

Superficial venous thrombosis of the upper limb presenting to a chiropractic clinic: a case report

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Objective: *To present the clinical case of a patient with an upper extremity superficial venous thrombosis (SVT), and to highlight the importance for clinicians working in musculoskeletal care settings, to consider non-musculoskeletal causes for their patients' presentations.*

Clinical Features: *A 31-year-old male presented to an academic chiropractic clinic with progressive left sided tension over the medial arm, extending to the anterior aspect of his proximal forearm.*

Intervention and Outcome: *The patient was initially diagnosed with possible biceps/brachialis muscular strain and peripheral entrapment of the median nerve. A course of treatment involving soft tissue therapy was initiated. Unfortunately, the patient's symptoms worsened, and on further evaluation, near full occlusion and phlebitis of the left cephalic vein was discovered. Symptoms dissipated over the next few days with conservative medicinal efforts.*

Summary: *Although not often viewed as a serious*

Objectif : *Présenter le cas d'un patient ayant une thrombose veineuse superficielle (TVS) du membre supérieur et souligner l'importance pour le clinicien dans un établissement de traitement de troubles musculosquelettiques de prendre en compte les causes qui ne sont pas d'origine musculosquelettique dans l'étude du tableau clinique du patient.*

Caractéristiques cliniques : *Un homme de 31 ans s'est présenté à une clinique chiropratique universitaire en raison d'une tension progressive ressentie à partir de la partie médiane du bras gauche jusqu'à la face antérieure de l'avant-bras proximal.*

Intervention et résultat : *On a d'abord évoqué la possibilité d'une foulure du biceps ou du muscle brachial antérieur et d'un englobement périphérique du nerf médian. Une thérapie des tissus mous a été amorcée. Mais malheureusement, les symptômes du patient se sont aggravés et, après une évaluation plus approfondie, on a découvert une occlusion presque complète de la veine céphalique gauche et une phlébite. Les symptômes se sont dissipés au cours des jours qui ont suivi le début d'un traitement conservateur par des médicaments.*

Résumé : *La TVS n'est pas souvent considérée comme*

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condition, or factored in the differential diagnoses of musculoskeletal practitioners, to not consider SVT as a cause of a patient's symptoms may lead to a protracted clinical course and increased discomfort for the patient, and in rare cases, more serious consequences.

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KEY WORDS: chiropractic, diagnosis, management, superficial venous thrombosis, upper limb

Introduction

Superficial venous thrombosis (SVT) is a relatively common condition, yet many cases are not recognized or reported as it is generally considered to have a benign and self-limiting course. That being said, SVT has been linked to more serious conditions such as deep vein thrombosis (DVT) and pulmonary embolism (PE).¹⁻³ Although the true incidence is uncertain, in the United States, the annual incidence of SVT has been roughly estimated to be over 123,000 cases.^{4,5} Patients often present with a painful “cord-like” mass along the course of the affected superficial vein, and clinical features may also include swelling, erythema, and/or warmth of the overlying skin.^{4,6,7}

In the early stages, some patients with venous thrombosis lack signs of acute inflammation and may present with non-discriminatory symptoms mirroring musculoskeletal or other biomechanical conditions.^{8,9} This may result in a delay in diagnosis or improper treatment options, which may lead to a progression of the disease process, poorer prognosis, and prolonged pain and discomfort for the patient. Therefore, it is important that SVTs are effectively identified by all primary care practitioners to allow for proper management and the mitigation of unfavourable outcomes. However, pathology associated with vascular diseases are not often considered as differential diagnoses by musculoskeletal practitioners such as physical therapists and chiropractors.¹⁰ We present the case of a 31-year-old male who presented to a chiropractic clinic with a chief complaint of anterior left arm tension, in-

une affection grave et n'est pas prise en compte dans les diagnostics différentiels posés par les praticiens de l'appareil locomoteur. En ne la considérant pas comme une possible cause des symptômes d'un patient, on risque de prolonger les interventions et d'aggraver la gêne du patient, et dans de rares cas, de causer des conséquences plus graves.

