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Mondor's Disease: A Rare Condition Revisited – Insights from Literature

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ABSTRACT

Introduction: This review paper aims to systematize the current knowledge about Mondor's disease, its etiology and epidemiology, diagnostic methods, differential diagnosis, and therapeutic approaches. Furthermore, it examines the prognosis and potential complications based on a comprehensive review of the available literature.

Materials and methods: A review of selected literature in the PubMed database was conducted, using the following keywords: „Mondor's disease", „vein thrombosis", „superficial thrombophlebitis".

Summary: Mondor's disease is a rare, self-limiting superficial thrombophlebitis, primarily affecting the anterior chest wall but also documented in the abdomen, axilla, groin, and penis. Its etiology remains unclear, though mechanical stress, inflammation, and hypercoagulability are implicated. It predominantly affects middle-aged women. Though benign, its clinical presentation may mimic malignancies, causing significant distress.

Diagnosis is primarily clinical, based on a palpable, tender, cord-like structure without systemic symptoms. Imaging, particularly ultrasonography, is warranted when malignancy is suspected. Mammography or Magnetic Resonance Imaging may be used to exclude neoplastic conditions. Management is conservative, focusing on NSAIDs, topical therapies, and activity modification. Anticoagulation is generally unnecessary but may be considered in extensive thrombosis. Surgical intervention is rare. Prognosis is favorable, with spontaneous resolution within weeks, though secondary cases require treatment of the underlying condition.

Conclusions: Healthcare providers must recognize Mondor's disease to ensure accurate diagnosis and effective management. While conservative treatment remains the standard, further research into its pathophysiology may refine diagnostic and therapeutic strategies. In recurrent or secondary cases, vigilance for thrombotic disorders or malignancies is essential for comprehensive patient care.

Keywords: Mondor's disease, vein thrombosis, superficial thrombophlebitis

Introduction

Mondor's disease primarily presents as a subcutaneous induration, palpable as a cord-like structure. The earliest documented cases date back to the 1850s. In 1870, British surgeon Charles Herbert Fagge was the first to characterize these cord-like formations as a clinical manifestation of superficial thrombophlebitis in ''Guy's Hospital Reports''. However, he considered it to be a manifestation of scleroderma [1][2][3].

In 1939, French surgeon Professor Henri Mondor systematically described the condition as a distinct pathological entity. His comprehensive review of previously reported cases led to the disorder being named Mondor's disease (MD) [4][5].

Over time, an increasing number of reports emerged regarding this pathological condition. In 1922, an analogous case was documented in France by Fiessinger and Mathieu, while in America, Williams and Daniels made similar observations in the early 1930s [2].

The hallmark of MD is thrombophlebitis of the superficial veins, most commonly affecting the anterior chest wall [6]. The most commonly affected veins are the lateral thoracic, thoracoepigastric, and superior epigastric veins [7]. Gradually, analogous occurrences have been identified in various anatomical areas, such as the groin, axilla, and penis [8][9].

Despite the absence of official classification, MD affecting the anterolateral thoracoabdominal wall is typically referred to as classic MD, whereas cases involving other regions are recognized as MD variants. The penile form, known as penile Mondor's disease, was first documented by Helm et al. in 1958. Another variation, affecting the axilla, is termed axillary web syndrome, initially described by Moskovitz et al. in 2001 as a postoperative complication of axillary surgery. While the majority of MD cases present as thrombophlebitis of superficial veins, some instances may also involve lymphangitis, either alone or in combination with thrombophlebitis [10].

Although rare and generally benign, MD can cause significant discomfort and anxiety, particularly when its symptoms mimic those of more serious conditions, such as malignancies. A thorough understanding of its pathophysiology, clinical progression, and available diagnostic and therapeutic approaches is essential for ensuring accurate diagnosis, effective management, and patient reassurance.

Etiology and epidemiology

MD is regarded as an infrequent clinical entity, with its actual prevalence likely underestimated due to underreporting and frequent misdiagnosis. It predominantly affects individuals in middle age, with a higher predilection for women than men (sex ratio of 3:1) [3]. MD most commonly affects women aged 30 to 60, especially those with risk factors [1]. Nevertheless, occurrences in males, especially in cases of penile MD, have also been documented [9].

Although the precise incidence remains undetermined, emerging evidence suggests that MD is more frequently encountered in clinical practice than previously assumed. This rise in reported cases is attributed to advancements in diagnostic imaging modalities and an increasing level of clinical awareness. While geographic and ethnic disparities in prevalence have not been thoroughly investigated, the condition is acknowledged on a global scale.

The exact cause of MD remains unclear, but it is believed to result from a combination of mechanical, inflammatory, and thrombotic factors. However, in many cases, no clear underlying cause is identified.

