MANAGEMENT OF LUNG ABSCESS WITH PERCUTANEOUS CATHETER DRAINAGE

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ABSTRACT

Percutaneous catheter drainage was used to treat 12 among 34 cases of lung abscesses, who were refractory to medical therapy, severely ill and high risk cases for surgery. A complete clinical and radiological recovery was achieved in all the cases who underwent catheter drainage, thereby obviating the need for surgery. None of the cases had catheter or procedures related complications. From this study it is inferred that percutaneous transthoracic catheter drainage is a safe and an effective modality of therapy for patients with lung abscess in whom medical therapy has failed and those who are unsuitable for surgery.

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KEYWORDS : Lung abscess; Percutaneous catheter drainage.

Introduction

Standard medical therapy of lung abscess consisting of appropriate antibiotics and internal drainage of pus aided by posture is effective in 80-90 per cent of cases [1,2]. Cases refractory to this form of therapy require definitive treatment either resectional surgery or external drainage [3]. Surgical intervention is risky particularly in cases who are elderly, debilitated and having underlying medical conditions such as heart disease, chronic obstructive pulmonary disease or advanced liver disease. Percutaneous drainage described in 1938 by Monaldi for the treatment of tuberculous cavities and adopted for pyogenic abscess [3] has not gained wide spread popularity and is considered only for seriously ill patients [4-6]. There have been reports of percutaneous catheter drainage (PCD) of lung abscesses with good outcome [1,2,7-9]. In this paper, experience with routine use of percutaneous catheter drainage of lung abscesses refractory to medical therapy is described.

Material and Methods

Between 1992 to 1995, 34 patients were treated with the problem of lung abscess at a thoracic centre in a zonal hospital. All cases had detailed clinical evaluation, blood examination, chest roentgenograms and sputum examinations including bacterial culture and smear for bacteria, acid fast bacilli and fungi. Ultrasound examination of chest and abdomen were done in six cases who had lung abscess involving lower lobes. Initially all cases received intravenous crystalline penicillin, gentamicin and metronidazole till the availability of sputum culture and sensitivity report. Later, antibiotic therapy was modified based on the sputum report. There

were 12 cases who despite having received antibiotics for 10 days, had persistent sepsis and increase in the size of abscess. These cases underwent rigid bronchoscopy to exclude intraluminal obstruction and were selected for percutaneous catheter drainage as they remained refractory to medical therapy. The site of catheter insertion was localized by postero-anterior and lateral chest roentgenograms and prior aspiration using 18 gauge needle. Under local anaesthesia using seldinger technique, 8F polyurethane/pig-tail catheter was introduced into the abscess cavity and the position confirmed either by fluoroscopy or chest skiagram. The catheter was secured to the skin by a suture and taped to the chest wall with adhesive plaster. The distal end of the catheter was closed using three way valve so as prevent air leak, after aspirating contents from the abscess cavity. The initial aspirate was sent for cytological, biochemical and microbiological examinations including aerobic as well as anaerobic cultures and smear examination for bacteria, acid fast bacilli and fungi. Gentle saline irrigation of abscess cavity was performed until the retrieved fluid was clear. In 4 patients, the abscess cavity was lavaged with 80 mg of gentamicin diluted with 10 ml of saline. The aspiration of abscess cavity was done twice daily till the drainage ceased, then the catheter was removed. Serial chest skiagrams were done in all cases till the closure of abscess cavity. The antibiotic therapy was continued for the duration of PCD and 5 days thereafter. All the cases were followed up for a minimum period of 3 months for evidence of recurrence.

Results

Table 1 depicts the summary of data of patients who underwent PCD. There were 10 males and 2 females in the age group of 50 to 68 years with the mean age of 61 years. More than one predisposing factors were present in 8 of these 12 cases. Seven had COPD, 3 had diabetes mellitus, 2 had IHD and one each had cirrhosis of liver and amoebic liver abscess. History of regular alcohol consumption was obtained in 6 cases of which 3 had aspiration pneumonia. None of the cases had foreign body, endobronchial growth

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Fig. 1 : Large lung abscess right side prior to PCD

Fig. 2 : Resolution of lung abscess following PCD

or evidence of malignancy. All the cases in whom PCD was performed, had solitary and pleural based lung abscess with sizes varying from 4 cms to 10 cms (Fig 1). One of these cases secondary to ruptured amoebic liver abscess had right sided empyema, besides an abscess cavity in the right lower lobe. This case yielded a total of 3 litres of anchovy sauce pus on PCD. In all cases, there was prompt drainage of pus from the cavity (Fig 2), amounting to 0.8L to 3L during the period of PCD. Total duration of catheter

drainage averaged 8 days and ranged from 4 to 15 days. The catheter was well tolerated and there were no major complications. One case had minimal wound infection at the site of catheter insertion which subsided with antibiotics following the removal of catheter. The improvement following PCD was dramatic. Abatement of toxemia, reduction in the fluid level and general feeling of well being was observed within 24 to 48 hours. All cases showed excellent recovery by the time the catheter was removed and at the end of 3 months of follow up, none had residual cavity.

