

Which is the Superior Approach for Diagnosing Cervical Lymphadenopathy: Fine Needle Aspiration Cytology (FNAC) or Open Biopsy? A Brief Review

Rafique Ahmed¹, Shafia Arshad^{2*} and Amina Arif³

¹Government Kott Khawaja Saeed Teaching Hospital, Pakistan

²Faculty of Medicine and Allied Health Sciences, The Islamia University, Pakistan

³Faculty of Life Sciences, University of Central Punjab, Pakistan

*Corresponding author: Shafia Arshad, Faculty of Medicine and Allied Health Sciences, The Islamia University, Bahawalpur, Pakistan



ARTICLE INFO

Received: 📅 March 03, 2022

Published: 📅 March 16, 2022

Citation: Rafique Ahmed, Shafia Arshad, Amina Arif. Which is the Superior Approach for Diagnosing Cervical Lymphadenopathy: Fine Needle Aspiration Cytology (FNAC) or Open Biopsy? A Brief Review. Biomed J Sci & Tech Res 42(4)-2022. BJSTR. MS.ID.006784.

ABSTRACT

Cervical lymphadenopathy is the most common manifestation of mycobacterial infections in the head and neck. It presents a significant prophylactic and treatment challenge since it mimics other disease conditions and produces contradictory clinical and lab results. Different procedures are used to evaluate cervical lymphadenopathy, including open biopsy and fine needle aspiration cytology. In this brief review we compared the both diagnostic techniques which is the better one according to the researchers. Lymph node biopsy refers to the surgical removal of an active lymph node for histological evaluation. Local anesthetic is typically used in open biopsy. Fine-needle aspiration cytology (FNAC) is used to identify enlarged "Lymph nodes" with a high degree of accuracy; it is a simple, rapid, and affordable method. Over the last decade, FNAC has surpassed open biopsy in terms of sensitivity and specificity in the diagnosis of cervical lymphadenopathy. Although FNAC is a straightforward, safe, reliable, and cost-effective diagnostic technique for lymphadenopathies, its limitations should be considered.

Introduction

Cervical lymphadenopathy is the most widespread head and neck expression of mycobacterial infections. It may be the symptom of a tuberculous or a unique clinical entity localized to neck. It is a great diagnostic and therapeutic challenge because it imitates other pathologic processes and yields inconsistent physical and laboratory findings (Kanlykama, et al. [1,2]). For evaluation of cervical lymphadenopathy, different techniques are used which include automatic core needle biopsy, fine needle aspiration cytology, flow cytometry, open biopsy and radiologically guided core needle biopsy (Nyquist, et al. [3-5]). Traditionally, open cervical lymph node biopsy has played significant role in the diagnosis of

cervical lymphadenopathy, especially the atypical Mycobacterium tuberculosis. Identification of lymphadenopathy by excision of a gland requires anesthesia and may result in complications. Grieg and Gray in 1904 reported first time "aspiration of "lymph nodes" for diagnostic purpose" They used this procedure in the diagnosis of trypanosomiasis (Danielides, et al. [6]). Guthrie in 1921 attempted combination therapy by correlating lymph node aspiration cytology with various processes.

Fine needle aspiration cytology (FNAC) does not require anesthesia, is easy to perform and is safe. Its diagnostic efficacy, particularly in tubercular lymphadenitis, has been reported to be as

high as histo-pathology (Jimenez Heffernan, et al. [7]). Fine Needle Aspiration Cytology is a procedure where by small amount of tissue or cells is aspirated from a pathological lesion with the help of fine 10 ml disposable syringe with 21- or 22-gauge needles. Virtually any superficial organ or tissue can be sampled through this procedure. Easily targeted organs include thyroid, breast, or "Lymph nodes" Whereas deep organs like Lungs, liver, kidney, mediastinum, and retroperitoneum are aspirated with the guidance of ultrasound or computed tomography. FNAC is an inexpensive, safe and quick procedure, and when performed by experienced worker is quite accurate (De Cursi, et al. [8]). Transforming cytology from a primarily screening tool to powerful diagnostic technique, FNAC has contributed a lot (Koo V, et al. [9]).

