



## “COMPARATIVE STUDY OF CT GUIDED VERSUS USG GUIDED BIOPSY OF PERIPHERALLY SITUATED LUNG MASSES”

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### ABSTRACT

**Introduction:** Computed tomography (CT) guided biopsies of lung masses have been in use since long to take biopsy of lung masses. That has been proved as standard technique to get histopathological diagnosis of underlying mass lesion.

Ultrasound guided biopsy of pleural based peripherally situated mass lesion is nowadays popular method and has advantage of real time technique with fast and radiation free technique and can be done in ultrasound room or bed side. In this study we aim to do comparative study of USG and CT guided biopsy in peripheral lung masses.

**Methods and Material:** A study of 50 cases was carried out in department of Radio-diagnosis at GCS Medical College, Hospital and Research center and record of both methods were kept for comparison. Biopsies were done on CT table in CT scan room under CT / USG guidance with standby anesthetic and patient kept for observation in recovery room.

**Results:** Out of 50 patients, 30 patients in which mass was seen under USG and no lung parenchyma was seen in between mass and pleura were done using USG guidance. Needle insertion was done under USG guidance and then confirmed on CT scan. In 20 patients CT guidance was used as lesion was not visualized on USG.

**Conclusions:** For pleural based large lesions (lesion greater than 3 cm), ultrasound guided biopsy is modality of choice as ease of procedure with real time approach, low rate of complications, lower time consuming and radiation free technique while CT is ideal for small lesion which cannot be seen on USG, intra parenchymal deeply situated lesion and lesion behind rib.

**KEYWORDS :** Computed tomography guided, pleural based lesions, ultrasound guided

### Introduction:

Image guided biopsy has become popular, widely accepted, effective and minimal invasive way to obtain specimen for histopathological diagnosis, staging, genetic and immunologic testing and ultimately resulting into improved management and patient care. <sup>(1)</sup>

With increasing frequency of lung masses situated peripherally and with limited diagnostic efficacy of flexible bronchoscopy and sputum cytology, the advent use of CT and USG guided biopsy is inevitable.

CT (Computerized Tomography) is most commonly utilized for obtaining per-cutaneous transthoracic biopsy from peripherally situated lung masses, providing adequate details about path of needle towards the lesion, however this modality exposes to risk of large amount of ionizing radiation, increase time of procedure because of breathing movement of patient and only axial section of the lung in real time scenario. <sup>(2)</sup>

Traditionally, USG (Ultrasonography) role is limited as ultrasound cannot penetrate aerated tissue of the lung. However, it is very impressive tool for localization of peripherally situated lung masses as no aerated tissue interposes between ultrasound probe and mass. The other advantage is no exposure to ionizing radiation, efficient and quick real time monitoring and can be done easily at bedside. <sup>(3)</sup>

In this study, comprehensive comparison of CT guided versus USG guided biopsy for peripherally situated lung masses in terms of sampling/tissue adequacy, time of procedure and rate of complications.

### Subjects and Methods:

The study was carried out among 50 patients in department of Radio-diagnosis at GCS Medical College, Hospital and Research center who had undergone CT or USG guided biopsies. All biopsies were carried out by interventional radiologist with adequate experience. Demographics of the patients, time taken for

procedure, adequacy of samples, histopathology reports, post procedural complications were comprehensively reviewed.

Ultrasound guided biopsy were carried out using Ultrasound unit (“GE healthcare Logic P5”) equipped with 1-5 MHz phased transducer with patient placed in comfortable position depending on the location of the mass which included supine, lateral, sitting upright with the lesion being scanned in intercostal approach and Doppler was used to determine the absence of any blood vessels in anterior and posterior mediastinal lesions. The biopsy site was properly disinfected, locally infiltrated with 2% xylocaine at marked site, putting the stab incision with 11 G knife and with real time USG guidance, 18 G mission health bard biopsy needle was introduced and biopsy sample was taken. The patients were properly monitored during and after the procedure and kept in recovery room for 4-6 hours under observation for if any complications developing or not.

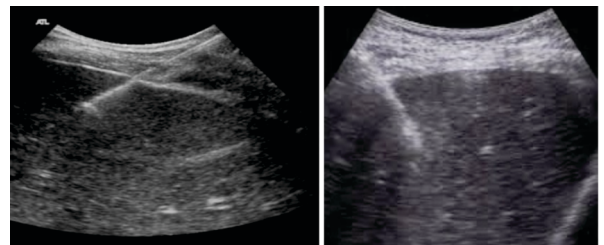
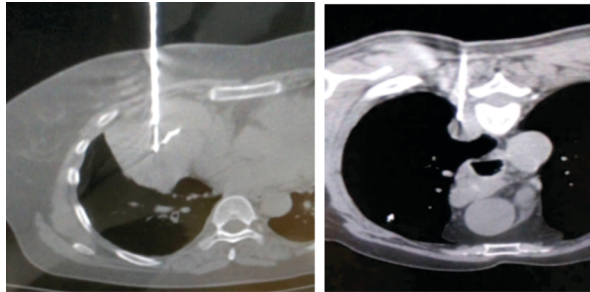


