STUDY OF CURRENT MANAGEMENT OF COMMUNITY ACQUIRED PNEUMONIA AND STRATEGIES FOR IMPROVEMENT

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ABSTRACT

Objectives: *To see that the patients admitted with community acquired pneumonia (CAP) are managed in accordance with British Thoracic society recommendations and guidelines.*

Material and Methods: *All patients admitted with Community-Acquired Pneumonia in medical wards admitted in large district general hospital setting in UK, were audited. The study period was between September and October 2002. Permission for the study was taken from the local hospital trust audit department.*

Results: *Seventy one sets of notes were reviewed leaving 38 patients appropriate for inclusion into the study. The findings observed in the record revealed that, Respiratory rate was not recorded in 36.8% (n=14) patients, level of confusion not recorded in 47.4% (n=18), Blood cultures not sent in 42.1% (n=16) patients, sputum not sent for culture in 47.4% (n=18) cases. Inappropriate antibiotics used 18.4% (n=7), treatment time of senior review not documented in 36.8% (n=14), radiographic findings not documented in 13% (n=5) cases. No follow up arrangements were made in 13.2% (n=5). Average time of senor review was 6 hours and average time of antibiotic given after admission was 2 hours.*

Conclusion: *This audit shows that even in a developed country with well-established guidelines for management of different diseases, guidelines for management of community-acquired pneumonia are not strictly adhered to. More efforts need to be made for dissemination and implementation of these guidelines.*

Key Words: *Community-acquired pneumonia, BTS guidelines.*

INTRODUCTION

Clinical audit has been defined in a variety of ways. Perhaps one of the simplest definitions is that it is a clinically led initiative which seeks to improve the quality and outcome of patient care whereby clinicians examine their practices and results against agreed standards and modify their practice where indicated. It provides a method for systematically reflecting on and reviewing practice. It is also a means to ensure professional accountability[1]. Clinical audit is also defined as "a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change"[2].

With the increasing cost of medical care and the recent cuts on the budget of the department of health, it is necessary to ensure that medical economics is balanced by good medical care. On the other hand, lack of a standardized, evidence based policy for management of any clinical condition may lead to substandard care of patients due to inadequate information and poor training[3]. Evaluation of the quality of care rendered to patients with different disease conditions and in various settings is important to assess the performance of the health care provider and determine the effectiveness of management and institute measures to improve the institution's service to patients. To address these issues, several guidelines for common diseases were developed over the last few years. The purpose of these guidelines is to provide physicians with a rational approach to the management of various clinical conditions. Development of Clinical guidelines for

community acquired pneumonia (CAP) was, based on the recognition that despite introduction of newer antibiotics, improvement in diagnostic technology and therapeutic modalities, there is still considerable morbidity and mortality from this condition[4,5].

Present audit study was undertaken by the Respiratory Medicine Department of a large district general hospital setting in UK to ensure that patients with Community Acquired Pneumonias are adequately managed in the hospital and are given best standard of care in accordance with current British Thoracic Society (BTS) recommendations and guidelines.

MATERIAL AND METHODS

The study was conducted in patients admitted to local trust hospital between September and October 2002. Permission for the study was taken from the local hospital trust audit department.

Inclusion Criteria:

Patients of either sex aged 15 years and above, with primary diagnosis of Community Acquired Pneumonia were included in the study.

Exclusion Criteria:

Patients having other associated conditions or having immunosuppression due to HIV infection, neutropenia or any other cause were excluded. Patients below 15 years of age were also excluded from the study.

Notes of patients were reviewed for observing documentation of vital signs, level of confusion that is mental test scores (MTS), time of senior review after admission, starting duration of antibiotics after admissions, appropriateness of antibiotics being used and appropriateness of microbial testing was reviewed. The parameters that were used for audit were; 1) If appropriate investigations were carried out. 2) The severity of CAP was identified. 3). Assessment of compliance with appropriate antibiotic regime according to trust policy and BTS guidelines. 4) Impact of prompt and early usage of antibiotics on complications of CAP. 5) Assess time of senior review and 6) Documentations of facts and findings in the case notes and adequate follow up plans after discharge were arranged.

RESULTS

A total of 71 sets of notes were reviewed. Using the above mentioned exclusion criteria, 38 patients case notes were studied. Their clinical record and outcome is mentioned in Table 1. Score for severity assessment was not documented in 52.6 % (n=20) patients. Respiratory rate was not recorded in 36.8% (n=14) patients, level of confusion not recorded in 47.4% (n=18). Blood cultures were not sent in 47.4% (n=18) and sputum was not sent in 42.1% (n=16) patients. Among those patients in whom culture was sent, positive blood culture was seen in 6% (n=1) that showed growth of Coagulase negative Staphylococcus. Similarly positive sputum culture was seen in 36% (n=3) that showed growth of Haemophillus Influenzae, Pseudomonas aeroginosa and Streptococcus pneumonae in 12% (n=1) each. The detail of the various antibiotics is given in table 2.