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MOTS CLÉS : chiropratique, diagnostic, prise en charge, thrombose veineuse superficielle, membre supérieur

itially attributed to a muscular strain/nerve entrapment, which was later identified as being the result of an SVT. An overview of the etiology, risk factors, diagnosis, and management of SVT as they pertain to this case will also be discussed.

Case presentation

History

A 31-year-old male presented to a chiropractic teaching clinic with a four-week history of progressive left sided arm tension which extended from the medial aspect of his arm to the anterior aspect of his proximal forearm. He indicated that he was generally healthy and had not changed any of his regular physical activity or exercise routines over the preceding year. He did not participate in any competitive training or repetitive overhead activities. He described his arm symptoms as tension along the medial aspect of the arm when full outstretched, and did not otherwise have any discomfort. The symptoms had been mildly progressive as they were becoming present with a reduced amount of extension to the elbow and they were not resolving with time. The patient indicated that the tension in the arm had begun to limit his ability to participate in physical activity and that he was becoming increasingly concerned and anxious. The patient denied any constitutional signs or symptoms, his medical history was unremarkable, and he was generally well. In addition, there were no red flags indicative of serious pathology identified during the assessment.

Physical examination

The patient was 5'4" and weighed 120 pounds. There was no observable swelling, discolouration, or skin lesion visualized over the area of complaint. Ranges of motion of the elbow were full with a report of tension over the anterior aspect of the left elbow in full extension. His blood pressure in the left arm was 110/65 mmHg and his heart rate was 64 bpm. An upper limb neurological examination was unremarkable bilaterally. Orthopedic testing of the left elbow was negative. Examination of the cervical spine was unremarkable and did not reproduce any of the patient's arm symptoms. On palpation, mild tenderness was elicited over the left biceps and brachialis musculature as well as over the cubital fossa. There was a thin rope-like structure that was tender to palpation along the anterior medial aspect of the forearm that coursed along the path of the median nerve. The differential diagnoses for the patient included biceps/brachialis muscular strain and peripheral entrapment of the median nerve.

Management

A treatment plan that included soft tissue therapy (specifically myofascial release techniques) over the area of complaint was initiated. Following a single session of manual therapy, the patient reported a gradual increase in tension in the anterior arm, and pain when performing full extension of the elbow. At this point, further manual therapies were discontinued and a trial of watchful rest was advised. After approximately one week of rest, the patient reported that the symptoms were progressively worsening and the patient was instructed to consult with his general physician who subsequently requisitioned a doppler ultrasound of the left elbow. The results of the ultrasound identified a near full occlusion and phlebitis of the mid-portion of the left cephalic vein, above the cubital fossa. The patient was then advised to avoid strenuous activity and to apply heat to the area until his symptoms dissipated. The patient began to experience relief to his arm within the five days that followed. On further questioning, it was discovered that approximately one month prior to the patient's initial clinic visit, he had undergone routine venipuncture for serology testing, which may have been the inciting event to the patient's condition.

Discussion

SVT characteristically involves a sequence of inflamma-

tion and thrombosis in the lumen of a superficial vein(s) as a consequence of one, or more, mechanical, chemical, biological, or rarely, infectious factors.^{1,11} The degree of thrombosis within a vein can vary, with more severe cases extending into the deep venous system.¹² The etiology of SVT has often been attributed to the components of Virchow's triad, which describes three broad categories of contributory factors for the development of thrombosis: 1) endothelial injury, 2) hemodynamic changes, such as venous stasis and turbulent flow, and 3) hypercoagulable states due to underlying conditions (i.e. factor V Leiden, prothrombin G mutation, protein C and protein S deficiency, antithrombin II, etc.).^{13,14} Endothelial damage to the vessel wall can result from either external trauma, such as from blunt force injuries or compression of the vein, or internal trauma, due to intravenous injections or drawing blood, as depicted in the presented case.¹

