CLINICOPATHOLOGICAL SPECTRUM OF LYMPHANGIOMA CIRCUMSCRIPTUM - OUR EXPERIENCE AND DETAILED REVISITING

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Abstract

Lymphangioma circumscriptum (L.C.) is a rare lymphatic malformation characterized by the presence of ectatic lymphatic channels in the skin. It typically presents as raised vesicles or nodules on the skin and can be present anywhere on the body. The diagnosis of L.C. is made by clinical examination and confirmed by histopathological examination. In this case report, we describe the histopathological findings with L.C. who presented with multiple raised vesicles. Microscopic examination of the skin biopsy showed focal atrophic epidermis, dilated thin lymphatic channels, eosinophilic proteinaceous fluid-like material, intervening fibrosis, andlymphocytic infiltration. The diagnosis of L.C. was confirmed based on the characteristic histological features. Management options include conservative management with topical and intralesional corticosteroids, surgical excision, or laser therapy, depending on the extent of the lesions. Early diagnosis and appropriate management of L.C. are crucial to prevent complications and improve patient outcomes.

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1. Introduction

Lymphangioma circumscriptum (L.C.) is a rare lymphatic malformation characterized by the presence of ectatic lymphatic channels in the skin. The lesions appear as raised vesicles, which may be solitary or grouped. The exact etiology of L.C. is unknown, but it is thought to be a congenital defect. The diagnosis of L.C. is made by clinical examination and confirmed by histopathological examination. In this case study, we describe the histopathological findings in a patient with L.C [1,2].

Case Report

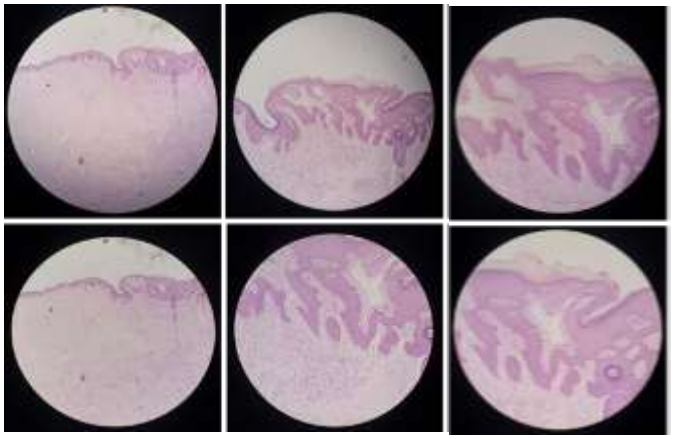
A 45-year-old female presented with multiple raised vesicles on her vulva. The vesicles were painless and had been present for several years. Clinical examination revealed raised, erythematous vesicles with a smooth surface. A biopsy was taken from one of the vesicles and sent for histopathological examination.

Microscopy

Histological examination of the skin biopsy showed focal atrophic epidermis. The upper dermis showed many dilated thin lymphatic channels, some of which were filled with eosinophilic proteinaceous fluid-like material with intervening fibrosis and lymphocytic infiltration. In areas, the lymphatic channels abut closely on the overlying epidermis. The mid and deep dermis and subcutaneous adipose tissue appeared unremarkable.

Histopathology/Morphology

The epidermis was elevated above the general level of the skin by solitary or grouped ectatic lymphatics located in the papillary dermis. This accounted for the raised vesicles seen clinically. These channels abut closely on the overlying epidermis and were thin-walled, consisting predominantly of an endothelial lining. The vessels may contain eosinophilic proteinaceous lymph or blood or thrombus and occasionally foamy histiocytes or multinucleate giant cells. Scattered lymphoid cells were sometimes seen in the dermis. There was atrophy of the epidermis directly over the vessels, with elongation of the rete ridges such that the vessels may appear to be intraepidermal, the picture resembling that of angiokeratoma. Deep irregular lymphatics were sometimes seen beneath the surface vessels in the dermis and subcutis, particularly in the extensive lesions.



