International Journal of Biomedical And Advance Research

ISSN: 2229-3809 (Online)
Journal DOI:10.7439/ijbar
CODEN:IJBABN

Research Article

Histopathological study of lymph node biopsy

Anand Vachhani[*1], Kaushik Bhuva[1], Jasmin Jasani[2], Dipmala patel[3], Nisarg Savjiani[3], Kuntal Patel[3], Bhumika Gharia[3] and R. K. Tandon[4]

[1]*Assistant Professor, Pathology Department, SBKS Medical Institute & Research Centre, Piparia.*
[2]*Associate Professor, Pathology Department, SBKS Medical Institute & Research Centre, Piparia.*
[3]*Resident , Pathology Department, SBKS Medical Institute & Research Centre, Piparia.*
[4]*Professor, Pathology Department, SBKS Medical Institute & Research Centre, Piparia.*

*** Correspondence Info:**
Dr. Anand Vachhani
Assistant Professor,
Pathology Department,
SBKS Medical Institute & Research Centre, Piparia, India
E mail: vachhanianand@gmail.com

Abstract

Introduction: Clinically Lymph node enlargement is one of the commonest presentations of patients seen in primary settings. It is essential to confirm the lymph node lesion & to identify the cause to decide whether it is within or outside the normal limits, to plan appropriate treatment modality.

Method: The present study was a prospective and observational (non interventional) type of study. Total 100 numbers of patients from February 2011 till March 2012 were recruited. All excised lymph node specimens received in the Department of Pathology SBKS MI & RC, Piparia constituted the study material. The specimens were subjected to detailed histopathological examination. In each case, pathological reaction pattern was studied carefully and documented.

Results: Out of total 100 cases, 51% cases were non specific reactive hyperplasia, 24% cases were granulomatous lymphadenitis, 2% cases were lymphoma and 23% cases were of metastatic lymph node. Most common type of metastasis was found out to be squamous cell carcinoma, followed by infiltrating ductal carcinoma, followed by metastatic adenocarcinoma. Cervical lymph nodes were most commonly biopsied group of lymph nodes in our study.

Conclusion: In present study the most common cause of lymph node biopsy was Non specific reactive hyperplasia followed by granulomatous lymphadenitis. Among neoplastic lesions metastatic lymph node disease accounted for maximum number of cases.

Keywords: Lymph node biopsy; Lymph node; Lymphadenitis, Lymphadenopathy

1. Introduction

The lymph node is one of the major anatomic components of the immune system.[1] The three major regions of a lymph node are the cortex, paracortex, and medulla.[2] Because the normal immune response leads to proliferation and expansion of one or more of the cellular components of lymph nodes, it leads to significant lymph node enlargement.[3] In everyday practice, lymphadenopathy is a common finding in a large proportion of the patients. Most patients can be diagnosed on the basis of a careful history and physical examination. Localized lymphadenopathy should prompt a search for an adjacent precipitating lesion and an examination of other nodal areas to rule out generalized lymphadenopathy. Supraclavicular nodes are always worrisome for malignancy. Three to four week observation is prudent in patients with localized nodes and a benign clinical picture. Generalized lymphadenopathy should always prompt further clinical investigation. When node biopsy is indicated, selection of the most abnormal node will best enable the pathologist to determine a diagnosis.[4]

The present study will address all the types of lymph node diseases in the excised specimens of lymph node. They will be broadly categorised in to one of the four types: 1.Non specific reactive hyperplasia; 2.Granulomatous lymphadenopathy; 3.Lymphoid neoplasm; 4.Miscellaneous. Further sub categorisation will be done if necessary depending on presence or absence of certain morphologic futures, clinical and microbiological inputs and other relevant parameters.

2. Material and Method

The present study was a prospective and observational (non interventional) type of study. Total 100 number of patients from February 2011 till March 2012 were recruited. All excised lymph node specimens received in the Department of Pathology SBKS MI & RC, Piparia constituted the study material. The specimens were subjected to detailed histopathological examination. In each case, pathological reaction pattern was studied carefully and documented. All the lymph node studies were categorised in to one of the four above mention categories.

2.1 Inclusion and exclusion criteria

Brief clinical data were noted from the case records, which included the age, presenting symptoms and clinical diagnosis whenever available. Inclusion criteria: 1. All types of lymph node specimens. 2. All age groups. Exclusion criteria: 1. Badly handled and poorly preserved lymph nodes specimens.

