
Anomalous Inferior Vena Cava as the cause of Multiple Deep Venous Thrombosis

Daniel W. Kang MD, MPH, Jeffrey Berenberg MD, Darrell Baranko MD, and Scot Tebo MD

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Abstract

An anomalous Inferior Vena Cava (IVC) is a possible independent risk factor for deep vein thrombosis (DVT). This case represents the rare complication of an anomalous IVC causing multiple DVTs, not only in the lower extremity, but also in the abdominal peri-aortic circulation. In young patients who develop a DVT without risk factors, an anomalous IVC should be in the differential diagnosis.

Case Report

A 19 year old previously healthy male presented to Hilo General Hospital (HGH) in Hawaii with symptoms of low back pain for 3 days. His low back pain was determined to be musculoskeletal in nature and he was discharged with non-steroidal anti inflammatory medication (NSAIDS). However, his symptoms worsened over the next few days, and progressed to include left lower extremity pain and swelling. He returned to HGH where an ultrasound demonstrated a left lower extremity deep venous thrombosis (DVT). He underwent emergent localized thrombolytics because of concerns of limb ischemia. Computerized Tomography (CT) scan showed resolution of the lower extremity DVT. He had near resolution of his symptoms, and thereafter was started on anticoagulation with unfractionated heparin.

Two days later, while still on heparin, he experienced renewed pain in his lower extremities and back. An immediate CT showed re-occlusion of his superficial femoral vein with a new DVT. CT also showed an anomalous inferior vena cava. He was transferred to Tripler Army Medical Center (TAMC) for further evaluation and management.

The physical exam at TAMC revealed left lower extremity tenderness and swelling, in addition to lower back tenderness. A repeat CT confirmed the DVT and anomalous IVC (figure 1), but also detected

an unknown mass (figure 2) in the peri-aortic area. A Magnetic Resonance Venogram (MRV) was done which was inconclusive. A follow up CT guided biopsy determined the mass to be a blood clot/ secondary DVT. He was treated conservatively with heparin and coumadin.

A review of systems revealed no precipitating events leading up to his DVT formation. He had a negative family history and a normal hypercoagulable workup. He was treated conservatively with heparin and coumadin. Upon discharge his symptoms improved to where he was able to walk with crutches. 8 month follow-up revealed that the patient was completely asymptomatic.

Discussion

The mechanism for DVT development in persons with anomalous IVC's are unknown. However, one plausible mechanism focuses on one component of Virchow's triad—stasis. Despite the presence of prominent collateral IVC vessels, this patient likely had increased lower extremity stasis contributing to clot formation^{1,3}. Anomalies of the IVC were once thought to be extremely rare, however, studies have shown that prevalence rates of 0.3% exist in the healthy general population². It's thought that malformation of IVC's are congenital and occur during embryogenesis³. Obernoster et al prospectively evaluated 31 patients with DVT and found 5 patients with anomalies of the IVC³. This 16% rate of anomalies existing in this group of patients was much higher than the 0.3% projected for the general population³. 3 of the 5 patients had additional hypercoagulable factors in this study. Other more limited retrospective case series of patients with anomalous IVC who developed DVT showed rates of 5.3% to 9.5%^{4,5}. However, these retrospective numbers were considered conservative because in these studies not every DVT case received a CT/MRI to evaluate for a potential IVC anomaly^{1,4,5}. These studies suggest that anomalous IVC's may be an independent risk factor for DVT's.

Patients with anomalous IVC's who develop DVT's usually have them in the lower extremity. A

Authors' Affiliation
Tripler Army Medical Center,
Honolulu, HI 96859 (D.W.K, J.B.,
D.B., S.T.)

Correspondence to:
Daniel W. Kang
389 Crestmont Dr.
Oakland, CA 94619

literature review demonstrates that this is only the third documented case of a patient who had no other risk factors for DVT's, and who developed separate and simultaneous DVT's in the abdomen and lower extremities (3,6). His low back pain was likely the initial symptom of his peri-aortic DVT. It is probable that in the subset of patients with undiagnosed IVC's who develop DVT's with symptoms of back pain, some of them might have had abdominal DVT's.

Conclusion

Anomalous IVC's may be an independent risk factor for the development of DVT's. In young patients who develop a DVT without known risk factors, the evaluation of an anomalous IVC should be considered as part of the hypercoagulable workup. Patients with an anomalous IVC may be at higher risk of developing DVTs and therefore should be advised about activities predisposing to blood clots such as smoking, oral contraceptives, and having prolonged periods of immobilization. In patients with existing anomalous IVC's, low back pain should raise suspicion for both a lower extremity as well as an abdominal DVT. Finally, a larger prospective may cement the causal relationship between anomalous IVC's and DVT's as reported by Obermaster and colleagues.

