

# The role of fine needle aspiration cytology and imprint cytology in cervical lymphadenopathy

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## ABSTRACT

**Objective:** To determine the diagnostic accuracy of cervical lymphadenopathy by fine needle aspiration (FNAC) and imprint cytology (IC).

**Methods:** This study included 94 patients with cervical lymphadenopathy. This study was carried out in the Departments of General Surgery and Pathology, King Fahad Hospital, Hofuf, Kingdom of Saudi Arabia, from June 2001 through to July 2002. They were subjected to clinical examination and FNAC of one of the enlarged lymph nodes. This was followed by IC and histological examination of this lymph node after its excision.

**Results:** Clinical examination was correct in 78% of the cases. The overall accuracy of fine needle aspiration was 93%. It was accurate on all cases of reactive hyperplasia, 93% of tuberculosis lymphadenitis, 90% in

Hodgkin's lymphoma, 86% in non-Hodgkin's lymphoma, and 91% of metastasis lymphadenopathy. On the other hand, the overall accuracy of IC was higher than that of fine needle aspiration, being 97%. It diagnosed all cases of reactive hyperplasia and non-Hodgkin's lymphoma, 97% in tuberculosis lymphadenitis, 90% in Hodgkin's lymphoma and 95% in metastasis lymphadenopathy.

**Conclusion:** These techniques proved to be reliable, rapid, and inexpensive procedures in diagnosis of lymphadenopathy. They can differentiate well between inflammatory and neoplastic lesions, in cases of lymphoma, cytological diagnosis should be followed by histological diagnosis for accurate classification and grading.

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Cervical lymphadenopathy is a common problem which is usually meeting the clinicians,<sup>1</sup> it may result from a variety of different underlying disease,<sup>2</sup> and its management is based upon a good clinical diagnosis, and an accurate histopathology diagnosis of an excised lymph node tissue. Even several methods are used to obtain tissue from lymph node, Fine needle aspiration cytology (FNAC) still simple, rapid, inexpensive technique and is reliable for the diagnosis of lymphadenopathy<sup>3-5</sup> and other tissue.<sup>6,7</sup> This diagnostic procedure is reserved for situations in which either a persisting enlargement of lymph nodes cannot be readily explained by clinical data or when a morphologic study of lymph nodes judged essential for diagnostic or therapeutic reason,<sup>8</sup> and it

is rarely indicated during the course of an acute illness. The clinical value of FNAC is not limited to neo-plastic condition. It is also valuable in the diagnosis of inflammatory, infection and degenerative conditions.<sup>9</sup> Another technique that complements the study of issue sections and that is too often neglected is the examination of imprint cytology (IC) from the cut section of the fresh lymph node. Imprint cytology is easy, reliable and valuable method of investigation adjunct in diagnosis of lymphoid disease. It is a quick, easy and reliable method of investigation.<sup>10-12</sup>

The aim of this work is to assess the accuracy and the role of FNAC and IC in diagnosis of cervical lymphadenopathy.

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**Methods.** This study was carried out in the Departments of General Surgery and Pathology, King Fahad Hospital Hofuf, Kingdom of Saudi Arabia, from June 2001 through to July 2002. It was carried out on 94 patients with chronic cervical lymphadenopathy (enlarged lymph nodes for more than 3 weeks). Cases with acute febrile illness, acute lymphadenitis or the presence of a localized acute inflammatory process (abscess) were not included here. All patients were subjected to the routine history taking and clinical examination, fine needle aspiration for one of the enlarged lymph nodes that was expected to represent the pathology, was carried out without use of a local anesthetic and no ultrasonic imaging guidance.<sup>6</sup> Excision of the previously aspirated lymph node was performed under general anesthesia, and the cut surface of the lymph node was subjected to IC.<sup>12</sup> The smears obtained from both techniques (FNAC, IC) were stained by hematoxylin and eosin. The lymph node was then fixed in buffered formaline saline 5%, processed for paraffin sections, and stained by hematoxylin and eosin. Microscopic examination of the aspiration and imprint smears was carried out as well as for the paraffin sections.

**Results.** (Table 1) A total of 94 patients were studied prospectively, there were 56 patients (60%) females and 38 patients (40%) were males. The mean age was  $30.36 \pm 11.80$  years (range 12-82 years); the most frequent age was the fifth decade. Eighty-one patients (86.2%) had deep cervical lymph nodes; it was affected mainly by lymphoma (29.8%) and tuberculosis (40.4%). Most of the females presented by metastasis papillary thyroid carcinoma and metastasis carcinoma of the breast. Clinical examination was accurate in diagnosis of 73 patients (78%). Its accuracy was high in patients with metastasis lymphadenopathy (91%), and also in lymphoma patients (88%). On the other hand, in cases of reactive hyperplasia, the clinical examination was poor, it was correct only in 6 cases (44%). As regarding the cytological diagnosis, FNAC was accurate in diagnosing 93% of the cases, while IC was accurate in 97%. Both were equal in cases of reactive hyperplasia and Hodgkin's lymphoma. But in the other conditions (Hodgkin's lymphoma, tuberculosis, metastasis) imprint cytology was superior.

