

Lower Extremity Multiple Thromboses Presenting as Sciatic Leg Pain: A Case Report

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ABSTRACT

Objective: The purpose of this report is to describe the management of a patient with lower back and right-sided lower extremity pain originating from multiple deep vein thromboses.

Clinical Features: A 24-year-old female collegiate runner with a history of right gluteal and thigh pain lasting for 2 weeks sought chiropractic care for her ongoing low back pain and right sided lower extremity pain. A physical exam identified a concerning “red flag” for serious pathology contributing to this young woman’s acute lower back pain and associated right lower extremity pain.

Intervention and Outcome: This patient was evaluated, and the clinical exam raised suspicion of a possible deep vein thrombosis as a source of her pain. An immediate referral was placed for further diagnostic work-up at a nearby emergency room where 3 thromboses were identified in the patient’s right lower extremity. The patient was treated with intravenous anticoagulant therapy for 3 days in the hospital setting, then underwent 6 months of oral anti-coagulant medication, along with activity modifications. The patient was diagnosed with Factor V Leiden Thrombophilia, after being referred to a hematologist for further evaluation.

Conclusion: We recommend clinicians stay mindful of all factors contributing to low back pain combined with lower extremity radicular symptoms. In this case, consideration of additional pathologies resulted in the identification of multiple deep vein thromboses as a source of right lower extremity pain imitating sciatic symptoms.

INTRODUCTION

Blood clots originating within the vascular drainage systems of the lower extremities, including deep vein thrombosis (DVT) and pulmonary emboli (PE), are estimated to effect 1 in every 1,000 individuals and contribute to an estimated 60,000-100,000 deaths per year in the United States.¹ Approximately, 1/3 of all diagnosed venous thromboses will embolize to the lungs as a pulmonary embolism, which may lead to respiratory symptoms or even death.² In young and otherwise healthy individuals between the ages of 25-35, the prevalence of deep vein thrombosis (DVT) is only 3 cases per 10,000 people.³ There is sparse evidence on the prevalence in those individuals under the age of 25.

The formation of thrombi in the deep veins occurs most commonly in the large veins of the legs or pelvis. Pulmonary embolism develops when a thrombus dislodges from the walls of a vein, traveling through the heart, and becoming lodged in the pulmonary arterial system as these vessels progressively narrow. There is a 50% chance that patients with untreated proximal deep vein thrombosis (DVT) will develop symptomatic PE within 3 months.⁴ A proximal DVT is one that is in the popliteal, femoral, or iliac veins. For 25% of patients, the initial manifestation of PE is sudden death, via obstruction of the cardio-pulmonary circulation.⁴ Venous thromboembolism (VTE) may be categorized as provoked or unprovoked. This categorization influences the risk of recurrent VTE and duration of anticoagulation therapy. It is important for primary care providers to clearly understand the pathogenesis and causes of thrombosis, and to create evidence-based therapeutic and prophylactic patient care plans that prevent recurrent VTE.⁴ An unprovoked VTE refers to a thrombotic event that is not associated with an environmental risk factor. Examples of nonenvironmental risk factors are hereditary thrombophilia, male sex, and advanced age. A provoked VTE refers to a thrombotic event that has been caused by environmental or acquired risk factors for VTE. Additionally, provoked events may be divided into transient or persistent causes. A transient variable is expected to resolve after the VTE event. Active cancer, congestive heart failure, obesity, and varicose veins are examples of persistent provoked risk factors, while examples of transient provoked risk factors include immobility or prolonged bed rest (> 3 days), estrogen therapy, trauma or surgery, pregnancy, or the presence of a foreign object or implanted medical device.⁴

Clinical signs and symptoms of a VTE include asymmetrical tissue swelling, warmth, redness, or pain in the affected extremity.¹ Pulmonary embolism may present with dyspnea, chest pain, hemoptysis, syncope, tachycardia, or hypotension.⁵ However, these signs and symptoms have been shown to be unreliable at predicting a DVT.⁶

The Wells Criteria is a common scoring system intended to help clinicians estimate the probability that an individual has a DVT. The Wells Criteria involves creating a score based on the presence or absence of 9 items and is shown in **Table 1**.⁷

