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Lymph Node Pathology in Infectious Diseases

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Abstract: ***Lymphadenopathy is commonly associated with numerous infectious diseases. The evaluation of lymphadenopathy may reveal local (regional) node involvement or diffuse (generalized) node involvement. Additional assessment factors used to evaluate the lymphadenopathy include the anatomic location, node characteristics, associated symptoms, medical and social history, and comprehensive physical examination fundings. Infectious diseases that cause generalized lymphadenopathy include mononucleosis, toxoplasmosis, leishmaniasis, brucellosis, HIV disease, secondary syphilis, and tuberculosis.***

Keywords: lymphadenopathy, etiology, infectious Diseases, B-cell, T-cell

1. Introduction

Lymphadenopathy is a common abnormal finding during the course of the physical exam in general medical practice. Patients and physicians have varying degrees of associated anxiety with the finding of lymphadenopathy as a small number of cases can be caused by neoplasm or infections of consequence, for example, HIV or tuberculosis (TB). Infectious diseases that cause generalized lymphadenopathy include mononucleosis, toxoplasmosis, leishmaniasis, brucellosis, HIV disease, secondary syphilis, and tuberculosis.

However, it is generally recognized that the majority of lymphadenopathy, both localized and generalized, is of benign, self-limited etiology. A clear understanding of lymph node function, location, description, and the etiologies of their enlargement is important in the clinical decisions of which cases need rapid and aggressive workup and which need only be observed (1-3)

The deepest structure within the lymph node is the medulla, consisting of cords of plasma cells and small B lymphocytes that facilitate immunoglobulin secretion into the exiting lymph. The lymph node, with its high concentration of lymphocytes and antigen-presenting cells, is an ideal organ for receiving antigens that gain access through the skin or gastrointestinal tract. Nodes have considerable capacity for growth and change. Lymph node size depends on the person's age, the location of the lymph node in the body, and antecedent immunologic events. In neonates, lymph nodes are barely perceptible, but a progressive increase in total lymph node mass is observed until later childhood. Lymph node atrophy begins during adolescence and continues through later life. The lymph node functions as an antigen filter for the reticuloendothelial (RE) system of the body. It consists of a multi-layered sinus that sequentially exposes B-cell lymphocytes, T-cell lymphocytes, and macrophages to an afferent extracellular fluid. In this way, the immune system can recognize and react to foreign proteins and mount an immune response or sequester these proteins as appropriate. In the course of this reaction, there is some multiplication of the responding immune cell line, and thus, the node itself increases in size. It is generally held that a node size is considered enlarged when it is larger than 1 cm. However, the reality is that "normal" and "enlarged" criteria vary depending on the location of the node and the age of the patient. For example, children younger than 10 years of age have more hypertrophic immune systems, and nodes up to 2 cm can be considered normal in some clinical situations yet, an epitrochlear node of above 0.5 cm is considered pathological in an adult.

2. Material and Methods

Relevant articles were identified form MEDLINE, EMBASE), MEDION, the Cochrane library, hand searching of reference lists from primary articles and reviews, conference abstracts and contact with experts in the field.

Results and Discussion

The pattern, distribution, and quality of the lymphadenopathy can provide much clinical information in the diagnostic process. Lymphadenopathy occurs in 2 patterns: generalized and localized. Generalized lymphadenopathy entails lymphadenopathy in 2 or more non-contiguous locations. Localized adenopathy occurs in contiguous groupings of lymph nodes. Lymph nodes are distributed in discrete anatomical areas, and their enlargement reflects the lymphatic drainage of their location. The nodes themselves may be tender or non-tender, fixed or mobile, and discreet or "matted" together. Concomitant symptomatology and the epidemiology of the patient and the illness provide further diagnostic cues. A thorough history of any prodromal illness, fever, chills, night sweats, weight loss, and localizing symptoms can be very revealing. Additionally, the demographic particulars of the patient, including age, gender, exposure to infectious disease, toxins, medications, and their habits, may provide further cues.

Acute lymphadenitis

True acute inflammation of lymph nodes, with neutrophil polymorph accumulation, is rarely seen in diagnostic pathology. This is not necessarily because it is uncommon but because it is rarely biopsied. More typically, however, acute lymph node reactions to infection are short-lived

expansions of lymphoid and antigen presenting components representing an immune response to infection in the drainage territory of the involved node(s). Although common, such reactive lymph nodes are also rarely biopsied since their enlargement is transient; histology, when sampled, is that of non-specific follicular and/or paracortical hyperplasia. True acute lymphadenitis may accompany some local and systemic bacterial infections and is reflected by accumulation of neutrophil polymorphs, initially within and adjacent to sinuses. There is often extension into perinodal fat and necrosis may lead to abscess formation. Rare nowadays, severe necrotizing acute lymphadenitis is the underlying pathology of the erupting lymph node lesions (‘buboes’), usually inguinal or axillary, characteristic of bubonic plague. The sites of lymphadenopathy in plague, caused by Yersinia pestis, reflect the lymphatic drainage from the entry site of causative organisms, via a ratflea bite. Characteristic acute necrotizing inflammation, with large numbers of gram-negative bacilli, would be anticipated and are present. Another classical uncommon infection (which, like plague, is potentially usable in bioterrorism) is anthrax. Inhaled spores of Bacillus anthracis result in bacillary proliferation and massive vascular leakage with haemorrhage and oedema. Such is found in hilar nodes, with abundant large gram-positive bacilli. Foci of necrotizing acute inflammation accompany a florid paracortical reaction in lymphadenopathy caused by Herpes simplex. Lymphadenopathy is uncommon in H. simplex infection, usually accompanies typical oral or genital ulcerative lesions, and is painful. Regional lymph nodes are involved (cervical or inguinal) with rare cases of more widespread lymphadenopathy. Cells containing eosinophilic, ground-glass nuclear inclusions vary widely in number and may be hard to find. Infection with Herpes zoster may very rarely cause similar lymphadenopathy.