Mechanical stressors, including excessive physical exertion, surgical interventions, and constrictive clothing, have been frequently implicated as inciting events [11][12]. Certain medical procedures, such as breast surgeries, biopsies, and even diagnostic imaging techniques like mammography, have been identified as potential precipitants [13]. Additionally, sustained venous compression or irritation due to external pressure, repetitive motion, or direct trauma can instigate endothelial injury, ultimately leading to localized thrombosis.

Inflammatory mechanisms also play a pivotal role in the pathogenesis of MD. Infectious agents, including bacterial and viral pathogens, may disrupt endothelial integrity, triggering vascular inflammation and thrombotic changes. Furthermore, autoimmune disorders, such as ulcerative colitis and rheumatoid arthritis, may contribute to a heightened pro-inflammatory milieu, predisposing affected individuals to vascular involvement [14][8][15].

Hypercoagulable states, whether hereditary, acquired, or associated with malignancy, have been proposed as significant risk factors. Conditions such as antiphospholipid syndrome, Factor V Leiden mutation, and occult neoplastic processes may foster a thrombogenic environment, warranting a thorough evaluation for underlying systemic associations. Given the potential for an undiagnosed hypercoagulable disorder, clinicians must maintain a high index of suspicion when encountering cases with recurrent or unexplained thrombophlebitis [1][13][16].

Hormonal influences, particularly in female patients, have also been postulated to contribute to disease development. The use of oral contraceptives [17], hormone replacement therapy, or pregnancy-related vascular alterations may heighten susceptibility to thrombophlebitis. Estrogen's well-documented impact on coagulation cascades and endothelial function further supports its potential role in the pathophysiology of MD [11].

Despite these recognized associations, a substantial proportion of cases remain idiopathic, with no discernible predisposing factor [18]. The multifactorial nature of MD underscores the necessity of a meticulous clinical assessment, incorporating a detailed patient history, evaluation of potential triggering events, and investigation of systemic conditions that may underlie vascular dysfunction.

Clinical Presentation and Diagnostic Approach

Patient History and Physical Examination

A comprehensive clinical assessment of MD begins with a thorough patient history, emphasizing potential risk factors previously mentioned [14].

During physical examination, the hallmark finding is a palpable, tender, cord-like structure along the affected vein, most commonly located on the anterior chest wall, upper abdomen, or, in some cases, the axillary region or penis. The indurated vein is often accompanied by erythema and mild edema, though overt signs of inflammation may be absent. Initially, the cord remains mobile but may eventually adhere to underlying structures. Patients frequently report discomfort or pain, which intensifies with movement or palpation. Unlike deep vein thrombosis, MD usually does not cause systemic manifestations such as fever or significant limb swelling [19][20].

Laboratory Studies

Laboratory tests have a limited role in MD, as the diagnosis in cases with a classic presentation is primarily established through a thorough medical history and physical examination, potentially supplemented by imaging studies if necessary. However certain laboratory investigations may be useful in assessing underlying causes or associated conditions.

Routine blood tests, including complete blood count (CBC) and C-reactive protein (CRP), can help evaluate systemic inflammation or an infectious component, though they are often within normal ranges in isolated MD cases.

In patients with a hypercoagulable state, screening should include assessments for protein C deficiency, protein S deficiency, antithrombin III deficiency, Factor V Leiden mutation, prothrombin G20210A mutation, systemic metastases, as well as the underlying etiology of hyperviscosity syndromes, such as myeloproliferative disorders.

Additionally, a thorough evaluation of lymph nodes adjacent to the affected vein is warranted to exclude neoplastic processes [21].
In cases of penile MD, it is imperative to conduct serological testing for syphilis and other sexually transmitted infections to rule out potential infectious etiologies [21][22].
While laboratory findings are generally nonspecific, targeted testing can provide valuable insights into potential predisposing factors, aiding in the comprehensive evaluation.

Imaging Studies

Ultrasonography

Ultrasound is the preferred imaging modality for confirming the diagnosis of MD. It is a non-invasive, readily available, and highly sensitive tool that allows for real-time visualization of superficial veins. Gray-scale ultrasound typically reveals a thickened, hypoechoic, or anechoic tubular structure corresponding to a thrombosed superficial vein. In the acute phase, the affected vein may appear non-compressible with surrounding soft tissue edema. As the condition progresses, partial or complete recanalization can be observed [23].
Color Doppler imaging is crucial for assessing vascular flow. In the early stages of MD, it often demonstrates an absence of blood flow within the thrombosed segment. As the healing process advances, the return of venous flow indicates recanalization [24]. Additionally, Doppler ultrasound can help differentiate MD from other superficial vascular pathologies, such as lymphangitis or superficial thrombophlebitis of another etiology.
Ultrasound not only aids in diagnosis but also serves as a valuable tool for monitoring disease progression and assessing treatment response, making it the imaging modality of choice in suspected cases of MD.

