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 emanation is the irregular gathering of pleural liquid in the pleural space because of a lopsidedness between pleural liquid arrangement and ingestion. The etiologic range of pleural emanation is expansive, going from pneumonia, congesive cardiovascular breakdown, tuberculosis, harm to Systemic lupus erythematosus, rheumatoid illness and chylothorax.[1,2] Pleural radiation is grouped into transudate and exudate based on different biochemical boundaries in the pleural liquid (PF) and in blood, regularly by applying Light's standards: proportion of complete protein in PF/serum (PF/S)>0.5; lactate dehydrogenase (LDH) PF/S>0.6 and LDH in PF>2/3 the typical upper incentive in blood. PF is a transudate if nothing unless there are other options conditions are met.(3)

Regular reasons for exudative pleural radiation contrast topographically, in territories where tuberculosis is exceptionally pervasive, driving reason for pleural emanation is tuberculosis trailed by harm. (4) Whereas in certain zones congestive cardiovascular breakdown is the main source of pleural radiation. (5)

As indicated by the rules by the British Thoracic Society, when pleural emission is suspected, posteroanterior (PA) chest x-beam should be performed. Liquid inspecting is a standard first intrusive advance in evaluation of pleural radiation. Goal guided by ultrasound improves achievement rate and decreases inconveniences like pneumothorax. Pleural liquid should consistently be sent for protein, lactate dehydrogenase, gram stain, cytology and microbiological culture. Different tests which are done distinctly in chose cases incorporate corrosive quick bacilli and tuberculosis culture, and adenosine deaminase (ADA) in instances of suspected tuberculosis related pleuritis. Haematocrit is performed to analyze haemothorax.(6)

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To analyze the reason for exudative pleural emanation, the differential cell tallies give pieces of information to the etiology of pleural radiations. Exudative pleural emissions with overwhelmingly polymorphonuclear leukocytes (>50%) mean intense cycle, and such causes are para-pneumonic radiation, aspiratory embolus, viral contamination, gastrointestinal infection, asbestos pleural emanation, threatening pleural illness, or intense TB pleurisy. Exudative pleural radiations with dominatingly mononuclear cells (>50%) demonstrate ongoing cycles, and the most well-known causes are threatening sickness, pneumonic embolization, pleural emanation following coronary blood vessel sidestep a medical procedure and TB. Reasons for eosinophilic pleural emissions (>10%) are air (generally normal) or blood in the pleural space, danger, para-pneumonic, transudates, TB, aspiratory embolism, asbestos-related pleural radiation, drug response, parasitic illness and Churg-Strauss syndrome(7)

Further indicative imaging incorporates CT check which should be performed with contrast improvement of the pleura and before complete seepage of pleural liquid.

When examining an undiscovered emanation where danger is associated and zones with pleural nodularity are appeared on differentiation improved CT, a picture guided cutting needle is the percutaneous pleural biopsy strategy for choice.(6)

Pleural tissue can be gotten by shut pleural biopsy performed by Abram's needle or TruCut needle and pleuroscopy. Different strategies which are obtrusive and performed under broad sedation incorporate video helped thoracoscopic medical procedure (VATS) and thoracotomy. Elements like state of the patient, accessibility of instruments and prepared faculty, indicative viability and cost add to the decision the system.

Shut pleural biopsy (CPB) was first acted in 1955 by Defrancis who utilized the Vim Silverman needle. From that point forward a few needles have been concocted; Abram, Cope, Raja, Ramel, named after their designers. (8) Abram's needle is favored over the others since it is protected, simpler to utilize, financially savvy and can be performed at the bedside. Topographical region, quiet choice and the quantity of pleural tissues taken are factors that add to the indicative yield of shut pleural biopsy. (9) The symptomatic yield of CPB goes from 64% to 70% as per various examinations. (10) (11) Studies have indicated that if the biopsy is guided by an imaging strategy, the analytic yield is higher. 81% if there should be an occurrence of ultrasound-guided pleural biopsy and 87% in the event of CT guided needle biopsy. (12) (13)

Thoracoscopy or pleuroscopy was first acted in 1866 by F.R. Voyage in Ireland utilizing a cystoscope. (14) In 1910, Hans-Christian Jacobaeus, from Sweden acquainted the system with look at pleural radiation with laparoscopy and his distribution got known around the world. (15)

Clinical thoracoscopy is another incredible demonstrative instrument for pleural emanations with better symptomatic outcomes going from 74% to 87%. (16,17) It is an insignificantly obtrusive strategy performed under nearby sedation or cognizant sedation utilizing non-expendable unbending or semi-inflexible instruments. (15) This strategy has become a standard demonstrative instrument for pleural emanations over the globe yet in Pakistan it is acted in a couple of focuses because of absence of subsidizing and prepared faculty.[16]

The point of this examination is to evaluate the viability of pleural biopsy and setting up a tissue analysis in patients giving pleural emission.

