Original Article

Cytomorphological study of Lateral Neck Swellings

Pathology Section

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ABSTRACT

Background: Swellings in the neck may be due to various causes. These swellings can be divided into midline swellings and lateral neck swellings (LNS). The common swellings are lymph node swellings, salivary gland enlargement, thyroid enlargement and branchial cyst. A neck mass in a 50- year-old smoker is different from neck mass in 15-year-old with respiratory tract infection.

Fine needle aspiration cytology (FNAC) has become an important first line of investigation in palpable masses. It is one of the most useful accurate, sensitive, inexpensive, and rapid investigation available in the assessment of patients with lateral neck swellings.

Aims: To find out the relative frequencies of various pathological conditions presenting as lateral neck swelling with respect to age and sex. And also to evaluate the role of FNAC in their diagnosis.

Methodology: This study was undertaken in the Department of Pathology, Sri Devaraj Urs Medical College, over a period of two years from January 2009 to December 2010. FNAC was done on patients who presented with lateral neck swelling. The cytological features were evaluated. The accuracy of FNAC was verified by histopathological examination in 70 cases.

Results: The study included 386 patients, with mean age of 24.5 years with male predominance. FNAC revealed that non neoplastic conditions of the LNS were in 251 (66.05%) cases, malignant neoplasms were in 104 (27.36%) cases and benign neoplasms were in 25(6.57%). Among the malignant neoplasms, metastatic squamous carcinoma was the commonest.

Conclusions: Reactive lymphadenitis is the commonest cause of LNS in children and in adolescence and squamous cell carcinoma is the commonest cause of LNS in patients older than 40 years. FNAC of lateral neck swellings is useful in diagnosis, can differentiate neoplastic and non neoplastic lesions.

Key Words: Lateral neck swellings, FNAC, lymphadinitis

INTRODUCTION

Swellings in the neck may be due to various causes. These swellings can be divided into midline swellings and lateral neck swellings (LNS). The common swellings are lymph node swellings, salivary gland enlargement, thyroid enlargement and branchial cyst [1]. A neck mass in a 50-year- old smoker is different from neck mass in 15-year-old with respiratory tract infection. Lateral neck swelling in an adult is a common presentation for primary and secondary malignant lesions. Paediatric neck swellings differ from those in adults in that malignancy is much less likely [2].

The gold-standard procedure for the diagnosis of a neck swelling is open biopsy of the swelling with histopathological examination of the excised tissue. However, open biopsy of a metastatic cervical swelling prior to definitive treatment of the neck (usually by radical neck dissection) has been reported to lead a higher incidence of wound complications, regional neck recurrence and distant metastasis, than in patients who have no biopsy performed prior to definitive treatment [3-5].

FNAC has become an important first line of investigation in palpable masses anywhere in the body but especially in the head and neck area, sometimes replacing but complimenting tissue pathology in many clinical situations. It is a form of surgical pathology, practiced on cytologic samples. It is one of the most useful accurate sensitive, inexpensive, and rapid investigation available in the assessment of patients with LNS [6].

METHODOLOGY

This study was undertaken in the Department of Pathology, Sri Devaraj Urs Medical College, over a period of two years from January 2009 to December 2010. FNAC was done on patients who presented with LNS. Only patients presenting with LNS were included in the study. Swellings in the midline of the neck and other area were excluded from the study. Prior to FNAC, clinical details regarding food habits, smoking, chewing pan, occupation, age of the patient at the onset of the swelling, its duration, change in size, and associated systemic symptoms were noted.

