PARAPNEUMONIC EFFUSIONS AND THORACOCENTESIS INDICATIONS AND COMPLICATIONS

Pages with reference to book, From 65 To 66

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Pleural effusions are divided into exudates and transudates. Exudative effusions require immediate evaluation, as delay in diagnosis and drainage can Cause complications[1]. Of the many causes of exudative effusions, parapneumonic is the commonest. These effusions range from small sympathetic effusion (which resolves when pneumonia is treated) to frank empyema, requiring immediate surgical drainage. Surgical drainage was first described in 1852 and is an easy procedure. The common problem encountered by the treating physician is to decide which effusion will resolve on antibiotic treatment and which would require surgical drainage. Biochemical and cytological analysis of the pleural fluid is necessary to reach a decision. It has been suggested that effusions of less than 10 mm on decubitus film usually get absorbed with the treatment of pneumonia by antibiotics[3]. Since delay in immediate drajnage is likely to lead to major complications and high morbidity, all parapneumonic effusions should have a diagnostic aspiration of 30-50 mls for laboratory examination. The specimen should be subjected to estimation of glucose, lactic dehydrogenase (LDH), pH, total number of erythrocytes and leukocytes, differential count, gram stain, AFB stain and both aerobic and anaerobic cultures, along with physical characteristics, i.e., colour turbidity, presence of blood or chyle. The recommended criteria for immediate insertion of chest tube include gross prulence, presence of organisms on gram stain, pH of less than 7.0, glucose of less than 40 mg/dl and LDH of over 1000 i.u./lit. but when the pH is between 7.0-7.2 and LDH levels of more than 1000 i.u., repeated aspirations or tube insertion is recommended on individual basis. It is also known that the S. pneumonic effusions resolve much better[5,6] without thoracentesis when compared to S. aureus infection where loculation of fluid is common[6,7]. When these criteria were reviewed by Poe et al, they found that even though these criteria were very specific, their sensitivity varied from 18% for positive gram stain to 53% for those with LDH> 1000 i.u/lit[7]. Gram stain was not always positive either due to absence of heavy innoculum or due to previous antibiotic therapy. Light et al[9] in an earlier study described that none of the patients with pH below 7.2 recovered without surgical drainage whereas those with pH over 7.2 recovered with antibiotics alone. Potts[7] later concluded that pH was a more sensitive indicator than glucose for identifying complicated effusions and patients with pH as high as 7.3 developed loculations requiring thoracocentesis, while Morganroth[9] described patient with pH below 7.2 who recovered with antibiotics alone. Light in 1981 reconfirmed that those with pH below 7.0 and glucose less than 40 mg/dl should have surgical drainage[3]. Modification of the original criteria[10] proposes that if an effusion has a pH below 7.30, glucose level of less than 60 mg/dl and LDH below 1000 i.u./lit than it is uncomplicated and surgical procedure would not be necessary. Applying this[7] criterion in one study 3 of 22 patients required surgery while one died with thick fibrotic peel. No laboratory value is absolute and patients with parapneumonic effusion will have to be dealt with on clinical judgement, serial observation and close follow-up. Complications of this seemingly simple procedure are fairly common. In a prospective study conducted at a place where all the staff involved in the procedure was properly instructed and printed guidelines issued; 46% of the procedures were complicated by atleast one adverse occurrence (major in 14% and minor in 33%)11. Similar results have been reported by other investigators whose frequency varied from 12 to 19%[12,13]. Minor complications include pain, persistant cough, dry taps, subcutaneous collection of fluid while major are mainly pneumothorax[12], which can be slight, requiring no interference to as much as 50% involvement of the lung, intercostal

laceration, unilateral pulmonary oedema[15], massive pulmonary haemorrhage[16]. re-expansion pulmonary oedema[17], haemoperitoneum[18], abdominal haemorrhage[19]. cerebral air embolism[20], delayed rupture of iatrogenic[21] spleen and subentaneous inflammation[22] with implantation of cancer following thoracocentesis has also been described. Complications are mainly due to poor technique, inability to adequately identify landmarks is mainly responsible for dry taps, as is small amount of effusion, inability to position correctly, failure of fluid to layer out in decubitus position alongwith increased prothrombin time. Thoracocentesis under ultrasound[23] monitoring is reported to produce fewer complications and this method is being advocated these days.

