

## Xanthomas in A Warehouse Worker: A Case Report

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### Abstract

**Background:** Xanthomas are visible external lump that appears on the body. Xanthomas are not tumors, instead, they are collections of foam cells that develop within the skin's connective tissue, tendons and layers beneath the skin. These formations are significant indicators of disorders in lipid metabolism and are frequently seen in individuals with hypercholesterolemia. This case report describes the case of a male patient who worked in a warehouse with xanthomas and analyzes the relationship between his disease and work.

**Case Presentation:** A 38-year-old man presented at a referral hospital in August 2023 with multiple yellowish elevated masses over the palm of the hands, sole and over the dorsum of the foot. The size of the masses varied between 0,5×0,5×0,5 cm (over the palm of the hands and sole), 1,5×1,5×0,5 cm and 2×1,5×1 cm (over dorsum of the foot) (Figure 1). The patient is accustomed to consuming fatty foods, coffee and alcohol. The patient presented with an elevated level of cholesterol and triglycerides. The patient had symptoms of discomfort and pain, which were due to the large size of the masses. The patient worked in a warehouse and encountered numerous potential hazards. Upon further examination, the patient was diagnosed with xanthomas. Excisional biopsy were performed to remove the massive xanthomas from the palm, sole and dorsum of the foot.

**Discussion:** The process of confirming an occupational illness necessitates following a seven-step method, which considers factors such as clinical diagnosis, individual, and other exposures outside of work. However, in this instance, no work-related, personal, or external environmental elements linked to xanthomas were identified.

**Conclusion:** There is no substantial evidence that occupational exposures as a warehouse worker cause or exacerbate the patient's diagnosis of xanthomas. Very high cholesterol and triglycerides remain the main contributing factors to the diagnosis.

**Keywords:** xanthomas, a warehouse worker, occupational disease

### Abstrak

**Latar Belakang:** Xanthoma merupakan benjolan luar yang tampak pada tubuh. Xanthoma bukanlah tumor, melainkan kumpulan sel busa yang berkembang di dalam jaringan ikat kulit, tendon, dan lapisan di bawah kulit. Formasi ini merupakan indikator signifikan dari gangguan metabolisme lipid dan sering terlihat pada individu dengan hiperkolesterolemia. Laporan kasus ini menggambarkan kasus seorang pasien laki-laki yang bekerja di gudang dengan xanthoma dan menganalisis hubungan antara penyakitnya dan pekerjaannya.

**Kasus:** Seorang laki-laki berusia 38 tahun datang ke rumah sakit rujukan pada bulan Agustus 2023 dengan keluhan beberapa benjolan berwarna kekuningan pada telapak tangan, telapak kaki dan punggung kaki. Ukuran massa bervariasi antara 0,5×0,5×0,5 cm (di atas telapak tangan dan telapak kaki), 1,5×1,5×0,5 cm, dan 2×1,5×1 cm (di atas punggung kaki) (Gambar 1). Pasien terbiasa mengonsumsi makanan berlemak, kopi dan alkohol. Pasien mengalami kadar kolesterol dan trigliserida yang tinggi. Pasien merasakan ketidaknyamanan dan nyeri, hal ini disebabkan karena ukuran besarnya benjolan. Pasien bekerja di gudang dan menghadapi banyak potensi bahaya. Setelah dilakukan pemeriksaan lebih lanjut, pasien tersebut didiagnosis menderita xanthoma. Tindakan biopsi eksisi dilakukan untuk mengangkat xanthoma yang besar dari telapak tangan, telapak tangan, dan punggung kaki.

**Diskusi:** Proses konfirmasi penyakit akibat kerja memerlukan metode tujuh langkah yang mempertimbangkan faktor-faktor seperti diagnosis klinis, individu, dan paparan lain di luar pekerjaan. Namun, dalam kasus ini, tidak ada elemen lingkungan terkait pekerjaan, pribadi, atau eksternal yang terkait dengan xanthoma yang teridentifikasi.