The study was conducted on lymph nodes removed at surgery, in hospital, in the best interest of patient. The specimens were fixed in 10% formalin for 24 hours after recording the gross morphological features – The size of nodes, shape, colour, consistency, presence of necrosis and matting, appearance on cut section and appearance of capsule were noted. 5mm thick bits (at least 2) were submitted for processing, 4 – 5 micron thick sections were cut with a microtome and stained with Haematoxylin and Eosin stain. The diagnosis of lymph node lesions was made on the basis of clinical presentation, gross morphology and light microscopic features of H & E. Special stain (Reticulin, PAS, ZN), immunohistochemistry (CD20, Cytokeratin) were done whenever required. Immunophenotyping and cytogenetic studies were not performed.

3. Result and Analysis

Amongst 100 cases of lymph node biopsies analysed in present study, non neoplastic cases were 75% and neoplastic cases were 25%. The present study included 51% non specific reactive hyperplasia, 25% lymphoid neoplasm and 24% granulomatous lymphadenitis. Maximum number of cases 51% were non specific reactive hyperplasia and least common cases were 24% granulomatous lymphadenitis.

In present study the patients observed were of wide range in ages from 6 months to 82 years. Mean age was 41.3 ± 40.7 years. Maximum numbers (28%) of cases were seen in age group of 31-40 years. Minimum numbers (2%) of cases were seen in age group of more than 71 years. Maximum numbers of nonspecific reactive hyperplasia (16%) and granulomatous lymphadenitis (8%) were in age group of 31-40 years and maximum numbers of neoplastic lesion (9%) were in age group of 41-50 years.

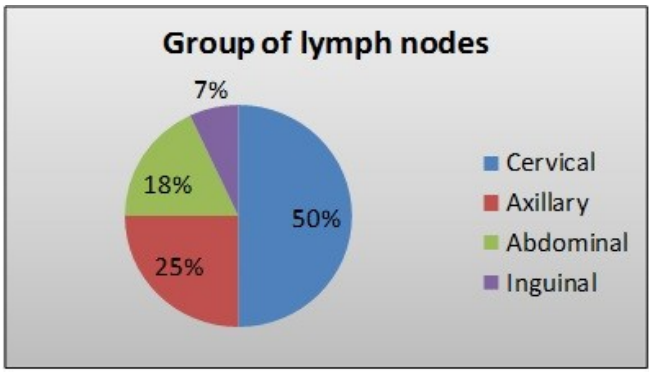
Table-1: Age wise distribution of lymph node biopsy.

Age	Non specific reactive hyperplasia	Granulomatous lymphadenitis	Lymphoid neoplasm	Total	Percentage
<10	03	00	00	03	03%
11-20	03	04	00	07	07%
21-30	08	05	02	15	15%
31-40	16	08	04	28	28%
41-50	09	03	09	21	21%
51-60	10	03	06	19	19%
61-70	02	00	03	05	05%
>71	00	01	01	02	02%
Total	51	24	25	100	-
Percentage	51%	24%	25%	-	100%

It is observed that there is a slight male preponderance for lymph node biopsy (52%) as compared to females (48%). M : F ratio was 1 : 0.92. In non specific reactive hyperplasia the M : F ratio was 1 : 0.54, in granulomatous lymphadenitis the M : F ratio was 1 : 1.67 and in lymphoid neoplasm the M : F ratio was 1 : 1.50.

Most common (50%) group for lymph node biopsy was cervical and least (07%) common was inguinal.

Figure 1. Graph showing frequency of various group of lymph nodes included in the study.



Out of total 25 neoplastic cases, primary neoplasm of lymph nodes were 2 cases (8%) one case was Diffuse Small Lymphocytic Lymphoma and another case was Mixed Cellularity Hodgkin's Lymphoma. Secondary neoplasm of lymph node were 23 cases (92%).

Out of total 100 cases , primary neoplasm of lymph nodes were 2 cases (2%) and secondary neoplasm of lymph node were 23 cases (23%) in which most common was metastatic squamous cell carcinoma in 9 cases followed by infiltrating ductal carcinoma of breast in 8 cases. Out of 3 other cases, each one case was metastatic invasive metaplastic carcinoma, metastatic invasive lobular carcinoma and metastatic invasive papillary carcinoma of breast.