H&E-stained image

The complete lesion consists of an apparently closed system of lymphatic vessels, arising from large muscle-coated cisterns which lie just above the deep fascia and exert a continuous or intermittent pressure on their contained fluid, which is transmitted through the skin via large dilated lymphatics to the surface, where saccular dilatation of subepidermal lymphatics occurs, giving rise to the clinically visible vesicles These findings seemed to support the growing belief that the abnormal vessels of L.C. may form part of a closed system. Normal lymphangiograms of the related limb have been obtained and inno case has there been any filling of the cisterns or other parts of the lymphangioma. There is, it seems, no retrograde connection between the normal main lymphatics and the cisterns. On a number of occasions dye or contrast medium has been injected into the cisterns at operation and has been observed not to drain away into any normal lymphatics. The cisterns appear to be truly isolated from the main lymphatics of the region. It has been confirmed that when multiple the cisterns do not intercommunicate. If one is punctured during operation and its contained fluid leaks out, the others do not become deflated. And dye injected into one cistern does not appear in neighbouring ones. When the lesion is being undercut at the plane of the deep fascia it has been observed that the cisterns do not leak or collapse, and by the time such specimens arrive in the laboratory they are still full of fluid. At no time has the operating surgeon in the course of undercutting the cisterns been able to detect any connections at all between them and the normal

lymphatics of the region. In two cases of typical L.C. a cannula was inserted into one of the cisterns atoperation. Tracings were made of the pressure within the cisterns and this was shown to rise and fall with a steady but very slow pulse rate of about 4 to 8 beats per minute, entirely independent of that of the cardiovascular system and of respiration. This rate of pulsation is of the same order as that which has been observed in normal large lymphatics such as the thoracicduct.

2. Discussion

Lymphangioma circumscriptum is a rare, benign lymphatic malformation that affects the skin and subcutaneous tissues. It is characterized by the formation of saccular dilatation of superficial lymphatic channels that lead to the formation of small vesicles or papules on the skin. The condition typically presents at birth or in childhood and may remain stable or slowly enlarge over time. It is often associated with other lymphatic malformations, such as lymphedema or cystic hygroma [3]. The histopathology of lymphangioma circumscriptum is characterized by dilated lymphatic channels in the dermis and subcutaneous tissue, lined by flattened endothelial cells and containing lymphatic fluid. The presence of subcutaneous lymphatic cisterns with small amounts of smooth muscle in the wall is a feature that distinguishes it from other lymphatic malformations. The surrounding stroma may show variable fibrosis and chronic inflammation, and lymphoid aggregates may be present in the dermis [4]. In conclusion, lymphangioma circumscriptum is a rare, benign lymphatic malformation that can be diagnosed based on clinical examination and histopathology [5]. The condition typically requires no treatment unless it causes significant cosmetic or functional impairment, and patients should be advised to seek medical attention if the lesions become painful, show signs of infection, or increase in size or number [6]. Lymphangioma circumscriptum (LC) is a rare benign lymphatic malformation characterized by the presence of multiple small vesicles or nodules in the skin and subcutaneous tissue. It is a type of lymphatic anomaly that arises from congenital abnormalities of the lymphatic system. LC typically occurs in children, but it can also affect adults. The condition is generally harmless, but it can cause discomfort and aesthetic concerns in some cases. Here's what you need to know about lymphangioma circumscriptum [7]:

Symptoms

The main symptom of LC is the appearance of small vesicles or nodules in the skin and subcutaneous tissue. These lesions can range in size from a few millimeters to several centimeters and are typically located on the trunk, limbs, or face. The vesicles or nodules are usually translucent or pink and filled with clear fluid. They can be tender, itchy, or painful, and they may bleed or become infected. LC can also cause swelling, discomfort, and limited mobilityin the affected area [8].

Causes

The exact cause of LC is unknown, but it is believed to result from a developmental defect in the lymphatic system. The lymphatic system is responsible for maintaining fluid balance in the body and protecting against infections. It consists of a network of vessels and nodes that transport lymph, a fluid that contains immune cells and waste products, throughout the body. In LC, there is an abnormal proliferation of lymphatic vessels, which leads to the formation of vesicles or nodules.

