

Bacterial Pneumonias

Pages with reference to book, From 82 To 83

Ghazala Haq (PMRC Research Centre, Jinnah Postgraduate Medical Centre, Karachi.)

Over 1,200,000 cases of bacterial pneumonias occur every year in United States accounting for 55,000 deaths. It has been seen that pulmonary defence mechanisms are effective in preventing pneumonia (Green et al., 1977). This defence line includes the humidification of inspired air, mucus secretions, ciliary action of airway epithelium, cough, lymphoid tissues, immunoglobulins, complements, pulmonary macrophages, leukocytes and leukocyte chemo. tactic factors. There is a difference in the bacteriology of community acquired and hospital acquired pneumonias. In the previous group streptococcus pneumoniae and Haemophilus influenzae are typically involved while in the later staphylococcus aureus, and gram negative aerobic or facultative bacilli are involved. However, there is a substantial overlap between the flora of hospital and community acquired pneumonias. The oropharynx is the major source of colonization of pulmonary bacterial pathogens. Colonization in healthy individuals is uncommon (Valenti et al., 1978). Presence of several species of anaerobes that normally reside in the oral cavity, particularly bacteroids, meningococcus inhibit the growth of a number of potential pulmonary pathogens (Murray and Rosenblatt, 1976); this bacterial interference may be an important defence against oropharyngeal colonization. If the bacteria have gained access to the normally sterile subglottic region, pneumonia can still be prevented if the pulmonary clearing mechanisms are intact (Green et al., 1977).

Common symptoms of bacterial pneumonia are fever, chills, cough, purulent sputum, pleuritic pain, dyspnoea and anorexia.

Etiologic diagnosis of pneumonia is made by bacterial cultures. Bacteriology and culture of the expectorated sputum is mostly done, which is the least reliable method because, almost all bacterial pulmonary pathogens are capable of colonizing in the oropharynx, so the recovery of such organisms from expectorated sputum, does not necessarily distinguish between infection and colonization.

Moreover, pathogens detected by means other than sputum culture may not always be recovered by sputum culture (Davidson et al., 1976; Barrett Connor, 1971). Cultures of blood and pleural fluid and gram stain may yield the pulmonary pathogen and are therefore indicated in suspected bacterial pneumonia (Brown et al., 1954). Transtracheal aspiration is a superior method specially for anaerobic bacteria (Bartlett and Finegold, 1972; Ries et al., 1974). Seldom cultures are obtained directly from tissues, and usually these studies are performed on post mortem (Hers and Mulder, 1953).

Out of the etiologic agents *S. pneumoniae* is the most frequent cause of pneumonia (Sanford, 1980). *Streptococcus pyogenes* (Sanford, 1980; Public Service Weekly Health Report, 1978), *Streptococcus agalactiae* (Bayer et al., 1976) are occasional causes of pneumonia. Group Y *Neisseria meningitidis* (Irwin et al., 1975; Koppes et al., 1977) and *Neisseria catarrhalis* has now been proved to be respiratory tract pathogen (McNeely et al., 1976). *H. influenzae* has been recognized as a pulmonary pathogen (Levin et al., 1977) and same is the case of *Legionella*. However *Staphylococcus aureus*, is a relatively common cause of pneumonia.

A great deal of controversy exists in literature regarding the pathogenesis of gram negative bacillary pneumonia (Pierce and Sanford, 1974).

Bartlett and Finegold (1972) have reported 143 cases of anaerobic pleuropulmonary infections. This type of infection is almost invariably polymicrobial with usually several species of anaerobic bacteria, often in association with one or more facultative organisms. *Bacillus anthracis*, *Francisella tularensis*, *Pseudomonas pseudomallei*, *Yersinia pestis* are rare pathogens of pneumonia.

Thus bacterial infections of the lung is an important cause of morbidity and mortality in adults and usually develops as a consequence of aspiration of bacteria that colonize in the oropharynx.

References

1. Bayer, A.S., Chow, A.W., Anthony, B.F. and Guze, L.B. (1976) Serious infections in adults due to group B streptococci clinical and serotypic characterization. *Am. J. Med.*, 61: 498.
2. Bartlett, J.G. and Finegold, S.M. (1972) Anaerobic pleuropulmonary infections. *Medicine*, 51 : 413.
3. Barrett. Connor, E. (1971) The non value of sputum culture in the diagnosis of pneumococcal pneumonia. *Am. Rev. Resper. Dis.*, 103 : 845.
4. Brown, C.C. Jr., Coleman, M.B. Alley, R.D., Stranahan, A. and Stuart - Harris, C.H. (1954) Chronic bronchitis and emphysema significance of the bacterial flora in sputum. *Am. J. Med.*, 17 : 478.
5. Green, G.M., Jakap, E.J., Low, R.B. and Davis, G.S.(1977) Defence mechanisms of the respiratory membrane. *Am. Rev. Respir. Dis.*, 115: 479.
6. Davidson, M., Tempest, B. and Palmer, D.Z. (1976) Bacteriologic diagnosis of acute pneumonia ; comparison of sputum, transtracheal aspirates and lung aspirates. *JAMA.*, 235 : 158 Hers, J.F.P. and Mulder, J. (1953) Mucosal epithelium of respiratory tract in mucopurulent bronchitis caused *Haemophilus influenzae*. *J. Pathol. Bacteriol.*, 66 : 103.
7. Irwin, R.S., Woelk, W.K. and Coudon, W.L. (1975) Primary meningococcal pneumonia. *Ann. Intern. Med.*, 82: 493.
8. Koppés, G.M., Ellenbogen, C. and Gebhart, R.J. (1977) Group Y. meningococcal disease in United States AirForce recruits. *Am. J. Med.*, 62 : 661.
9. Levin, D.C., Schwarz, M.I., Matthay, R.A. and LaForce, F.M. (1977) Bacteremic hemophilus *influenzae* pneumonia in adults; a report of 24 cases and a review of the literature. *Am. J. Med.*, 62 : 219.
10. McNeely, D.J., Kitchens, C.S. and Kluge, R.M. (1976) Fatal neisseria (*Branhamella*) *catarrhalis* pneumonia in an immunodeficient host. *Am. Rev. Respir. Dis.*, 114: 399.
11. Murray, P.R. and Rosenblatt, J.E. (1976) Bacterial interference by oropharyngeal and clinical isolates of anaerobic bacteria. *J. Infect. Dis.*, 134 : 281.
12. Pierce, A.K. and Sanford, i.P. (1974) Aerobic Gram. negative bacillary pneumonias. *Am. Res. Respir. Dis.*, 110 :647.
13. Public Health Service Advisory Committee on Immunization. Practices. Pneumococcal polysaccharide vaccine, *Morbidity Mortality Weekly Rep.*, 27 : 25, 1978.
14. Ries, K., Levison, M.E. and Kaye, O. (1974) Transtracheal aspiration in pulmonary infection. *Arch. Intern. Med.*, 133; 453.
15. Sanford, J.P. *Pneumonia caused by Gram positive bacteria in pulmonary diseases and disorders.* Edited by Fishman, A.P. New York; McGraw-Hill, 1980, p. 1130.
16. Valenti, W.M., Trudell, R.G. and Bentley, D.W. (1978) Factors predisposing to oropharyngeal colonization, with Gram negative bacilli in the aged. *N. Engl. J. Med.*, 298:1108.