FNAC was done using a 22-24 gauge needle fitted to a 10 ml disposable syringe. After immobilizing the target swelling multiple passes are given to get sufficient material. Smears were prepared and stained with May- Grunwald Giemsa stain (MGG), haematoxylin and eosin (H &E) and Papanicolaou stain. The Zeihl- Neelsen's stain for AFB was done in those cases, where the clinical suspicious or diagnosis was tuberculosis and in those cases where purulent or cheesy material was aspirated. A repeat FNAC was done in cases where the yield was inadequate in the first aspiration. The cytological features evaluated included cellularity (scanty, moderate and high), cell arrangement, nuclear and cytoplasmic characteristics, and background elements. Surgically excised specimens were routinely processed and stained with H and E. Histopathological findings were compared with cytological reports and sensitivity, specificity, predictive values and accuracy of FNAC were calculated.

RESULTS

The study included 386 patients with LNS. Six were excluded from the study as the smears were unsatisfactory. There were 225 (59.21%) male patients and 161 (42.36%) female patients with male to female ratio of 1.39:1. Age range varied from 4 months to 84 years with the mean age of 24.5 years. FNAC revealed that malignant neoplasm of the LNS were in 104 (27.36%) cases, benign neoplasms were in 25 (6.57%) cases and non neoplastic conditions of LNS were in 251 (66.05%) cases. The distribution of the 380 cases is given in [Table/Fig-1]. The most common LNS seen were an enlarged lymph node due to inflammation (49.2%). Others were, malignant neoplasms (27.36%), benign neoplasms (6.57 %), non neoplastic thyroid lesions (6.05%), sialadinitis (3.42%) and others (2.89%) where FNAC was inconclusive. Reactive lymghadinitis is the commonest condition presenting as LNS in children aged less than 10 years, malignant neoplasms were the common condition presenting as LNS in patients aged more than 40 yrs [Table/Fig-2]. Among the malignant neoplasms, metastatic squamous cell carcinoma was the commonest, followed by other malignancies shown in [Table/Fig-3]. The accuracy of FNAC was verified by histopathological examination in 70 cases. The sensitivity of FNAC in this study was 89.5%, specificity was 100%, the positive predictive value was 100%, and the negative predictive value was 12.5%.

DISCUSSION

All the 380 cases of LNS were analyzed with their history, clinical presentation, FNAC and available histopathology. Six cases (1.55%) were excluded, as they were inadequate. The incidence of inadequate or unsatisfactory samples in various studies ranged 0 to 25 [7]. Unsatisfactory aspirates in the previous studies were the result of poor handling of the aspirated material and lack of trained cytopathologists [8] whereas inadequacy in the present study was attributed to firm small swellings and uncooperative patients.

Diagnosis	No. of Cases	Percentage
Reactive lymphadinitis	113	29.73
Tuberculous lymphadinitis	64	16.84
Granulomatous lymphadinitis	10	2.63
Malignant neoplasms	104	27.36
Benign neoplasms	25	6.57
Thyroid (non neoplastic)	23	6.05
Benign cysts	17	4.47
Sailadenitis	13	3.42
Others	11	2.89

[Table/Fig-1]: Results of FNAC of LNS showing the relative frequencies of various pathological conditions

Type of malignancy	No of cases	Percentage
Squamous cell carcinoma	64	16.84
Papillary carcinoma of thyriod	13	3.42
Adinocarcinoma	11	2.89
Non-hodgkins lymphoma	8	2.10
Hodgkins lymphoma	3	0.78
Small cell carcinoma	3	0.78
Poorly differentiated carcinoma	2	0.52
Total	104	27.36

[Table/Fig-3]: Distribution of malignant swellings of the lateral neck

	Present study	Ahmad T[9]	Shehan T[5]	Hag EL[10]	Alsame AA[3]
Reactive lymphadenitis	29.73	18		33	
TB lymphadenitis (ZN positive)	16.84	36		21	
Granulomatous lymphadenitis(ZN negative)	2.63				
Malignant neoplasms	27.36	14	38.6	13	28.8
Thyriod(non neoplastic)	6.05		3.3		
Benign neoplasms	6.57		10.5	9	61.5
Benign cysts	4.47	10	7.9	11	
Sialadinitis	3.42	6		5	
Others	2.89	8	3.9		9.6

[Table/Fig-4]: Frequencies of various pathological conditions

Reactive lymphadenitis was the commonest condition in our study which correlates with other studies shown in [Table/Fig-4] [9, 10,11]. The most common lateral neck swelling seen in children and adolescences were enlarged lymph nodes. Reactive lymphadenitis may occur as a part of specific disease or purely as a non- specific response [12]. It is important to note the location of the lymphadenopathy, size of the lymph nodes, mobility, and consistency. After appropriate treatment, however, if the lymphadenopathy persists or continues to enlarge, FNAC is appropriate [13].