Table 1: Wells criteria for the prediction of deep vein thrombosis (DVT)

Clinical Features	Points
Active cancer (receiving treatment or treated in past 6 months)	1
Paralysis, or recent cast immobilization in lower extremities	1
Bedridden for ≥ 3 days or having major surgery within the past 12 weeks	1
Localized tenderness along the distribution of deep venous system	1
Swelling of the entire leg	1
Calf swelling of ≥ 3 cm (compared to asymptomatic leg)	1
Pitting edema on affected leg	1
Collateral superficial veins (non-varicose)	1
Previous DVT	1
Alternate diagnosis is at least as likely as DVT	-2
DVT Likely 2 points or more	
DVT Unlikely 1 point or less	

Diagnosis of VTE is best done with compression ultrasonography or computed tomography pulmonary angiography (CTPA). However, only 20% of all suspected cases have a VTE confirmed.⁵ D-Dimer testing may also be considered when evaluating a suspected thrombus, although this laboratory test is less accurate when used in the elderly. D-Dimer is a sensitive

marker for VTE and can exclude those VTE that are non-specific and avoid the need for further imaging.⁵

Management of suspected VTE in private practice necessitates an immediate referral for medical management, preferably to the emergency department. Once diagnosed, treatment consists of 3 phases: initial, long term, and extended.⁵ Anticoagulation medications are the treatment of choice for most patients prescribed by their primary care physician. The choice of medication should be carefully weighed with patient characteristics and preference.

The purpose of this case study is to demonstrate the management of a suspected DVT in a college athlete who was seeking chiropractic care for low back and lower extremity pain.

CASE PRESENTATION

A 22-year-old female college athlete presented with pain in her right gluteal region and right anterior thigh. This pain was well-localized and did not extend past her knee. The athlete stated she participates in track and field at a local university and explained she regularly runs about 5 miles per day. She explained she was experiencing low back pain and “sciatica” in her right gluteal region that began about one week prior while playing basketball. She denied experiencing episodes of similar pain in the past. She chose to take a break and rest from her usual daily runs for a few days, which led to a mild reduction in her pain levels. However, on the morning she presented for care, she attempted to return to running just prior to her appointment. The athlete stated she ran one tenth of a mile before having to stop due to pain in her right gluteal area and right anterior thigh region. She also noted that after her run she felt weakness and was unable to bear weight on her right leg. She noticed mild swelling in her anterior thigh with an associated sensation of “tightness” shortly after her morning run. At her initial consultation, she rated her pain as a 6/10 on the numerical pain rating scale (NRS) while resting and a 9/10 while walking or performing any weight-bearing activity. She reported her symptoms were constantly present, and had gradually worsened since running that morning. The athlete described her pain as “deep” and “radiating,” extending from her right gluteal area to her anterior thigh. Bending, standing, walking, sitting, and general lower extremity movements provoked her symptoms. She could not recall anything that provided relief of her pain. On initial presentation, the athlete presented with her mother and utilized a wheelchair to assist with mobility, since walking or bearing weight on her right leg was too painful.

Upon the initial evaluation, a thorough history and review of systems were performed; no findings from her past health history appeared to contribute to her conditions. She also denied any allergies, surgeries, hospitalizations, significant past traumas, or illnesses. The only prescription medication she reported taking was an oral contraceptive. She also denied having sought any prior evaluation for treatment for her current low back and leg pain complaint. Her vital signs were within normal limits. Lower extremity neurological testing demonstrated normal sensory findings. She exhibited weakness with right hip flexion graded

