

Outcomes and Complications of Computed Tomography Guided Biopsy of Pulmonary Lesions; Our Experience - A Single Centre Experience

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ABSTRACT

Objective: The purpose of this retrospective study is to share our experience, results and complications of CT-guided biopsy of lung lesions.

Study Design: A retrospective cross-sectional study

Place and Duration of Study: This study was conducted at the Interventional Radiology Department at Rehman Medical Institute Peshawar from February 2019 till December 2022.

Materials and Methods: It was retrospectively analyzed. Patient demographics, lesion size and its depth, cores number, outcomes, positive biopsy rate, negative biopsy rate and complications are reviewed. All the data was analyzed by using SPSS version 24.

Results: A total of 124 CT-guided pulmonary lesion biopsies were performed. 63 (50.81%) were female patients and 61 (49.19%) were male. The overall accuracy of CT-guided pulmonary lesions biopsies was 93.54 %, moreover, 4 (3.23%) cases were repeated for definite diagnosis, and 4 (3.23%) of them were inconclusive. 27 (21.77%) patients had post-biopsy complications which included minor hemoptysis (but the patients were stable and did not require any resuscitation) in 06 (4.8%) patients. Other complications like small pneumothorax were observed in 15 (12%), and 4 (3.2%) cases had pneumothorax which required aspiration with a 16-gauge cannula. Additionally, 2 (1.2%) of these patients collapsed after the biopsy and recovered after a cycle of CPR.

Conclusion: CT-guided biopsy is a safe procedure to establish diagnosis of pulmonary lesions. Proper technique and tertiary care settings are required to manage post-biopsy complications.

Key Words: CT Guided Biopsy; Pulmonary Lesions; Complications; Outcomes

Citation of article: Farman W, Kamran M, Khan AN, Summaya. Outcomes and Complications of Computed Tomography Guided Biopsy of Pulmonary Lesions; Our Experience - A Single Centre Experience. Med Forum 2023;34(8):229-232.doi:10.60110/medforum.340853.

INTRODUCTION

Cancer of the lungs is the biggest cause of death in all cancers around the globe. The identification of lung cancer is critical and use of computed tomography (CT) is widely available, which is important for identifying lung cancer. When lung nodules or tumors are suspected of being cancerous, then it is better to get the proof of tissue through biopsy.¹ Transthoracic CT-guided biopsies are useful for outside lesions because they avoid the loss of normal lung tissue during lobectomy.

Fine needle aspiration biopsy (FNAB) and core biopsy are the two most used CT-guided biopsy procedures.² Earlier research found that core biopsies were more accurate than FNAB in terms of diagnosis reliability for non-malignant samples, tissue description of cancer lesions, and capacity for detecting cancer in the lack of pathologists. In earlier investigations, the diagnosis accuracy of CT-guided core biopsy ranged from 51.4% to 95.8%. Previous research, however, had mostly focused on greater lesion diameters. Radiologists continue to struggle with lesions that are less than 15 mm in size.³⁻⁵ Most of the centers are reluctant in CT guided biopsies thinking it has higher complication rates. Complications of biopsy include pulmonary hemorrhage and pneumothorax. Previous studies were conducted for the investigation of the above complications, they concluded that mostly it is because of needle size larger than required, the size of nodules (small), and the location of lesion in the lung like lower and middle zone.^{6,7} Because all liquid markers have the ability to spread away from the nodules, the appropriate dye for localizing intermediary PNs remains a point of contention.⁸ Tiny lesions measuring 15 mm or less can be accurately diagnosed by CT-guided biopsies while

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Received: March, 2023

Accepted: May, 2023

Printed: August, 2023

using a guiding needle (17 gauge) and biopsy with the size of 18 gauge. The accuracy of large lesion biopsy was more than that of small lesions, nevertheless the results were accurate and reliable for decision-making during clinical practices. Addressing the potential complications linked with CT-guided biopsy, it is critical to counsel patient before the-procedure.⁹ The present study identifies the complications including minor hemoptysis, pneumothorax, our experiences and the outcome of CT- guided biopsy.

MATERIALS AND METHODS

The current study was retrospective cross-sectional study and conducted in the Interventional Radiology Department at Rehman Medical Institute Peshawar. The study was conducted from Feb 2019 to Dec 2022. Patients were primarily referred by Pulmonologists, Oncologists and Cardiothoracic surgeons. Pre-biopsy CT scans were performed in all. Planning and positioning done on pre-procedure CT. All CT guided biopsies were performed in CT room on 128 Slice Toshiba CT scanned. Pre-procedure planning CT done. Appropriate site marked. After prepping the patient and using sterile technique, 18 G Chiba needle is used as co-axial and biopsy obtained with 20 G automatic biopsy needle. Local anesthesia is at entry site. A total of 124 CT-guided pulmonary lesions biopsies were performed. Out of these 63 were female patients and 61 were male. The patients were 21 to 87 years of age. Those participants were only included with pulmonary lesions. Pleural lesions are excluded in this study. Informed consent was signed before by every individual participant before the procedure, and the privacy and confidentiality of each patient was assured. Data was collected through a questionnaire which was composed of different sections like outcomes of investigation and results were extracted from Biopsy reports. All the data was analyzed by using SPSS version 24. Frequencies and percentages were documented for gender and outcome while means and standard deviations were calculated for variables like age.