Tuberculous lymphadenitis was the second common inflammatory condition in our study, accounting to 16.84%. Frequency of incidence varies from 13% to 52% in different studies. Advanced tests, such as Enzyme Linked Immunosorbent Assay (ELISA) for serum Ig M and Polymerase Chain Reaction (PCR), are very costly and are unavailable at all centers in developing countries. The patients are treated with unnecessary antibiotics or undergo incision

Diagnosis	0 -9yrs	10-19 Yrs	20-29 Yrs	30-39 Yrs	40-49 Yrs	50-59 Yrs	60-69 Yrs	70-79 Yrs	>80 Yrs	total
Reactive lymphadenitis	28	20	19	19	10	6	9	2		113
TB lymphadinitis	9	13	22	10	4	2	2	2		64
Granulomatous lymhadinitis	1	3	3	2	1					10
Malignant Neoplasms	2	4	7	3	28	15	24	12	9	104
Thyriod(non-Neoplastic)		1	6	8	7			1		23
Benign neoplams	2	1	3	6	4	7	1	1		25
Sialadenitis		2	4	2	3	1	1			13
Benign cysts		1	5	3	4	3	1			17
Others	2	2	2	2	2	1				11

[Table/Fig-2]: Age group-cytological diagnosis

and drainage (I&D). Morbidity increases due to complications. All these favour an early diagnosis by FNAC [14].

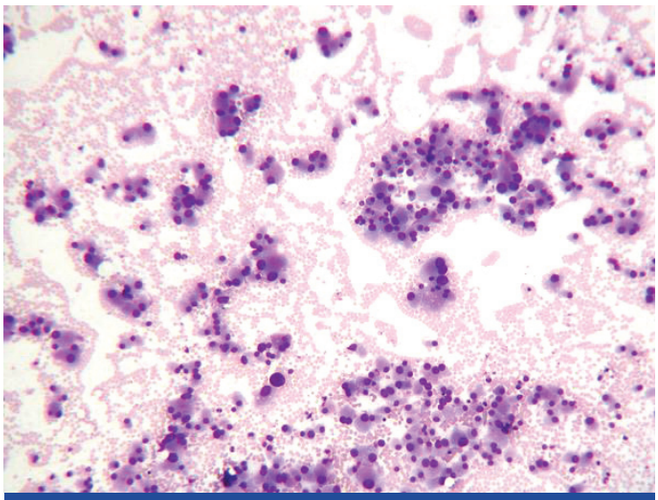
Malignant neoplasms were the commonest cause of LNS in patients older than 40 years. Frequency of incidence in the present study is comparable to Alseman [3], whereas in other studies it varied from 7.5% to 38.6% [5,10,11]. More than 75% of lateral neck swellings in patients older than 40 years are caused by malignant neoplasm, and the incidence of neoplastic cervical adenopathy continues to increase with age, particularly those with alcohol abuse and heavy smoking [15]. Neck metastases presents mostly as firm, solid masses, but a distinct subset of metastatic nodes present as cystic masses frequently related to thyroid carcinoma followed by squamous cell carcinoma and malignant melanoma [16].

Non-neoplastic thyroid lesions accounted for 6% of lateral neck swellings. Most common lesion was colloid goiter with cystic change. One must be careful in committing a false negative diagnostic error in the cystic lesions that contain macrophages and scanty material, since these features do not exclude malignancy. Repeat FNAC or thyriodectomy is advised for persistent nodules [7].