For the diagnoses of enlarged "Lymph nodes" with a high degree of accuracy; Fine-needle aspiration cytology (FNAC) is used, it is an easy, quick, inexpensive technique (Choudhury, et al. [10]). In malignant lymphadenopathy diagnosis, the accuracy of FNAC ranges from 79% to 94.5% (Knappe, et al. [11]). Using multi variate logistic regression some factors are identified that were significantly associated with the malignant lymphadenopathy. They include increasing age, fixed neck masses, Patients's history of malignant disorder, increase in the number of ENT examination etc (Al Kadah, et al. [12]) Over the last 10 years, FNAC has gained a more important role than open biopsy in the diagnosis of cervical lymphadenopathy with high sensitivity and specificity. The aim of this review was to compare the diagnostic accuracy of the both techniques, so that a technique could be offered to the patients with cervical lymphadenopathy in future.

Fine Needle Aspiration Cytology FNAC:

In 1937, Ferguson, thirteen pioneers of prostatic aspirations, wrote: "The only function of aspiration biopsy is to differentiate neoplastic from non-neoplastic tissue". Today, this concept still remains the primary goal. There are, however; a number of additional indications for the procedure. These include:

- Identification of the tissue constituting the mass (especially in the neck) (Salgarelli, et al. [13]). Recovery of specific organisms, and use in research.
- Among the advantages of aspiration biopsy which are numerous and as following:
 1. It usually is an office procedure, necessitating neither patient preparation nor specialized anesthesia.
 2. It eliminates or modifies lengthy periods of "watchful waiting."
 3. It is safe and almost painless.
 4. Both the procedure and its interpretation may be completed rapidly.

5. Sensitivity and specificity are high.
6. It is cost-effective and ideal for implementation of diagnosis-related groups (DRGs)

FNAC should be used as part of the initial examination of the patient and, when indicated, should be equal in priority to a chest radiograph or electrocardiogram. Specific limitations of FNAC must be understood. Open biopsy should be performed whenever indicated. The two methods are not in opposition and may even complement each other. Limitations decrease as interpretative expertise rises, but still include: An inability to diagnose unusual tumors, difficulty in the classification of neoplasms, inappropriate or insufficient biopsy specimens. There is the great potential to aspirate a cellular material because aspiration of an exact cystic mass is an important step concerned with the diagnosis as well as treatment. When FNA is accompanied with ultrasonographic guidance, the best results are obtained that can improve the accuracy of the sampling; a cytologist stains and previews the slides before the procedure is completed. Other than this when a lymphoma is suspected, it also provides the best chance to obtain additional material for flow cytometry (Gourin [14]). The choice of the therapy i.e. surgery, radiation or chemotherapy depends on the accurate diagnosis of the aspirated material. If there is any doubt about the result regarding interpretation of the aspirate, decisions on further therapy should be delayed until the aspirate is accurately diagnosed with confidence.

The use of FNAC under the appropriate conditions is important. As FNAC complements clinical diagnosis, after a thorough history and physical examination, it should not be taken into account. These limitations are similar to those encountered with formal biopsy. Sometimes, special test such as electron microscopy or immunochemistry, as well as tissue sections can be used to establish a specific diagnosis on FNAC. A problem unique to FNAC, however, is the effect of fibrosis on adequate biopsy sampling. Still almost no absolute contraindications are provided by fine-needle aspiration. For the sake of contraindications along with fine-needle aspiration, computed tomography (CT) or ultrasonography (US) is available for the guidance; especially when the physician is concerned about proximity to particular organ (Halloush, et al. [15]). Coagulopathy is also applied with some concerns. Efforts should be directed to correction of the coagulation defects, as most FNAC procedures are elective. These are also an important measure, before the procedure, with the patients who are anticoagulated, some reversal of the drug is usually done. In all cases, proper compression after the procedure is essential. Few complications result from FNAC, and these must be compared with those from incisional or excisional biopsy. Seeding of tumor cells, the most frequently cited limitation of aspiration biopsy, is almost a myth. A handful of cases have been recorded in the thousands of reports from the world literature.