**Kesimpulan:** Tidak ada bukti substansial bahwa paparan pekerjaan sebagai pekerja gudang menyebabkan atau memperburuk diagnosis xanthoma pada pasien. Kolesterol dan trigliserida yang sangat tinggi tetap menjadi faktor utama yang berkontribusi terhadap diagnosis

**Kata kunci :** xanthoma, pekerja gudang, penyakit akibat kerja

## Background

Xanthomas are visible external lump that appears on the body. Xanthomas are not tumors, instead, they are collections of foam cells that develop within the skin's connective tissue, tendons and layers beneath the skin. These formations are significant indicators of disorders in lipid metabolism and are frequently seen in individuals with hypercholesterolemia.<sup>1</sup> Not all individuals with high levels of lipids or cholesterol in their blood, a condition known as hyperlipidemia or hypercholesterolemia, will experience the development of xanthomas.

Nonetheless, the presence of xanthomatous lesions can serve as a distinctive and significant clinical sign of these metabolic conditions. In people with hyperlipidemia, lipoproteins in the bloodstream can seep through the cells lining blood vessels and accumulate in the skin, underlying tissues, and tendons. Specialized cells called tissue macrophages then engage in a process of engulfing and eliminating the lipid components from these deposits. This process is believed to be responsible for the formation of "foam cells," which are a hallmark of xanthomas.<sup>2</sup>

For cases of normocholesterolemic xanthomatosis, a different sequence of events is proposed, with local tissue damage resulting from either injury or inflammation playing a significant role. These are often referred to as "eruptive xanthomas" and are associated with specific types of hypercholesterolemias (types I, IV, and V). It is theorized that the heightened permeability of blood vessels due to tissue injury leads to a similar process of leaked lipoproteins that are then ingested by skin cells.<sup>3</sup> This route has been suggested as the origin of abnormalities observed in regions that experience frequent physical stress, like the xanthomas found in the Achilles tendon. These xanthomas are commonly observed in individuals with type II hypercholesterolemia.<sup>4</sup>

Although xanthomas can emerge during any life stage, they predominantly manifest in the second decade of individuals who have underlying systemic conditions such as familial hypercholesterolemia.<sup>5</sup> About 75% of elderly patients with familial hypercholesterolemia display tendinous xanthomas.<sup>6</sup> In a sizable retrospective analysis involving 5504 non-cancerous eyelid growths seen at a Swiss eye clinic, roughly 6% were identified as xanthelasma. Here, we describe the case of a male

patient who worked as a warehouse worker and suffered from xanthomas; to analyze whether there was a connection between the patient's field of work and his skin condition.

## Case

A 38-year-old man presented at a referral hospital in August 2023 with multiple yellowish elevated masses over the palm of the hands, sole and dorsum of the foot. The size of the masses varied between 0.5×0.5×0.5 cm (over the palm of the hands and sole), 1,5×1,5×0,5 cm and 2x1,5x1 cm(over the dorsum of the foot. Yellowish elevated masses have appeared on the palms, soles, and dorsum since 5 years ago. Initially, only one yellow mass grew on the palm of the right hand the size of a pimple and the patient has not had any treatment. Then more and more patients don't pay attention to it, in the past few years it has continued to appear on the palms of the right and left hands, then it also appears on the soles of the right and left foot. It doesn't itch, but hurts when pressed. Because it was increasingly disturbing, the patient went to the hospital in July 2023 and was given ointment but did not improve.

Then in August 2023, the patient was referred to a referral hospital. Planned for removal of masses on the foot and now the masses have been removed from the patient's palm, only masses remained on the sole denied decreased appetite. Denied weight loss. Body weight tends to increase because patients often feel hungry. Complaints are often thirstily denied. Night urination, woke him up once. Patients usually eat at work, in the form of nasi uduk or nasi padang. Evenings at home eat instant noodles more often. The patient does not like vegetables or fruit. Drink instant coffee three times a day. The patient denied any history of hypertension, diabetes mellitus, allergies, asthma, cardiovascular issues, previous autoimmune disorders, cancer, or any menstruation-related symptoms. He also declined the presence of hypertension, diabetes mellitus, atopic conditions, asthma, autoimmune disorders, cancer, or analogous symptoms in their family's medical history.

