Lymphadenopathy in a Family Practice

John N. Allhiser, MD, Thomas A. McKnight, MD, and J. Christopher Shank, MD
Cedar Rapids, Iowa

This paper presents data on the incidence and clinical spectrum of lymphadenopathy, then offers guidelines for clinical decision making in regard to this problem. Eighty cases were identified and reviewed, for an annual incidence of 0.5 percent in the study population. Most (70 percent) cases were discovered by patients themselves. Several clinical parameters important to the evaluation of lymphadenopathy were incompletely recorded in the medical record. Excepting node enlargement, few associated physical and laboratory findings were discovered. Isolated cervical nodes accounted for 44 percent of all cases while 24 percent of patients had enlarged nodes in more than one anatomic region. The most frequently performed laboratory test was the complete blood count (34 percent), and the most frequently positive test was the throat culture (30 percent). Twenty percent of patients received antibiotics. No cases of malignancy were discovered.

A four-level model is proposed for clinical decision making in the investigation of lymphadenopathy. This takes into account: (1) knowledge of the problem's natural history, (2) key initial findings, (3) the value of time, and (4) costs and usefulness of laboratory studies.

The investigation of enlarged lymph nodes is frequently pursued with indecision, inconsistency, or lack of appreciation of relevant clinical and epidemiologic facts. Greenfield and Jordan have developed clinical algorithms for the investigation of lymphadenopathy in adolescents and adults.[1] Cervical node management in adults has been reviewed by Devine,[2] and Linet and Metzler have reported 56 percent incidence of palpable cervical nodes in asymptomatic adults.[3] McMillan et al have outlined a diagnostic approach to lymphadenopathy in the child.[4] Moffet's textbook on pediatric infectious disease, and articles by Dajani et al, Barton, and Schmitt have addressed the problem of childhood cervical adenitis.[5-8] In the discipline of family practice, there are neither data on the incidence/prevalence of lymphadenopathy, nor studies of the decision making process in the clinical management of this problem.

The purpose of this report is fourfold. First, the annual incidence of lymphadenopathy is determined. Secondly, the paper analyzes the clinical spectrum and management of lymphadenopathy in a representative family practice setting, a family practice residency program. Thirdly, based on this retrospective two-year audit and literature review, guidelines are suggested for the management of

From the Cedar Rapids Family Practice Residency Program, Cedar Rapids, Iowa. Requests for reprints should be addressed to Dr. J. Christopher Shank, Family Practice Center, 610 Eighth Street SE, Cedar Rapids, IA 52401.

0094-3509/81/010027-06$01.50

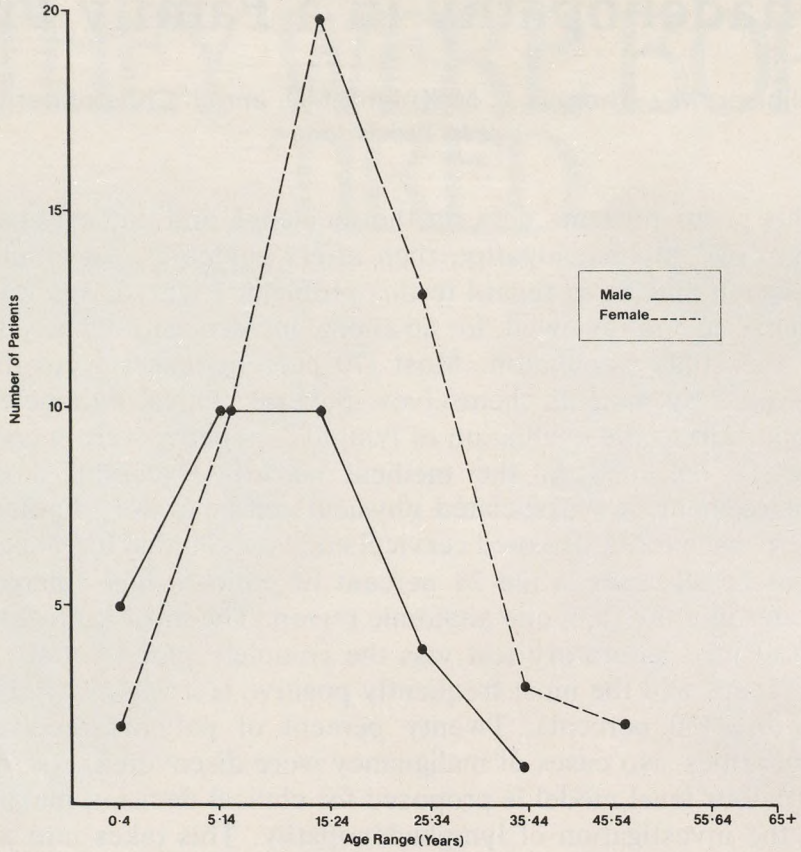

Figure 1. Age/sex distribution

lymphadenopathy in family practice. And fourthly, this report illustrates several aspects of one stimulating new area within family practice research—clinical decision making.

