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Comparative Study of Fine Needle Aspiration Cytology and Cell Block Technique in Lymphadenopathy

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Abstract: ***Background: Lymphadenopathy is one of the commonest clinical presentation of all age groups attending out patient department. The aetiology can vary from an inflammatory process to a malignant condition. Fine needle aspiration cytology (FNAC) is an economical and reliable first line investigation in lymphadenopathy. Sometimes fine needle aspiration does not yield sufficient information for precise diagnosis. Hence to make the best possible use of aspirate, smear should be combined with cell block (CB) preparation that in turn gives a better morphological & histological diagnosis. Objective: This study was undertaken to assess the utility of cell block technique in diagnosing lymphadenopathies in correlation with FNAC findings. Material and methods: We carried out this study on 220 patients in Department of Pathology, JLN medical College, Ajmer (Rajasthan) from July 2018 to June 2020. After proper history taking, clinical examination and relevant investigations, we performed FNAC from lymph node swellings in cytology section of pathology department with approval from the institutional ethical committee. Results - Out of 220 cases, 144 cases of reactive lymphadenitis, 47 were of tubercular lymphadenitis, 18 of metastatic deposits of varied primaries, 4 cases of lymphomas and 7 cases were under category of non - diagnostic cases. The sensitivity and Specificity of cell block was 77.78% and 100% respectively and positive predictive value (PPV) and negative predictive value (NPP) was 100% and 92.98% respectively. Conclusion: The combined use of both the FNAC and Cell block techniques increases the diagnostic accuracy and helps the clinician in appropriate management of the patient.***

Keywords: Lymphadenopathy, FNAC, Cell – block

1. Introduction

Cervical lymphadenopathy is a common clinical finding and may be a sign of an indolent inflammation, infection or a malignant disorder, depending upon many factors including the geographical and socio - economical setup. In our country, infective (tubercular) lymphadenopathy is quite common. However, still a large percentage of cervical lymphadenopathy in adults turns out to be malignant. Hence, it is necessary to evaluate a patient of unexplained cervical lymphadenopathy without any delay.[1-2]

The underlying aetiology of lymphadenopathy can be diagnosed by good clinical history and examination, radiological examination, cytology, histology and other lab investigations. In all, Lymph node sampling by Fine Needle Aspiration Cytology (FNAC) has potential benefits over the other diagnostic modalities like simplicity, minimal trauma and complications, and easy availability of results, that have made it a frequently practiced investigation in the initial diagnosis, management and follow up of primary lymph node malignancies; and in following patients with other malignancies and identifying metastasis or recurrence. [3]

Although; Fine needle aspiration cytology (FNAC) being safe, minimally invasive and cost - effective method, is widely practiced and has proven to be a very effective means of obtaining tissue from different body sites for diagnosis, however sometimes it does not yield sufficient information for precise diagnosis and the risk of false negative diagnosis always exists. [4, 5] Disadvantages of FNAC include availability of limited material, lack of tissue architecture, overcrowding of cells and paucity of representative cells. [6]

In order to overcome these problems, Cell Block (CB) technique has been resorted to make the best use of the available material. This method uses histologic technique for processing & thus, offers one major advantage that multiple sections of the same material may be processed for routine stains as well as for special stains & IHC. The advantage of Cell Block is recognition of histologic pattern of the disease that cannot be reliably identified in smears. CBs are increasingly being used as an adjunct to smears to improve the diagnostic accuracy of FNA cytology. [7]

The cell block technique not only increases the positive results but can also be of great help in the correct diagnosis and the primary site. Apart from this, morphological details can also be obtained with the cell block method, which include preservation of the architectural pattern like cell balls and papillae and three dimensional clusters, excellent nuclear and cytoplasmic details, and individual cell characteristics. [8]

The disadvantage with the CB technique is the delay in diagnosis because of the increased turnaround time. [9] All CB techniques are labor intensive and demanding; restricted use is possible in all laboratories, but the use of CB as a routine may be difficult because of manpower - related issues in low - resource settings. Lastly, in comparison with traditional smear cytology, the CB method adds an extra cost to patient management. [10]
The present study has been undertaken to assess the utility of cell block preparation in increasing the sensitivity of cyto - diagnosis of lymph nodes lesions since cell block technique study for lymph nodes has an architectural pattern, It is a useful method for comparison of routine cell cytology. This study will bear impact in correct diagnosis of lymphadenopathy and hence patient's management and prognosis. [11, 12]

The primary differential diagnosis of lymphadenopathy include:

1) Reactive/Infectious lymphadenitis
2) Metastatic diseases
3) Lymphoma

2. Material and Methods

This prospective study of patients with lymphadenopathy was carried out on patients of Cytology section of Department of Pathology, at Jawahar Lal Nehru. Medical College, Ajmer; Rajasthan (India) from July 2018 to June 2020, with approval from the institutional ethical committee.