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 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 conclusion of pleural radiation isn't in every case simple. Regardless of rehashed thoracocentesis and biopsies about 20% of pleural radiations stay undiscovered. (21) Tuberculosis and neoplasia is the most widely recognized reason for undiscovered pleural emanations. Different strategies are utilized for diagnosing the reason for these emissions yet analytic proof can be given by biopsy. (22)

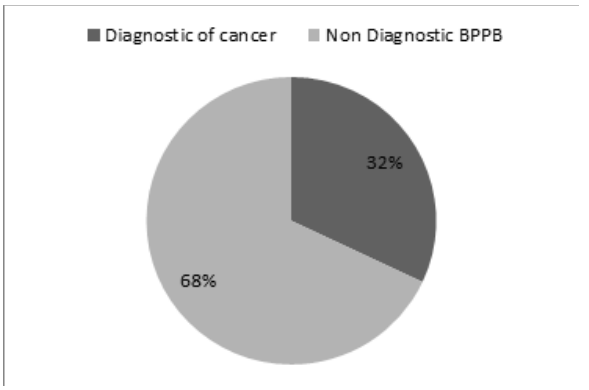

Chart 1: Success rate of Blind Percutaneous Pleural Biopsy (BPPB)

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

A comparable report directed in Iran uncovered a male to female proportion of 2.4:1 and a mean period of 38.9 years. (23) In our investigation the mean age was 69 years (range 32-91), male to female proportion was 17:7.Our discoveries with the Pleural tissue examination of the example acquired to be 30 (63%) yet just 8 (27%) were indicative of disease. Another examination uncovers that yield of shut biopsy utilizing Abrams needle in the location of harm goes from 27-56%. (24)

Generally, percutaneous pleural biopsy by Abram's needle yields positive outcomes in around 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.

REFERENCES

1. Diaz-Guzman E, Dweik RA. Diagnosis and management of pleural effusions: a practical approach. Compr Ther [Internet]. 2007 [cited 2018 Mar 14];33(4):237–46. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18025616

2. Light RW. Pleural Effusions. Med Clin North Am [Internet]. 2011 Nov [cited 2018 Mar 14];95(6):1055–70. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22032427

3. Liam C-K, Lim K-H, Wong CM-M. Causes of pleural exudates in a region with a high incidence of tuberculosis. Respirology [Internet]. 2000 Mar 1 [cited 2018 Mar 14];5(1):33–8. Available from: http://doi.wiley.com/10.1046/j.1440-1843.2000.00223.x

4. Marel M, Zrůtová M, Štasny B, Light RW. The Incidence of Pleural Effusion in a Well-Defined Re-

gion. Chest [Internet]. 1993 Nov 1 [cited 2018 Mar 14];104(5):1486–9. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0012369215422974

5. BTS- British Thoracic Society. BTS Pleural Disease Guideline 2010. Thorax. 2010;65(supp 2):1–76

6. Na, Moon Jun. "Diagnostic Tools of Pleural Effusion." Tuberculosis and Respiratory Diseases 76.5 (2014): 199–210. PMC. Web. 11 Apr. 2018.

7. Metintas M, Ak G, Dundar E, Yildirim H, Ozkan R, Kurt E, et al. Medical Thoracoscopy vs CT Scan-Guided Abrams Pleural Needle Biopsy for Diagnosis of Patients With Pleural Effusions. Chest [Internet]. 2010 Jun [cited 2018 Mar 23];137(6):1362–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20154079

8. Hussain SF, Mujahid S, Khan JA. Diagnostic Evaluation of Pleural Effusion and the Role of Needle Pleural Biopsy. [cited 2018 Mar 15]; Available from: http://www.jpma.org.pk/PdfDownload/4553.pdf

9. Rajawat GS, Batra S, Takhar RP, Rathi L, Bhandari C, Gupta ML. Diagnostic yield and safety of closed needle pleural biopsy in exudative pleural effusion. Avicenna J Med [Internet]. 2017 [cited 2018 Mar 19];7(3):121–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28791245

10. Saifullah N, Baig S, Soomro NH, Rizvi N, Zafar AA, Postgraduate J, et al. DIAGNOSTIC YIELD OF PLEURAL BIOPSY USING. 2016;14(2).

