4 or higher who are at high risk (>50%) of streptococcal pharyngitis, selection of antibiotics prescribed requires consideration of effectiveness, spectrum of activity, safety, dosing schedule, cost, and compliance issues of the antibiotic.

Penicillin, penicillin congeners (ampicillin or amoxicillin), clindamycin, and certain Cephalosporins and macrolides are effective against streptococcal pharyngitis. Based on cost, narrow spectrum of activity, safety, and effectiveness, penicillin is recommended by the (Cooper et al., 2001) American Academy of Family Physicians (AAFP), American (Centre of Infectious diseases, 2003) Academy of paediatrics (AAP), American Heart (Dajani et al., 1995) Association (AHA), Infectious Diseases Society of America (IDSA) (Bisno et al., 2002), and WHO for the treatment of streptococcal pharyngitis (Rimoin et al., 2005). Erythromycin or oral cephalosporins are second-line antibiotics that can be used if patient is allergic to penicillin, or if symptoms persist after therapy with first-line antibiotics.

Despite the low incidence of acute pharyngitis caused by bacteria, prescription of antibiotics is exceptionally high, about 80% of acute pharyngitis patients received antibiotics along with the inappropriate duration of administration, which would greatly contribute to antibacterial resistance. Standard duration of antibiotic administration for acute pharyngitis is 6–10 days for adults and 10 days for children, but patient compliance in this regard was generally low (Altamimi et al., 2009).

Administering of antibiotics for acute pharyngitis with proper duration is rare, appropriateness of duration of administration only occurred in 0.5% of patients, with most patients (50%) being given antibiotics for 5 days. Furthermore, the use of corticosteroids in acute pharyngitis patients remained (Bergeso et al., 2013) controversial overprescribing antibiotics could increase the risk of side effects in patients, which was seen at 25% of patients taking antibiotics (Shulman et al., 2012).

Various factors such as introduction of many drugs in market, a variable pattern of drug prescribing, lack of updated and reliable drug information, increase concerns regarding the cost of drugs, and appearance of delayed adverse effects due to the use of drugs have increased the importance of drug utilization studies (Baksaas et al., 1986) in medical practices. Evaluation and monitoring of drug use pattern from time to time help in giving feedback to prescribers regarding prescribing and rational use of drugs (Krishnaswamy et al., 1985)

Limitations

Duration of study was short; hence effect of seasonal variation could not be determined. Study was carried out at a single centre, further large-scale research is required for detailed evaluation.

Conclusion

Acute pharyngitis is expected to be main cause of inappropriate use of antibiotics in clinical practice, cautious and judicious use of antibiotics will reduce burden of multi-drug resistance and thereby enabling better patient management and limiting resultant morbidity, there is a need to increase awareness of use of standard treatment guidelines to encourage rational drug utilization.

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References

Altamimi S, Khalil A, Khalaiwi KA. 2009. Short versus standard duration antibiotic therapy for acute streptococcal pharyngitis in children. Cochrane Database Syst. Rev 1, CD004872.

Baksaas I, Lunde PK. 1986. National drug policies: The need for drug utilization studies. Trends in Pharmacological Sciences, 7:331-4.

Bergeso K, Rogers N, Shailendra P. 2013. Corticosteroids for a sore throat? Journal of Family Practice, 62:372–374.

Bisno AL, Gerber MA, Gwaltney JM, Kaplan Jr, Schwartz EL. 2002. RH.; for the Infectious Diseases Society of America. Practice guidelines for the diagnosis and management of group A streptococcal pharyngitis. Clinical Infectious Diseases, 35:113–125.

Committee on Infectious Diseases. Red Book, 26th ed.; American Academy of paediatrics: Elk Grove Village, IL, USA, 2003; pp. 578–580.

Cooper RJ, Hoffman JR, Bartlett JG. 2001. for the American Academy of Family Physicians; American College of Physicians; American Society of Internal Medicine; Centres for Disease Control and Prevention. Principles of appropriate antibiotic use for acute pharyngitis in adults: Background. Annals of Internal Medicine, 134:509–517.

Dajani A, Taubert K, Ferrieri P, Peter G, Shulman S. 1995. Treatment of acute streptococcal pharyngitis and prevention of rheumatic fever: A statement for health professionals. Committee on Rheumatic Fever; Endocarditis; and Kawasaki Disease of the Council on Cardiovascular Disease in the Young; the American Heart Association. Paediatrics, 96:758–764.

Dhingra PL, Dhingra S. 2010. Acute and chronic pharyngitis. In: diseases of ear nose and throat. 5th edition. New Delhi: Elsevier, 268-270.

Gaash B. 2008. Irrational Use of Antibiotics. Indian Journal for the Practising Doctor, 5(1).

Gerber MA. 2008. Group A streptococcus. In: Kliegman RM, Jenson HB, Behrman RE, Stanton BF, editors. Nelson Textbook of Paediatrics. 18th edition, New Delhi: Elsevier; 2:1135-45.

Grace NN, Bussmann RW. 2006. Traditional management of ear, nose and throat (ENT) diseases in Central Kenya. Journal of Ethnobiology and Ethnomedicine, 2:54.

Jain N, Lodha R, Kabra SK. 2001. Upper respiratory tract infections. Indian Journal of Pediatrics, 68:1135-8.

Krishnaswamy K, Kumar BD, Radhaiah G. 1985. A drug survey – precepts and practices. European Journal of Clinical Pharmacology, 29(3):363-70.

Laporte JR, Porta M, Capella D. 1983. Drug utilization studies: A tool for determining the effectiveness of drug use. British Journal of Clinical Pharmacology, 16:301-4.

Prudhomme S, Bonnaud B, Mallet F. 2005. Endogenous retroviruses and animal reproduction. Cytogenetic and Genome Research, 110:353-364.

Rimoin AW, Hamza HS, Vince A. 2005. Evaluation of the WHO clinical decision rule for streptococcal pharyngitis. Archives of Disease in Childhood, 90:1066–1070.

Shaikh N, Leonard E, Martin JM. 2010. Prevalence of streptococcal pharyngitis and streptococcal carriage in children: A meta-analysis. Paediatrics, 126, e557–e564.

Short S, Bashir H, Marshall P, Miller N, Olmschenk D, Prigge K, Solyntjes L. 2011. Diagnosis and treatment of respiratory illness in children and adults. Institute for Clinical Systems Improvement, 3:1-81.

Shulman ST, Bisno AL, Clegg HW. 2012. Clinical practice guideline for the diagnosis and management of group A streptococcal pharyngitis: 2012 update by The Infectious Diseases society of America. Clinical Infectious Diseases, 1–17.

Snow V, Mottur-Pilson C, Cooper RJ, Hoffman JR. 2001. Principles of appropriate antibiotic use for acute pharyngitis in adults. Annals of Internal Medicine, 134:506–508.

Van den Bruel A, Haj-Hassan T, Thompson M, Buntinx F, Mant D. 2010. Diagnostic value of clinical features at presentation to identify serious infection in children in developed countries: a systematic review. Lancet, 375(9717):834–45.

Vincent MT, Celestin N, Hussein AN. 2004. Pharyngitis. American Family Physician, 69:1465–1470.

W.H.O document; dept. of child and adolescent health and development. 2001. “Cough and cold remedies for the treatment of acute respiratory infections in young children” 01-32.

WHO Expert Committee (1977). The Selection of Essential Drugs, Technical Report Series no. 615. Geneva: World Health Organization.