REFERENCES

1. Light, R.W. Pleural diseases. Philadelphia, Lea and Febiger, 1983, pp. 61-7.
2. Bowditch, H.I. Parocentesie thoracis. Am.J. Med. Sci., 1852;23:103-5.
3. Light, RW., Girard, W.M., Jenkinaon, S.C. and George, RB. Parapneumonic effusions. AmJ.Med., 1980;69:507-12.
4. Light, R.W. Management of parapneumonia effusion. Arch. intern. Med., 1981; 14 1: 1339-41.
5. Taryle, D.A., Potts, D.E. and Sahn, S.A. The incidence and clinical correlates of parapneumonic effusions in pneumococcal pneumonia. Chest, 1978;74:170-3.
6. Poe, R.H., Marin, MG., Israel, RH. and Kallay, M.C. Utility of pleural fluid analysis in predicting tube thoracostomy/decortication in pneumonic effusions. Chest, 1991;100:963-7.
7. Potts, D.E.,Tatyle, D.A. and Sahn, S.A. The glucose pH retstionahipinparapneumonic effusiona. Arch. Intern. Med., 1978;138:1378-80.
8. Light, W.R., MacGregor. M.l., Ball, W.C. Jr. and Luchsingcr, P.C. Diagnostic significance of pleural fluid pH and PCO. Chest, 1973;64:591-6.
9. Berger, HA. and Morganroth, M. Immediate drainage is not required for all patients with complicated parapneumonia effusions. Chest, 1990;97:731-5.
10. Sahn, S.A. and Light, R.W. The sun should never set on parapneumonic effusions. Chest, 1989;95:945-7.
11. Seneff, M.G., Corwin, LW., Gold, L.H. and Irivin, R.S. Complicationa associated with thoracocentesis. Chest, 1986;9:97-100.
12. Schroeder, S.A., Marton, LI. and Strom, B.L. Frequency and morbidity of invasive procedures. Arch. Intern. Med., 1978;138:1809-11.
13. Collins, T.R. and Sahn, S.A. Thoracentesis: Complications, patient experience and diagnosticvslue. Am.Rev. Respir. Dis., 1983;127:A114.
14. Carney, M. and Revin, CE. Intercostal artery laceration during thoracocentesia. Chest. 1979;75:520-2.
15. Trapnell, D.H. and Thurston, 1.0. Unilateral pulmonary oedems after pleural aspiration. Lancet, 1970;1:1367-9.
16. Sharman, S., Nishio, IN. and Rsvi Krishnan, K.P. Massive pulmonary hsemorrhsgt complicating thorscocentcsis in chronic renal failure. Chest, 1979;76:118-23.
17. Mshsjan. V.K. and Huber, G.L. Re-expansion pulmonary oedems. Chest, 1980;77:708-9.
18. Msnenti, A. An unusual complication of thorscentesis haemoperitoneum Acts. Chir. BeIg., 1980;79:43-5.
19. Heffner. J.E. and Sshn, S.A. Abdominal hsemorrhsge after perforation of s disphragmatic artery during thorsccntesis (letter). Arch. Intern. Mcd., 1981;141:1238.
20. Diamond, S., Kaplitz, S. and Novick, 0. Cerebral sir embolism as a complication of ehorscentesis. OP., 1964;30:87-91.
21. Awsd, LW. Delayed istrogenic rupture of spleen. Lancet, 1980;2:754-5.

22. Stewart, B.N. and Block, A.J. Subcutaneous inflammation of cancer following thoracocentesis. Chest, 1974;66:546-57.
23. Ravin, C.E. Thoracocentesis of loculated effusion usinggrey scale ultrasound guidance. Chest, 1977;71:666-8.