Despite the potential danger of dispersal of tumor cells, 12 long-term studies indicate scant risk. Following NAB, there was no recurrence of tumor along the needle tract during a 10-year study of 175 patients with mixed tumor of the salivary glands or during a 5-year study of 469 patients with prostatic carcinoma treated only with hormones. Moreover, the procedure had no adverse influence on prognosis in a 5-year comparative study of patients with renal carcinoma or in a 15-year study of patients with breast carcinoma. Morbidity following aspiration biopsy is rare. The pitfalls which are applicable to all body sites include; Inexperience, Inflammation, and Fibrosis. Today, the chief cause of both false-positive and a false-negative diagnosis is still in experience, not only in interpretation of the FNAC but also in FNAC biopsy technique and specimen preparation. Aspiration biopsy adds a significant dimension to the art of diagnosis. When it is used correctly, this procedure has a high specificity and accuracy, with the latter ranging from about 80 to 97%.

Open Biopsy for Cervical Lymph Nodes

For histological examination, the surgical excision of an active lymph node is called Lymph node biopsy. This technique usually employs the use of local anesthesia and a sample that is commonly taken from superficial nodes in the cervical, supraclavicular, axillary, or inguinal region. Excision is usually more preferred technique because it provides a larger specimen that can be used for different purposes. Lymph node enlargement could be because of the malignant or non-malignant causes, discrimination between them is done by microscopic examination of the specific tissue. Hodgkin's disease is the condition in which lymphoma affects the entire lymph system, and this is the vital type of the cancer prevailing in adolescents as well as young adults. Metastatic cancer can also be the cause of the lymph node malignancy. Sometimes surgical biopsy for diagnosis purpose is applied to the patients with enlarged superficial "lymph nodes" and the pathology associated with biopsy have been described in many case series (Nathanson, et al. [16]).

To assist the patient in making a decision to go for an open surgical biopsy, the development of clinical algorithms is very helpful (Vassilakopoulos [17]) because of the reference of the patients to a specialist's clinic there have not found its general application. Sometimes due to the lack of the awareness in patients, with enlarged superficial "lymph nodes", they are unable to manage it rationally. In United Kingdom public health authorities have arouse a call to help the patient and rationalize them where to go for the management of the disease (Mc Alister, et al. [18]). For the public ease and awareness there have been some reports available giving the understanding about the importance of generic neck lump clinics (Kishore, et al. [19,20,21]).

Comparison of the Two Biopsy Techniques

For many reasons including; no tumor spread, no inconvenient wound to deform future surgical intercession, no delay between diagnosis and treatment and because of its simplicity, "fine needle aspiration biopsy is preferable to open biopsy of a cervical "lymph nodes". When there is the need to obtain preoperative positive histological diagnosis and by needle biopsy, a diagnosis of malignancy cannot be made, then an open biopsy procedure can be adopted conditionally it can be followed by a frozen section, associated with definitive neck dissection. Open cervical "lymph nodes" biopsy, alters the outcome of treatment by modifying the patterns of lymphatic drainage and creates a wound which distorts future surgical intervention (Pynnonen, et al. [22]).