We received patients in cytology section with lymph node swellings from different department of J. L. N Medical college and Associated group of hospitals. After proper history taking and clinical examination, we performed FNAC from appropriate site. FNAC was performed using 21, 22 or 23 gauge needles attached to the 10 ml or 20 ml disposable syringes under aseptic condition. Smears were made, and immediately alcohol fixed in 95% ethyl alcohol for Papanicolaou stain & haematoxylin and eosin (H& E) stain and air dried for geimsa stain. The remaining material in the aspirating syringe was centrifuged at 3000rpm for 15 minutes and by plasma - thromboplastin method cell - block prepared.

Microscopic photographs

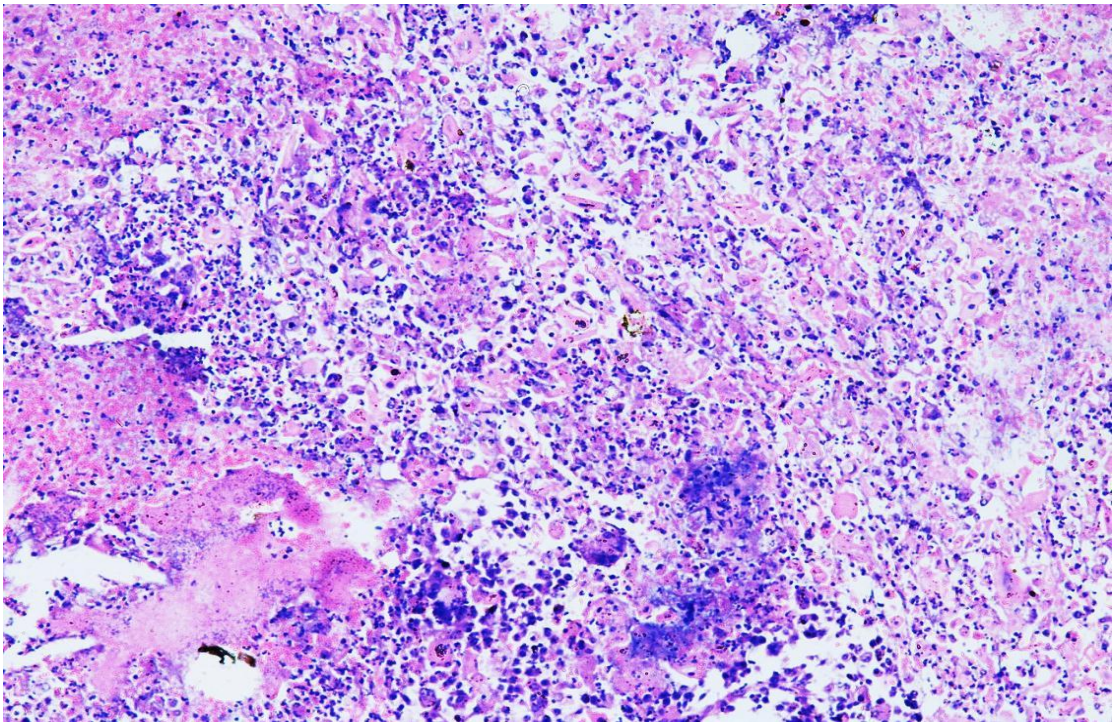


Figure 1: Cell Block - Acute Suppurative Lymphadenitis (H&E 100x)

Section shows polymorphous population of cells predominantly intact and degenerated neutrophils and tingible body macrophage with ingested debris.