Metastatic squamous cell carcinoma was the most common metastatic deposit amounting to 36%, followed by infiltrating ductal carcinoma of breast which was 32% than followed by adenocarcinoma which was 12%.

Figure 2. Tuberculous lymphadenitis: Showing caseous necrosis, multinucleated giant cells (Langhans cells), epithelioid cells, lymphocytes. (H & E, 60x)

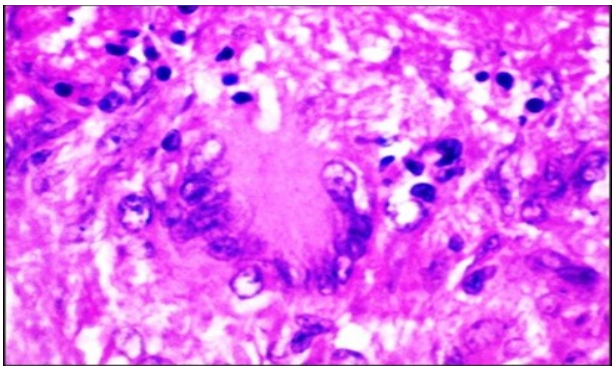


Figure 3. Metastatic Adenocarcinoma: Showing malignant cells having pleomorphism, hyperchromatism, high N:C ratio and prominent nucleoli. (H & E, 40x)

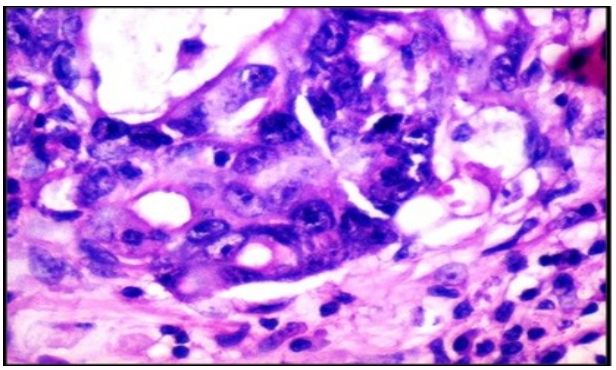


Figure 4 – Metastatic Squamous cell carcinoma: Showing malignant cells in nest pattern and forming keratin pearl. (H & E, 20x)

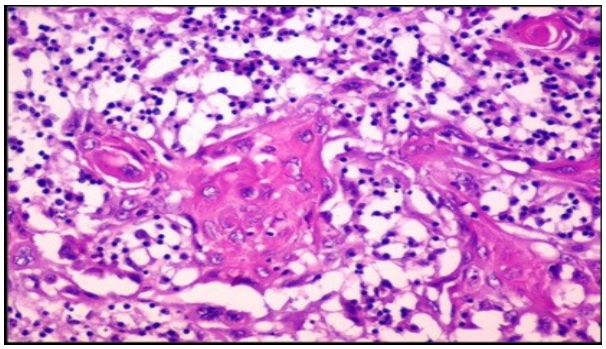


Figure 5. Metastatic Infiltrating ductal Carcinoma of Breast: Showing infiltrating malignant cells having pleomorphism, hyperchromatism, high N:C ratio, mitotic figure and prominent nucleoli. (H & E, 40x)

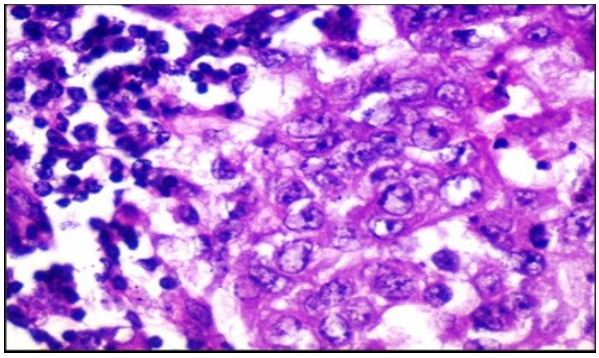


Figure 6. NHL - Diffuse small lymphocytic lymphoma: Monotonous proliferation of small lymphocytes effacing the architecture of the lymph node. (H & E, 40x)

