# DIAGNOSTIC EFFICACY OF BLIND PERCUTANEOUS PLEURAL BIOPSY (BPPB) USING ABRAM'S NEEDLE IN REHMAN MEDICAL INSTITUTE, PESHAWAR, PAKISTAN

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**ABSTRACT**

**Introduction:** Diagnostic rates of Blind Percutaneous Pleural Biopsy (BPPB) for cancer have been reported to be 57% compared video assisted thoracoscopic surgery(VATS) whose efficacy is 95%

Aims: The aim of this study was to assess the efficacy and diagnostic value of BPPB in obtaining pleural tissue and concluding a diagnosis in patients presenting with pleural effusion.

**Materials & Methods:** Clinical and pathological data of all patients who underwent BPPB between January 2015 and December 2016 was obtained and retrospectively analyzed.

**Results:** 57 patients went under BPPB procedure. Out of which, cases notes were reviewed in 48 [36 procedures (75%) as in-patient,12(25%) as out-patient]. Age of the patients ranged from 32 to 91 years and the mean age was 69 years. 34 males (71%) and 14 females (29%) were present in our study and male to female ratio was 2.4. Pleural tissue was obtained in 30(63%) patients but only 8(27%) diagnosed cancer. Following a non-diagnostic BPPB, 17(35%) underwent VATS biopsy procedure out of which 15(88%) were diagnostic (14 cancers, 1 fibrosis). To obtain a definitive clinical diagnosis (3 cancers and 2 inflammatory conditions), 2 underwent thoracotomy and open pleural biopsy, 1 rigid bronchoscopy, 1 lymph node biopsy and 1 medical thoracoscopy. 8(17%) of the patients were unfit for further investigations and a clinical diagnosis was made (7 cancers and 1 heart failure).10(21%) required no further invasive pleural investigations as other investigations were enough to point towards the diagnosis (4 heart failure,4 pneumonias, 1 recurrent cancer and 1 rheumatoid arthritis).

**Conclusion:** BPPB (Abram's needle) had a low diagnostic yield in our study. A significant number of patients required further investigations to establish a definitive tissue diagnosis. Patients should be referred for VATS biopsy or medical thoracoscopy to increase the diagnostic yield where thoracic surgery facilities are present.

**Key words:** Pleural Effusion, VATS Biopsy, Cancer, Retrospective.

## INTRODUCTION

Pleural effusion is the abnormal accumulation of pleural fluid in the pleural space due to an imbalance between pleural fluid formation and absorption. The etiologic spectrum of pleural effusion is very broad, ranging from pneumonia, congesive heart failure, tuberculosis, malignancy to Systemic lupus erythematosus, rheumatoid disease and chylothorax.(1,2)Pleural effusion is classified into transudate and exudate on the basis of various biochemical parameters in the pleural fluid (PF) and in blood, most often by applying Light's criteria: ratio of total protein in PF/serum (PF/S)>0.5; lactate dehydrogenase (LDH) PF/S>0.6 and LDH in PF>2/3 the normal upper value in blood. PF is a transudate if none of the above conditions are met.(3)

Frequent causes of exudative pleural effusion differ geographically, in areas where tuberculosis is highly prevalent, leading cause of pleural effusion is tuberculosis followed by malignancy. (4) Whereas in some areas congestive heart failure is the leading cause of pleural effusion. (5)

According to the guidelines by the British Thoracic Society, when pleural effusion is suspected, posteroanterior (PA) chest x-ray should be performed. Fluid sampling is a routine first invasive step in assessment of pleural effusion. Aspiration guided by ultrasound improves success rate and reduces complications like pneumothorax. Pleural fluid should always be sent for protein, lactate dehydrogenase, gram stain, cytology and microbiological culture. Other tests which are done only in selected cases include acid fast bacilli and tuberculosis culture, and adenosine deaminase (ADA) in cases of suspected tuberculosis related pleuritis. Haematocrit is performed to diagnose haemothorax.(6)

To diagnose the cause of exudative pleural effusion, the differential cell counts provide clues for the etiology of pleural effusions. Exudative pleural effusions with predominantly polymorphonuclear leukocytes (>50%) mean acute process, and such causes are para-pneumonic effusion, pulmonary embolus, viral infection, gastrointestinal disease, asbestos pleural effusion, malignant pleural disease, or acute TB pleurisy. Exudative pleural effusions with predominantly mononuclear cells (>50%) indicate chronic processes, and the most

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common causes are malignant disease, pulmonary embolization, pleural effusion following coronary arterial bypass surgery and TB. Causes of eosinophilic pleural effusions (>10%) are air (most common) or blood in the pleural space, malignancy, para-pneumonic, transudates, TB, pulmonary embolism, asbestos-related pleural effusion, drug reaction, parasitic disease and Churg-Strauss syndrome(7)

Further diagnostic imaging includes CT scan which should be performed with contrast enhancement of the pleura and before complete drainage of pleural fluid.