Neck lump clinics", offer many advantages to the patients that include referral pathways, so that patients may clearly know where they have to go for the treatment and also the quick cure done by experienced, specialized and trained teams for the implementation of the procedures using latest resources. Because of the elevated concentrations of special clinics, the availability fine needle aspiration cytology along with the ultrasound scanning and out-patient laryngopharyngoscopy has become competent and cost-effective. In such types of the clinic's patients get all the facilities under one roof (Mc Combe, et al. [23,19]). Once a diagnosis has been made, clear pathways for onward referral establishes that reducing the delay in the treatment. Further investigations done in this regard indicated that in 45% of all lymph node biopsies no treatment is required because it shows non-specific lymphadenopathy. Ultrasound scanning has become sophisticated and precise diagnostic instrument, in case of the negative results diagnosis other non-surgical procedures can also be followed including cytological analysis (Schafernak, et al. [24]) or by ultrasound scanning (Blum, et al. [25,26]). Amongst the children, where there is the maximum need to avoid the surgery, the biopsy success rate is not satisfactory, up to 85% cases show negative indications.

Conclusion

FNAC is a very useful diagnostic tool in patients having significant lymphadenopathy. By the application of FNAC, the metastatic carcinomas, and tuberculous lymphadenopathy can be diagnosed accurately. Although open biopsy for histological confirmation is gold standard, it has its limitations because it distorts the surgical planes and may increase risk of induction of tumor spread especially in metastatic upper and middle cervical "lymph nodes" which are potentially curable with radiotherapy or node dissection. FNAC is preferable and if it is positive then the advancement can be made to the treatment of the neck without excisional biopsy of the inflamed "lymph nodes". Finally, it can be

concluded that, FNAC is simple, safe, reliable and cost-effective diagnostic tool for lymphadenopathies but the limitation of the procedure should be kept in mind. If FNAC is negative it does not rule out the disease and should be followed by open biopsy for histopathological confirmation.

