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Original research article

Ultrasound Guided FNA And Biopsy In Suspected Lung Cancer

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Abstract

Introduction: Despite the fact that it offers a number of advantages over computed tomography, ultrasonography (USG) has been underutilised for image guided biopsy or FNA of suspected cases of lung cancer (CT). The use of USG as a method for directing a FNA or biopsy of peripheral lung, pleural, or mediastinal lesions, as well as extrathoracic metastatic lesions, can be highly beneficial. The purpose of this research was to determine if a USG-guided biopsy or a FNA is more effective in diagnosing lung cancer.
Keywords: Diagnostic yield, histopathology, image guided biopsy, lung cancer

Introduction

Chest radiographs or computed tomography (CT) can detect lung cancer, which is the largest cause of death due to cancer worldwide [1]. Lung cancer can also be observed as a tumour in the lungs. The histopathological investigation is considered the gold standard for the diagnosis of lung masses. For the purpose of acquiring a histopathological specimen, either a fine needle aspiration (FNA) or a biopsy may be performed. It is usual practice to use computed tomography (CT) or ultrasound for image guidance during a percutaneous transthoracic FNA or biopsy (USG). USG has been underutilised for the imaging of lung cancer; nonetheless, it has been shown to be helpful for guiding FNA/biopsy of peripheral lung lesions, pleural lesions, mediastinal lesions, and extra-thoracic metastatic lesions [2, 3, 4]. It is common practise to miss the supraclavicular lymph nodes, and in many cases, they are not palpable. USG might be beneficial in detecting and guiding for biopsy or FNA of these lymph nodes, which might eliminate the need for a lung biopsy, which is more likely to result in complications [5]. The utilisation of USG guidance in the biopsy process for the detection of lung cancer is a relatively recent phenomenon in Nepal. The majority of the published material on image guided biopsy in lung cancer in Nepal is based on CT guided biopsy, and there are just a few of these available at this time. As a result, the purpose of this study is to determine the yield of USG guided FNA and biopsy in individuals with a possible diagnosis of lung cancer at a tertiary cancer hospital in Nepal.

Methods

In this retrospective cross-sectional study, participants with a possible diagnosis of lung cancer were referred to the radiology department. The study was carried out from

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March 1, 2019, to February 29, 2020. Every patient had their lungs examined to look for any abnormal lesions. In order to reach peripherally accessible mediastinal lymph nodes, supraclavicular lymph nodes, pleural lesions, and chest wall lesions, they used USG (Esaote MyLab X 6). If the size of these lesions was greater than 10 millimetres, a USG-guided tru-cut biopsy was performed, and if the size was less than 10 millimetres, a USG-guided FNA was carried out. In the event that these extrapulmonary lesions were not present, USG was used to access the lung lesions to determine whether or not a biopsy or FNA was feasible. USG guided biopsy was performed on peripheral lesions that were larger than 10 millimetres and had broad contact with the pleura. Smaller lesions received USG guided FNA. For the biopsy, a semiautomatic tru-cut biopsy equipment with an 18G x 15 cm needle and a 17G coaxial needle were utilised; for the FNA, either a 22G spinal needle or a hypodermic needle was utilised. We obtained either the cytology report or the histopathology report of the participants.

Lesions in the lungs that were suspicious but could not be seen with USG and did not have any USG-accessible extrapulmonary lesions were not included in the study. Participants who couldn't be tracked down for cytology or histopathology results were also disqualified from the investigation.

The analysis of the data was carried out in the same copy of Microsoft Excel 2016 that had all of the data that was entered.

Results

Table 1: Sites of USG guided biopsy/ FNA (n=178)

	Biopsy (%)	**FNA (%)**	**Total (%)**
Right lung	74(41.6)	18(10.1)	92(51.7)
Left lung	48(27)	12(6.7)	60(33.7)
Supraclavicular lymph node	7(3.9)	15(8.4)	22(12.3)
Chest wall lesion	2(1.1)	1(0.6)	3(1.7)
Mediastinal lymph node	1(0.6)	0(0)	1(0.6)
Total	132(74.2)	46(25.8)	178(100)

Table 2: Cytology/ histopathological diagnosis after USG guided Biopsy/ FNA (n=148)