Varicose veins are thought to be a major predisposing factor for SVT and have been found to be associated in as high as 62% of cases due to their increased susceptibility to local external injury, as well as their propensity for venous stasis and altered flow rates.^{1,14-16} Additional risk factors that have been identified for the development of SVT include prolonged immobilization, obesity, use of oral contraceptives or hormone replacement therapy, pregnancy, recent surgery, vein stripping, the use of certain drugs, a history of SVT or DVT, intravenous catheter use, and active malignancies.^{1,11,13} Autoimmune diseases may also increase susceptibility to the development of SVT, such as Behçet's disease and Buerger's disease.^{17,18}

Although the epidemiology of SVT has not been well established, the prevalence of SVT in the lower extremity in the general population has been estimated to be around 3% to 11%, with an increased prevalence in women and older adults.^{5,19} This is approximately two-times higher than both DVT and PE combined.²⁰ SVT in the upper extremity is less common and typically involves the cephalic and basilic veins.^{13,21}

Clinical features of SVT can include the presence of erythema, warmth, and/or swelling over the affected vein. On palpation the vein is usually tender and may be hard along its distribution.^{6,22,23} In the absence of characteristic signs and symptoms, recognizing potential instigating factors from the patient's history, such as possible traumas or systemic conditions, becomes imperative for identifying the correct diagnosis.

Compared to the lower extremity, the risk of progression of upper extremity SVT to DVT or PE is believed to be less.¹³ Nevertheless, pulmonary emboli have been reported to be present in up to one-third of patients with upper extremity DVT.²⁴ Additionally, although a rare occurrence, the development of PE arising from thrombosis of the superficial veins of the arm, such as the basilic vein, has been documented.²⁵ The risk also seems to be greater when an SVT is in close proximity to a junction with the deep venous system, in particular, the saphenofemoral and the saphenopopliteal junctions.^{1,22} In fact, migration of an SVT to within three centimetres of the saphenofemoral junction, where the great saphenous vein joins the femoral vein, is considered to be as dangerous as a proximal femoral DVT.⁴

In the present case, the patient's chief complaint was that of tension over the anteromedial arm and forearm with no obvious signs of swelling or discolouration. His medical history was unremarkable. However, he did recall routine blood work being performed approximately one month prior to the onset of his left arm complaints that was conducted on the same side of his presenting symptoms. This key piece of information was initially not considered during the initial assessment, and only deemed relevant after an adverse response to soft tissue therapy was experienced by the patient. As stated above, SVTs occurring in the upper extremities are not as common as those in the lower extremities, but specific details of the patient's history such as the use of intravenous catheters, intravenous injections or drug use, or venipuncture for blood work or donations, should increase the suspicion of an upper extremity SVT as these are believed to be chief causative factors.^{13,26} In addition to asking the patient about potential causes for vessel trauma, inquiring about other risk factors discussed above should be included in the patient's initial evaluation (Table 1). In the absence of a local or obvious causative factor, the presence of an underlying occult condition should be considered and the patient may be required to undergo additional screening for coagulation abnormalities, particularly in cases where the thrombosis is extensive, migrant, or recurrent.^{22,27} Likewise, the presence of fever or leucocytosis may indicate that the patient is suffering from a systemic infection.¹³

In an otherwise healthy, young patient, where there is clinical suspicion of venous thrombosis in the upper ex-

Table 1.
Factors that should increase a practitioner's suspicion of SVT.