Magnetic Resonance Imaging (MRI) and Computed Tomography (CT)

MRI, particularly with contrast-enhanced sequences, can offer detailed visualization of soft tissues and venous structures. It may reveal a non-compressible, thickened superficial vein with surrounding inflammatory changes. Additionally, MRI can be useful in differentiating MD from malignancies, deep vein thrombosis, or other vascular pathologies, especially in patients presenting with atypical or persistent symptoms. Nevertheless, it is not a first-line diagnostic tool and is warranted only in select cases, with its role primarily confined to the exclusion of alternative pathologies. CT is not recommended for diagnosing MD, and no documented cases in the literature have reported its use for this purpose [25][26].

Mammography

Mammography is not a primary imaging modality for MD; however, it may be performed in cases where the condition affects the breast or presents with symptoms resembling breast pathology. Given that MD can manifest as palpable, tender cord-like indurations on the chest wall, it may raise clinical suspicion for malignancy, prompting further evaluation with mammography [18].
On mammographic imaging, MD typically appears as a superficial, beaded, or linear density corresponding to a thrombosed vein. In some cases, subtle skin thickening or retraction may be observed due to localized inflammation and fibrosis.

Importantly, mammography helps exclude underlying breast malignancies, particularly in patients with risk factors or concomitant suspicious findings. Depending on the results, further diagnostic evaluation may be warranted [23].

Histopathological Evaluation- Biopsy

Given the predominantly benign and self-limiting nature of the disease, invasive diagnostic procedures are generally reserved for cases with persistent, unexplained symptoms or when imaging and clinical evaluation raise concerns about an alternative pathology. A biopsy of the affected vein can reveal features consistent with superficial thrombophlebitis, including endothelial damage, luminal thrombosis, and perivascular inflammation. In cases where MD is secondary to malignancy, biopsy findings may demonstrate tumor infiltration or paraneoplastic vasculopathy [20].

A biopsy may also be used to assess the progression of healing following MD. However, it is not routinely performed, as most patients would not derive significant benefit from the procedure [21].

Management

General Management Approach

Primary MD is typically self-limiting, with symptoms resolving spontaneously within 4 to 8 weeks without any specific treatment. Due to the rarity of this condition, no standardized management protocol has been established, as no therapeutic approach has been proven to significantly shorten its duration. Treatment is primarily conservative, focusing on symptom relief. Patients are advised to avoid excessive physical activity and any external pressure that may exacerbate symptoms. In cases of penile MD, abstaining from sexual activity is particularly important [27][28].

In cases of secondary MD, the primary focus should be on managing the underlying condition, as MD itself is benign and does not pose a life-threatening risk. However, it is often associated with more serious conditions, including malignancies, which require thorough evaluation and appropriate intervention [29].

Conservative Treatment

Pain is the most distressing symptom and should be prioritized to improve patients' quality of life. Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, are commonly used not only for analgesia but also to mitigate the inflammatory component of the disease. However, in cases of severe pain, surgical intervention may be necessary.

In instances of extensive thrombosis, low-molecular-weight heparins (LMWH) or other anticoagulants, such as fondaparinux, may be considered, particularly in cases of recurrent disease or underlying hypercoagulable states. It is important to note, however, that anticoagulant or antiplatelet therapy does not accelerate healing, nor has it been proven to prevent additional thrombosis [27][28].

Adjunctive treatments for symptom relief include warm compresses, heparin-based ointments, and NSAID gels. Antibiotic therapy is not routinely recommended unless secondary infection is suspected. Patients should be monitored for disease progression, and further evaluation should be conducted if symptoms persist beyond the expected timeframe or if malignancy is suspected [26].

Surgical Management

Surgical intervention is rarely indicated due to its invasive nature; however, it may be considered in cases resistant to conservative treatment or for symptom relief in severe presentations. The procedure typically involves thrombectomy to remove the thrombus, and in certain cases, excision of the affected vein may also be necessary [12].

Management of Specific Presentations

Axillary Web Syndrome (AWS)

In AWS, similar to MD in more typical locations, conservative treatment is preferred. This includes physiotherapy, range-of-motion exercises, and anti-inflammatory therapy to alleviate symptoms.

In 2009, a minimally invasive yet effective technique known as manual axial distraction was introduced. This method involves applying firm finger pressure combined with distraction at various points along the fibrotic band until a rupture occurs, which is perceptible as a distinct snapping sensation. Pain relief is immediate.

A study evaluating this technique included 30 patients, of whom 25 (83.3%) experienced full resolution of symptoms after a single session, while 3 patients (10%) required two sessions, and only 2 patients (6.7%) needed additional treatments. Participants reported the procedure as moderately uncomfortable, yet following its completion, pain and movement restrictions were significantly alleviated. No complications, such as bruising or skin damage, were observed. Notably, manual axial distraction was the sole therapeutic approach used in these cases. For more complex cases, percutaneous release of the fibrotic band with autologous fat grafting may prove to be an effective alternative [30].