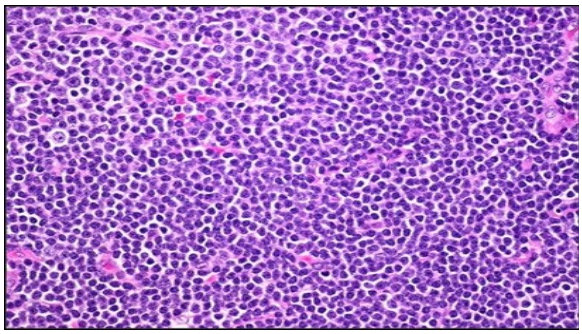
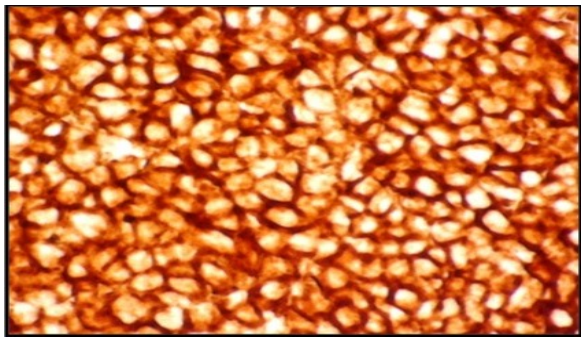


Figure 7. NHL - Diffuse small lymphocytic lymphoma: Majority of the neoplastic cells show a distinct membranous staining reaction. (CD20cy, 60x)



4. Discussion

In studies conducted in USA by Henry *et al*[5], YeuTsu N *et al*[13] and in India (Karnataka) by Kamat *et al*[15] all studies are comparable with our study results that non neoplastic lesions are much more common than neoplastic lesions in general hospital. In a study conducted in India (Hyderabad) by Rao M N *et al*[10], the total number of patients were 50, lymphadenopathy due to malignancy were 22 (44%), non – malignant causes were 28 (56%). In this study there is higher percentage of neoplastic lesions than our study, it may be due the small number of cases.

4.1 Non Neoplastic Lesions

In present study 51% of cases were reactive hyperplasia and 24% were granulomatous lymphadenitis. In a study conducted in USA by Henry *et al*[5], in Russia by Chumakov *et al*[8], in South Africa by Moore *et al*[11], frequency of reactive hyperplasia and granulomatous lymphadenitis are comparable with our study results.

Table 2 - Comparison of distribution of various lesions

No	Study	Sample size	Place of study	Non neoplastic lesion			Neoplastic lesion		
				RH	GL	Others	L	M	Others
1	Henry *et al*[5]	220	USA	63%	21%		16%		
2	Sibanda *et al*[6]	2194	Zimbabwe	33%	26.7%	-	7%	12.4%	Kaposi's sarcoma : 9%
3	Thomas *et al*[7]	427	Nigeria	37%	28%	-	36%		
4	Chumakov *et al*[8]	114	Russia	64.9%	20.2%	-	-	14.9%	-
5	Akinde *et al*[9]	733	Lagos , Nigeria	31.37%	14.93%	-	16.85%	36.50%	-
6	Rao *et al*[10]	50	Hyderabad India	56%			44%		
7	Moore *et al*[11]	1877	South Africa	47.8%	36.3%	Miscellaneous: 3.9%	8.5%	2.62%	Kaposi's sarcoma : 0.07%
8	Tiwari *et al*[12]	55	Nepal	36%	47%	Acute Necrotizing :2%	2%	11%	Lymphangioma: 2%
9	YeuTsu *et al*[13]	925	California, USA	60%			12%	28%	-
10	Anunobi *et al*[14]	720	Lagos, Nigeria	34%	17.40%	-	14.20%	33.6%	-
11	Kamat *et al*[15]	244	Karnataka, India	30.73%	58.19%	-	3.67%	7.37%	-
12	Present Study	100	Gujarat , India	51%	24%	-	2%	23%	-

*RH – Reactive Hyperplasia, GL - Granulomatous lesion, L – Lymphoma, M – Metastasis

In a study conducted in Nepal by Tiwari *et al*[12], total number of patients were 55, reactive hyperplasia was 36% and granulomatous lymphadenitis was 49 %. In a study conducted in India (Karnataka) by Kamat *et al*[15], the total number of patients were 44, reactive hyperplasia was 30.73 % and granulomatous lymphadenitis was 58.19 %.