Materials and Methods

The study population was provided by the Cedar Rapids Family Practice Residency Program model office, an urban practice in a community of 110,000. At the midpoint of this study, there were 7,483 active patients cared for by 24 resident physicians and by the full-time faculty. The practice population is approximately 95 percent Caucasian, 60 percent female, and 60 percent aged less than 45 years.

The patients' problems are stored on computer and organized according to the ICHPPC-1 code system. A printout was obtained of all patients being coded as having lymphadenopathy—Code 7827, or acute lymphadenitis—Code 6830, from November 1976 through December 1978. Eighty patients were identified and their charts were reviewed. For the purpose of this study, acute lymphadenitis was combined with lymphadenopathy into the study problem of "enlarged nodes." Not included were three patients later identified with the diagnosis of chronic and nonspecific lymphadenitis—Code 2891.

Results

The annual incidence of the problem of enlarged lymph nodes was 0.5 percent in the study popula-

Table 1. Physical Examination Parameters

Parameter	Recorded Findings		Parameter Not Recorded in Chart
Size of node	≤1 cm in 26%	>1 cm in 45%	29%
Mobility	Mobile in 70%	Fixed in 1%	29%
Temperature	Normal in 77%	Elevated in 14%	9%
Liver/Spleen	Normal 44%	Enlarged in 1%	55%
Thyroid	Normal 30%	Enlarged in 1% (goiter)	69%
Heart/Lungs	Normal in 61%		39%
Evident Distal Mass	None Recorded		100%
Evident Distal Infection	None in 46%	Discovered in 34%	20%

tion. The sex ratio revealed 39 percent male patients and 61 percent female. The age/sex distribution is illustrated in Figure 1. There is a more even distribution in the male age groups, whereas for women there is a peak in the 15 to 24-year age group. Clearly in both sexes, this is a problem of children and young adults.

There were a total of 132 visits made by the 80 patients under study. This provided a ratio of 1.6 visits per diagnosis.

Historical Information

Fifty-six cases (70 percent) were discovered by patients and 15 cases (19 percent) were discovered by the physician (previously unknown to the patient). It was unclear from the record who first noted the node enlargement in the other 9 cases (11 percent). Of those discovered by the patient, the duration of swelling by the time of first visit ranged from one day to six months, with one third reporting swelling of less than one week.

Thirty-seven patients (46 percent) reported pain and 35 (44 percent) denied it. No mention of pain was found in the charts of 8 patients (10 percent). Concerning weight, it was recorded increased in one patient and decreased in two patients. No weight information was recorded in 38 charts (48 percent). There were no recorded bruising problems, joint problems, or implicated drug use, but presence or absence of these parameters was not recorded in 100 percent, 83 percent, and 40 percent of the charts, respectively. A history of rash was present in 4 percent of cases, but presence or absence of recent rash was not mentioned in 73 percent of cases.

Physical Examination and Laboratory Studies

Seven patients (9 percent) had nodes measuring less than 0.5 cm, 14 patients (18 percent) had nodes 0.5 to 1 cm, and 36 patients (45 percent) had nodes recorded as greater than 1 cm. There was no notation of node size in 23 (20 percent) of the patients. One node (1 percent) was fixed, 56 (70 percent) were mobile, and in 23 (29 percent) of the cases no mention of mobility was made. The remainder of the physical examination findings are in Table 1. The location of the enlarged nodes is detailed in Table 2. Of the 19 cases with more than one anatomic location of nodes (Table 3), cervical nodes were included in 17 cases. The most common combination of enlarged nodes was cervical, axillary, and inguinal.

Laboratory studies done are illustrated in summary fashion in Table 4. The most frequently performed test was the complete blood count (done in 34 percent of cases). The test providing the highest percent of positive results was the throat culture (30 percent of tests done were positive).

Table 2. Location of Enlarged Nodes

Location	Number	Percent
Cervical	35	44
Inguinal	13	16
Submandibular	9	11
Axillary	3	4
Occipital	1	1
More than one location	19	24

Table 3. Combination of Node Enlargements

Combination	Number
Cervical, Axillary, Inguinal	7
Cervical, Submandibular	3
Cervical, Occipital	2
Cervical, Axillary	2
Cervical, Subclavian	1
Cervical, Axillary, Submandibular	1
Cervical, Sublingual, Axillary, Inguinal	1
Occipital, Axillary, Inguinal	1
Submandibular, Axillary, Inguinal	1
Total	19

Follow-Up and Treatment

There was at least one repeat visit in 35 (44 percent) cases, reaching a maximum of six repeat visits in one case. No follow-up visit after the first was recorded in 46 (58 percent) charts. Of those not having follow-up visits in the model office, four were referred to a surgeon, two to an otolaryngologist, one to an internist, and one to a dentist. Four cases resulted in biopsy and one in incision and drainage.