	Biopsy (%)	**FNA (%)**	**Total (%)**
Adenocarcinoma	41(27.7)	7(4.7)	48(32.4)
Squamous cell carcinoma	39(26.3)	6(4.1)	45(30.4)
Small cell carcinoma	9(6.1)	3(2)	12(8.1)
Adenosquamous carcinoma	4(2.7)	0(0)	4(2.7)
Carcinoid	2(1.3)	0(0)	2(1.3)
Sarcoma	1(0.7)	0(0)	1(0.7)
Carcinosarcoma	1(0.7)	0(0)	1(0.7)
Carcinoma	2(1.3)	5(3.4)	7(4.7)
Non-Small cell carcinoma	1(0.7)	1(0.7)	2(1.3)
Malignancy	0(0)	1(0.7)	1(0.7)
Suspicious for malignancy	0(0)	2(1.3)	2(1.3)
Negative/ Inadequate	6(4.1)	7(4.7)	13(8.8)
Benign	8(5.4)	2(1.3)	10(6.8)
Total	114(77)	34(23)	148(100)

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Table 3: Common types of malignancies in different age groups (n=125)

Age group	Adenocarcinoma	Squamous cell carcinoma	Small cell carcinoma	Total malignancy
31-40	3	1	0	5
41-50	11	4	2	17
51-60	11	8	3	29
61-70	13	13	6	36
71-80	8	18	1	35
81-90	2	1	0	3
Total	48	45	12	125

Discussion

There are a variety of imaging techniques that can be used for guided biopsies or FNA. When deciding which imaging technique to use, it is necessary to take into account a number of different parameters, such as the location and size of the lesion, the way in which the lesion is related to important anatomical structures, and how visible the lesion is. Today, guidance from the United States Geological Survey is favoured over other methods since it enables real-time monitoring and does not put users at risk of radiation exposure. However, this only applies to superficial lesions, particularly those found in lung biopsies [4, 6]. It is possible to collect a tissue sample with CT guidance in lung biopsy even if a minor pneumothorax develops while the procedure is being performed, which is one of the advantages of using CT guidance rather than USG guidance. CT guidance has a few advantages over USG guidance.

The diagnostic yield of a USG-guided biopsy in lung lesions might range anywhere from 64-97% [4]. The diagnostic yield of a USG guided lung biopsy in the study that was done by Khosla *et al*. [4] was 91.8%, which is lower than the diagnostic yield of a USG guided lung biopsy in the study that was presented here, which was 94.7%. On the other hand, we also performed biopsies and FNA on extrapulmonary lesions in 17 of the individuals. In the investigation carried out by Diacon *et al*. [3] the diagnostic yield of USG guided transthoracic biopsy was 81%, which is lower than the yield seen in the present study. In contrast to the findings of the present investigation, Diacon *et al*. discovered that FNA had a greater diagnostic yield (91%) as compared to the biopsy (81%) in their previous research. We discovered that biopsy had a better diagnostic yield (94.7%), compared to FNA (79.4%). In contrast to Diacon *et al*., who received three aspirations from rather distinct regions of the target lesion, we only acquired a single aspiration from the target lesion. It is possible that this is the reason why FNA had a higher diagnostic yield in the investigation that was carried out by Diacon *et al*. In today's world, determining the genetic alterations that are present in lung cancer is essential for the process of planning targeted therapy [6]. Core biopsy yielded considerably more adequate samples for molecular analysis than fine needle aspiration biopsy did (67 percent versus 46 percent, respectively; p = 0.007 for each comparison), according to the research of Schneider *et al*. [7]. The diagnostic yield for malignancy in this study was 84.5%, which is comparable to the study that was conducted by Diacon *et al*. [3] (86%), although it is marginally higher than the study that was conducted by Khosla *et al*. [4] (79.7%). In the past, squamous cell carcinoma was the most common form of lung cancer, and it was the type that most frequently presented with major central lesions. As a result of this shift, adenocarcinoma is currently the kind of lung cancer that is diagnosed in the majority of patients [8]. Adenocarcinoma was reported to be the most frequent type of lung cancer (38.4%), followed by squamous cell carcinoma (36%). In the investigations conducted by Diacon *et al*. [3], Modi *et al*. [9],

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and Lee *et al*. [2], adenocarcinoma was found to be the most prevalent form of lung cancer. On the other hand, Srivastava and Bajaj [10] discovered that squamous cell carcinoma was the most prevalent kind of cancer in their investigation. One of the reasons for this mismatch could be because their study had a rather small sample size. At the present time, there is a trend toward an increase in peripheral squamous cell carcinomas [11]. These peripheral squamous cell carcinomas can be discovered by USG, and the results of the test can guide a biopsy or FNA procedure. In our research, 41 out of 108 lung lesions that were sampled under the direction of the USG were found to contain squamous cell carcinoma. In the current investigation, squamous cell carcinoma was observed in older patients than adenocarcinoma was, with a mean age of 65.9 years compared to 60 years for each condition separately. Kawase *et al*. [12] presented evidence that supported similar findings. Our research has some important caveats and restrictions. A significant number of participants - 16.9% - could not be located for follow-up, which may have an impact on our findings, particularly our diagnostic yield. Due to the fact that the study is retrospective, it may contain some selection bias. The sample sizes used for the biopsy and FNA were not consistent, which may be the reason why the diagnostic yield of the FNA was lower in comparison to the yield of other research. In addition, as this was a study conducted at a single location, the findings cannot be generalised.