Figure shows USG guided biopsy of preferable lesion

CT guided biopsies were carried out using 16 slice multi detector CT (“SIEMENS Somatom Emotion”) with patient positioned on CT table in prone, supine or lateral decubitus position, depending on the location of the lesion with skin site marked by using laser light from gantry. The site of biopsy was properly disinfected, local anesthesia (2% xylocaine) was infiltrated and then stab incision was put by 11 G stab knife and trocar was advanced in mass lesion, confirming tip in to lesion by CT scan, if properly satisfied by tip of needle biopsy needle of 18 G mission health advanced into cannula (17G) and same for biopsy. The patients were properly monitored during and

after the procedure and kept in recovery room for 4-6 hours under observation for any complications developing. Post procedure check CT scan was done to see pneumothorax.

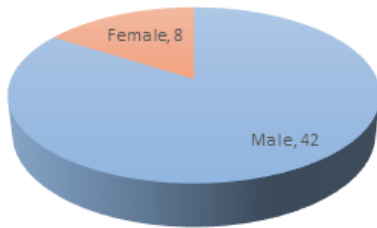


Figures shows CT guided biopsy of the preferable lesions

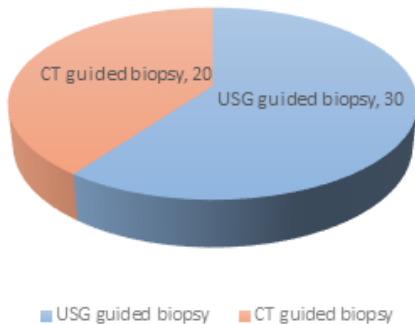
Biopsy specimen were obtained, placed in formaldehyde container and sent to cyto-pathologist for evaluation.

**Results:**

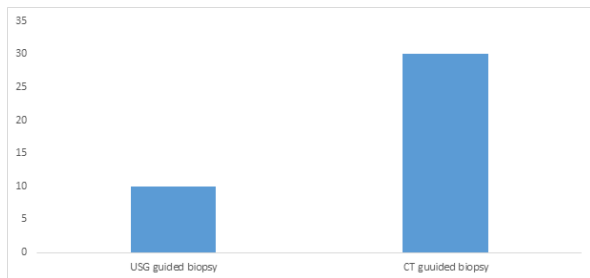
There were 50 patients in the study. 42 were males and 8 were females. The age of patients had range from 46 to 76 years.



There were 20 patients who underwent CT guided biopsy and 30 patients who underwent USG guided biopsy.



The mean time taken for CT guided biopsies was around 30 minutes as compared to USG guided biopsies which were done in about 10 minutes.



Adequacy of sample was the another finding that we evaluated and we found out the rate of sample adequacy was comparable in both the methods of procedures.

Repeat biopsy rate was almost same in both the cases with only 2 patients in CT guided group and 3 patients in USG guided group requiring repeat biopsies due to inadequacy of the sample.

**Table 1: Rate of repeat biopsy for both methods of biopsy**

Mode of biopsy	Number of repeat biopsies	Percentage
USG guided	03	10%
CT guided	02	10%

The most common complication is pneumothorax, followed by hemorrhage. These two post procedural complications were studied in detailed in for two different kinds of procedure for biopsy.

**Table 2: Number and type of complications for both methods of biopsy**

Mode of biopsy	No. of complications	Pneumothorax	Hemorrhage
USG guided	03	03	00
CT guided	10	08	02

There are few limitations that of our study that should be considered, we cannot exclude patient bias, as procedures were performed on the basis of patients referred to us for biopsy and we did not have data as to how many patients were suitable for USG and CT guided biopsy. Also we did not have idea regarding emphysema in our patients that could be factor for occurrence of pneumothorax in our patients. Also the number of needle punctures during the procedures were not available. The study includes the cases which were positive for lung malignancy hence the validity of these results cannot be taken account for general population.

**Discussion:**

Accepting the above limitations, we conclude that USG guided biopsy should be considered 1st priority for biopsy of peripheral lung masses because it is faster and safer then CT guided biopsy and lesion which are more than 3 cm in size. Besides, there is no exposure to radiation and real time monitoring are other obvious advantages. The lower rate of post procedural complications and lower rate of repeat biopsies also adds to the utility of the USG guided biopsies. The CT is preferable for smaller lesion which are situated behind rib and cannot be seen on USG.

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