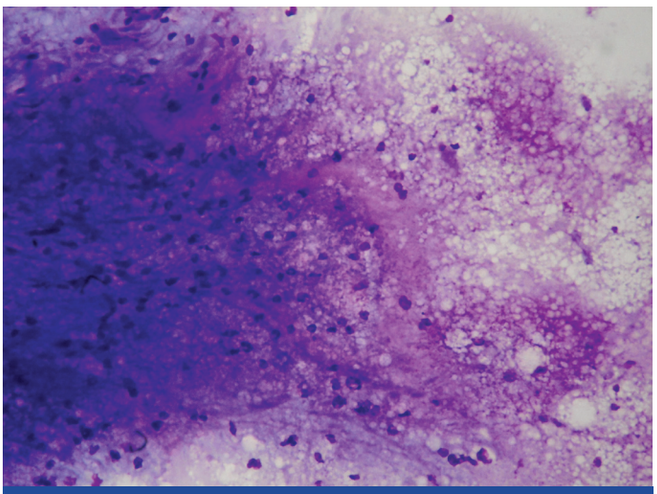
Benign neoplasms of the lateral neck swellings accounted for 6.57% which is comparatively less than the study done by Sheahan P et al [5]. The commonest benign lesion was pleomorphic adenoma of salivary gland, which showed various combination of three elements: ductal cells, chondromyxiod matrix and myoepithelial cells. We reported a case of paraganglioma in 50 year old male patient presenting as LNS [Table/Fig-5].

Benign cystic lesions were found in 4.47% of cases, comparatively less than other similar studies [5,10.11]. The common cyst was epidermal cyst, others were branchial cleft cysts, thyroglosal duct cysts and we reported one case of cystocercosis presenting as cystic LNS [Table/Fig-6]. The most cystic lesions in the lateral neck are benign entities. Necrosis and nuclear grade are very useful indices to differentiate benign from malignant lesions.

Cervical lymph node metastasis presenting as lateral neck swellings can be found in every neck level. In general, nodes in level 1 to 3 are attributed to a presumable primary SCC located in the mucosa of the upper aerodigestive tract, whereas nodes in level 4 and 5b more often arise from proximal oesophageal and thyroid carcinoma, but can also originate from distant organs in the body, often containing adenocarcinoma or large cell undifferentiated carcinoma. Lymph nodes in level 2b and 5a are more typical of nasopharyngeal cancer. [16]



[Table/Fig-5]: Paraganglioma (MGG; 450×)



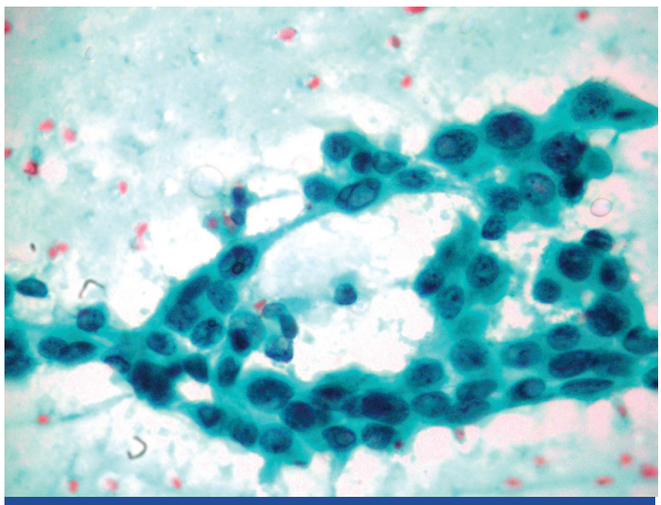
[Table/Fig-6]: Paranchymal wall of cystocercosis (MGG;450×)