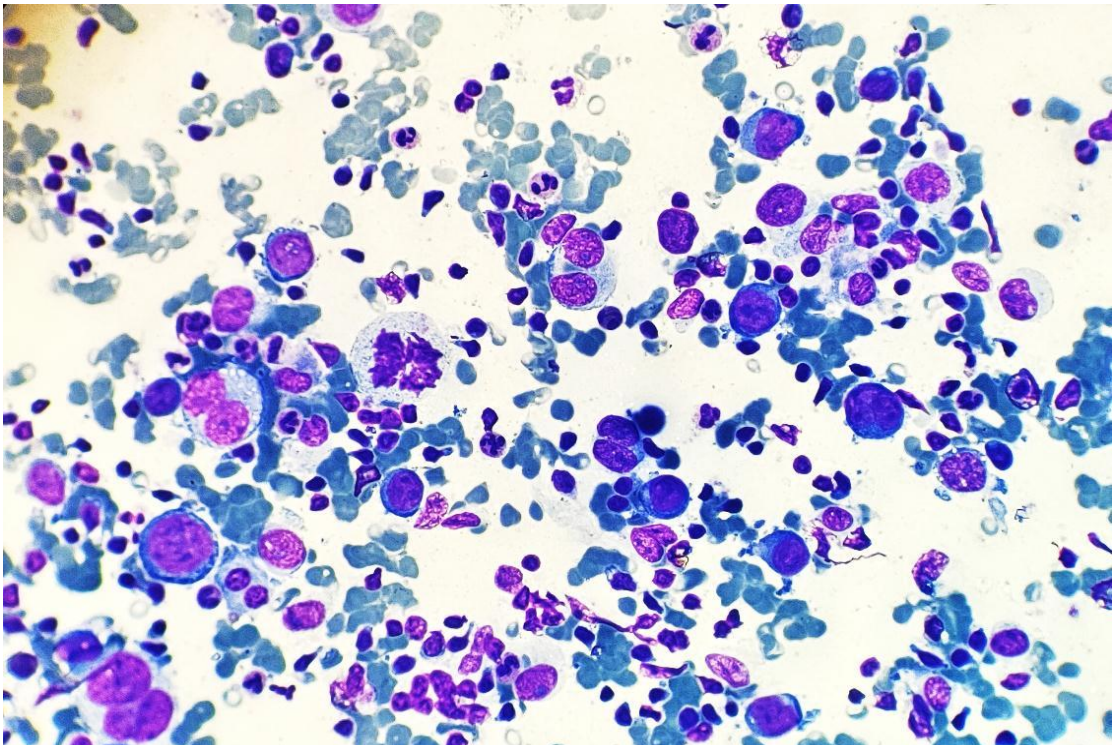


Figure 16: Cell - Block - Hodgkin's lymphoma (H&E 400X)

Section shows Reed - Sternburg (RS) cell with abundant basophilic cytoplasm and bilobed nucleus against the lymphoid background.

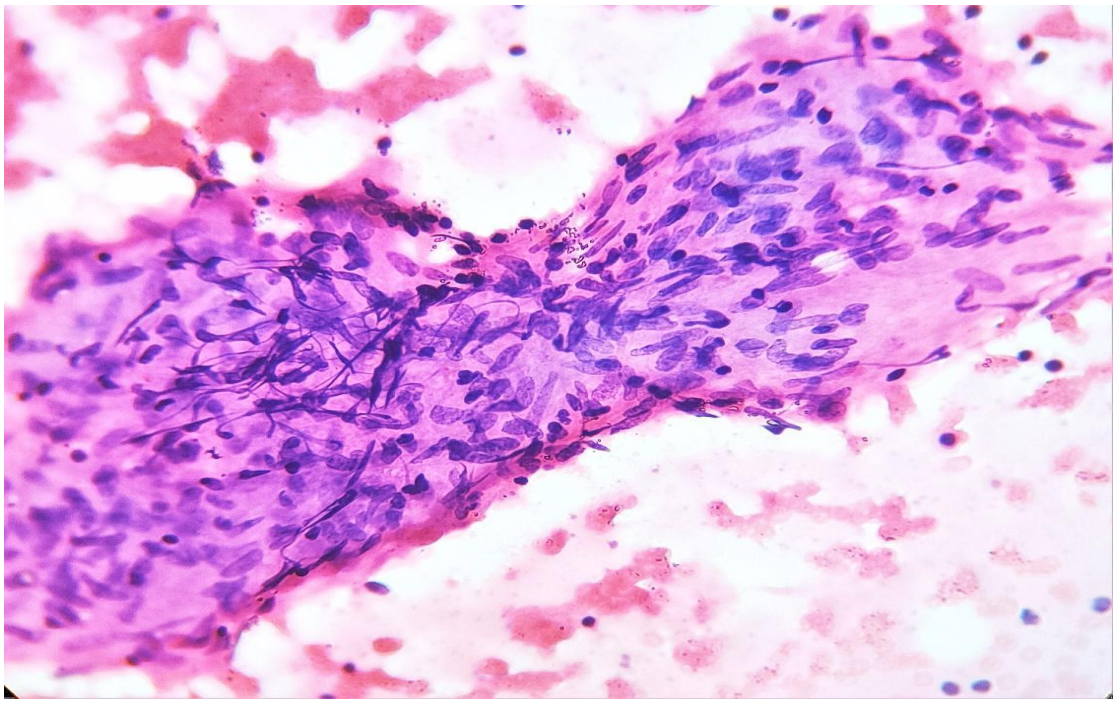


Figure 7: Cell - Block: Granulomatous lymphadenitis (H&E 400x)