Penile Mondor's Disease (PMD)

The treatment of PMD largely mirrors the approach used for this condition in more typical anatomical locations. In most cases, the disease resolves spontaneously within a few weeks, with the primary therapeutic goal being symptomatic relief. Nonsteroidal anti-inflammatory drugs (NSAIDs), heparin, and other anticoagulant or antiplatelet agents are commonly employed.

In cases of severe pain, a subcutaneous injection of 0.5% bupivacaine hydrochloride into the affected vein may be administered for analgesic relief. Additionally, risk factor modification and sexual abstinence are strongly recommended to prevent symptom exacerbation [26].

Surgical intervention may occasionally be considered, particularly in refractory cases, with the objective of excising the diseased vein [31][16].

It is crucial to exclude malignancy and Peyronie's disease as potential underlying conditions. Patients with suspected PMD should undergo clinical observation for a period of 4 to 8 weeks to monitor disease progression and ensure appropriate management [21].

Differential Diagnosis

The differential diagnosis of MD encompasses a range of conditions that may present with similar clinical manifestations. The specific differential considerations depend on the anatomical location of the lesion.

It is often necessary to exclude deep vein thrombosis, lymphangitis, cellulitis, thrombosed varicose veins, and musculoskeletal disorders such as costochondritis or intercostal neuralgia. Unlike MD, DVT typically involves deeper venous structures and presents with more significant swelling and systemic symptoms. Inflammatory lymphatic involvement may present with similar cord-like thickening but is usually accompanied by fever and systemic signs of infection. In cases with atypical presentations or systemic symptoms, histopathological evaluation may be required to rule out malignant venous involvement.

In cases of MD of the breast, differentiation from breast abscesses and inflammatory breast cancer is essential. Conversely, when evaluating PMD, it is crucial to consider Peyronie's disease as well as lymphatic dissemination of infection [1][32].

Prognosis and Possible Complications

The prognosis of Primary MD disease is favorable, it is generally considered a benign and self-limiting condition, with spontaneous resolution occurring in most cases within a few weeks. Recurrence is rare but possible, particularly in individuals with persistent risk factors, and may even occur years after the initial episode [33].

The vast majority of patients experience complete symptom resolution without long-term sequelae. However, in some cases, residual skin tethering or persistent venous thickening may develop.

Regarding PMD, isolated reports have documented chronic pain and priapism in the past, though the overwhelming majority of patients remain free from structural or functional impairments [34][35].

In cases of secondary MD, prognosis is contingent upon the underlying condition, as it often dictates the overall clinical outcome.

Summary and Conclusions

MD is a rare, self-limiting condition characterized by superficial thrombophlebitis, most commonly affecting the anterior chest wall, but also documented in the abdominal wall, axilla, groin, and penis. Initially described in the 19th century, it was formally recognized as a distinct pathological entity by Henri Mondor in 1939. Although its exact etiology remains unclear, contributing factors include mechanical stress, inflammation, and hypercoagulability. The disease predominantly affects middle-aged women but is also observed in men, particularly in cases of penile MD. While generally benign, MD can be distressing for patients, especially when its symptoms resemble malignancies. Increased awareness among clinicians can help improve diagnostic accuracy and reassure affected individuals.

The diagnosis is primarily clinical and relies on the presence of a palpable, tender, cord-like structure without systemic symptoms. In typical cases, additional testing is unnecessary, but further evaluation, including imaging and laboratory studies, is warranted if malignancy or systemic pathology is suspected.

Ultrasonography remains the preferred diagnostic tool for visualizing thrombosed superficial veins. In select cases, mammography or MRI may be indicated to rule out underlying neoplasms. Treatment is predominantly conservative, focusing on symptom relief through NSAIDs, topical therapies, and activity modification. In cases of PMD, sexual abstinence is recommended. Anticoagulation is not routinely required but may be considered in patients with extensive thrombosis or hypercoagulable states. Surgical intervention is rarely necessary, reserved for refractory cases or significant discomfort. Prognosis is generally favorable, with spontaneous resolution occurring within weeks. However, secondary MD requires management of the underlying condition to ensure optimal outcomes.

As MD becomes increasingly recognized in clinical practice, healthcare providers must be aware of its risk factors, clinical presentation, and management strategies. While conservative treatment remains the mainstay, further research into its pathophysiology and potential associations with systemic conditions may enhance diagnostic accuracy and therapeutic approaches. Lastly, in cases of recurrent or secondary MD clinicians should maintain vigilance for underlying thrombotic disorders or malignancies, ensuring comprehensive patient evaluation and care.

Disclosure

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