Diagnosis

The diagnosis of LC is based on the characteristic appearance of the skin lesions and confirmed by a biopsy. In some cases, imaging studies such as ultrasound, magnetic resonance imaging (MRI), or lymphangiography may be performed to assess the extent and location of the lymphatic malformatiThe complete lesion consists of an apparently closed system of lymphatic vessels, arising from large muscle-coated cisterns which lie just above the deep fascia and exert a continuous or intermittent pressure on their contained fluid, which is transmitted through the skin via large dilated lymphatics to the surface, where saccular dilatation of subepidermal lymphatics occurs, giving rise to the clinically visible vesicles These findings seemed to support the growing belief that the abnormal vessels of L.C. may form part of a closed system. Normal lymphangiograms of the related limb have been obtained and inno case has there been any filling of the cisterns or other parts of the lymphangioma. There is, it seems, no retrograde connection between the normal main lymphatics and the cisterns. On a number of occasions dye or contrast medium has been injected into the cisterns at operation and has been observed not to drain away into any normal lymphatics. The cisterns appear to be truly isolated from the main lymphatics of the region. It has been confirmed that when multiple the cisterns do not intercommunicate. If one is punctured during operation and its contained fluid leaks out, the others do not become deflated. And dye injected into one cistern does not appear in neighbouring ones. When the lesion is being undercut at the plane of the deep fascia it has been observed that the cisterns do not leak or collapse, and by the time such specimens arrive in the laboratory they are still full of fluid. At no time has the operating surgeon in the course of undercutting the cisterns been able to detect any connections at all between them and the normal lymphatics of the region. In two cases of typical L.C. a cannula was inserted into one of the cisterns atoperation. Tracings were made of the pressure within the cisterns and this was shown to rise and fall with a steady but very

slow pulse rate of about 4 to 8 beats per minute, entirely independent of that of the cardiovascular system and of respiration. This rate of pulsation is of the same order as that which has been observed in normal large lymphatics such as the thoracicduct.

3. Discussion

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Diagnosis

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Treatment

LC is generally a benign condition and does not require treatment unless it causes symptoms or aesthetic concerns. Treatment options for LC include:

1. Observation: If the lesions are small and do not cause discomfort, they can be left untreated and monitored for any changes.
2. Surgery: Surgical excision is the most effective treatment for LC. The goal of surgery is toremove the affected tissue without causing damage to nearby structures. However, surgery can be difficult and risky, particularly if the lesions are located in sensitive areas such as the face, neck, or genitals.
3. Laser therapy: Laser therapy can be used to shrink the lymphatic vessels and reduce the size of the lesions. This treatment is less invasive than surgery and can be used to treat lesions in sensitive areas.
4. Sclerotherapy: Sclerotherapy involves the injection of a sclerosing agent, such as sodium tetradecyl sulfate or ethanol, into the lymphatic vessels to cause them to collapse and seal shut. This treatment is effective for small lesions but may not be suitable for larger or deeper lesions.

   Prognosis The prognosis for LC is generally good, and the condition is not associated with an increased risk of developing cancer. However, the lesions can recur after treatment, particularly if they are not completely removed. Long-term follow-up may be necessary to monitor for any changes or new lesions [9].

In conclusion, lymphangioma circumscriptum is a rare benign lymphatic malformation that can cause discomfort and aesthetic concerns in some cases. The condition is typically diagnosed based on the appearance of skin lesions and confirmed by a biopsy. Treatment options for LC include observation, surgery, laser therapy, and sclerotherapy. The prognosis for LC is generally good,

and the lesions can be managed effectively with appropriate treatment [10].

Role of histopathology in Lymphangioma circumscriptum (L. C.)

Histopathology plays a critical role in the diagnosis of Lymphangioma circumscriptum (LC). It involves the examination of tissue samples from the affected area under a microscope to identify the characteristic features of the condition. The histological findings are essential for confirming the diagnosis and distinguishing LC from other skin lesions. The histopathological features of LC include the presence of dilated lymphatic vessels in the papillary and reticular dermis. These vessels are lined by endothelial cells and surrounded by a thin layer of smooth muscle cells. The lymphatic vessels may be interconnected, forming a network that extends into the subcutaneous tissue. The walls of the vessels may be thin or thick, and they may contain lymphatic fluid, red blood cells, and lymphocytes. There may also be areas of fibrosis, lymphocytic infiltrates, and hemosiderin deposits. The histopathological examination of tissue samples is also useful in determining the extent and location of the lymphatic malformation, which can guide treatment decisions. For example, if the lesions are deep or involve critical structures, such as nerves or blood vessels, surgery may be more challenging and risky. In addition to diagnosis and treatment planning, histopathology can also provide insights into the pathogenesis of LC. Studies have shown that LC is associated with mutations in genes that regulate lymphatic vessel development and function, such as VEGFR3, FOXC2, and PROX1. The histopathological examination of tissue samples can help to identify these genetic abnormalities and elucidate the underlying mechanisms of the condition. In summary, histopathology is a crucial tool in the diagnosis and management of LC. It provides important information about the characteristic features of the condition, the extent and location of the lymphatic malformation, and the underlying genetic abnormalities. The histological findings can guide treatment decisions and provide insights into the pathogenesis of the condition [11].