References

- Kanlykama M, Mumbuç S, Bayazy Y, Sirikci A (2000) Management strategy of mycobacterial cervical lymphadenitis. *J Laryngol Otol* 114(4): 274-278.
- Bezabih M (2001) Cytological diagnosis of soft-tissue tumours. *Cytopathology* 12(3): 177-183.
- Nyquist G G, Tom W D, Mui S (2008) Automatic core needle biopsy: A diagnostic option for head and neck masses. *Arch Otolaryngol Head Neck Surg* 134(2): 184-189.
- Kim B M, Kim E K, Kim M J, Yang W I, Park C S, et al. (2007) Sonographically guided core needle biopsy of cervical lymphadenopathy in patients without known malignancy. *J Ultrasound Med* 26(5): 585-591.
- Wakely P E, Kneisl J S (2000) Soft tissue aspiration cytopathology. *Cancer* 90(5): 292-298.
- Danielides V, Patrikakos G, Moerman M, Bonte K, Dhooge C, et al. (2002) Diagnosis, management and surgical treatment of non-tuberculous mycobacterial head and neck infection in children. *ORL* 64(4): 284-289.
- Jiménez Heffernan, J A Vicandi, B López Ferrer P, Hardisson D, Viguer J M, et al. (2001) Value of fine needle aspiration cytology in the initial diagnosis of Hodgkin's disease. *Acta cytologica* 45(3): 300-306.
- De Cursi J A T, Marques M E A, De Assis Cunha Castro C A C, et al. (2020) Fine-Needle Aspiration Cytology (FNAC) is a reliable diagnostic tool for small breast lesions (≤ 1.0 cm): a 20-year retrospective study. *Surg Exp Pathol* 3.
- Koo V, Lioe T F, Spence R A (2006) Fine needle aspiration cytology (FNAC) in the diagnosis of granulomatous lymphadenitis. *Ulster Med J* 75(1): 59-64.
- Choudhury A Allam, Tuhin Sultana, Belayat Hossain S, A Sufi Ahmed Amin (2011) "Diagnosis of Parotid Gland Mass by the Fine Needle Aspiration Cytology (FNAC) and it's Histopathological Correlation-2 Years Study in BSMMU, Dhaka." *Bangabandhu Sheikh Mujib Medical University Journal* 4(2): 65-69.
- Knappe A, Hör S, Wittmann S, Fickenscher H (2000) Induction of a novel cellular homolog of interleukin-10, AK155, by transformation of T lymphocytes with herpesvirus saimiri. *Journal of virology* 74(8): 3881-3887.
- Al Kadah B, Popov H H, Schick B, Knöbber D (2015) Cervical lymphadenopathy: study of 251 patients. *European Archives of Oto-Rhino-Laryngology* 272(3): 745-752.
- Salgarelli A C, Cappare P, Bellini P, Collini M (2009) Usefulness of fine-needle aspiration in parotid diagnostics. *Oral Maxillofac Surg* 13(4): 185-190.
- Gourin C G, Johnson J T (2000) Incidence of unsuspected metastases in lateral cervical cysts. *Laryngoscope* 110(10): 1637-1641.
- Halloush R A, F A Khasawneh, H A Saleh, A O Soubani, T J Piskrowski, et al. (2007) "Fine needle aspiration cytology of lung lesions: a clinicopathological and cytopathological review of 150 cases with emphasis on the relation between the number of passes and the incidence of pneumothorax." *Cytopathology* 18(1): 44-51.
- Nathanson S David (2003) "Insights into the mechanisms of lymph node metastasis." *Cancer* 98(2): 413-423.
- Vassilakopoulos T P, Pangalis G A (2000) Application of a prediction rule to select which patients presenting with lymphadenopathy should undergo a lymph node biopsy. *MEDICINE BALTIMORE* 79(5): 338-347.
- Mc Alister F A, Bertsch K, Man, J Bradley, J Jacka M, et al. (2005) Incidence of and risk factors for pulmonary complications after nonthoracic surgery. *American journal of respiratory and critical care medicine* 171(5): 514-517.
- Kishore A, Stewart C J, R Mc Garry G W, MacKenzie K (2001) One stop neck lump clinic; phase 2 of audit. *Clin Otolaryngol* 26(6): 495-497.
- Murray A, Stewart C J, R Mc Garry G W, MacKenzie K (2000) Patients with neck lumps: can they be managed in a 'one-stop' clinic setting?. *Clinical Otolaryngology & Allied Sciences* 25(6): 471-475.
- Smith O D, Ellis P D, Bearcroft P W, Berman L H, Grant J W, et al. (2000) Management of neck lumps--a triage model. *Annals of the Royal College of Surgeons of England* 82(4): 223.
- Pynnonen Melissa A, M Boyd Gillespie, Benjamin Roman, Richard M Rosenfeld, David E Tunkel, et al. (2017) "Clinical practice guideline: evaluation of the neck mass in adults." *Otolaryngology-Head and Neck Surgery* 157(2_suppl): S1-S30.
- Mc Combe A, George E (2002) One-stop neck lump clinic. *Clin Otolaryngol* 27(5): 412.
- Schafernak K T, Kluskens L F, Ariga R, Reddy V B, Gattuso P, et al. (2003) Fine-needle aspiration of superficial and deeply seated lymph nodes on patients with and without a history of malignancy: review of 439 cases. *Diagn Cytopathol* 29(6): 315-319.
- Blum A, Schlagenhauß B, Stroebel W, Breuninger H, Rassner G, et al. (2000) Ultrasound examination of regional lymph nodes significantly improves early detection of locoregional metastases during the follow-up of patients with cutaneous melanoma: results of a prospective study of 1288 patients. *Cancer* 88(11): 2534-2539.
- Tschammler A, Beer M, Hahn D (2002) Differential diagnosis of lymphadenopathy: power Doppler vs color Doppler sonography. *European radiology* 12(7): 1794-1799.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2022.42.006784

Shafia Arshad. Biomed J Sci & Tech Res



This work is licensed under Creative Commons Attribution 4.0 License

Submission Link: <https://biomedres.us/submit-manuscript.php>



Assets of Publishing with us

- Global archiving of articles
- Immediate, unrestricted online access
- Rigorous Peer Review Process
- Authors Retain Copyrights
- Unique DOI for all articles

<https://biomedres.us/>