

## Skin Conditions can be Associated with Cardiovascular Diseases

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Passages Article

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### Cardiovascular Diseases: An Overview

Cardiovascular diseases (CVDs) represent a group of disorders affecting the heart and blood vessels, which remain the leading cause of mortality worldwide [1]. Common conditions under this umbrella include coronary artery disease, hypertension, heart failure, and arrhythmias. Risk factors such as smoking, diabetes, obesity, and sedentary lifestyles contribute significantly to their prevalence. While these diseases primarily impact the heart, they often present systemic symptoms,

including notable changes in the skin. The skin, as the largest organ, reflects circulatory efficiency, oxygenation, and metabolic balance, all of which are influenced by cardiovascular health. Manifestations like edema, cyanosis, or even more localized symptoms such as splinter hemorrhages or Osler nodes can provide early diagnostic clues. For clinicians, understanding these dermal signs bridges the gap between visible symptoms and underlying systemic diseases, enabling earlier intervention.

### Edema



### Swelling in Your Feet and Lower Limbs

Edema manifests as visible and palpable swelling, typically in the lower extremities. This condition arises when excess fluid accumulates in the interstitial tissues, often due to poor venous return or lymphatic drainage. In cardiovascular diseases, edema is a hallmark symptom of congestive heart failure (CHF) [2]. When the heart fails to pump effectively, blood

backs up in the veins, increasing venous pressure. This heightened pressure pushes fluid into surrounding tissues, leading to swelling. Edema is often more pronounced after prolonged standing or at the end of the day. Patients with CHF may notice an improvement when lying down, as fluid redistributes. Severe cases may involve pitting edema, where pressing on the skin leaves a depression that persists for several seconds.

Beyond its aesthetic impact, untreated edema can cause discomfort, impair mobility, and lead to secondary complications like skin breakdown and infections. Its

presence requires a thorough cardiovascular evaluation, focusing on cardiac function, kidney performance, and potential venous insufficiency.

### Cyanosis



#### Blue or Purple Color on Your Skin

Cyanosis is a clinical sign of hypoxemia, a state where oxygen saturation in the blood falls below normal levels. This results in a bluish or purplish tint to the skin, particularly noticeable in areas with thin skin such as the lips, nails, and fingertips. Central cyanosis, linked to systemic oxygen desaturation, is often caused by congenital heart defects, severe heart failure, or pulmonary hypertension. Peripheral cyanosis, on the other hand, is due to localized issues such as reduced blood flow or vasoconstriction in extremities. The condition occurs because deoxygenated hemoglobin

imparts a dark blue color to blood, which becomes visible through the skin. Cyanosis often presents alongside other symptoms like shortness of breath, fatigue, and chest pain, necessitating immediate medical evaluation to pinpoint the underlying cause [3]. Diagnosing cyanosis involves pulse oximetry, arterial blood gas analysis, and imaging studies like echocardiography to assess cardiovascular function. Treatment depends on the root cause, ranging from oxygen therapy for acute hypoxemia to surgical correction in congenital anomalies.

### Livedo Reticularis



#### Blue or Purple Net-Like Pattern on Your Skin

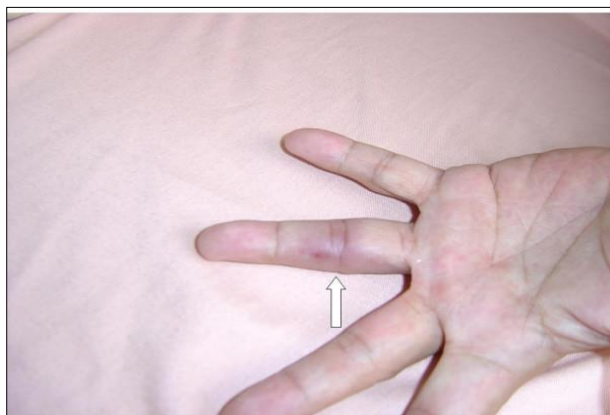
Livedo reticularis is a distinctive skin condition characterized by a net-like, reddish-blue or purple pattern that often appears on the arms, legs, and back [4]. It typically occurs when blood flow to small vessels is compromised, causing stagnation of blood and a resultant discoloration. In the context of cardiovascular

diseases, livedo reticularis is most commonly associated with conditions such as vasculitis, atherosclerosis, and peripheral artery disease (PAD), where the arteries become narrowed or blocked due to plaque buildup. In vasculitis, the inflammation of blood vessels can lead to reduced blood flow, resulting in the characteristic net-like pattern of livedo reticularis. Similarly, in PAD, the

arteries in the limbs become obstructed, reducing circulation and triggering this visible skin change. Livedo reticularis is also observed in patients with a history of deep vein thrombosis (DVT) or embolic events, as blood clots can impair circulation. While livedo reticularis itself is generally benign, it can serve as a warning sign of underlying vascular issues. The pattern may fluctuate in severity depending on temperature and the individual's level of physical

activity, as cold temperatures often exacerbate the condition. A thorough evaluation, including Doppler ultrasound or angiography, may be required to assess the extent of vascular involvement. Treatment is generally directed at managing the underlying cardiovascular disorder, whether it involves medication to improve blood flow, surgical interventions, or lifestyle changes to reduce cardiovascular risk factors.