11. Koegelenberg CFN, Bolliger CT, Theron J, Walzl G, Wright CA, Louw M, et al. Direct comparison of the diagnostic yield of ultrasound-assisted Abrams and Tru-Cut needle biopsies for pleural tuberculosis. Thorax [Internet]. 2010 Oct 1 [cited 2018 Mar 24];65(10):857–62. Available from: http://thorax.bmj.com/cgi/doi/10.1136/thx.2009.125146

12. Metintas M, Ak G, Dundar E, Yildirim H, Ozkan R, Kurt E, et al. Medical Thoracoscopy vs CT Scan-Guided Abrams Pleural Needle Biopsy for Diagnosis of Patients With Pleural Effusions. Chest [Internet]. 2010 Jun [cited 2018 Mar 24];137(6):1362–8. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0012369210602899

13. Hoksch B, Birken-Bertsch H, Müller JM. Thoracoscopy before Jacobaeus. Ann Thorac Surg [Internet]. 2002 Oct [cited 2018 Mar 24];74(4):1288–90. Available from: http://www.ncbi.nlm.nih.gov/pubmed/12400799

14. Loddenkemper R, Mathur PN, Lee P, Noppen M. History and clinical use of thoracoscopy/pleuroscopy in respiratory medicine. Breathe [Internet]. 2011 Dec 1 [cited 2018 Mar 24];8(2):144–55. Available from: http://breathe.ersjournals.com/lookup/doi/10.1183/20734735.011711

15. Kiani A, Abedini A, Karimi M, Samadi K, Sheikhy K, Farzanegan B, et al. Diagnostic Yield of Medical Thoracoscopy in Undiagnosed Pleural Effusion. Tanaffos [Internet]. 2015 [cited 2018 Mar 19];14(4):227–31. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27114723

16. Mootha VK, Agarwal R, Singh N, Aggarwal AN, Gupta D, Jindal SK. Medical thoracoscopy for undiagnosed pleural effusions: experience from a tertiary care hospital in north India. Indian J Chest Dis Allied Sci [Internet]. [cited 2018 Mar 19];53(1):21–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/21446220

17. Bousquet J, Jeffery PK, Buse WW JM and VA, Of S, Art THE. State of the Art State of the Art : 2006;36(1):20–3.

18. Ihsanullah, e. (2018). Yield of Abrams needle pleural biopsy in exudative pleural effucion. – PubMed – NCBI. [online] Ncbi.nlm.nih.gov. Avaiable at: https://www.ncbi.nlm.nih.gov/pubmed/20364757 [accessed 3 Apr. 2018]

19. Mishra AK, Verma SK, Kant S, Kushwaha RA, Garg R, Kumar S, et al. A study to compare the diagnostic efficacy of closed pleural biopsy with that of the thoracoscopic guided pleural biopsy in patients of pleural effusion. South Asian J cancer [Internet]. 2016 [cited 2018 Apr 24];5(1):27–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27169119

20. Khurram M, Jaffery AH, Khar HB. Evaluation of lymphocytic exudative pleural effusion with pleural biopsy. J Coll Physicians Surg Pak 2002; 12:74-7.

21. Blanc FX, Atassi K. Diagnostic value of medical thoracoscopy in pleural disease. Chest 2002; 121:1677-83.

22. Mehrdad S, Mirmohamad M. Approach to undiagnosed exudative pleural effusion: the diagnostic yield of blind pleural biopsy. Caspian J Intern Med 2013;4:642-47.

23. Ogirala RG, Agarwal V, Visioli LD. Comparision of the Raja and the Abrams pleural biopsy needles in patients with pleural effusion. Am Rev Respir Dis 1993; 147:1291–94.

24. Magsi JA, Khan SU, Awan SR. Pleural biopsy in the diagnosis of lymphocytic exudative pleu- ral effusion. Ann King Edward Med Coll 2005; 11:572-4.