RESULTS

In the current study, a total of 124 patients underwent CT-guided pulmonary lesion biopsy. 63 (50.81%) were female patients and 61 (49.19%) were male. (Figure 1) The patients were 21 to 87 years of age, and the mean age of the patients was 56 years with a standard deviation of 10. Out of the total patients, 116 (93.54%) were positive, for benign and malignant etiologies, and 8 (6.46%) were negative for any pathology. The overall accuracy of CT-guided pulmonary lesions biopsies was 93.54 %. Out of the 8 negative, 4 (3.23%) cases were repeated for definite diagnosis, and 4 (3.23%) still were inconclusive (Figure 2). 27 (21.77%) patients had post-biopsy complications which include minor hemoptysis,

pneumothorax, patients requiring resuscitation. These are listed below (Table 1).

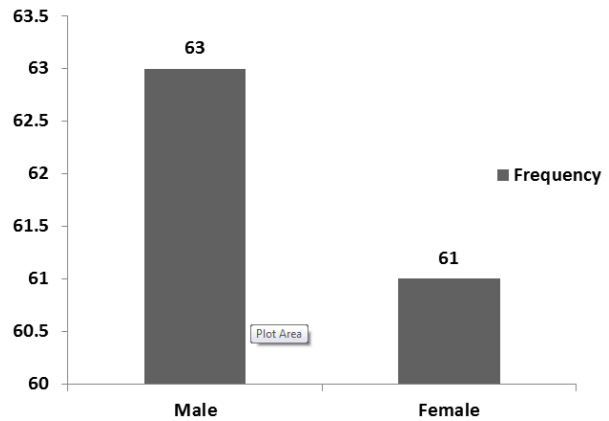


Figure No. 1: Distribution of patients based on gender

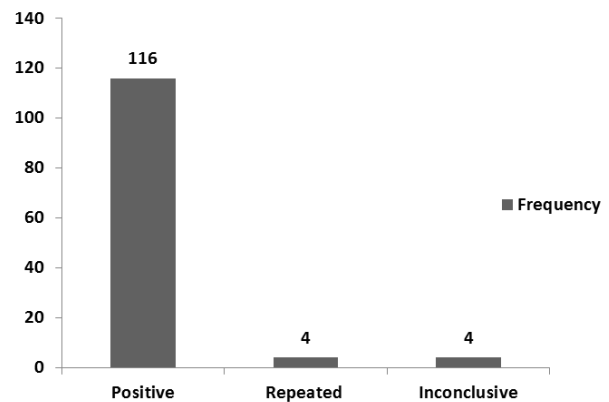


Figure No. 2: Positive, repeated and inconclusive cases for benign and malignant etiologies

Table No. 1: Post-biopsy complications in our enrolled patients

COMPLICATIONS	NUMBER OF PATIENTS OUT OF 124
1. Minor Hemoptysis	06 (4.8 %)
2. Small pneumothorax that does not require aspiration	15 (12 %)
3. Pneumothorax requiring aspiration	04 (3.2%)
4. Chest Intubation	None
5. Collapsed patients requiring ICU care	02 (1.6 %)

DISCUSSION

CT-guided biopsy is one of the safe and accurate procedure for the investigation of pulmonary disease that are suspected to be malignant. Experience of interventional radiologist and multidisciplinary team can help to minimize the post biopsy complications. The substantial heterogeneity can be attributable to a variety of factors, including patient selection, performance

experience, the presence or absence of a bedside pathologist, and biopsy equipment selection. In the current study, the results show overall accuracy of results which was valid and reliable 93.54 %, moreover, the results of another study show a quite similar percentage of accuracy 93.9 %, (Huang MD et al 2019).⁹ According to the results of this study, 21.77 % of patients developed complications after the biopsy which is relatively less than the study conducted by (Vachani A et al 2022)¹⁰ which shows 25.8% of the patients developed complications after the biopsy. A study conducted by Taslakian B et al 2019¹¹ shows that 34% of the patients developed complications. The Society of Interventional Radiology (SIR) Guidelines classify problems as mild or serious. Minor problems include the following: Pneumothorax not requiring any intervention, pulmonary hemorrhage surrounding, and hemoptysis with spontaneous hemostasis are all possibilities.¹² Pneumothorax necessitating intervention, hemothorax, needle tube seeding, air embolism, and mortality are all serious consequences. In our study, the overall pneumothorax rate was 15.32 %. The study conducted by Chkrabarti et al. shows pneumothorax in 24 % patients.¹³ Our results are comparable. Only 3.2% patients had serious pneumothorax that required aspiration, while 12 % patients had no significant pneumothorax and were followed on serial Chest Xray. These resolved spontaneously. According to this study, 3.2% of patients with Pneumothorax required aspiration while another study results show 6 % of the cases required aspiration.¹⁴ None of the our patients needed insertion of chest tube, but another study shows that 1.5 % of the patients needed a chest tube insertion.¹⁵ In our 1.6 % of the patients collapsed after procedure and required ICU care for monitoring. These were not intubated. 0.3% patient were intubated according to another study. Small lesions, central location and longer procedure time are few factors that are responsible for post biopsy complications. All biopsy were performed using still CT. CT fluoroscopy may help in further improving the diagnostic accuracy and reducing complication rates.¹⁶

CONCLUSION

CT guided pulmonary lesion biopsy via transthoracic approach is a safe procedure with less post procedure complication risks and lesser hospital stay. Operator experience and tertiary care hospital with good ICU is needed to ensure patient safety.

Author's Contribution:

Concept & Design of Study: Wasif Farman
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 Data Analysis: Summaya
 Revisiting Critically: Wasif Farman,
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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