In our study, The most common tumour metastatizing to the neck nodes was the squamous cell carcinoma (16.84%) shown in [Table/Fig-7]. Smears composed of cells arranged in tight clusters, loosely scattered cells showing various degrees of keratinization seen. It has been observed that certain squamous cell carcinoma more likely to produce metastases that are cystic. These sites predominately include primary tumours of the tonsil tissue from Waldayer's ring [18], we had four cases of cystic squamous cell carcinoma. However, when squamous-lined cysts of the lateral neck are considered, the distinction between a congenital cyst and a metastatic squamous cell carcinoma with cystic change can be difficult or impossible to make with confidence [19]. All patients over 40 years old who present with a lateral cystic neck mass must be presumed to have a cancer until proven otherwise, should be excised, as it is impossible to pre-operatively establish if it is benign or malignant [20].

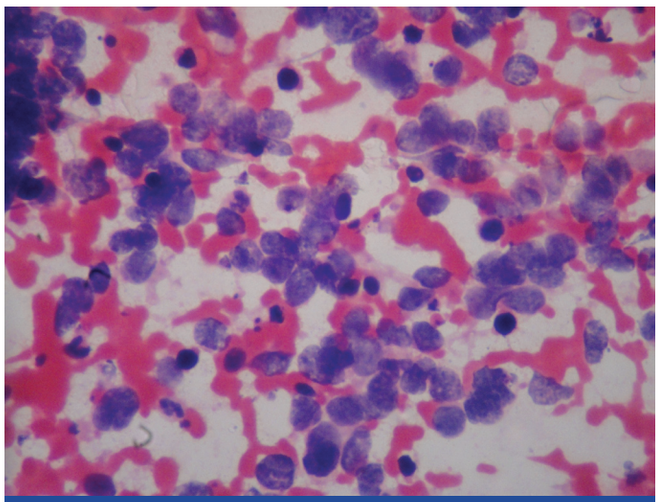
Type of malignancy	Present study %	Bagwan IN[18]	Sheahan P[5]
Squamous cell carcinoma	16.84	36.81	27.50
Adenocarcinoma	2.89	07.33	2.00
Papillary carcinoma thyroid	3.42	02.83	0.7
Non-hodgkins lymphoma	2.10		4.6
Hodgkins lymphoma	0.78		
small cell carcinoma	0.78	00.91	
Poorly differentiated carcinoma	0.52	12.18	0.7

[Table/Fig-7]: Distribution of malignant swellings of the lateral neck

Papillary carcinoma of thyroid was reported in 13 cases. Aspirates showed papillary branching, three-dimensional groups of cells with ground glass nuclei, nuclear grooves [Table/Fig-8]. Metastases in levels 3, 4, 6 should raise suspicion of a primary thyroid malignancy [17]. Metastatic adenocarcinoma can originate from either salivary gland or other primary sites including breast, lung, kidney, prostate and gonads. Smears composed of round to columnar cells with abundant cytoplasm, hyperchromatic nuclei, and prominent nucleoli often with mucinous background seen. Cells with vacuolated cytoplasm, signet ring cells were also seen. Metastatic small cell carcinoma was reported in 3 cases. Cells were small with indistinct cytoplasm, chromatin was salt and pepper type [Table/Fig-9]. Nuclear dust, individual cell death and nuclear molding were also seen.



[Table/Fig-8]: Papillary carcinoma with intranuclear inclusions (PAP; 450×)



[Table/Fig-9]: Small cell carcinoma with nuclear moulding

CONCLUSION

It is concluded from the present study that, reactive lymphadenitis is the commonest cause of LNS in children and in adolescence and squamous cell carcinoma is the commonest cause of LNS in patients older than 40 years. FNAC of lateral neck swellings is useful in diagnosis, can differentiate neoplastic and non-neoplastic lesions. When neoplastic, the diagnosis of benign or malignant tumour allows the surgeon to plan the operative approach. If found to be inflammatory or reactive lesion, surgery can be avoided.

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