

The significance of VTE in cancer: Introduction of the ‘Spot the CLOT’ series

by Laurie Sardo, Julia Bayadinova, Susan Jenkins, Lynne Penton

ABSTRACT

Learning needs of patients with cancer have been examined and published widely in oncology nursing literature. However, the topic of cancer-associated thrombosis (CAT) is rarely considered a necessary inclusion.

Awareness by individuals with cancer about venous thromboembolism (VTE) and its association with cancer is low (Aggarwal et al., 2015). A 2015 qualitative study by Dr. Simon Noble revealed that high-risk cancer patients receiving active chemotherapy knew more about febrile neutropenia than signs and symptoms of VTE, despite a higher absolute risk of VTE. This is concerning given that CAT is the number one cause of death for patients undergoing chemotherapy treatment. Awareness of CAT is generally low not only in patients and their families, but also in healthcare providers. Research has found that many patients diagnosed with CAT perceived a significant knowledge deficit in their treating physicians because alternative diagnoses were considered before CAT, despite classic signs and symptoms of VTE (Noble et al., 2015).

VTE is a common and often severe complication in cancer patients, being the leading cause of morbidity and second leading cause of

mortality (Noble et al., 2015). Despite its significance, however, the awareness of CAT is low in patients, caregivers, and healthcare providers. This article is the first in a series entitled, ‘Spot the CLOT’, which is aimed at promoting the awareness of CAT in oncology nurses with the goal of improving patient education on this important topic.

INTRODUCTION

In 2019, Cancer Care Ontario (CCO) published the Ontario Cancer Plan (OCP). This four-year plan was developed in collaboration with clinical leaders across the province with the goal of creating a cancer system that is “person-centred, safe and effective in an efficient, equitable and timely manner” (CCO, 2019a). The Patient Education Program Strategic Framework is an essential component of the OCP with three distinct pillars: Quality Standards, Advance Health Literacy, and Promote Self-Management (CCO, 2019b). In particular, self-management requires cancer patients and survivors to learn about potential impacts of the disease, side effects of cancer treatment, and late and long-term effects following the completion of therapy.

Learning needs of patients with cancer have been examined and published widely in oncology nursing literature. However, the topic of cancer-associated thrombosis (CAT) is rarely considered a necessary inclusion despite its incidence and life-threatening potential. This is concerning given cancer patients account for 15 to 20 percent of all venous thromboembolic (VTE) events. The highest incidence of VTE in cancer patients is seen in the initial period after cancer diagnosis with mortality rates highest in the first year after diagnosis (Elymany et al., 2014). Moreover, cancer patients have a five- to seven-fold increased risk of VTE with up to 20% of cancer patients developing VTE throughout the course of their disease (Abdol Rasak et al., 2018). In hospital mortality rates are as high as 19.4% in patients with pulmonary embolism (PE) (Xiong, 2021).

The type and amount of information that patients want is dependent on the type of cancer, the extent of the disease, their treatment plan, and the disease trajectory (Jansen et al., 2007). The uncertainty of living with cancer creates considerable emotional stress. Information that is not tailored to patients’ learning readiness and learning capabilities is often reported by staff as unsuccessful teaching (Grahm & Johnson, 1990; Guan et al., 2021). It is the intention of the authors to educate nurses on this life-threatening occurrence within the cancer patient population to aid in their education of cancer patients and survivors.

A series of dedicated articles from Advanced Practice Nurses involved in the care of CAT patients will be published in the