Smear showing granuloma consists of epithelioid cells, fibroblast, lymphocyte against the haemorrhagic background.

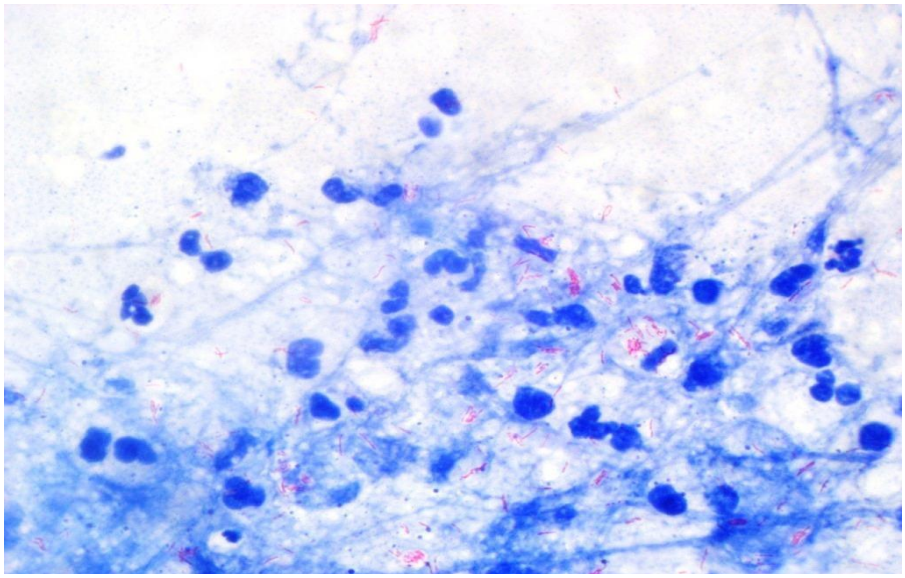


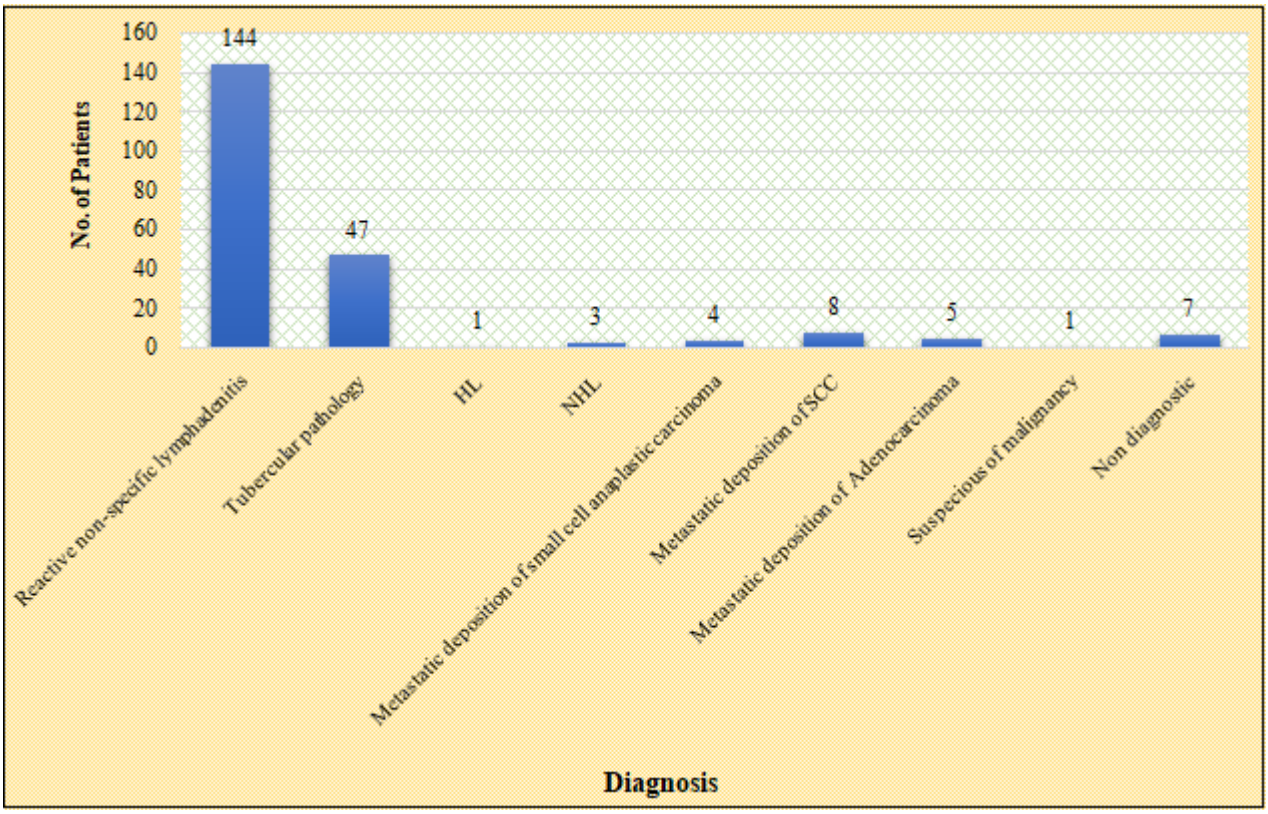
Figure 8: Cell block – Tubercular Lymphadenitis (ZN 400X)