TABLE 1

Patient Characteristics

Age (yrs)	Other underlying conditions	Abscess site	Duration of medical therapy prior to drainage (days)	Sputum culture
56	COPD Alcoholic	RLL	14	No growth
60 (F)	D mellitus, IHD	RLL	12	Commensals
64	Alcoholic cirrhosis	RLL	16	Pneumococci
68	COPD	LLL	10	Commensals
57	COPD, Alcoholic	Lingula	8	Mixed flora
62	D mellitus, Alcoholic	RUL	8	Klebsiella
56 (F)	D mellitus	RML	9	Mixed flora
66	IHD, COPD	RLL	11	No growth
65	COPD	LLL	12	No growth
61	Alcoholic, COPD	RLL	10	Commensals
67	COPD	RLL	10	Commensals
50	Amoebic liver abscess, Alcoholic	RLL	8	No growth

RLL - Right lower lobe, LLL - Left lower lobe, RUL - Right upper lobe, RML - Right middle lobe

TABLE 2

Results of percutaneous catheter drainage of lung abscess

Patient	Bacteriology of pus	Duration of drainage (days)	Complications	Outcome
1.	Sterile	10	Nil	Recovery
2.	Sterile	7	Nil	Recovery
3.	Pneumococci	8	Nil	Recovery
4.	H influenzae	11	Nil	Recovery
5.	Pseudomonas	7	Nil	Recovery
6.	Klebsiella	12	Nil	Recovery
7.	No growth	5	Nil	Recovery
8.	H influenzae	7	Nil	Recovery
9.	Pneumococci	6	Nil	Recovery
10.	No growth	4	Nil	Recovery
11.	No growth	4	Nil	Recovery
12.	No growth	15	Infection catheter site	Recovery

Discussion

Previously one of the common indication for surgery in primary lung abscess was the presence of an abscess having a diameter of greater than 4 cms with persistent sepsis and toxicity despite appropriate medical therapy. Such cases may now be effectively treated

by means of catheter drainage [9]. This is particularly so in patients who are high risk surgical cases since surgical treatment which involves pulmonary resection is associated with mortality between 5 per cent to 41 per cent, despite improved surgical and anesthetic techniques [10]. External drainage of lung abscess through percutaneous approach appears to be a safe alternative to thoracotomy and has the advantage of preserving lung function. It is the preferred method of treatment for pleural based abscesses, particularly in patients with high risk surgical mortality [11]. Complications such as broncho-pleural fistula, empyema, bleeding or spillage of pus in to tracheo-bronchial tree are greater after surgery than after tube drainage, even though patients in the latter group typically are more ill than those undergoing surgery [9]. In this series, there were no major complications which could be attributed to large cavity size, use of small size catheter, location of abscess close to pleura with negligible intervening lung tissue and correct placement of catheter in the cavity. The risk of broncho-pleural fistula or empyema are greater when there is an area of normal lung parenchyma between the pleural surface and the abscess cavity, since the catheter has to traverse through normal lung en-route to the abscess. However, these complications can be definitely avoided by appropriate selection of cases for drainage and correct placement of catheters in the abscess cavity without travelling through healthy lung.

It is now well established that 10-14 F catheter can routinely and effectively drain pus [9]. This is substantiated further in this series, wherein prompt drainage of pus was achieved using 8 F pigtail catheter with excellent results. Clogging of small bore catheters can be minimized by periodic saline irrigation and was not a problem in this series. Large bore chest tube drainage of lung abscess appears unnecessary in most of the cases and associated with undesirable trauma to the lung, particularly when the tube has to travel through lung tissue en-route to the abscess cavity. Moreover, bleeding in to abscess cavity due to constant friction of large bore chest tube with the fragile lung tissue during respiration is a possible hazard. Curved, smooth and non irritant tip of pigtail catheter by encircling within the abscess cavity, facilitates better drain-

age. The position of the catheter is also secured with less chances of displacement since a large segment of the catheter lies within the cavity. For effective drainage through wide bore chest tube with straight tip, it is essential that the tube is placed at the most dependent part of the cavity. Bigger size catheters may be necessary in patients who have extremely tenacious and viscous abscess contents. The potential advantages of percutaneous drainage of lung abscess are several including immediate drainage of pus, avoidance of thoracotomy and forestalling major complications of lung abscess such as rupture, haemoptysis and aspiration to healthy lung. This study establishes that percutaneous catheter drainage of lung abscess is a safe and an effective procedure with potential advantages over surgery or tube thoracotomy. Hence it is recommended to use this procedure routinely for management of pleural based lung abscess which remain refractory to medical therapy.

REFERENCES

1. Weissberg D. Percutaneous drainage of lung abscess. *J Thorac-cardio vasc surg* 1984; 87: 308-12.
2. Yellin A, Yellin EO, Lieberman Y. Percutaneous tube drainage: the treatment of choice for refractory lung abscess. *Ann Thorac Surg* 1986; 39: 267-70.
3. Monaldi V. Endo cavitary aspiration in the treatment of lung abscess. *Chest* 1956; 29: 193-201.
4. Morris JF, Okies JE. Enterococcal lung abscess: Medical and Surgical therapy. *Chest* 1974; 65: 688.
5. Vainrub B, Musher DM, Guinn GA, et al. Percutaneous drainage of lung abscess. *Am Rev Respir Dis* 1978; 117: 153.
6. Kellen FS, Rosch J, Barker AF, Dotter CT. Percutaneous interventional catheter therapy for lesions of chest and lung. *Chest* 1982; 81: 407.
7. Mengoli L. Giant Lung abscess treated by tube thoracotomy. *J Thorac Cardiovasc Surg* 1985; 90: 186-94.
8. Shim C, Santos GH, Gelefsky M. Percutaneous drainage of lung abscess. *Lung* 1990; 168: 201-7.
9. Van sonnenberg E, et al. Lung abscess: CT - guided drainage. *Radiology* 1991; 178: 347-51.
10. Hagan JL, Hardy JD. Lung abscess revisited. *Ann Surg* 1993; 197: 755-62.
11. Klein JS, Schultz S, Heffner JE. Interventional radiology of the chest: Image - guided percutaneous drainage of pleural effusions, Lung abscess and pneumothorax. *Am J Roentgenol* 1995; 164: 581-8.