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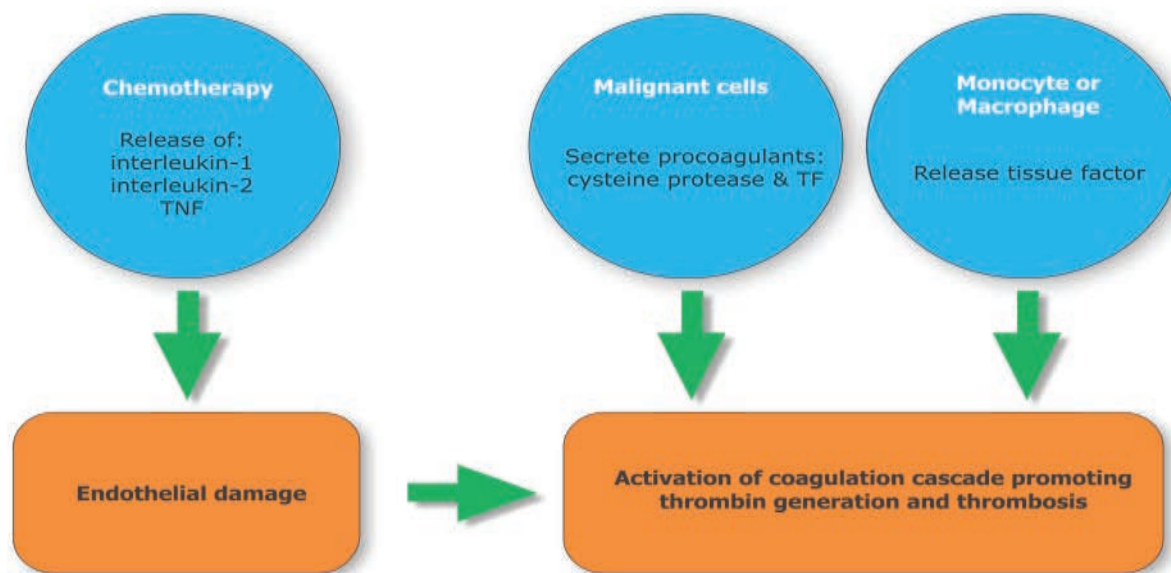
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Figure I
Mechanisms of Cancer-Associated Hypercoagulability



Adapted from Bick, 2003.

Canadian Oncology Nursing Journal. The purpose of the series is to focus on this critical and largely overlooked aspect of patient education. The approach is to move towards goals of having routine dialogue with patients about VTE, quantifying risk, reducing emergency room presentations, involving patients and families in the monitoring of symptoms and, most importantly, reducing patient and caregiver stress.

This series entitled, ‘Spot the CLOT’, will offer education targeting the importance of patient (and caregiver) teaching on venous thromboembolism (VTE) and its association with cancer, the value and impact of nurse education, risk stratification tools, and available resources to assist in achieving the goals cited above.

PATHOPHYSIOLOGY OF CAT

The association between cancer and thrombosis is well-established. Armand Trousseau documented the relationship in 1865. However, Jean Baptiste Bouillaud first described the presentation of deep vein thrombosis (DVT) in cancer patients in 1823 (Noble & Pasi, 2010). The pathophysiology of CAT is a

complex interplay between the tumor cells, cancer treatment, patient-related factors, and the coagulation cascade.

Hemostasis is the physiologic defense mechanism to control bleeding and consists of vasoconstriction, platelet plug formation, and blood coagulation. Thrombosis is the final product of the coagulation cascade activation. It occurs when an imbalance in the normal hemostatic response results in a blood clot that completely or partially obstructs a vein or an artery.

Cancer and its treatments act as drivers for thrombosis in multiple ways as illustrated in Figure I. This may also be explained by Virchow’s triad of hypercoagulability, stasis of blood flow, and endothelial injury, all of which are common in cancer patients. First, the tumour cells express a cancer procoagulant called cysteine protease, which can directly activate the coagulation cascade resulting in thrombin generation. In addition, monocytes and macrophages release tissue factor, which activates Factor VII and mucin (sialic acid) from adenocarcinomas and can activate factor X, resulting in further thrombin generation. Both of these mechanisms contribute to a hypercoagulable state.

Next, cancer treatment typically involves surgery, chemotherapy, and/or central venous catheter placement, all of which induce endothelial injury via vascular damage (Elyamany et al., 2014). Moreover, patients with cancer often require central venous catheters, which have a thrombogenic surface and are, therefore, associated with an increased thrombosis risk (Bick, 2003). Finally, immobility, hospitalization, and vascular compression by the tumor may contribute to the stasis of blood flow.