Concerning etiology, as determined in this retrospective study, infectious or probably infectious was concluded in 55 (69 percent) of the cases. An unknown or not specified etiology was present in 23 (29 percent) of the cases.

Sixteen patients (20 percent) received antibiotic courses (4 with erythromycin and 12 with penicillin). Seven were advised to use warm compresses, and only one was documented to receive suggestions for both warm compresses and antibiotics.

Discussion

As noted above, there are no series in the literature concerning lymphadenopathy from the family practice setting, thus making comparisons difficult. This study is retrospective and descriptive. It does offer a look at the incidence of one common condition in family practice. The 0.5 percent annual incidence of lymphadenopathy seems to be a more meaningful figure than that provided by Linet and Metzler.[3] They reported 56 percent of patients presenting for "physical exam for various reasons" to have palpable nodes. In about one third of those patients with palpable nodes, some associated abnormality, such as dental caries or chronic pharyngitis, was found on physical examination. It is quite likely, however, that the true incidence of enlarged nodes is greater than documented here. Omission of the diagnosis of lymphadenopathy could occur when an obvious cause for the lymphadenopathy was present, and that obvious cause was coded alone. For example, with an enlarged inguinal node and a foot lesion, one might code only the foot lesion.

As with many retrospective studies, the problem of lack of recording, either positive or negative, was encountered for important clinical parameters. Furthermore, there is certain to be some variation in the definition or labeling of enlarged node groups in a retrospective study of this fashion. For example, what one physician might call an enlarged anterior cervical gland, another physician might label an enlarged submandibular gland. In addition, no mention was made of size or mobility in 23 (29 percent) of the patients. Liver or spleen enlargement was apparently not assessed in 44 (55 percent) cases, and thyroid size was not mentioned in 55 (69 percent) cases. One must wonder if a physical finding is not mentioned, is it assumed to be normal?

Keeping these points in mind, the laboratory work-up by location of nodes can be compared with that suggested for adults by Greenfield and Jordan.[1] For example, regarding nodes localized to the cervical area (by far the largest category in this study), there were 6 throat cultures (2 positive), 9 complete blood counts (all normal), 7 Monospot tests (1 positive), 6 sedimentation rates (all normal), 4 chest x-ray films (all normal), 3 PPD skin tests (all normal), 1 biopsy, and 1 chemistry panel. In contrast, Greenfield and Jordan's al-

Table 4. Laboratory Work-Up

	Number Done	Number Abnormal	Number Repeated
Complete Blood Count	27	1	1
Sedimentation Rate	15	0	2
Chest X-ray Film	14	0	
Monospot	13	1	2
Throat Culture	10	3	
PPD	8	1	
Chemistry Panel	4	0	
Urinalysis	4	0	
Biopsy	4	0*	
Other Cultures	2	0	
Total	101	6	5

*All benign

gorithm suggests a throat culture for gonorrhea and streptococcus in all cases if there is a pharyngitis or recent sore throat and no evident facial, ear, or dental infection. If the cultures are negative, a peripheral blood smear and a Monospot test are suggested. Should these be negative, a toxoplasmosis and cytomegalovirus serology are indicated. And finally, should those be negative, a chest x-ray film, PPD skin test, and biopsy are considered. The differences between their suggested clinical decisions and those observed in this practice are dramatic. The work-up in this practice seems spotty and inconsistent whereas the algorithm work-up is impractical, time consuming, and more expensive. Other contrasts reveal a much less aggressive work-up of these patients with inguinal nodes. axillary nodes, and generalized nodes than Greenfield and Jordan suggest.

It is interesting that nearly all the tests performed in this study were normal. The only positive findings were a positive Monospot in a patient with cervical adenopathy, one elevated white blood cell count in a patient with enlarged cervical/axillary nodes, and one positive PPD skin test in a patient with enlarged cervical/axillary/inguinal nodes. Three throat cultures were positive for beta hemolytic streptococcus. Despite not doing a sophisticated cost effectiveness analysis, it appears that many unnecessary tests were performed. One might argue that the family physician should wait a period of time, such as two to three weeks, before launching into an investigation for lymphadenopathy. Notably, there were no cases of malignancy in this series of 80 patients.

Despite the drawbacks of this study, being retrospective in design and thus relying on the dictated problem-oriented medical record for data, it does stimulate healthy concern regarding the management of lymphadenopathy in family practice. It is useful to highlight items of history and physical examination which are lacking in the record, as well as the many noncontributory "normal" laboratory tests. It is likely that these findings are not dissimilar from other residency programs and private practices.

