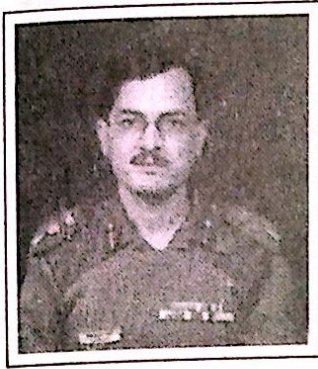


# PERCUTANEOUS CATHETER DRAINAGE



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## Introduction

Percutaneous catheter drainage (PCD) offers an alternative approach to needle thoracentesis and standard chest tube drainage (CTD) for treatment of patients with symptomatic pleural effusions and empyemas (1-10). Needle thoracentesis is not uniformly successful and frequently multiple taps are required. Patient discomfort associated with CTD may be considerable. PCD done under direct imaging guidance usually makes it possible to avoid improper tube placement and small catheter seems to be better tolerated by the patient than large tubes.

The indication for doing PCD includes treatment of symptomatic pleural effusions, malignant effusion, mediastinal fluid collections, parapneumonic effusion and empyemas and drainage of lung abscesses. Percutaneous catheter drainage can be used as the primary drainage procedure or as follow up treatment for failed thoracentesis or CTD (1, 4, 6-10). In patients with infections, the decision to drain should be based on the characteristic of the fluid. Light advocates early thoracentesis if grossly purulent fluid or a positive gram stain is present (11).

PCD can be done with either a modified Seldinger approach or trocar catheter approach. For nonviscous effusion ordinary 7-8 French angiographic pigtail catheters are usually satisfactory. Larger diameter single lumen catheter of size 10-14 F is used for thick purulent or viscous collection. Before drainage, the location, extent and presence or absence of loculation is determined as accurately as possible with standard and decubitus chest films, sonograms and contrast enhanced CT scans as needed. The drainage procedure is done under fluoroscopic control, combined sonographic-fluoroscopic or CT guidance. CT guidance generally chosen when fluid collection is fixed in position, when there is multiple collection or when there are difficult accesses.

After insertion of catheters, non-purulent fluid is drained in 24 hrs and catheter removed. However with purulent or viscous fluid the catheter is connected to water seal suction. The patient is followed with chest film, sonogram and / or CT scans are obtained. The optimal time for catheter removal depends on the response of treatment. Usually it can be removed in 7 days but some empyemas may require much longer treatment time(1,2,6-9). Periodic irrigation with 10-25ml of sterile saline is used when fluid is viscous or contains particulate materials.

## Complication

Major complications are rare mainly because of imaging guidance. Infection of sterile fluid is the possibility. Minor complications include bleeding, pneumothorax and pain.

## Results and discussion

Complete or nearly complete removal of the fluid is almost achieved in patients who have uncomplicated fluid collections. A successful outcome of empyemas by PCD has been reported in 67-85% of the patients (1, 4, 6-10). Causes of failure of PCD include multiple loculations, organization, extensive clot formation, extensive particulate debris or the development of a thick chronic pleural peel. Moulton et al (2) published encouraging results in patients with loculated fluid collection by installing urokinase through the drainage catheter. PCD also can be used for sclerotherapy for malignant effusions and drainage of mediastinal abscess.

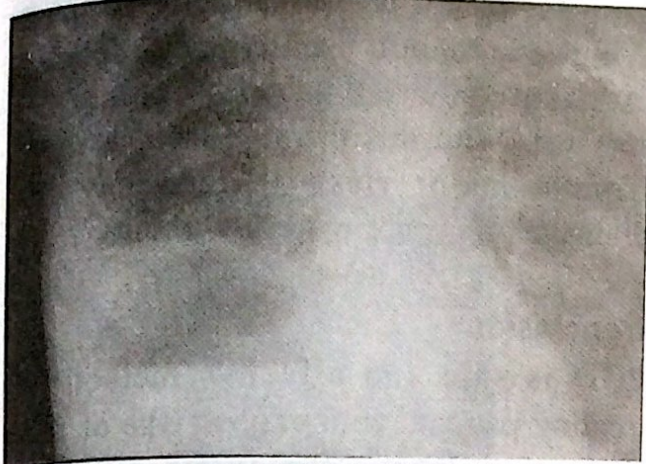
### Management of a case of Lung Abscess by in situ Percutaneous small gauge Catheter Drainage under CT Guidance

Lung abscesses reflect infection with an unusual microbial burden usually due to aspiration of oro-pharyngeal contents, a failure of clearance mechanisms as in cases of bronchial obstruction or both causing necrosis of pulmonary tissue and formation of cavities containing necrotic debris or fluid. Periodontal disease is highly associated with lung abscess formation. Anaerobic bacteria may be isolated from up to 89% of patients. However, most lung abscesses contain a mixed bacterial flora. Management of lung abscess must be guided