Section of lymph node showing tubercle bacilli (Acid fast bacilli) (INSET) in the background of necrosis.

3. Result

Table 1: Final cytopathological diagnosis of lymph nodes lesions after evaluation of FNAC and cell block findings

Diagnosis	Cases	
	No. of patients	Percentage (%)
Reactive non - specific lymphadenitis	144	65.45
Tubercular lymphadenitis	47	21.36
Non - Hodgkin's Lymphoma	3	1.36
Hodgkin's Lymphoma	1	0.45
Suspicious of malignancy	1	0.45
Metastatic deposition of small cell anaplastic carcinoma	4	1.81
Metastatic deposition of Squamous cell carcinoma	8	3.64
Metastatic deposition of Adenocarcinoma	5	2.27
Non diagnostic	7	3.18
Total	220	100



Graph 1: Final cytopathological diagnosis of lymph nodes lesions after evaluation of FNAC and cell block findings

In our study, Cumulative cytopathological diagnosis of lymph node lesions on FNAC and cell block of 220 cases, 149 cases were benign and 22 cases were malignant.

Out of 149 benign cases, 144 (65.45%) cases were of reactive lymphadenitis,, 47 (21.36%) were of tubercular lymphadenitis.
Out of 22 malignant cases, four were primary malignancies of which three cases were diagnosed as Non - Hodgkin's lymphoma and one case as Hodgkin's lymphoma on cytology. Rests of the 18 cases were metastases to the lymph nodes. Out of 18 metastatic cases eight cases were diagnosed as metastatic squamous cell carcinoma, five cases were diagnosed metastatic adenocarcinoma carcinoma and four cases of metastatic small cell anaplastic carcinoma. So, the most common metastasizing tumor to the lymph nodes is squamous cell carcinoma. (Reference Table No.1 and Graph No.1)

Table 2: Diagnostic contribution by cell - block method in lymph node lesions

Site	Cases	
	No. of patients	Percentage (%)
Confirmed	60	27.27
Established diagnosis	10	4.55
Non diagnostic	145	65.91
Non contributory	5	2.27
Total	220	100

In our study, out of 220 cases cell block confirmed the FNAC diagnosis in 60 (27.27%) cases. In 10 (4.5%) cases cell block established a specific diagnosis by improved architecture and with the help of histochemical stains and also by immunohistochemistry (IHC). Cell block was non - diagnostic in 145 cases (65.9%) and non - contributory in remaining 5 cases (2.2%) due to insufficient material. (Reference Table No.2)

Table 3: Cross tabulation of FNAC vs cellblock.