Proposed Diagnostic Approach

Based on this study and a review of the literature, the following guidelines are suggested concerning practical decision making with this problem. This model is based first on the Subjective-Objective-Assessment-Plan format first popularized by Lawrence Weed. It is further organizied into "levels" of investigation taking into account: (1) knowledge of the natural history of lymphadenopathy, (2) key initial findings, (3) value of time

Table 5. Levels of Work-Up

Level 1:	History, physical examination
Level 2:	Throat culture, antibiotic if indicated, clinical observation 1-3 weeks
Level 3:	Complete blood count, mononucleosis test, sedimentation rate, clinical observation 1-3 weeks
Level 4:	PPD, chest x-ray film, biopsy and culture, serologic testing, skin testing

where applicable, and (4) an assessment of costs and usefulness of laboratory studies. This scheme offers more flexibility in its application to specific patient problems than the traditional box-diagram algorithm.

Subjectively, it is important to note the patient's age, the duration of node enlargement, and the presence of pain. Also it is reasonable to record recent weight change, rash, bruising, fever, sore throat, peripheral skin breakdown, or arthralgias. History of recent immunization, exposure to cats, or symptoms suggestive of mycoplasma infection should be documented.[9,10]

Objectively, one should record the temperature, location of nodes, size, mobility, and tenderness. In a brief, problem directed examination, liver, spleen, and other lymph node groups should be assessed. The presence or absence of any obvious lesions in an area drained by the enlarged nodes should be commented upon.

At this point an initial *Assessment* must be made, taking the above factors into consideration. An immediate, automated or algorithmic work-up is not recommended. Node enlargement can be physiologic, particularly in children, whereas nodes greater than 1 cm in adults are nearly always pathologic. As suggested in Greenfield and Jordan's paper, the location of nodes should affect the work-up.[1]

The *Plan* includes the following levels of practical outpatient management (Table 5).

Level 1: An initial problem directed history and physical examination, looking for evidence of localized infection, malignant primary (eg, breast) mass, or systemic signs/symptoms (eg, weight loss) is recommended.

Level 2: This would then include a throat culture for beta streptococcus if there is cervical adenopathy (pharyngeal gonorrhea culture only if indicated by history). Antibiotics should be used if a culture is positive or if an obvious distal infection is noted. If the throat culture is negative and there is no evident infection, clinical observation is recommended for one to three weeks without further investigation and expense.

Level 3: Should the node enlargement persist longer than three weeks, a complete blood count, a mononucleosis test, and perhaps a sedimentation rate are recommended to screen for mononucleosis, anemia, leukocytosis, leukemia, or evidence of other chronic disease. Should these be within normal limits and no new symptoms are present, again one to three weeks may pass before Level 4 is reached. With symptoms of headache, malaise, and dry cough, screening for mycoplasma infection with a cold agglutinin titer could be considered.

Level 4: At this stage a PPD skin test and chest x-ray film are recommended. (The chest x-ray film might be done earlier, ie, in Level 2, if the patient is an adult with a smoking history and has an isolated supraclavicular node.) The next critical decision is biopsy and culture vs further serologic and/or skin testing. Conditions to be considered include: toxoplasmosis, cytomegalovirus, lymphogranuloma venereum, cat scratch disease, other fungal agents, and atypical mycobacterial infection.

References

1. Greenfield S, Jordan MC: The clinical investigation of lymphadenopathy in primary care practice. JAMA 240:1388, 1978
2. Devine KD: The patient has a lump in the neck. Postgrad Med 57:131, 1975
3. Linet OI, Metzler C: Incidence of palpable cervical nodes in adults. Postgrad Med 62:210, 1977
4. McMillan JA, Nieburg PI, Oski FA: The Whole Pediatrician Catalog. Philadelphia, WB Saunders, 1977, pp 30-33
5. Moffet HL: Pediatric Infectious Diseases: A Problem Oriented Approach. Philadelphia, JB Lippincott, 1975
6. Dajani AS, Garcia RE, Wolinsky E: Etiology of cervical lymphadenitis in children. N Engl J Med 268:1329, 1963
7. Barton LL, Feigin RD: Childhood cervical lymphadenitis: A reappraisal. J Pediatr 84:846, 1974
8. Schmitt BD: Cervical adenopathy in children. Postgrad Med 60:251, 1976
9. Committee on Infectious Diseases: Revised recommendations on rubella vaccine. Pediatrics 65:1182, 1980
10. Levine DP, Lerner AM: The clinical spectrum of mycoplasma pneumoniae infections. Med Clin North Am 62:961, 1978