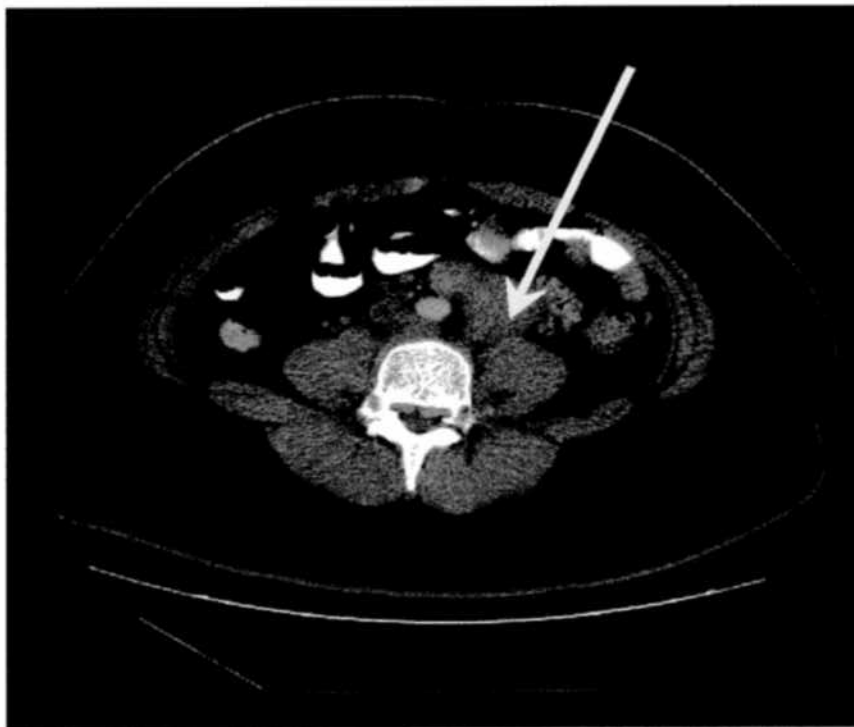


Figure 1.— CT of Peri-Aortic Thrombus

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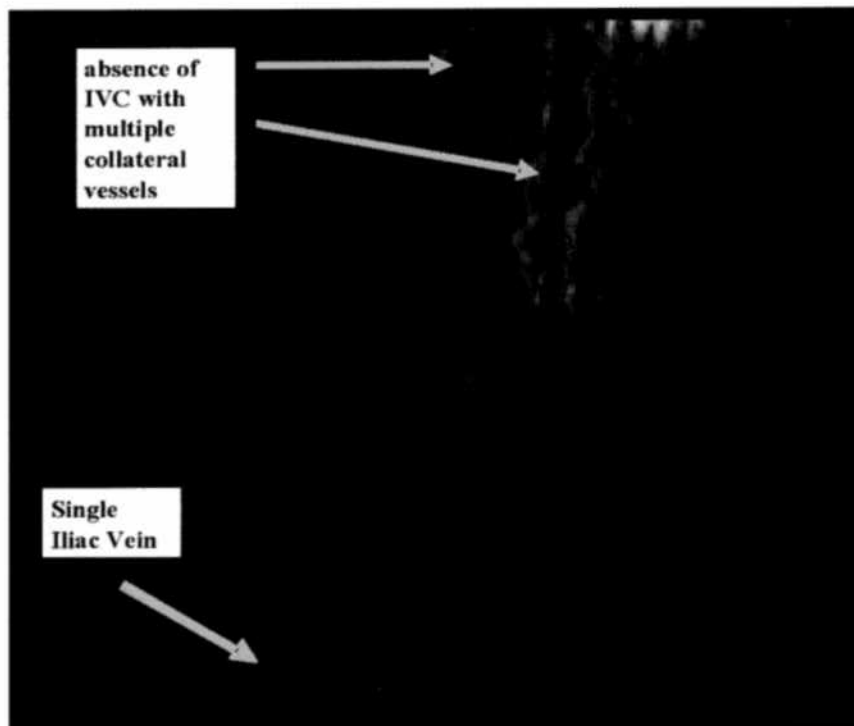


Figure 2.— Magnetic Resonance Venogram

Until there's a cure, there's the American Diabetes Association.