There is a statistical significant difference between above mentioned studies that the granulomatous lymphadenitis is more common than the reactive hyperplasia. In our study result reactive hyperplasia is more common than granulomatous lymphadenitis. It is because above studies excluded cases of metastatic lymph node associated with primaries elsewhere in the body. In our study many cases of reactive hyperplasia were from the neoplastic lesion which do not shows metastatic deposit in it due to early diagnosis and surgical excision.

4.2 Neoplastic Lesions

In present study lymphoreticular malignancies accounted for 2 % of all cases, while metastatic disease accounted for 23 % of all cases.

4.3 Lymphoma

In present study there were 2 (2%) cases of Lymphoma, out of which one case was Mixed Cellularity Hodgkin's Lymphoma and one case was Diffuse Small Lymphocytic Lymphoma. So Hodgkin's lymphoma and Non Hodgkin's lymphoma ratio was 1:1.

In study conducted in India (Karnataka) by Kamat *et al*[15] and in Nepal by Tiwari *et al*[12] frequency of lymphoma cases are comparable with present study.

In study conducted in Zimbabwe by Sibanda *et al*[6], the total number of patients were 2194, 7% of cases were lymphomas. In study conducted in Nigeria by Akinde E *et al*[9], the total number of patients were 733, lymphoma cases constituted 16.85 % of cases. In study conducted by Nigeria Anunobi C *et al*[14], the total number of patients were 720, lymphoma cases constituted 14.20 % of cases.

Above studies result are not comparable with our study result. It may be due to the small number of cases in present study, all above studies were carried out in Zimbabwe and Nigeria where incidence of lymphoma is much higher. Present study was conducted in general hospital catering to a general population. If this type of study is conducted in referral centre, research centre or in onco institute then the incidence of lymphoma may be much higher.

4.4 Metastatic lymph node

In present study there were 23 cases of metastatic lymph nodes, out of which 09 cases (36%) were metastatic squamous cell carcinoma, 08 cases (32%) were metastatic infiltrating ductal carcinoma and 03 cases (12%) were metastatic adenocarcinomas.

In present study out of 23 metastatic lymph nodes 18 (72%) were found between the age of 41-70 years. In a study by Sriwatanawongsa *et al*[16], incidence of secondaries after the age of 55 years was 75.8% which is comparable with present study results. In study conducted in USA by YeuTsu N *et al*[13], frequency of metastatic deposit in lymph node which is comparable with present study results.

In study conducted in Nigeria by Akinde E *et al*[9] and by Anunobi C *et al*[14] frequency of metastatic deposit in lymph node in above studies is higher than our study, it may be due to small number of cases in present study and incidence of malignancy may be much higher in Nigeria.

Present study shows higher percentage of metastatic deposit in lymph node than in study conducted in Nepal by Tiwari *et al*[12] and in India (Karnataka) by Kamat *et al*[15]. It may be because of higher number of patients of oral cancer and breast cancer is attending to our hospital. It may be also because of above studies excluded cases of metastatic lymph node associated with primaries elsewhere in the body. The incidence of cancer is increasing in India, because of cultural, ethnic, geographic factors and the popularity of addictive habits, the frequency of oral cancer is high. Adopting a western lifestyle, with increased consumption of fat products leading to obesity, late marriages, delayed child bearing and less number of children being conceived leading to reduced breast feeding are all believed to be behind this increased risk of breast cancer. Such cases initially may present with lymph node enlargement, which on subsequent investigation turn out to be secondary metastatic deposits.

5. Conclusion

Amongst 100 cases of lymph node biopsies analysed in present study, non neoplastic cases were 75 (75%) and neoplastic cases were 25 (25%). The study included 51 cases (51%) of Non specific reactive hyperplasia, 24 cases (24%) of