Role of IHC in Lymphangioma circumscriptum (L.C.)

Immunohistochemistry (IHC) is a specialized technique used in the histopathological examination of tissue samples to identify specific proteins and cell types. In the case of Lymphangioma circumscriptum (LC), IHC can play a significant role in confirming the diagnosis, differentiating LC from other skin lesions, and providing insights into the pathogenesis of the condition. IHC can be used to identify the endothelial cells that line the dilated lymphatic vessels in LC. Themost commonly used markers for lymphatic endothelial cells are podoplanin, Prox1, and LYVE-

These markers are highly specific for lymphatic endothelial cells and are not expressed in blood vessels or other cell types. The presence of these markers in the tissue samples can confirm the diagnosis of LC and distinguish it from other skin lesions that may appear similar, such as hemangiomas or vascular malformations [12].

IHC can also be used to identify other cell types and proteins that may be involved in the pathogenesis of LC. For example, studies have shown that LC is associated with mutations in genes that regulate lymphatic vessel development and function, such as VEGFR3, FOXC2, and PROX1. IHC can be used to detect the expression of these proteins in the tissue samples, which can provide insights into the underlying mechanisms of the condition.

Furthermore, IHC can help to identify potential targets for therapy. For example, recent studies have shown that LC is associated with the overexpression of vascular endothelial growth factor- C (VEGF-C) and its receptor, VEGFR-3. IHC can be used to detect the expression of these proteins in the tissue samples, which can guide the development of targeted therapies that inhibit the VEGF-C/VEGFR-3 signaling pathway [13].

In summary, IHC is a valuable tool in the histopathological examination of tissue samples in LC. It can confirm the diagnosis, differentiate LC from other skin lesions, provide insights into the pathogenesis of the condition, and identify potential targets for therapy.

Superficial lymphangioma

Superficial lymphangioma, also known as lymphangioma circumscriptum, is a type of lymphatic malformation that affects the skin and subcutaneous tissues. The condition is characterized by the formation of saccular dilatation of superficial lymphatic channels that lead to the formation of small vesicles or papules on the skin. Here are the features that distinguish superficiallymphangioma:

1. Location: Superficial lymphangioma is typically located on the skin and subcutaneous tissues. The lesions can occur anywhere on the body but are more common in the head and neck region, especially the oral cavity, tongue, lips, and eyelids. In contrast, deep lymphangiomas involve the deeper tissues and organs such as the bones, muscles, and viscera.
2. Appearance: Superficial lymphangioma appears as multiple translucent vesicles or papules on the skin. The vesicles are usually small, measuring less than 1cm in diameter,and may be grouped or scattered in a particular area. The lesions may also appear as a cluster of small vessels or lymphatic channels visible beneath the skin.
3. Histopathology: Superficial lymphangioma is characterized by the presence of dilated lymphatic vessels in the dermis and subcutaneous tissues. The vessels are lined by flattened endothelial cells and may contain lymphatic fluid or blood. The presence

of subcutaneous lymphatic cisterns with small amounts of smooth muscle in the wall is a feature that distinguishes superficial lymphangioma from acquired lymphangiectasia, in which they are absent.

4. Clinical course: Superficial lymphangioma is a benign condition that typically presents at birth or in childhood. The lesions may remain stable or slowly enlarge over time. The condition may be associated with other lymphatic malformations, such as lymphedema or cystic hygroma, which may affect the lymphatic drainage of the affected area.

In summary, superficial lymphangioma is a distinct clinical entity that is characterized by the formation of saccular dilatation of superficial lymphatic channels leading to the formation of small vesicles or papules on the skin. The presence of subcutaneous lymphatic cisterns with smooth muscle in the wall is a feature that distinguishes it from acquired lymphangiectasia. The condition is typically benign and may remain stable or slowly enlarge over time [14].

4. Conclusion

All these observations made *in vivo* support the morbid anatomical hypothesis that the abnormal vessels of L.C. stem from one or more underlying cisterns, and extend it by showing that their muscle coats pulsate slowly, causing fluctuation of the pressure within them. It seems likely that this pressure is transmitted from the cisterns, up through the abnormal subcutaneous and dermal lymphatics to reach the surface where the vesicles occur.

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