The patient has worked in a shoe manufacturing company for 17 years. The patient works Monday to Saturday and takes a 15-minute motorbike ride to get there. The patient works with two other colleagues. Patients and co-workers work in 1 shift, from 08.00 am to 04.30 pm and 1.5 hours of rest (11.30 am -01.00

pm) Arriving at the shoe manufacturing company, the patient is absent in front of the office, then the patient immediately goes up to the second floor where the patient works. The patient spends most of the time standing and bending and he can rest when his job of taping, lifting and assembling the shoe box containing the leather shoes is finished. On average, in a day, patients with duct tape remove around 100-200 shoe boxes filled with leather shoes. There are several potential hazards in the patient's workplace, including physical, chemical, ergonomic, and psychosocial hazards.

Potential physical hazards include UV rays, noise, whole-body vibration on the motorbike. Potential chemical hazards that patients must face include vehicle emissions (CO, Pb). Ergonomic potential hazards in the form of lifting the arm by gripping the handlebar, back without support when on the motorbike; right-hand position flexy deviation, more than 10 seconds, left hand pressing more than 10 seconds. arms down and arms up  $45^\circ$ , neck bowed  $30^\circ$  for more than 10 seconds with a frequency of more than two times a minute when taping a shoe box; position of both hands ulnar deviation, more than 10 seconds, elbows of both hands extended more than 10 seconds and frequency  $\geq 2x/\text{minute}$ , arms down and up  $\geq 45^\circ$ , neck bent and extended  $30^\circ$  for more than 10 seconds with a frequency of more than two times a minute, back bent  $20^\circ$  for more than 10 seconds with a frequency of more than two times a minute, squad Foot  $>2x/\text{min}$  while lifting a shoe box containing leather shoes; the position of both hands ulnar deviation, more than 10 seconds, elbows of both hands extended more than 10 seconds and frequency  $\geq 2x/\text{minute}$ , arms down and up  $\geq 45^\circ$ . neck bent and extended  $30^\circ$  for more than 10 seconds with a frequency of more than two times a minute, back bent  $20^\circ$  for more than 10 seconds with a frequency of more than two times a minute, squad Foot  $>2x/\text{min}$  when assembling shoe boxes.

Psychosocial potential hazards consist of job targets, fatigue, stress, and boredom due to monotonous work. On physical examination, the bilateral palmar region, under the left big toe, lateral side of the left dorsum pedis, and lateral side of the right dorsum pedis: yellow masses, multiple, discrete-confluent, billion-lenticular, circumscribed-diffuse (Figure1).

The results of cholesterol and triglyceride tests in April 2023 were very high, total cholesterol was 569 and triglycerides was 642 Histopathological examination in June 2023 showed that histology was plexiform xanthomas. The edges and base of the incision are free of

lesions These findings are consistent with the diagnosis of xanthomas.

## Discussion

An occupational disease refers to a condition that is caused or worsened by being exposed to certain factors in the workplace. To diagnose an occupational disease, a particular approach involving seven distinct stages is required:

1. Establishment of the clinical diagnosis
2. Determination of the occupational exposures
3. Determination of the relationship between occupational exposures and the clinical diagnosis
4. Determination of whether the exposure is intense enough to cause the clinical diagnosis
5. clinical diagnosis
6. Determination of other individual factors that might be the cause or a risk factor of the diagnosis
7. Determination of other factors outside the workplace
8. Establishment of the diagnosis of occupational disease.<sup>8</sup>

The first step in diagnosing an occupational disease involves making a clinical diagnosis. By evaluating the patient's medical background, conducting a physical examination, and analyzing histopathological findings, the conclusion of xanthomas was reached. The patient experienced masses on both palms and both soles of the foot accompanied by pain. The characteristic histopathological findings of xanthomas led us to a clinical diagnosis of xanthomas.<sup>9,10</sup>

The second step in the occupational disease diagnosis process involves recognizing the workplace elements that might have led to the condition. This can be done by carefully assessing the patient's work surroundings and job-related specifics. Potential risks that individuals may be subjected to include physical dangers (such as extreme temperatures, vibrations, noise, and UV radiation), chemical dangers (vehicle emissions (CO, Pb)), ergonomic risks (prolonged immobility, repetitive movements), and psychosocial hazards (like physical tiredness, mental exhaustion, monotony, and stress).