at 3/5 with corresponding pain. Her other lower extremity motor functions were graded within normal limits at 5/5 which included: left hip flexion, bilateral knee extension, bilateral knee flexion, bilateral ankle dorsiflexion/inversion, bilateral ankle plantarflexion/eversion, and bilateral big toe extension. While she retained muscle strength during testing, she labored to move the right leg and took a bit of time for full muscle contraction. Right patellar reflex was graded 1+ and all other lower extremity reflexes were 2+. Lumbosacral orthopedic tests revealed negative straight leg raise test, negative crossed straight leg raise test, negative slump test, negative Braggard sign, negative Bechterew test, negative sacral thrust, and negative Valsalva test. Visual inspection of the athlete's right quadriceps muscles demonstrated moderate edema, causing difficulty in movement of the right lower extremity. There was mild erythema and mild warmth in the anterior thigh, suggesting a possible inflammatory cause of this patient's complaint. Lumbosacral range of motion testing revealed a mild reduction of lumbar extension with antalgia towards her right side. All other lumbosacral ranges of motion were within normal limits and pain-free. Right hip range of motion demonstrated a mild reduction in extension, due to discomfort and "tightness"; all other ranges of motion were pain-free and within normal limits. During segmental and muscle palpation, pain was unable to be reproduced in the lower back. The athlete did exhibit localized pain and tenderness at the right gluteal muscles, specifically inferior to the piriformis muscle and in the region of the right ischial tuberosity. While she was lying prone, mild swelling was also noted in the right calf region, when compared to the left side. Her dorsal pedal and posterior tibial pulses were within normal limits and equal bilaterally. Due to the athlete's painful presentation and difficulty performing transitional movements, the chiropractic physician did not perform additional exams or orthopedic testing in the regions of complaint.

Considering inconclusive musculoskeletal findings upon examination including lack of true nerve root lesion signs and difficulty reproducing the patient's pain in the lumbosacral region, the clinical decision was made to refer the patient to a local emergency room (ER) for further diagnostic work-up. A recommendation with a medical provider was given for a lower extremity doppler ultrasound test to exclude potentially serious pathology, such as thrombosis or compartment syndrome.

The chiropractic physician followed-up with the athlete and her mother later that evening. Her mother stated she took her daughter to the ER after the initial encounter. Three blood clots were identified in the patient's right lower extremity; locations included one within the posterior medial thigh, one within the anterior medial thigh, and the third in the medial calf region. The athlete was immediately admitted to the hospital and underwent intravenous anti-coagulant therapy. She was closely monitored for the effectiveness of the therapy and was hospitalized for a total of 3 days. Had anti-coagulant therapy been ineffective, surgical breakdown of the clot formations would have been performed based on the attending physician's recommendations. The attending physician reportedly claimed if the patient

would have continued to ambulate that day, the risk for pulmonary embolism would have substantially increased. Clinically relevant reasoning associated to patient diagnosis was correlated with the use of birth control, considering she had no other co-morbidities inherent to this diagnosis.

Combined estrogen-progestin oral contraceptives (COC) are widely used. Various contraceptive medications are available and studies have shown these medications increase the risk of thromboembolism. This risk varies according to the type of progestin in the medication, and the risk decreases with shorter duration of use and less estrogen contents.⁸

Following the patient's hospital stay, she was referred to a hematologist and underwent further testing to investigate additional contributors involved with her tendency to form clots. She was diagnosed with a clotting disorder known as Factor V Leiden thrombophilia. The athlete will continue to undergo treatment with anticoagulant medication until otherwise noted. Swelling of the lower extremity reduced within a few weeks after the initial onset and she gradually returned to short distance light jogging as well as other non-compressive activities and movements including swimming and biking.

Venous thromboembolisms are uncommon among young, and otherwise healthy, athletes presenting to a chiropractic clinic. Characteristic risk factors for thromboembolism include obesity, sedentary lifestyle, and older age (>60); these risk factors do not apply to young adult athletes, which makes this a novel case.⁹ The National Blood Clot Alliance has provided guidelines when evaluating suspected venous thromboembolisms in athletes.¹⁰ These guidelines are presented in **Table 2**.

Table 2: National Blood Clot Alliance Guidelines for Suspected Venous Thromboembolisms in Athletes

Traveling long distances to and from a sports competition (by plane, bus, or car)
Dehydration (during and after a strenuous sporting event)
Significant trauma
Immobilization (brace or cast)
Bone fracture or major surgery
Birth control pills and patch, pregnancy, hormone replacement therapy
Family history of DVT or pulmonary embolism
Presence of an inherited or acquired clotting disorder (Factor V Leiden, prothrombin, 20210 mutation, antiphospholipid antibodies, and others)
Presence of a congenital abnormality of the anatomy of the veins
May-Thurner Syndrome (narrowing of the major left pelvic vein)
Narrowing or absence of the inferior vena cava (the main vein in the abdomen)
Cervical rib causing thoracic outlet obstruction.