• Intravenous catheters • Intravenous injections or drug use • Venipuncture for blood work or donations • Prolonged immobilization • Recent surgery	• Pregnancy • Use of oral contraceptives or hormone replacement therapy • Varicose veins or vein stripping • Inherited hypercoagulable condition • History of SVT or DVT
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tremity, consideration should also be given to a diagnosis of Effort Thrombosis, or Paget-Schroetter Syndrome. This is a relatively infrequent disorder, and refers to axillary-subclavian vein thrombosis associated with strenuous and repetitive or sustained upper extremity movements, such as those involved in sporting activities.^{28,29} Swelling and arm discomfort are the most frequent presenting problems associated with this condition, and unlike those suffering from upper extremity DVT secondary to central venous catheters, patients with effort thrombosis are usually symptomatic.²⁸

In most uncomplicated cases of SVT, a clinical diagnosis is established based on presenting signs and symptoms, however, due to the associated risk of DVT and PE, further evaluation may be necessary. Concomitant DVT has been reported in up to 44% of individuals with a diagnosis of SVT and is usually associated with extensive limb swelling.^{22,27} Furthermore, up to 33% of DVT's have been reported to have asymptomatic PE, and up to 13% have symptomatic PE.²⁷ In a systematic review and meta-analysis on the prevalence of DVT and PE in patients with SVT, roughly 18% and 7% of patients with SVT were found to have DVT and PE respectively.²⁰ For this reason, asking patients who present with confirmed or suspected SVT about symptoms of PE, such as dyspnea, pleuritic chest pain, and fever is important. Given that a diagnosis of SVT on the basis of clinical features alone is not always straightforward, as well as taking into consideration the supplemented risk of an associated DVT or PE, venous ultrasonography is now considered essential for both confirming the clinical diagnosis of SVT and for

ruling out concomitant DVT.^{4,23} Ultrasound may also be useful for excluding other differential diagnoses, such as cellulitis, panniculitis, erythema nodosum, insect bites, and lymphangitis.²⁴

Treatment of an SVT will depend on a number of factors, including the location and the underlying cause of the SVT, as well as the presence of concomitant DVT, varicose veins, and hypercoagulability disorders.^{1,13} The majority of patients are treated symptomatically with the goal of relieving pain, reducing erythema and swelling, and preventing potential complications or re-occurrence.^{1,13} These treatments may include local heat, anti-inflammatory agents, and compression.¹ In cases of upper extremity SVT secondary to an intravenous catheter, the device is first removed followed by conservative measures. Anticoagulation is seldom indicated for SVT unless there is progression or involvement of the deep venous system³⁰, inflammation is persistent in the affected area³¹, or venous reflux is demonstrated on duplex ultrasound at the saphenofemoral junction/ saphenopopliteal junction in association with varicose veins¹. If a hypercoagulable disorder is identified, treatment with long term anticoagulation may be warranted.¹

In this case, the patient underwent a course of soft tissue therapy over his area of complaint due to an initial differential diagnosis of muscular strain and peripheral nerve entrapment. This treatment exacerbated the patient's condition after a single session and prompted ancillary investigation. Local massage or manual therapy is generally contraindicated over an area of venous disease involvement (this may include phlebitis, thrombophlebitis, DVT and/or SVT) due to potential for worsening accompanying inflammation and pain.³² In the case of varicose veins, the area with varicosities should be avoided if applying pressure is pain provoking or if the patient has risk factors of clot formation.³² Although this patient's symptoms eventually resolved within five days once the appropriate diagnosis was made, unnecessary pain and discomfort could have been avoided.

Summary

This case demonstrates the importance for clinicians that work primarily in a musculoskeletal care setting to consider non-musculoskeletal causes for their patients' presentations when formulating differential diagnoses. With respect to SVT, the initial signs, symptoms, and

examination may not always point to a definitive diagnosis. Therefore, ensuring that key elements from the patient's history are acknowledged, such as possible trauma or underlying medical conditions, becomes essential. Due to the associated risks of DVT and PE, ultrasound evaluation of a suspected SVT may need to be performed. As such, communication with the patient's primary care physician, or other health care providers, may be necessary to help facilitate further diagnostic procedures. In the case of a confirmed SVT contributing to a patient's symptoms, it may be within the practitioner's scope to provide symptomatic relief and/or coordinate with other practitioners to provide interventions that may fall outside their abilities or legal restrictions. For chiropractors and other manual therapists, the main goal should be to identify these conditions early, to prevent unnecessary and potentially harmful treatments, and to ensure that the appropriate work-up is carried out.

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