The third step in the process of diagnosing occupational diseases is determining the relationship between occupational exposure and clinical diagnosis.

We found no clear evidence of a direct association between such exposure and xanthomas. However, xanthomas are caused by localized lipid deposits in organ systems. Often these symptoms are important signs of systemic disease. The patient's diagnosis was made after the patient had been working for decades. Therefore, occupational exposure in a warehouse cannot be the cause of the diagnosis. There is no evidence of disease progression after his current job. Then the results of his last examination in August 2023 after an excision of the lump on his palm showed that his overall condition had improved. Therefore, there is no suspicion that the patient's workplace exposure exacerbated his illness.

The fourth step in diagnosing an occupational disease is determining whether the exposure is

sufficiently strong to cause a clinical diagnosis. The patient had worked as a nurse for 17 years, 8 hours a day, 6 days a week. Patients do not use gloves and masks as a means of self-protection. The patient wears sandals while working. However, as no specific exposure has been proven to cause the patient's illness, it can be concluded that the intensity of occupational exposure is not sufficient to cause a clinical diagnosis of xanthomas.

The fifth step in diagnosing an occupational disease is determining other individual factors that may be causes or risk factors for the diagnosis. The patient and her family had no history of previous autoimmune diseases, atopic, allergy, hypertension, diabetes mellitus, cancer, and recent viral infection. The patient has a habit of consuming fatty foods every day, consuming alcohol and also smoking two



**Figure 1.** Physical examination findings

packs a day. Based on blood tests, total cholesterol and triglyceride levels were very high. High cholesterol levels in the blood are the main risk of xanthomas.

The sixth step in the process of diagnosing occupational diseases is determining other factors outside the workplace. no studies have been found that say factors outside of work that influence the occurrence of xanthomas. Currently, in these patients, there are no other factors outside of work that influence the occurrence of xanthomas.

The seventh and final step in the process of diagnosing occupational diseases is establishing a diagnosis of occupational diseases. From the available evidence, history, and close examination of the patient, it can be concluded that the patient's diagnosis of xanthomas is not caused or exacerbated by workplace exposure. Environmental, immunological, and genetic factors all play a role in the development of xanthomas. The only important factor that may occur in this case is the dietary pattern which results in high levels of total cholesterol and triglycerides thereby triggering the onset of xanthomas in the patient.

The following are some recommendations for patients. The first is about lifestyle such as eating low fat, stopping consuming alcohol, stopping smoking, and don't forget to exercise regularly. The Second, at the workplace use gloves, socks and use comfortable sneakers when working. The third, maintain personal hygiene by diligently washing hands, bathing two times a day and routine to check the skin all over the body. The fourth, routine control of the dermatologist and internist when the drug runs out or there are new complaints. Careful management of lipid and cholesterol profiles can provide effective control of the development of new lesions in the same patient. Various studies have shown that atheromatous deposits occur together with xanthomas formation, which can cause significant morbidity and mortality.<sup>11</sup>

## Conclusion

Diagnosis of occupational diseases given the diverse possible dangers in a work environment and how they connect to clinical identification, it's crucial to evaluate the potential hazards in the workplace and

their relation to clinical diagnosis. It is important to assess the potential risks that may exist elsewhere. In this case, there was no strong evidence that the patient's diagnosis of xanthomas was caused or exacerbated by her work as a warehouse worker. Very high cholesterol and triglycerides remain the main contributing factors to the diagnosis.

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