The presence of venous thromboembolisms requires medical management and cannot be managed by a chiropractor. Clinicians should consider the risk factors shown in **Table 2** when evaluating athletes who may have suspicious findings detected on physical examination. In cases such as this, the appropriate referral will result in further testing. The athlete, prior to this incident, was unaware that she had Factor V Leiden thrombophilia (FVL), which can lead to other clot-related pathologies. Patients may present with either venous or arterial thrombotic events, both of which are associated with a high morbidity and mortality. Co-morbidities of FVL include recurrent venous thromboembolisms as well as obstetric complications due to the risk of anticoagulation, which may adversely affect the fetus in utero or during birth.¹¹ Cerebral vein thrombosis can occur in FVL individuals, especially in patients using oral contraceptive pills.¹¹ Studies have shown FVL to be associated with an increased risk of Budd-Chiari syndrome and a modest increase in the risk of coronary artery disease. The FVL mutation is associated with an increased risk of stroke especially in women, smokers, and younger individuals.¹¹

Factor V Leiden thrombophilia is a genetic disorder characterized by a deficient anticoagulant response to activated Protein C (APC) and an increased risk for venous thromboembolism. The current evidence suggests that the mutation has a modest effect on recurrence risk after initial treatment of a first venous thromboembolism. Factor V Leiden is also associated with up to a 3-fold increased risk for spontaneous abortion or other obstetric complications, although the probability of a successful pregnancy remains high among women with this condition.¹² The clinical expression of Factor V Leiden is influenced by the number of mutated Factor V Leiden alleles, coexisting genetic and acquired thrombophilia disorders, and circumstantial risk factors. Diagnosis requires the activated Protein C resistance assay (a coagulation screening test) or DNA analysis of the *F5* gene, which encodes the Factor V protein. The duration of oral anticoagulation therapy should be based on an assessment of the risks for venous thromboembolism recurrence and anticoagulant-related bleeding. In the absence of evidence that early diagnosis reduces morbidity or mortality, decisions regarding testing at-risk family members should be made on an individual basis.¹² Lifestyle modifications for those diagnosed with FVL are described in **Table 3**.

Table 3: Agents/Circumstances to Avoid with Factor V Leiden.¹³

Women heterozygous for the Leiden variant and a history of VTE should avoid estrogen-containing contraception and hormone replacement therapy (HRT).
Women homozygous for the Leiden variant with or without prior VTE should avoid estrogen-containing contraception and HRT.
While asymptomatic women heterozygous for the Leiden variant should be counseled to consider alternative forms of contraception and control of menopausal symptoms, those electing use of:
-Oral contraceptives should avoid third generation and other progestins with a higher thrombotic risk.
-Short-term HRT for severe menopausal symptoms should avoid oral formulations.

CONCLUSION

Young athletes have minimal risk of venous thrombosis; however, this population is exposed to many acquired thrombogenic risk factors, including trauma, immobilization, long-distance travel, and the use of oral contraceptives.¹⁴ Since high performance sports are

known to carry an increased risk of thrombogenesis, measures to avoid thrombosis or a thromboembolic event must be initiated in case of known APC resistance. Suitable measures are early anticoagulation during periods of immobilization, leg muscle exercises for long distance flights, and avoidance of hemoconcentration with a sufficient oral fluid intake.¹⁵

Finally, in relation to this presenting case, chiropractic management must include a thorough history and physical exam with critical thinking to include other differential diagnoses not commonly found. Clinical reasoning and consideration of all differential diagnoses is necessary to rule out red flags or serious pathologies that present as lower back and lower extremity pain.

It is essential for clinicians to evaluate and interpret numerous factors that may be contributing to the patient's clinical presentation, to provide the highest quality care possible and make the appropriate referral for further evaluation and management.

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