Conclusion

The study found that ultrasound guided FNA and biopsy had a good diagnostic yield in patients suspected of having lung cancer. When compared to FNA, the diagnostic yield for malignancy was higher with biopsy, and biopsy may also be superior for molecular testing.

References

1. Purandare NC, Rangarajan V. Imaging of lung cancer: Implications on staging and management. Indian J Radiol Imaging [Internet]. 2015:25(2):109-20. Available from: https://pubmed.ncbi.nlm.nih.gov/25969634
2. Lee MH, Lubner MG, Hinshaw JL, Pickhardt PJ. Ultrasound Guidance Versus CT Guidance for Peripheral Lung Biopsy: Performance According to Lesion Size and Pleural Contact. Am J Roentgenol [Internet]. 2018:210(3):W110-7. Available from: https://doi.org/10.2214/AJR.17.18014
3. Diacon AH, Theron J, Schubert P, Brundyn K, Louw M. Wright CA, *et al*. Ultrasound-assisted transthoracic biopsy: fine-needle aspiration or cutting-needle biopsy? Eur Respir J [Internet],2007:29(2):357LP-362. Available from: http://erj.ersjournals.com/content/29/2/357.abstract
4. Khosla R, McLean AW, Smith JA. Ultrasound-guided versus computed tomography-scan guided biopsy of pleural- based lung lesions. Lung India [Internet]. 2016:33(5):487-92. Available from: https://pubmed.ncbi.nlm.nih.gov/27625440
5. Fultz PJ, Harrow AR, Elvey SP, Feins RH, Strang JG, Wandtke JC *et al*. Sonographically Guided Biopsy of Supraclavicular Lymph Nodes: A Simple Alternative to Lung Biopsy and Other More Invasive Procedures. Am J Roentgenol [Internet]. 2003:180(5):1403-9. Available from: https://doi.org/10.2214/ajr.180.5.1801403
6. Anzidei M, Porfiri A, Andrani F, Di Martino M, Saba L, Catalano C *et al*. Imaging-guided chest biopsies: techniques and clinical results. Insights Imaging [Internet]. 2017/06/21,2017:8(4):419-28. Available from: https://pubmed.ncbi.nlm.nih.gov/28639114

ISSN:0975 -3583,0976-2833 VOL11, ISSUE 04, 2020

7. Schneider F, Smith MA, Lane MC, Pantanowitz L, Dacic S, Ohori NP. Adequacy of core needle biopsy specimens and fine-needle aspirates for molecular testing of lung adenocarcinomas. Am J Clin Pathol,2015:143(2):193-200. Available from: https://doi.org/ 10.1309/AJCPMY8UI7WSFSYY
8. Barta JA, Powell CA, Wisnivesky JP. Global epidemiology of lung cancer. Ann Glob Heal,2019, 85(1). Available from: https://doi.org/10.5334/aogh.2419
9. Modi MB, Rathva MR, Shah NR, Trivedi M, Patel H. Role of FNAC in lung carcinoma and its histo-cytological correlation. J Lung Pulm Respir Res,2016:3(4):90. Available from: https://doi.org/10.15406/jlprr.2016.03.00090
10. Srivastava S, Bajaj S. Ultrasonogram–Guided Fine Needle Aspiration Cytology In Peripheral Lung Lesions. Int J Contemp Med Surg Radiol,2018:3(1):60-4.
11. Travis WD. Pathology of lung cancer. Clin Chest Med,2011:32(4):669-92.
12. Kawase A, Yoshida J, Ishii G, Nakao M, Aokage K, Hishida T, *et al*. Differences Between Squamous Cell Carcinoma and Adenocarcinoma of the Lung: Are Adenocarcinoma and Squamous Cell Carcinoma Prognostically Equal? Jpn J Clin Oncol [Internet]. 2012:42(3):189-95. Available from: https://doi.org/10.1093/jjco/hyr188