granulomatous lymphadenitis, 1 case (1%) of Hodgkin's disease, and 1 case (1%) of Non Hodgkin's lymphoma and 23 cases (23%) of metastasis in lymph node. Maximum number of cases were of Non specific reactive hyperplasia i.e. 51 (51%). Maximum number of cases were seen in age group of 31-40 years i.e. 28 cases (28%); minimum number of cases were seen in age group of more than 70 years i.e. 2 cases (2%). Maximum numbers of neoplastic lesions (9%) were in age group of 41-50 years. There was a slight male preponderance for Lymph node biopsy (52%) as compared to females (48%). M: E ratio was 1:0.92. Most common site for lymph node biopsy was cervical in 50 cases (50%) followed by Axillary in 25 cases (25%). Hodgkin's lymphoma to Non Hodgkin's lymphoma ratio was 1:1. There was a single case of Hodgkin's disease, Mixed Cellularity type and single case of Non Hodgkin's disease, Diffuse Small Lymphocytic Lymphoma. Out of 23 cases of, metastatic lymph node, 9 cases were metastatic squamous cell carcinoma (36%), 8 cases were metastatic infiltrating ductal carcinoma (32%) and 3 cases were metastatic adenocarcinoma (12%).

References

1. Delves PJ, Roitt IM: The immune system. First of two parts. *N Engl J Med* 2000; 343:37-49.
2. Stein H, Bonk A, Tolksdorf G, Lennert K, Rodt H, Gerdes J: Immunohistologic analysis of the organization of normal lymphoid tissue and non-Hodgkin's lymphomas. *J Histochem Cytochem* 1980; 28:746-760.
3. Longo, Fuci *et al* , Harrison's Internal Medicine 17th edition ch.-60 p 370-372.
4. Pangalis GA, Theodoros P. Clinical approach to lymphadenopathy. Seminars in Onclogy, (Dec.) 1993; Vol 20, No.6:570-582.
5. Henry P, Longo D. Enlargement of lymph nodes and spleen. In: Kasper D, Braunwald E, Fauci A, Hauser S, Longo D, Jameson L. Harrison's principles of internal medicine. 16th ed. New York: McGraw Hill, 2005; p. 343-348.
6. Sibanda EN, Stanczuk G. Lymph node pathology in Zimbabwe: a review of 2194 specimens. *Q J Med*. 1993;86(12):811-817.
7. Thomas JO, Ladipo JK, Yawe T. Histopathology of lymphadenopathy in a tropical country. *East Afr Med J*. 1995 Nov; 72(11):703-5.
8. Chumakov FI, Khmeleva RI. Head and neck lymph node lesions. *Vestn Otorino Laringol*. 2002; 6:27-29.
9. Akinde OR, Anunobi CC, Abudu EK, Daramola AO, Banjo AA, Abdulkareem FB, Osunkalu VO. Pattern of lymph node pathology in Lagos. *Nig Q J Hosp Med*. 2011 Apr-un; 21(2):154-8.
10. Rao MN, Raju YS, Prasad AK, *et al*. Evaluation of lymphadenopathy at a referral centre. *JAPI*. 2002; 50: 1488-1489.
11. Moore SW, Schneider JW, Schaaf HS. Diagnostic aspects of cervical lymphadenopathy in children in the developing world: a study of 1877 surgical specimens. *Pediatr Surg Int.* 2003; 19(4):2040-2044.
12. Tiwari M, Aryal G, Shrestha R, Rauniyar SK, Shrestha HG, *et al*. Histopathologic diagnosis of lymph node biopsies. *Nepal Med Coll J*. 2007 Dec; 9(4):259-61.
13. Yeu Tsu N, Roger T, Robert J. Lymph node biopsy for diagnosis: A statistical study, *Journal of Surgical Oncology,* 1980, May Vol 14(1), 53–60.
14. Anunobi CC, Banjo AA, Abdulkareem FB, Daramola AO, Abudu EK. Review of the histopathologic patterns of superficial lymph node diseases, in Lagos (1991-2004). *Niger Postgrad Med J*. 2008 Dec; 15(4):243-6.
15. Kamat GC *et al*, A ten-year histopathological study of generalised lymphadenopathy in India. *S Afr Fam Pract* 2011:53 (3) : 267-270 .
16. Sriwatanawongasa V, Cardoso R, Chang P. Incidence of malignancy in peripheral lymph node biopsy. *Am Surg* 1985 October ; 51 (10) : 587-90.
17. Oluwale SF, Odesanmi WO, Kalidasa AM. Peripheral lymphadenopathy in Nigeria. *Acta Trop* 1985 March ; 42 (1) : 87-96.
18. Sinclair Stephen, Beckman Edward, Ellman Leonard. Biopsy of enlarged superficial lymph nodes. *JAMA* 1974 ; 228 (5) : 602-4.