Table 4: Combined FNAC and FCI versus available histopathology diagnosis

Combined FNAC and FCI diagnosis	Histology diagnosis					
	DLBL	**FL**	**SLL**	**MCL**	**Lymphob lastic**	**Other**
DLBL (15)	14					1 (Burkitt's)
FL (4)		4				
SLL (3)			3			
MCL (2)				2		
Lymphoblastic (3)					3	
Suggestive of NHL (4)	1		1			1 ALCL 1 FL to large B-NHL

DLBL = Diffuse large B lymphoma, SLL = Small lymphocytic lymphoma, FL = Follicular lymphoma, MCL = Mantle cell lymphoma, ALCL = Anaplastic large cell lymphoma, FNAC = Fine needle aspiration cytology, NHL = Non Hodgkin's lymphoma, FCI = Flow immunophenotyping

tion exists in the smears. A major disadvantage inherent in the FNAC smear is the inability to identify a follicular growth pattern [15], which is a major prognostic factor. After the introduction of REAL and WHO classification, the major emphasis has been given on cell morphology and immunopheotype rather than the growth pattern [13,14]. In the present paper, we attempted to apply the combined approach of FNAC and FCI to implement WHO classification on FNAC. FCI showed light chain restriction in 75% (30/40) cases of B-NHL. In rest of the ten cases, there were predominant CD19 and CD20 positive cell populations (>80%). Considering the cytomorphology and predominant CD 19 and CD20 expression, we considered these cases as B-NHL. The lack of expression of surface immunoglobulin light chains in B-NHL is an unusual phenomenon. However, it has been also noted by other authors [16,17]. Zardawi et al [17] encountered seven cases of B-NHL, which did not show any light chain restriction on FCI. Similarly Zeepa et al [16] noted 12 cases of B-NHL with no demonstrable light chain restriction. In fact, it has been suggested by them that CD20 positivity in excess of 85% is diagnostic of NHL in a cytological suspicious case of lymphoma [16].

In addition to providing clear, quantitative evidence of monclonality, FCI was helpful in subclassification of NHL in 79% (38/48) cases. It was particularly helpful in subclassification of low grade B-NHL. The FNAC of small lymphocytic lymphomas, mantle cell lymphomas and low grade follicular lymphomas are difficult to differentiate by cytomorphology alone. Combining CD 19 with other antibodies such as CD 5, CD10, CD 23 and FMC 7 are usually helpful to distinguish these lesions. In the present study, all the SLL cases, expressed both CD5 and CD 23 antigen. SLL cases usually show absence of expression of CD 10 and FMC 7. Typically they show a low proliferative index. In MCL, we noted only CD5 positive and CD23 negative population of cells. We did not have FMC 7 antibody in our laboratory for additional confirmation in MCL cases. MCL is associated with characteristic cytogenesis abnormality of t(11:14). This anomaly causes overexpression of BCL1 gene, which encodes cycin D1. So MCL are positive for cyclin D1 in addition to CD 5 positivity. This is an additional characteristic feature of MCL [18]. CD 10 expression along with other B cell markers (such as CD19/CD 20), was useful in diagnosis of FL. These cases were negative for CD5. However in two cases CD10 positivity was not demonstrated and a confident diagnosis of FL was not possible. The FL is associated with the charateristics t(14:18)(q32;21) translocation. This can be demonstrated on cytology smears with the help of fluorescent in situ hybridisation (FISH) [19]. This reciprocal translocation may lead to oberexpression of BCL2 protein [20]. Demonstration of BCL2 protein overexpression may be helpful in histology sections where architecture is preserved.

FCI alone was not very helpful in distinguishing DLBL, lymphoblastic lymphoma and Burkitt's lymphoma, and in those cases cytomorphology on the FNAC smears was important. Lymphoblastic lymphomas are positive for early markers such as TdT and CD34. B cells may also express pan B-cell makers such as CD20 and lack surface and sometimes cytoplasmic immunoglobulin. We did not have adequate standardization of TdT and so we relied on cytomrphology to diagnose lymphoblastic lymphomas. The T-lymphoblastic lymphomas showed variable positivity of CD3, CD2 and CD10 markers. Wheras B-lymphoblastic lymphomas showed varaiable expression of CD19, CD20 and CD10. Careful history and peripheral blood picture should always take into consideration as Acute myeloid leukaemia (AML-M0) may simulate similar picture. The Burkitt's lymphomas have characteristic cytomorphology. FNAC smears show dissociated cells with deep blue vacuolated cytoplasm, having round regular nuclei with prominent nucleoli and abundant tingible body macrophages in the background. High cell proliferation markers (Ki 67 index more than 99%) and t (8;14)(q24;q32) translocation are the characteristic features of Burkitt's lymphomas [13]. The Burkitt lympho-