Complications were seen in 10.5% (n=4) in this audit; 5.3% (n=2) required non-invasive ventilatory support; 2.6% (n=1) required invasive ventilatory support in ITU; 2.6 %(n=1) developed pleural effusion while none developed empyema.

CLINICAL RECORD AND OUTCOME OF PATIENTS WITH COMMUNITY ACQUIRED PNEUMONIA

Parameter	Number (n=38)	%age
Patients died (mortality)	10	26.3
Respiratory rate not documented in the notes	14	36.8
Level of confusion not documented	18	47.4
Blood cultures not sent	16	42.1
Sputum samples not sent for culture and sensitivity	18	47.4
Inappropriate antibiotics used	7	18.4
Time for senior review not documented	14	36.8
CXR findings not documented	5	13.2
Vitals not documented	5	13.2
No follow up arrangements made	5	13.2
Average time of Consultant / Registrar review)	6 hours	-

Table 1

ANTIBIOTICS USED FOR THE TREATMENT OF COMMUNITY ACQUIRED PNEUMONIA

Antibiotics used	Frequency (n=38)	%age
Amoxacillin / Ampicillin + Erythromycin / Clarithromycin	24	63.2
Amoxacillin / Ampicillin only	5	13.2
Augmentin + Clarithromycin	2	5.3
Augmentin only	2	5.3
Cefutoxime + Clarithromycin	2	5.3
Ciprofloxacin + Metronidazole	1	2.6
Ciprofloxacin only	1	2.6
Cefotoxime only	1	2.6

Table 2

DISCUSSION

Clinical audit is a useful tool to identify the pitfalls in the management of a disease and by rectifying the deficiency it helps improve patient care. It also helps in improving the academic environment in any department and institution.[6,7] The management of CAP is a sufficiently common and important issue in acute medicine that warrant the development of audit measures of the process of care and outcome to evaluate the quality of care for CAP using guidelines as a standard of management. There is evidence from Hiriani and Macfarlane[8] Gleason *et* al[9] and Gilbert *et* al [10] that guidelines do guide and standardize management, but with less measurable effect on outcome.

Out of the 71 sets of notes only 38 patients case notes were used in the study. The disqualified subjects included 33 patients who did not meet the case confirmation criteria set by BTS guideline. This result implies that several patients are being treated as a case of pneumonia without proper confirmation, giving us the impression that this disease entity is being over diagnosed.

Recent guidelines for the treatment of patients with community-acquired pneumonia summarize the limited value of testing to determine cause in many clinical settings and emphasize the importance of empirical guidelines to aid antibiotic selection, primarily on the basis of illness severity.[11] Common pathogens causing Community Aquired Pneumonias are 70% of the time due to Streptococcus pneumoniae, other pathogens include: Mycoplasma Pneumonia 5-18%, Haemophilus Influenza 4-5%, Viruses 2-8%, Legionella 2-5%, Chlamydia psittaci 2-3%, Stapholococcus Aureus 1%.[12]

The pathogens responsible for CAP are diverse and vary in their ability to cause severe disease[11]. In this audit combination of antibiotics used were satisfactory i.e. in majority of patients (n=24) combination of Amoxycillin / Ampicillin & Clarithromycin / Erythromycin were used followed by Amoxycillin /Ampicillin (n=5) only. Amoxycillin & Clarithromycin combination is effective against most local causative pathogens. Less than 1% of local pneumoccocal pneumonias are resistant to penicillin at recommended doses. These findings are consistent with the results of the BSAC Working Party which identified that 79% of hospitals (n = 431) surveyed in 1990 used an antibiotic formulary or limited drug list whereas about three-fifths (62%, n = 342) had a policy for antibiotic therapy.[13] It does not appear that national guidance issued within the intervening decade has had much success in increasing the use of documentation to control antibiotic prescribing within UK NHS hospitals.[14] The UK Antimicrobial Resistance Strategy and Action Plan (2000) recommended that tailored information, guidelines and prescribing support should be provided to promote optimal antimicrobial prescribing in clinical practice[15]. In this audit study blood cultures not sent in 16 patients (42%) and Sputum samples not sent for Microbial culture and sensitivity testing in 18 pts (47%).

The value of blood cultures in community-acquired pneumonia (CAP) has been questioned. Several studies have provided further evidence that the overall sensitivity of blood and sputum cultures in CAP is low, particularly for patients with non-severe CAP and no co-morbid disease and for those who have received antibiotic treatment before admission.[16,17] This has led to a changed recommendation that blood cultures may be omitted in a patient with no severity indicators or co-morbid disease providing the diagnosis of CAP has been definitely confirmed. In our study majority of the patients are given combination of antibiotic regimen, which are in line with BTS guideline, which explains fewer complications,

noted in this study.