As evidenced above, the critical step in evaluation for adenopathy is a careful history and focused physical exam. The extent of the history and physical is determined by the clinical presentation of the patient. For example, a patient with posterior cervical adenopathy, sore throat, and tremendous fatigue need only a careful history, cursory examination, and a mono test, while a person with generalized lymphadenopathy and fatigue would require a much more extensive investigation. Generally, the majority of the lymphadenopathy is localized (some site a 3:1 ratio), with the majority of that being represented in the head and neck region (again, some site a 3:1 ratio). It also is accepted that all generalized lymphadenopathy merits clinical evaluation, and the presence of "matted lymphadenopathy" is strongly indicative of significant pathology. Examination of the patient's history, physical examination, and the demographic in which they fall can allow the patient to be placed into 1 of several different accepted algorithms for workup of lymphadenopathy. The use of these cues and selection of the correct arm of the algorithm allows for a fairly rapid and cost-effective diagnosis of lymphadenopathy, including determination when it is safe to observe (4-6).

Algorithmic Analysis of Lymphadenopathy

After a history and physical examination are completed, lymphadenopathy is placed into 3 categories:

1) "Diagnostic" such as strep pharyngitis or upper respiratory tract disease, in which case the course of action is to treat the condition
2) "Suggestive" such as mononucleosis lymphoma or HIV wherein the history and physical strongly suggestive diagnosis specific testing is performed and if positive the action is to treat the condition
3) "Unexplained" where the lymphadenopathy is divided into generalized lymphadenopathy and localized lymphadenopathy

Etiology

Infectious disease can be of viral, bacterial, mycobacterial, fungal, or parasitic etiology:

- Viral etiologies of lymphadenopathy include HIV, mononucleosis caused by EBV or CMV, roseola, HSV, varicella, and adenovirus.
- Bacterial etiologies of lymphadenopathy include *Staphylococcus*, *Streptococcus*, *Salmonella*, *S yphilis*, and *Yersinia*
- Mycobacterial etiology of lymphadenopathy include tuberculosis and Mycobacterium avium intracellulare (MAI)
- Fungal etiology of lymphadenopathy include coccidioidomycosis, histoplasmosis, and *Candida*
- Parasitic etiology of lymphadenopathy include toxoplasmosis, Chagas, and many of the ectoparasites

Treatment and management

The management and treatment of lymphadenopathy are dependent on its etiology. Lymphadenopathy caused by bacterial disease: Supportive care, antibiotics, and elimination of nidus of infection if applicable Lymphadenopathy caused by viral disease: Observation and supportive care or treatment of the virus if particular antiviral medications exist

3. Conclusion

The prognosis of lymphadenopathy, whether localized or generalized, is entirely dependent on the etiology of the enlarged lymph nodes. Most adenopathy in the general medicine office is caused by a treatable bacterial or treatable viral illness. However, HIV, active tuberculosis, and neoplasm all have more guarded prognoses. Generalities include the majority of localized lymphadenopathy has a better prognosis than the majority of generalized lymphadenopathy secondary to etiologies. Etiologies that are established earlier in a clinical setting will tend to have better prognoses than those established later.

References

[1] Pannu AK, Prakash G, Jandial A, Kopp CR, Kumari S. Epitrochlear lymphadenopathy. Korean J Intern Med. 2019 Nov;34(6):1396.
[2] Brucoli M, Borello G, Boffano P, Benech A. Tuberculous neck lymphadenopathy: A diagnostic challenge. J Stomatol Oral Maxillofac Surg. 2019 Jun;120(3):267-269.

[3] Fajgenbaum DC. Novel insights and therapeutic approaches in idiopathic multicentric Castleman disease. Blood. 2018 Nov 29;132(22):2323-2330.
[4] Dorfman T, Neymark M, Begal J, Kluger Y. Surgical Biopsy of Pathologically Enlarged Lymph Nodes: A Reappraisal. Isr Med Assoc J. 2018 Nov;20(11):674-678.
[5] Kumar S, Gupta P, Sharma V, Mandavdhare H, Bhatia A, Sinha S, Dhaka N, Srinivasan R, Dutta U, Kocchar R. Role of Ultrasound-Guided Fine-Needle Aspiration Cytology of Omentum in Diagnosis of Abdominal Tuberculosis. Surg Infect (Larchmt). 2019 Jan;20(1):91-94.
[6] Godfrey J, Leukam MJ, Smith SM. An update in treating transformed lymphoma. Best Pract Res Clin Haematol. 2018 Sep;31(3):251-261.
[7] Siddiqui S, Osher J. Assessment of Neck Lumps in Relation to Dentistry. Prim Dent J. 2017 Aug 31;6(3):44-50.
[8] Loizos A, Soteriades ES, Pieridou D, Koliou MG. Lymphadenitis by non-tuberculous mycobacteria in children. Pediatr Int. 2018 Dec;60(12):1062-1067.
[9] Prudent E, La Scola B, Drancourt M, Angelakis E, Raoult D. Molecular strategy for the diagnosis of infectious lymphadenitis. Eur J Clin Microbiol Infect Dis. 2018 Jun;37(6):1179-1186.
[10] Gaddey HL, Riegel AM. Unexplained Lymphadenopathy: Evaluation and Differential Diagnosis. Am Fam Physician. 2016 Dec 01; 94(11):896-903.