**Discussion.** Lymphadenopathy is considered as one of the most common clinical problems affecting different age groups and involving any site of the body. The most frequent cause of peripheral lymphadenopathy is reaction to some symptomatic or asymptomatic inflammatory process.<sup>5</sup> Malignant tumors either primary or metastasis from the head and neck are one of the most important causes in the

chronic cervical lymphadenopathy.<sup>2</sup> For these reasons, lymphadenopathy requires careful investigations that should be easy, rapid and accurate.<sup>13</sup> Collaboration between clinical, cytological and histopathology examination is essential for the proper diagnosis of lymph node enlargement. Although surgical excision biopsy of cervical lymph node is a common and relatively simple surgical procedure,<sup>14</sup> FNAC offers the alternative of an immediate preliminary diagnosis of cervical lymphadenopathy. In this study history taking, clinical examination was an important tool in the provisional diagnosis of lymphadenopathy. Its accuracy was 44% in reactive hyperplasia and 91% in metastasis tumors. The low result was in cases of reactive hyperplasia might be due to over estimation by the clinician and the presence of other clinical data suggesting other diagnosis.<sup>15</sup> Cytology diagnosis of reactive hyperplasia, in both techniques (FNAC, IC), showed 100% accuracy as it revealed a mixed and abundant of small and large lymphocytes which accumulate around the histiocytes forming what is called lymphohistiocytes aggregates.<sup>16</sup> Diagnostic accuracy, particularly in certain cases of reactive lymphadenopathy depended on the representatives of the aspirate and the quality of the cytological preparations. In granulomatous lymphadenitis, cytological diagnosis based upon the presence of lymphocytes, macrophages, histiocytes of epithelioid type forming cohesive clusters and multinucleated giant cells of Langhans, s grant cell. Histological some times it is confusing to differentiate and recognize the caseating granulomatous reaction of TB from other necrotizing granulomatous lymphadenitis. However, the presence of necrotic material and Langhans giant cells may suggest TB,<sup>4</sup> but TB remain in the differential diagnosis whether necrosis is present or not and this diagnosis requires bacteriological confirmation.<sup>9</sup> The accuracy was 93% in FNAC and 97% in IC in TB cases. The inaccurate cases were proved to be early cases of TB in histological examination. In this study, TB lymphadenopathies represent only 32% of cervical lymphadenopathy and this is not consistent with other reports.<sup>17</sup> All cases of non-Hodgkin's lymphoma were correctly diagnosed by IC (100%) and 86% were diagnosed by FNAC, this agrees with other studies.<sup>18</sup> The diagnosis depending on the presence of monomorphic cellular infiltrate and absence of phagocytosis.<sup>19</sup> Cytological sub typing of non-Hodgkin's lymphoma in FNAC is difficult and requires extensive experience.<sup>9</sup> In cases of Hodgkin's disease the accuracy of both FNAC and IC was 90%. This diagnosis based upon the presence of the characteristic reed-Sternberg cells, mononuclear Hodgkin's cells, eosinophils, plasma cells and lymphocytes.<sup>20</sup> The remaining cases were diagnosed as reactive hyperplasia but proved to be

**Table 1** - The accuracy of clinical examination, fine needle aspiration cytology, imprints cytology in the diagnosis of lymphadenopathy

Histopathological diagnosis	n	Clinical diagnosis		FNAC		IC	
		Correct	Incorrect	Correct	Incorrect	Correct	Incorrect
Reactive hyperplasia	18	8 (44)	10	18 (100)	-	18 (100)	-
Tuberculosis lymphadenitis	30	24 (80)	6	28 (93)	2	29 (97)	1
Non-Hodgkins lymphoma	14	12 (86)	2	12 (86)	2	14 (100)	-
Hodgkins lymphoma	10	9 (90)	1	9 (90)	1	9 (90)	1
Metastatic lymphadenopathy	22	20 (91)	2	20 (91)	2	21 (95)	1
<b>Total</b>	<b>94</b>	<b>73 (78)</b>	<b>21 (22)</b>	<b>87 (93)</b>	<b>7 (7)</b>	<b>91 (97)</b>	<b>3 (3)</b>

FNAC - fine needle aspiration cytology, IC - imprints cytology

lymphocytic predominance cases of Hodgkin's disease by histological examination. From this study and other,<sup>21-23</sup> surgical biopsy and histopathology in cases of lymphoma diagnosed by cytology is necessary for accurate diagnosis and classification. The identification of metastasis lesions in lymph nodes by cytological examination (FNAC, IC) was relatively easy. The criteria for diagnosis were foreign cells amongst normal, reactive lymphoid cells and cytological criteria of malignancy.<sup>9</sup> Failure of diagnosis was due to scanty of the scattered single cells (micro metastases) and marked necrosis, this was detected by histological examination. The overall accuracy of FNAC in this study was 95%, in comparison to that of Chu and Hoyer 96%,<sup>24</sup> Frable and Frable 96%<sup>25</sup> and Young et al 94%.<sup>18</sup> On the other hand, our accuracy in imprint cytology was 97% compared to those of Feinberg et al 99%<sup>11</sup> and Bhabra et al 99.3%.<sup>26</sup>

From this study it could be concluded that, FNAC and IC of suspicious palpable lymph nodes should be one of the first procedures performed during the patients' work up as it could differentiate the infectious process from the neoplastic one. The technique is useful to detect the presence of lymph node metastasis in a subject with established diagnosis carcinoma. Cytology diagnosis of lymphoma should be followed by excisional biopsy of accurate classification and grading. Intra-operative IC is an accurate, rapid and cheap method for evaluation of lymphadenopathy. We advocate the use of this technique instead of frozen section histology especially when the facilities and apparatus are lacking.

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