### Osler Nodes



### Painful Lumps in Your Fingers and Toes

Osler nodes are small, raised, painful lesions found on the fingers, toes, or palms, typically appearing as red or purple spots [5]. They are most commonly associated with infective endocarditis, a serious bacterial infection of the heart valves. This condition occurs when bacteria enter the bloodstream, often from dental procedures or skin infections, and infect the heart valves, leading to the formation of clots or infected masses. These infected masses, or emboli, can travel through the bloodstream and lodge in smaller blood vessels, leading to the formation of Osler nodes in the skin. The nodes are typically tender and can be quite painful to the touch. They often present in conjunction with other signs of

infective endocarditis, such as fever, chills, heart murmur, and fatigue. Osler nodes are often considered a classic clinical sign of infective endocarditis, though they are not present in every case. The presence of Osler nodes is an indication that the infection has spread beyond the heart, potentially leading to more severe systemic complications. Diagnosis requires blood cultures, echocardiography, and sometimes, a biopsy of the node to confirm the presence of bacterial infection. Treatment typically involves intravenous antibiotics to clear the infection, and in some cases, surgical intervention may be necessary to repair or replace damaged heart valves.

### Xanthelasma



### Yellowish-Orange, Waxy Growths on Your Skin

Xanthelasma are soft, yellowish plaques that appear on the eyelids, often in the area around the eyes [6]. These lesions are composed of cholesterol deposits and are typically seen in individuals with elevated cholesterol levels or lipid disorders, which are significant risk factors for cardiovascular disease. Xanthelasma are most commonly observed in middle-aged or older individuals, especially those with hyperlipidemia, a condition where there are high levels of cholesterol and fats in the blood. The presence of xanthelasma serves as an important warning sign that lipid levels may be abnormally high, and individuals with this condition are at an increased risk of developing atherosclerosis, which can lead to coronary artery disease and other

cardiovascular problems. While the plaques themselves are benign, they indicate an underlying metabolic issue that may contribute to the development of heart disease. In some cases, xanthelasma can be removed for cosmetic reasons, though treatment typically involves addressing the underlying lipid disorder through lifestyle changes, such as diet modification and statin therapy to lower cholesterol. Xanthelasma is particularly significant because its appearance on the skin can often prompt earlier testing and management for cardiovascular risk factors. Regular monitoring of cholesterol levels, blood pressure, and heart health is crucial for individuals with this condition.

### Clubbing



#### **Nails Curve Downward and the Ends of Your Fingers Are Swollen**

Clubbing is a physical sign where the tips of the fingers or toes become rounded and swollen, and the nails curve downward in a concave shape, resembling a drumstick. This phenomenon occurs when there is prolonged low oxygen levels in the blood, which can result from various cardiovascular conditions, including congenital heart disease, cyanotic heart disease, and chronic pulmonary diseases [7]. The pathophysiology behind clubbing is not entirely understood, but it is believed that chronic hypoxia causes changes in blood flow to the fingers and toes, leading to increased vascularity and tissue growth in the nails. In cardiovascular disease, clubbing often accompanies conditions that impair oxygen delivery to peripheral tissues, such as congenital heart defects or heart failure with significant oxygen deprivation. Although clubbing

itself is not a disease, it is a sign of an underlying health issue. Its presence warrants a thorough investigation into the cardiovascular system to identify and manage the underlying cause. Diagnostic tests such as echocardiograms, arterial blood gas analysis, and chest X-rays can help assess whether the individual has a condition that is affecting oxygen saturation or blood flow. Treatment generally involves managing the underlying cardiovascular disease. For example, surgical repair of congenital heart defects or interventions to manage heart failure may improve oxygenation and prevent further progression of clubbing. If the clubbing is associated with a chronic condition, such as end-stage heart failure, the prognosis may be dependent on the severity of the underlying disease. As such, early diagnosis and effective treatment are essential for improving quality of life and preventing complications.