There are additional patient-related risk factors that may contribute to CAT. Many cancer patients are older and have multiple comorbidities such as hypertension, diabetes and coronary artery disease that place them at increased risk (Falanga et al., 2017).

CAT PATIENT AWARENESS & NEED FOR EDUCATION

Awareness by individuals with cancer about VTE and its association with cancer is low (Aggarwal et al., 2015). A 2015 qualitative study by Dr. Simon Noble revealed that high-risk cancer patients receiving active chemotherapy knew more about febrile neutropenia than signs and symptoms of

VTE, despite a higher absolute risk of VTE. This is concerning given that CAT is the number one cause of death for patients undergoing chemotherapy treatment.

Cancer patients' ability to recall healthcare provider discussions about febrile neutropenia provides assurance that patients are able and willing to participate in their cancer care. Dr. Noble's study revealed that cancer patients, once diagnosed with a blood clot, were surprised and disappointed that they were never informed of VTE risks during their prior healthcare visits (Noble et al., 2015). This appears to be of greater concern for cancer outpatients, as previous studies have found low awareness among outpatients compared to cancer inpatients, suggesting an opportunity for improved education (Aggarwal et al., 2015; Sousou & Khorana, 2010).

Symptoms of VTE are often confused with side effects of cancer and its treatment, thus underscoring the significance of patient education on VTE. It is essential that cancer patients understand and recognize the signs and symptoms of VTE. This is not so patients can self-diagnose, but rather so they can seek medical attention quickly when concerning or unusual symptoms arise.

Low awareness of VTE is not limited to the cancer population. A 2014 Canadian IPSOS-REID poll revealed that public awareness of thrombosis (68%) was significantly lower than that of heart attacks (88%) and stroke (85%), and its association with cancer was particularly low (16%) (Wendelboe et al., 2015). Strategies to increase patient and

family awareness are necessary and are an important goal of the 'Spot the CLOT' series.

CAT AWARENESS IN HEALTHCARE PROVIDERS

Surprisingly, the awareness of CAT is generally low not only in patients and their families, but also in healthcare providers. Dr. S. Noble, for example, found that many patients diagnosed with CAT perceived a significant knowledge deficit in their treating physicians because alternative diagnoses were considered before CAT despite classic signs and symptoms of VTE (Noble et al., 2015). For example, a patient presenting with unilateral leg swelling was continuously treated with escalating doses of diuretics with no improvement before a diagnosis of DVT was considered. Similarly, a patient with shortness of breath and new onset of chest pain was presumed to have pneumonia and was treated with antibiotics prior to diagnosis of PE (Noble et al., 2015).

Similarly, nurses also demonstrate a knowledge deficit when it comes to VTE. An Australian study by Gaston and White (2013) showed that acute care nurses on both medical and surgical wards had major knowledge deficits regarding VTE, were astounded about the rates of VTE in hospitalized and recently discharged patients, and mistakenly believed that VTE risk only applied to surgical patients. Furthermore, Lee et al. (2014) reported that almost one-third of acute care nurses indicated that their knowledge of VTE risk was fair or poor, and nearly one-third of the respondents rarely completed VTE risk

assessment in their patients. Knowledge deficit was the most commonly reported barrier to the ability to perform VTE risk assessments (Lee et al., 2014).

For oncology nurses in particular, a study by Baddeley et al. (2021) revealed that nurses working in a regional cancer centre were not aware of the magnitude of the risk of CAT, or the reasons behind the increased risk and, therefore, did not prioritize CAT among the necessary topics in patient education.

CONCLUSION

VTE is a common and often severe complication in cancer patients, being the leading cause of morbidity and second leading cause of mortality (Noble et al., 2015). Despite its significance, however, the awareness of CAT is low in patients, caregivers, and healthcare providers. This article is the first in a series, entitled 'Spot the CLOT', which has been developed to promote awareness of CAT in oncology nurses with the goal of improving patient education on this important topic. Future publications in the series will focus on education of patients and caregivers, as well as opportunities for intervention by nurses working with this population.

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