Only five of the patients developed complications i.e. four patients needed ventilatory support either in the form of non-invasive or at ICU setting and one patient had pleural effusion. This is due to the fact that inappropriate treatment was used in 18% of the patients. A Parapneumonic effusions develop in 36-57% of patients with bacterial pneumonia admitted to hospital and can be the cause of persisting pyrexia despite adequate antibiotic treatment.[18]

Interesting finding from this study was that none of the pneumonias progressed to develop empyema partly due to the time of diagnosis and giving antibiotics was brief less than 2 hours majority within an hour of arrival into the hospital.

There were some cases noted to have received antibiotics late but these were patients who would have shown signs of pneumonia later than the time of admission.

According to the BTS guidelines based on various studies similar to ours emphasizes management of Non-severe CAP with Oral Amoxycillin (+) Macrolides. Use Intravenous Penicillin / Ampicillin when Oral treatment contraindicated (+) Macrolides Clarithromycin.[5]

Management of severe CAP includes parental antibiotics. Combination of a broad-spectrum, beta-Lactamase stable e.g Co-Amoxiclav (Augmentin) or a second generation e.g. Cefuroxime or third generation Cephalosporin e.g Cefotaxime / Ceftriaxone together with Macrolides are the drugs of choice. Quinolones may be suitable for selected patients intolerant to first line treatment and local concerns regarding local Clostridium.Difficile. New fluoroquinolones are not recommended as first line agents or for community use for pneumonia, but can provide a useful alternative in selected hospitalised patients with CAP.[19,20] Newer group of quinolones are available in the form of Levofloxacin and Moxifloxacin, which have a very broad cover. Moxifloxacin has the advantage of being used once a day.[20] Patients with I/V antibiotics should be transferred to oral regimen as soon as clinical improvement or temperature returns to normal for 24 hrs. In 36% of the patients treatment time for senior review were not documented: vital were not documented in 13%of patients; and also no follow up arrangements were made in 13%. This may explain 26% mortality seen in this group of patients.

The reported mortality of adults admitted to hospital with CAP has varied widely. Some UK studies have reported mortalities of 8%[21], 12%[22] and 14%[23]. Countries with similar healthcare systems have reported hospital mortality rates of 4%[24], 7%[25,] 8%[26,] and 10%[27]. Mortality figures from North American hospital studies have tended to be higher, probably because more patients with CAP are provided with ambulatory care as outpatients and only those with more severe pneumonia or co-morbid disease are admitted to hospital. CURB 65 scoring was hardly assessed in any of the patient in this audit. This initial scoring system, which is recommended by both the BTS Pneumonia Guidelines Committee and the BTS Standards of Care Committee the 2004 CAP update [28], to decide as to where to treat a patient with community-acquired pneumonia (whether at home, in a medical ward, or critical care unit). This is probably the most important decision in the management of pneumonia. This is true in terms of patient outcomes and, definitely, in terms of costs. Therefore, all current European and American guidelines agree that the assessment of severity is the starting point in the management algorithm.[11,29]

CONCLUSION

This audit shows that even in a developed country with well-established guidelines for management of different diseases, guidelines for management of community-acquired pneumonia are not strictly adhered to. More efforts need to be made for dissemination and implementation of these guidelines.

REFERENCES

1. Dixon N. Good practices in clinical audit. London: National Center for Clinical Audit, 1996: 362.
2. Scrivener R, Morrell C, Baker R, Redsell S, Shaw E, Stevenson K, et al. (Eds) Principles for Best Practice in Clinical Audit. Oxford. Radcliff Medical Press, London, 2002:1
3. Jenks SF, Wilensky GR. The health care quality improvement initiative. J Am Med Assoc 1992; 268: 900-3.
4. Task Force on Community-acquired Pneumonia. The Philippine Clinical Practice Guidelines on the Diagnosis, Empiric Management and Prevention of Community-Acquired Pneumonia in Immunocompetent Adults. NCP publishing Corporation, Philippine. 1999.
5. Macfarlane J, BTS Guidelines for the Management of Community Acquired Pneumonia in Adults. Thorax 2001; 56: 64.
6. Wiffen PJ, Mayon-White RT. Encouraging good antimicrobial prescribing practice: A review of antibiotic prescribing policies used in the South East Region of England. Bio Med

Central Public Health 2001; 1: 4-9.