### Splinter Hemorrhage



#### Red or Purple Lines Under Your Nails

Splinter hemorrhages are small, linear, red or purple streaks that appear under the nails, often resembling splinters [8]. These are caused by tiny blood clots or emboli blocking small capillaries beneath the nail bed, resulting in small bleeds that appear as streaks of blood. Splinter hemorrhages are most commonly associated with infective endocarditis, a condition where bacterial infection causes inflammation of the heart valves and can lead to the formation of emboli that travel to peripheral parts of the body, including the fingers. When these emboli lodge in the tiny blood vessels in the nails, they can result in splinter hemorrhages. This phenomenon is not exclusive to infective endocarditis

and may also be seen in conditions like vasculitis, systemic lupus erythematosus, and trauma. However, in the context of cardiovascular diseases, splinter hemorrhages are often a sign of an embolic event and can be a crucial clinical clue for diagnosing infective endocarditis. The presence of splinter hemorrhages, particularly in the setting of other systemic signs like fever, chills, or heart murmurs, should prompt healthcare providers to investigate further. Blood cultures, echocardiography, and other imaging studies are essential for diagnosing infective endocarditis, and early antibiotic treatment is critical to managing the infection. In some cases, surgical intervention may be necessary if valve damage is severe.

#### Nodules of Systemic Amyloidosis



Amyloidosis is a rare condition in which abnormal proteins, known as amyloids, accumulate in various tissues and organs throughout the body [9]. This accumulation can lead to organ dysfunction and is most commonly associated with the heart, kidneys, liver, and spleen. Systemic amyloidosis can cause the formation of nodules or papules in the skin, which may be the first signs of the disease in some patients. These nodules are often firm, waxy, and shiny, and they may appear on the face, neck, or upper body. In the context of cardiovascular disease, amyloidosis is particularly concerning because the amyloid deposits can infiltrate the heart, leading to restrictive cardiomyopathy. This condition impairs the heart's ability to pump blood

effectively, resulting in symptoms such as shortness of breath, fatigue, and edema. Amyloidosis can be primary (AL amyloidosis) or secondary (AA amyloidosis), with the latter often being linked to chronic inflammatory diseases such as rheumatoid arthritis or systemic lupus erythematosus. The diagnosis of amyloidosis involves a combination of clinical examination, biopsy of affected tissues (such as skin nodules), and specialized tests such as serum amyloid A (SAA) levels, echocardiography, and cardiac MRI. Treatment options are limited, but chemotherapy or stem cell transplants may be considered in some cases. For patients with cardiac involvement, managing heart failure and reducing amyloid deposition are key therapeutic goals.

#### Psoriasis



Psoriasis is a chronic autoimmune disorder that causes the rapid growth of skin cells, resulting in thick, scaly patches on the skin, often located on the scalp, elbows, knees, and lower back [10]. While psoriasis is primarily a skin condition, there is a well-established association between psoriasis and an increased risk of cardiovascular disease. Chronic inflammation, which is a hallmark of psoriasis, contributes to systemic inflammation and has been linked to the development of atherosclerosis, hypertension, and an increased risk of heart attack and stroke. Individuals with severe psoriasis may also have metabolic syndrome, which includes conditions such as obesity, high blood pressure, and high blood sugar, all of which increase cardiovascular risk.

The inflammation associated with psoriasis can damage the lining of blood vessels, making it easier for plaque to form and harden, which can lead to coronary artery disease. Treatment of psoriasis typically includes topical therapies, phototherapy, and systemic medications that suppress the immune system. Given the cardiovascular risks associated with psoriasis, it is essential for individuals with the condition to undergo regular cardiovascular screening, including blood pressure monitoring, cholesterol levels, and assessment for signs of heart disease. Lifestyle modifications, such as maintaining a healthy weight, exercising, and quitting smoking, can help reduce both psoriasis flares and cardiovascular risk.

### Janeway Lesions



### Brownish or Reddish Discoloration, Usually on Sole or Palm

Janeway lesions are painless, flat, red or brownish spots found on the palms of the hands or soles of the feet [11]. They are associated with infective

endocarditis and occur when bacteria in the bloodstream form emboli that lodge in the small blood vessels of the skin, causing localized discoloration. Unlike Osler nodes, Janeway lesions are typically not painful, but they are indicative of a systemic bacterial infection affecting

the heart, often in the presence of endocarditis. These lesions are seen in cases of septicemia or bacteremia, particularly when the heart valves become infected by bacteria. The presence of Janeway lesions, combined with other signs of infective endocarditis (such as fever, heart murmur, and positive blood cultures), serves as a key diagnostic clue. Janeway lesions are typically transient, disappearing once the infection is treated. Prompt recognition and diagnosis of infective endocarditis are crucial, as the infection can cause severe damage to the heart valves, leading to complications such as heart failure, stroke, or kidney damage. Treatment usually involves prolonged intravenous antibiotic therapy, and in severe cases, surgical intervention may be needed to repair or replace damaged heart valves.

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