When investigating an undiagnosed effusion where malignancy is suspected and areas of pleural nodularity are shown on contrast-enhanced CT, an image-guided cutting needle is the percutaneous pleural biopsy method of choice.(6)

Pleural tissue can be obtained by closed pleural biopsy performed by Abram's needle or TruCut needle and pleuroscopy. Other procedures which are invasive and performed under general anesthesia include video assisted thoracoscopic surgery (VATS) and thoracotomy. Factors like condition of the patient, availability of instruments and trained personnel, diagnostic efficacy and cost contribute to the choice the procedure.

Closed pleural biopsy (CPB) was first performed in 1955 by Defrancis who used the Vim Silverman needle. Since then several needles have been invented; Abram, Cope, Raja, Ramel, named after their inventors. (8) Abram's needle is preferred over the others because it is safe, easier to use, cost-effective and can be performed at the bedside. Geographical area, patient selection and the number of pleural tissues taken are factors that contribute to the diagnostic yield of closed pleural biopsy. (9) The diagnostic yield of CPB ranges from 64% to 70% according to different studies. (10) (11) Studies have shown that if the biopsy is guided by an imaging technique, the diagnostic yield is higher. 81% in case of ultrasound-guided pleural biopsy and 87% in case of CT guided needle biopsy. (12) (13)

Thoracoscopy or pleuroscopy was first performed in 1866 by F.R. Cruise in Ireland using a cystoscope. (14) In 1910, Hans-Christian Jacobaeus, from Sweden introduced the procedure to examine pleural effusion with laparoscopy and his publication became known worldwide. (15)

Medical thoracoscopy is another great diagnostic tool for pleural effusions with better diagnostic results ranging from 74% to 87%. (16,17) It is a minimally invasive procedure performed under local anesthesia or conscious sedation using non-disposable rigid or semi-rigid instruments. (15) This procedure has become a standard diagnostic tool for pleural effusions across the globe but in Pakistan it is performed in a few centers due to lack of funding and trained personnel. (16)

The aim of this study is to assess the efficacy of pleural biopsy and establishing a tissue diagnosis in patients presenting with pleural effusion.

## MATERIALS & METHODS

This is a retrospective analysis of pathological data of all the patients who underwent Blind Percutaneous Pleural Biopsy (BPPB) using Abram's needle from 2016-2017 at Department of Pulmonology, Rehman Medical Institute, Peshawar. The following variables were taken into account, age, gender, type of test used for diagnosis and presence of any disease before diagnosis.

## RESULTS

Table 1 summaries the basic characteristics/data of patients underwent Blind Percutaneous Pleural Biopsy. Out of 57 cases, 48 case notes were reviewed. In the patients, male to female ratio was 2.43:1. The mean age of patients was 69(32-91). Of the 48 procedures, 12 were out-patient procedures while 36 procedures were done in inpatient setting.

Pleural tissue was obtained in 30(63%) but diagnostic of cancer in only 8(27%).Chart I. Following a non-diagnostic BPPB in 17 (35%) patients, 15 underwent video assisted thoracoscopic surgery (VATS) and the remaining 2 underwent thoracotomy). 8(17%) were unfit for further investigations and a clinical diagnosis was made (7

**Table 1: General characteristics (n=57).**

| **Variable** | | **Frequency (n / %)** |
|---|---|---|
| Gender | Male | 34(71%) |
| | Female | 14(29%) |
| **Patient Age** | | |
| Mean | | 69 |
| Minimum | | 32 |
| Maximum | | 91 |
| Out/In-Patient Ratio | | 12/36 |

