**Title: Managing Venous Thromboembolism in Patients with Active Cancer**

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**Date: 16 Feb 2024**

**Dr Alok Khorana**

"I'm Alok Khorana. I'm a medical oncologist and I'm a professor of medicine at the Cleveland Clinic, Lerner College of Medicine.

How does VTE present in cancer patients, and what considerations should be made for diagnosis and treatment?

VTE can present in a couple different ways in people with cancer. Firstly, it can be the first presenting symptom of cancer. So sometimes people present with VTE and on workup, they're discovered to have cancer. Another way is that it presents early in the course of a cancer diagnosis. So some may be diagnosed with cancer, and then they either get surgery or get started on systemic therapy like chemotherapy or immunotherapy. And very shortly after starting treatment, they can present with a swollen leg that can lead to a diagnosis of a DVT, or they can present with what's called incidental DVT or PE, which means that they got a scan for the cancer workup. And on the scan, somebody found a blood clot in the lungs or in one of the deep vein veins of the body. So many different ways that people can present.

What are the current treatment options for VTE in patients with cancer?

Thankfully, there's a lot of different treatment options for people with cancer who have been diagnosed with VTE. There's some older drugs, such as warfarin and heparin. Heparin can be unfractionated heparin, which is intravenous, or it can be low molecular heparin, which is subcutaneous and can be given as an outpatient. More recently, in the past several years, there's been a new class of drugs called direct oral anticoagulants that includes drugs like edoxaban, rivaroxaban and apixaban that can be used to treat people with a new diagnosis of VTE. These drugs are oral, although one of them, edoxaban, needs four or five days of heparin before you can transition to the drug. The other two can be started immediately.

What is the research landscape, and what are the ongoing studies in this area?

Current studies are focusing on two aspects of VTE in cancer. One is better treatments. So even though we've gotten much better and have increased the amount of options available to people with cancer with VTE, there's still the risk of bleeding in patients who are receiving full-dose anticoagulation. So one set of research is looking at new molecules, such as the class of drugs known as factor eleven inhibitors, to see if we can continue with the efficacy against blood clot prevention, but at the same time reduce the risk of bleeding. And so there's a couple of different large studies that are addressing this issue. A second set of research is focused around primary prevention. So finding high-risk patients and then preventing them from having VT in the first place. And there's several different ongoing approaches to this, using either the direct oral anticoagulants or other drugs.

What would be your take-home messages for vascular clinicians?

I think it's important to identify high-risk patients so that primary prevention can be discussed. This is now recommended by several guidelines, including those of the cancer societies such as ASCO and NCCN, as well as the haematology and thrombosis societies such as ISTH and ASH and ITAG. Second, it's important to individualise treatment options for people with cancer with VTE. For some patients, direct oral anticoagulants may be the right choice. For others, it may be low-molecule heparin, depending on drug, drug interactions, risk of bleeding, patient preference and values and so on. And so just making sure that everybody's aware of the options and patients are educated about their options.

What further study is needed in this area?

We continue to refine risk assessment, so better being able to understand what's causing and driving blood clots in people with cancer, what can be done to identify high-risk patients? How can we prevent this from happening in the first place? And if it does happen, how we can prevent it from recurring? These are all important research questions that we're addressing.

One thing I want to highlight is that there's still a marked lack of awareness amongst cancer patients about the risk of DVT or PE. Many, and in some studies, even the majority of cancer patients are not aware that they are at risk for getting blood clots. And they're not aware about the warning signs and symptoms of blood clots, such as asymmetrical, swollen leg, new onset, chest pain, new onset, shortness of breath, blood in your cough, all of those things. So it's very important that patients be made aware of this possible diagnosis and that clinicians and patients both make sure that everybody understands the risk of VTE in people with cancer.”