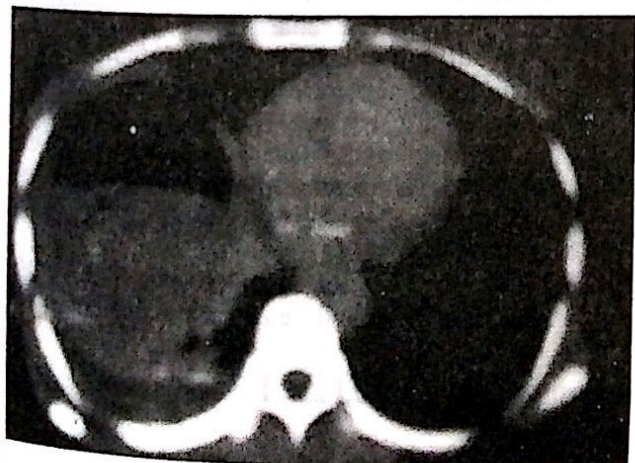
by the microbiology or knowledge of the underlying condition. Small abscesses can be managed conservatively with antimicrobials, chest physiotherapy and postural drainage. A rapidly enlarging abscess with toxic features requires urgent surgical lung resection. Intermediate to these approaches would be to drain the abscess via a catheter; either bronchoscopically or radiographically guided transthoracic drainage of any fluid or necrotic debris. Many types of tubes are used for drainage – among them the pigtail drainage catheter is used to drain loculated empyemas and sometimes it is used to drain peripheral lung abscesses.

*A 46 years old woman from Dhule presented with right sided chest pain radiating to her ipsilateral shoulder and back, productive cough with mucoid sputum, high grade intermittent fever associated sometimes with chills and rigors, shortness of breath, about 10 kilograms of weight loss in 3 months, anorexia, nausea and vomiting of 3 months duration. She took some treatment at a nearby medical facility with which she did not improve but her fever became low grade. She did not have a significant past history of illness.*

*Clinical examination showed a cachectic, ill and moribund patient. She was febrile, tachycardic, hypotensive, tachycardia and tachypnea. Patient had bad oral hygiene. Examination of respiratory system showed an enlargement of the right hemithorax with diminished movements, decreased breath sounds, hyperresonant percussion with a succussion splash anteriorly and a dull percussion note posteriorly. Liver was palpable 5 cm below the right costal margin with a normal span. There was great tenderness over the right lower half of the right hemithorax.*



X-ray & CT chest showed a large cystic space occupying the right middle and lower lobe area with a fluid level, pushing the liver downwards. She had a raised ESR of 95mm, Mantoux test showed no induration, no growth was obtained on blood and sputum culture and sputum for AFB and malignant cells was negative. Gram staining of the sputum revealed a few Gram-negative rods. HIV screening was negative and no other cause of her being immunocompromised could be found. An abdominal ultrasound examination did not reveal any liver pathology.



Diagnosed as a case of necrotising pneumonia and lung abscess with empyema, she was administered heavy doses of parenteral antibiotics and a drainage procedure was considered.

As the lung abscess was peripherally located, just next to the chest wall, bronchoscopic aspiration would not have been feasible in this case. So, the transthoracic approach was decided for the drainage procedure.

A 10F Vygon chest drainage catheter was used in our case due to non-availability of the pigtail catheter. After cleaning and draping the marked area a small skin incision was made. Under CT guidance the catheter was introduced through the skin nick in to the 5<sup>th</sup> intercostal space in the anterior axillary line on the right. When it reached the abscess cavity the trocar was removed and the drain was pushed further in to it. Aspiration of the necrotic material was done with the help of a 50ml syringe after fixing a 3-way connector. The aspirated contents were highly putrid with a feculent smell of rotten eggs.



On the first day 280ml of pus was aspirated and the drain was fixed to the chest wall with the help of silk sutures. Dressing was applied leaving the mouth of the catheter outside, for further daily aspirations. By the 5<sup>th</sup> day the foul

smelling nature of the pus disappeared and the drainage was 30ml. Only 5ml of sanguino-purulent fluid could be aspirated by the 15<sup>th</sup> day and the drainage catheter was removed on the 20<sup>th</sup> day. The patient was discharged from hospital on further antibiotics.

In the mean while patient received antibiotics and other supportive therapy. The aspirated pus was negative for malignant cells and AFB and no growth could be obtained on culture probably because she was on high doses of antibiotics. Anaerobic culture is not done at our pathology lab. Needle aspiration of the loculated empyema was performed under ultrasonologic guidance and it resolved further with antibiotics. A follow up CT revealed that the size of the abscess had drastically reduced with a residual cavity still present in the middle lobe area. A multiloculated small empyema was also present which was tried for aspiration. Only 5ml of fluid could be aspirated. It was decided that the small empyema be left alone to be resolved by itself. The patient was advised to come for review after 15 days.



Here we have presented a case of lung abscess who underwent CT guided transthoracic catheter drainage of a right sided lung abscess which is possibly the first time that this procedure has been done in Nepal. She showed significant recovery with this type of therapy and her days of

hospitalization were markedly reduced. Without antibiotic therapy and a drainage procedure, there was no chance of survival. With this therapy, she was saved from a major risky thoracotomy and drainage procedure with good results.

### Conclusion

PCD is safe and effective method of treating patients with various type of fluid collection in the thorax. It offers an attractive alternative and supplement to standard CTD and needle thoracentesis.

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