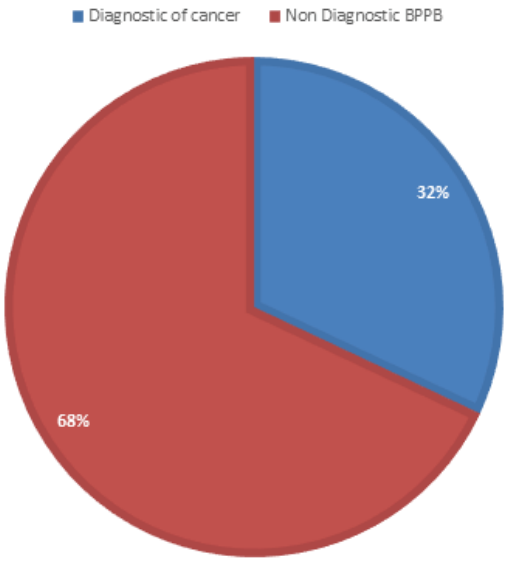


**Chart 1: Success rate of Blind Percutaneous Pleural Biopsy (BPPB)**

cancers and 1 heart failure). 10(21%) had no further invasive pleural investigations as other investigations pointed towards the diagnosis (4 heart failure,4 pneumonia,1 recurrent cancer and 1 rheumatoid arthritis).

## DISCUSSION

The diagnosis of pleural effusion is not always easy. Despite repeated thoracocentesis and biopsies about 20% of pleural effusions remain undiagnosed. (21) Tuberculosis and neoplasia is the most common cause of undiagnosed pleural effusions. Various techniques are employed for diagnosing the cause of these effusions but diagnostic evidence can be provided by biopsy. (22)

A similar study conducted in Iran revealed a male to female ratio of 2.4:1 and a mean age of 38.9 years. (23) In our study the mean age was 69 years (range 32-91), male to female ratio was 17:7.Our findings with the Pleural tissue analysis of the sample obtained to be 30 (63%) but only 8 (27%) were diagnostic of cancer. Another study reveals that yield of closed biopsy using Abrams needle in the detection of malignancy ranges from 27-56%. (24)

Overall, percutaneous pleural biopsy by Abram's needle yields positive results in about 50-60% of the cases. (25) Either Abram's needle or TruCut needle can be used to perform a biopsy. Studies have shown that ultrasound assisted pleural biopsies performed by Abram's needle have a higher diagnostic efficacy and are more likely to contain pleura than biopsies performed using TruCut needle. (25)

Following a non-diagnostic BPPB, 17(35%) subsequently underwent VATS biopsy of which 15 (88%) were diagnostic (14 cancers, 1 fibrosis). A study in Ayub Teaching hospital the whole diagnostic yield of pleural biopsy was found to be 95% in malignancy, tuberculosis and Anthrachosis. (20)

Medical thoracoscopy is minimally invasive procedure which is performed under local anesthesia using an pleuroscope. It can be used to visualize the pleural space and collect specimens. According to a study, it has a higher diagnostic efficacy (78.2%) than biopsy performed by Abram's needle (21.7%).(19) In different studies, efficacy of both the procedures vary, but thoracoscopy always has a higher diagnostic yield than biopsies performed by Abram's needle or TruCut needle. Thoracoscopy is a great diagnostic tool and its use is rapidly expanding in the developed countries and closed needle biopsy procedures are now considered obsolete. Thoracoscopy is done under local anesthesia hence it also prevents the complications of general anesthesia. This is also the reason for its superiority over VATS because it can be done on patients with multiple comorbidities which makes general anesthesia a relative or absolute contraindication in the patients. In Pakistan, however, thoracoscopy is performed in only a few centers in big cities. Lack of trained personnel, infrastructure and fundings are factors which contribute to the lack of this facility. This procedure has a great outcome and efforts should be made to train the concerned personnel through workshops and provide the required infrastructure by the government in tertiary care hospitals.

## CONCLUSION

Due to availability of newer technique and image-guided biopsies, closed needle biopsy procedures are becoming less common in developed countries. However, in a set up like Pakistan, due to the higher cost and lack of availability of newer techniques, closed biopsy procedures remain the method of choice to determine the cause of pleural effusion.

In this regard,healthcare providers should provide proper infrastructure, adequate training programs through workshops, timely functioning but it should also provide possible future guidance and facilitation for the use and expansion of advanced medical thoracoscopy for the better healthcare of patients and to further enhance doctor's skill in the tertiary care hospital.

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