	FNAC				
Cell Block Diagnosis	Malignant		Benign		Total
	No.	percentage%	No	percentage %	
Malignant	14	77.78	0	0.00	14
Benign	4	22.22	53	100.00	57
Total	18	100.00	53	100.00	71

Statistical analysis in our study shows that cell - block method has a sensitivity of 77.78%, specificity of 100%, positive predictive value of 100%, negative predictive value of 92.98%, accuracy 94.37%, chi - square = 46.551 with 1 degree of freedom, $p < 0.001$. (Reference Table No.3)

4. Discussion

The present study consists of comparative analysis between FNAC and cell - block of lymph nodes of the body.

In our study, benign lesions are more common than malignant one. Among benign lesions, Non - specific reactive lymphadenitis is the most common findings of enlarged lymph nodes amounting to 65.45% cases, followed by tubercular lymphadenitis amounting to 21.36% cases. Our findings are concordant with the studies done by Ishar et al [13], Hirachand et al [14], and Lee et al[15].

In our study, Primary malignant lesions (Hodgkin's and Non - Hodgkin's lymphoma) were 1.81%, findings are concordant with the studies done by Manjunath B S et al[16] and Bharathi K et al[17]. Metastatic lesions were found in 8.18% cases which is concordant with the study of Ahmad et al[18].

In our study, sensitivity, specificity and diagnostic accuracy of cell block technique was found 77.78%, 100% and 94.37% respectively. These findings are concordant with Dareen Mohamed et al[19], which states that cell block accuracy percentage was 98.85%.

5. Conclusions

Although fine needle aspiration cytology is a safe, quick and minimally invasive technique which can be performed as an outpatient department procedure not requiring anaesthesia and readily acceptable by the patient but FNA alone doesn't yield sufficient information for precise diagnosis. Cell block method improves accuracy of FNA, allows the recovery and processing of small fragments of tissue left in needle hub which facilitates the better classification of tumour especially if accompanied with special stains. Cell block for histology and immunohistochemistry provides supportive evidence for the diagnosis.

In the present study it can be concluded that cell block method yielded more cellularity and better architectural patterns which improved the diagnosis of malignancy. Multiple sections could be obtained if required for special - stain.

Therefore, the cell block technique could be considered as a useful adjunct technique in evaluating lymph node cytology for a final cytodiagnosis, along with the routine conventional FNAC smears method.

References

[1] Quadri S K, Hamdani NH, Shah P, Lone M I et al. Profile of lymphadenopathy in Kashmir Valley: a cytological study. APJCP.2012; 13.8.3621.
[2] Darnal HK, Karim N, Kamini K, Angela K. The Profile of Lymphadenopathy in Adults and Children. Med J Malaysia.2005; 60: 590 - 8.
[3] Kalpana Chandra, Praveen et al. J of Evolution of Med and Dent Sci/ eISSN - 2278 - 4802, pISSN - 2278 - 4748/ Vol.3/ Issue 51/Oct 09, 2014
[4] Kulkarni MB, Prabhudesai NM, Desai SB, Borges AM. Scrape cell block technique for fine needle aspiration cytology smears. Cytopathology.2000; 11: 179 - 84. Patrick H. Henry, Dan L. Longo. Enlargement of lymph nodes and spleen. Harrison's Principles of Internal Medicine. Vol - 1, 17th edition, Fauci AS, Braunwald E, Kasper DL, et al. (Eds), McGraw - Hill: New York, NY 2008: p370 - 372
[5] Basnet S, Talwar OP. Role of cell block preparation in neoplastic lesions. Journal of Pathology of Nepal.2012; 2: 272 - 276.3. BasnetS, Talwar O. Role of cell block preparation in neoplastic lesions. Journal of Pathology Nepal 2012; 2: 272 - 6.

[6] Koksal D, Demirag F, Bayiz H, Koyuncu A, Mutluay N, Berktas B, et al. The cell block method increases the diagnostic yield in exudative pleural effusions accompanying lung cancer. Turkish Journal of Pathology.2013; 29 (3): 165 - 70.
[7] Koss LG, Melamed MR. Laboratory Techniques. In: Koss' Diagnostic Cytology & its Histopathologic Bases.5th ed. Philadelphia: Lippincott Williams & Wilkins; 2006. P.1590 - 1593.
[8] Leung SW, Bedard YC. Methods in Pathology. Simple mini block technique for cytology. Mod pathol 1993; 6 (5): 630 - 632.
[9] Yang GC, Wan LS, Papellas J, Waisman J. Compact cell blocks. Use for body fluids, fine needle aspirations and endometrial brush biopsies. Acta Cytol 1998; 42: 703–6.
[10] Keyhani - Rofagha S, Vesey - Shecket M. Diagnostic value, feasibility, and validity of