7. Lee J, March bank A, Gold straw P. Implementation of the British Thoracic Society recommendations for organizing the care of patients with lung cancer: The surgeon's perspective. Ann R Coll Surg Engl 2002; 84:304–8.
8. Mandell LA, Bartlett JG, Dowell SF, File TM Jr, Mosher DM, Whitney C. Infectious Diseases Society of America. Update of practice guidelines for the management of community-acquired pneumonia in immunocompetent adults. Clin Infect Dis 2003; 37:1405-33.
9. Switzer GE, Halm EA, Chang CC, Mittman BS, Walsh MB, Fine MJ. Physician awareness and self-reported use of local and national guidelines for community-acquired pneumonia. J Gen Intern Med 2003; 18:816–823
10. Nathawani D, Robinstein E, Barlow G, Davey P. Do Guidelines for Community-Acquired Pneumonia Improve the Cost-Effectiveness of Hospital Care? Clinical Infectious Diseases 2001;32:728–741
11. Niederman MS, Mandell LA, Anzueto A, Bass JB, Broughton WA, Campbell GD, et al. Guidelines for the management of adults with community-acquired pneumonia. Diagnosis, assessment of severity, antimicrobial therapy, and prevention. Am J Respir Crit Care Med 2001;163:1730-54.
12. Barlow GD, Lamping DL, Davey PG. Nathwani. Evaluations of outcomes in Community Acquired Pneumonia: A guide for patients, physicians, and policy makers. Lancet Infect Dis 2003;3(8):476-88.
13. Falguera M, Piffare R, Martin A, Sheikh A, Moreno A. Etiology and Outcome of Community-Acquired Pneumonia in Patients With Diabetes Mellitus. Chest 2005; 128:3233-9.
14. Working Party of the British Society for Antimicrobial Chemotherapy. Hospital antibiotic control measures in the UK. J Antimicrob Chemother1994; 34: 21–42.
15. Woodford EM, Wilson KA, Marriott JF. Documentation of antibiotic prescribing controls in UK NHS hospitals. J Antimicrob Chemother 2004; 53: 650-2
16. Department of Health UK Antimicrobial Resistance Strategy and Action Plan. Department of Health, London 2000: 45-9.
17. Theerthakarai R, El-Halees W, Javadpoor S. Non value of the initial microbiological studies in the management of non severe community-acquired pneumonia. Chest 2001; 119:181–4.
18. Campbell SG, Marrie TJ, Anstey R, Dickinson G, Ackroyd-Stolarz S, Edmonton AL et al. The contribution of blood cultures to the clinical management of adult patients admitted to the hospital with community-acquired pneumonia. Chest 2003;123:1142–50.
19. Silber H S, Garrett C, Okafo T, Singh R, Sweeney A, Rosenberg C, et al. Early administration of antibiotics does not shorten time to clinical stability in patients with moderate to severe community acquired Pneumonia. Chest 2003; 124:1798-1804.
20. Torres A, Muir JF, Corris P Kubin R, Duprat-Lomon I, Sagnier PP, et al. Effectiveness of Oral Moxifloxacin in standard first line therapy in Community Acquired Pneumonia. Eur Resp J 2003; 21: 135-43.
21. Salkind AR, Cuddy PG, Foxworth JW. Fluoroquinolone treatment of community-acquired pneumonia: a meta-analysis. Ann Pharmacother 2002; 36:1938–43.
22. White RJ, Blainey AD, Harrison KJ, Clarke SK. Causes of pneumonia presenting to a district general hospital. Thorax 1981; 36:566-70.
23. Macfarlane JT, Finch RG, Ward MJ, Colville A, Guion A, McFarland RM, et al. Hospital study of adult community-acquired pneumonia. Lancet 1982;II:255-8.
24. Lim WS, Macfarlane JT, Boswell TC, Harrison TG, Rose D, Leinonen M, et al. SCAPA: Study of Community Acquired Pneumonia Etiology in adults admitted to hospital: implications for management guidelines. Thorax 2001; 56:296-301.
25. Jokinen C, Heiskanen L, Juvonen H, Kleemola KS,Leininen MR, Setn MT et al. Incidence of community-acquired pneumonia in the population of four municipalities in eastern Finland. Am J Epidemiol 1993; 137:977-88.
26. Karalus NC, Cursons RT, Leng RA, Mahood CB, Rothwell RP, Hancock B et al. Community acquired pneumonia: Aetiology and prognostic index evaluation. Thorax 1991; 46:413-8.
27. Neill AM, Martin IR, Weir R, Anderson R, Chereshsky A, Epton MJ et al. Community acquired pneumonia: Aetiology and usefulness of severity criteria on admission. Thorax 1996;51:1010-16.
28. Macfarlane JT, Boldy D. 2004 update of BTS

pneumonia guidelines: what's new? Thorax 2004; 59:364-6.

29. Woodhead M, Blasi F, Ewig S, Huchon G, Ieven M, Ortqvist A, et al. Guidelines for the management of adult lower respiratory tract infection. Eur Respir J 2005; 26:1138–80.

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