Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(6B):1953-1955 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2016.v04i06.017

Review Article

Thromboprophylaxis in Cancer Patients-A Review

Nayana KG, Panayappan L, Krishna Kumar K, Jayaprakash K*
Department of pharmacy practice, St. James College of Pharmaceutical Sciences, Chalakudy
St. James Hospital Trust Pharmaceutical Research Centre (DSIR certified), Chalakudy, Kerala

***Corresponding author**
Jayaprakash K
Email: stjamespharmacyproject@gmail.com

Abstract: Venous thromboembolism(VTE)is a frequent complication of cancer and cancer treatment and is associated with multiple clinical consequences including recurrent venous thromboembolism(VTE),bleeding,and increase in the risk of death.Low molecular weight heparins(LMWH) are often used for long term prophylaxis because of reduced need of coagulation monitoring, few major bleeding episodes and once daily dosing .Low molecular weight heparin have ability to reduce the incidence of VTE and prevent recurrent VTEvents in cancer patients.Malignant conditions are frequently associated with a hypercoagulable state,with recurrent thrombosis due to the impact of cancer cells and chemotherapy or radiotherapy on the coagulation cascade. Heparin and, its pharmacokinetically improved versions, low molecular weight heparins are effective in the prevention and treatment of thromboembolic events in cancer patients.This review article explains the role of the thromboprophylaxis in cancer patients.
Keywords:venousthromboembolism, pulmonary embolism

INTRODUCTION

Venous thromboembolism is one of the most important causes of morbidity and mortality in cancer patients. Venousthromboembolism (VTE), which includes deep vein thrombosis (DVT)and pulmonary embolism (PE).Patients suffering from malignancy are at a 4-7 fold greater risk of thrombosis when compared to non-cancer patients. Venous thromboembolism is a frequent complication in patients with cancer. management of deep vein thrombosis (DVT) and pulmonary embolism (PE) may be difficult in cancer population because of the high risk of both recurrent events and major haemorrhages, even if adequate vitamin antagonist therapy is administered .low molecular weight heparins is more effective than vitamin K antagonist and LMWH is now recommended as the first option for patients with any type of cancer who have acute venous thromboembolism [1].

The most important risk factor of venous thromboembolism is tumour entity, stage and certain anti-cancer treatments. Cancer surgery represents a strong risk factor for VTE, and medical oncology patients are at increased risk of developing VTE, especially when receiving chemotherapy or immune modulatory drugs .Biomarkers are used to predict the risk of VTE in cancer patients which includes elevated leukocyte, platelet count,D-dimer etc.Cancer patients with metastatic diseaseand additional risk factors such as immobility or infection should receive thromboprophylaxis.Patients clearly at increased risk of haemorrhage should not receive thromboprophylaxis. Parenteral thromboprophylaxis with low molecular weight heparin is likely to reduce the risk of venous thromboembolism in cancer patients and primary thromboprophylaxiswith low molecular weight heparin is recommended postoperatively for a period of up to 4 weeks after major cancer surgery [2].

CAUSES OF DVT IN CANCER

- ***Cancer and its treatment***

  Cancer patients have high platelets and clotting factors because cancer cells produce and release chemicals that stimulate body to make more platelets and clotting factors which lead to clot formation. Chemotherapy kills cancer cells and release substances that induce coagulation. Hormone drug Tamoxifen used for cancer treatment also increase the risk of clot formation.

- ***Damage to blood vessel walls***

  Surgery and chemotherapy damage the walls of blood vessels and increase the risk of clot formation.

- ***Type of cancer***

Cancer of pancreas, bowel, lung,stomach, ovary, or womb increases the risk of blood clot.

- ***Being less active***

  Staying increases the risk of clotting because the normal movement of the leg muscles help to pump the blood back up to the heart.

MECHANISM OF THROMBOSIS IN CANCER

The increased risk of venous thromboembolism seen in cancer patients due to the fact that malignancy can effect each component of the Virchow triad: venous stasis, blood components, and vessel damage these factors contributes to the alteration of normal blood flow andtherebyincreasing thrombus formation .In cancer patients venous stasis is caused by excessive bed rest or extrinsic compression of blood vessels by a tumour mass. Blood components are altered in malignancy that activate coagulation cascade .Vessel damage can be caused by indwelling catheters, intravenous chemotherapy, direct tumour invasion and anti angiogenic agents [3].

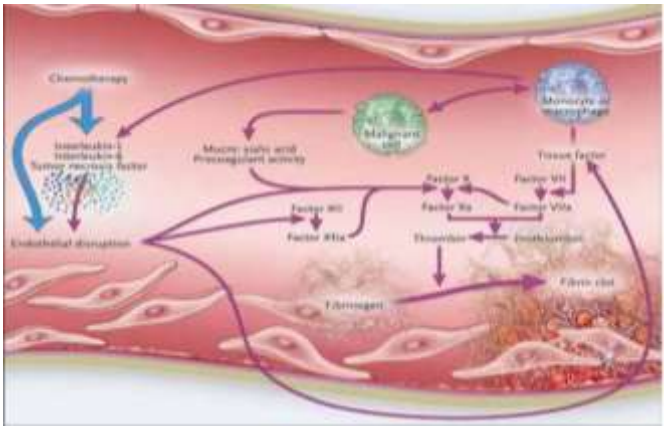

Fig-1: Thrombosis

PATHOPHYSIOLOGY OF VENOUSTHROMBOEMBOLISM AND CANCER

The association between cancer and venous thromboembolism work both ways ,with cancer inducing a hypercoagulable state and the prothrombotic changes in turn facilitating cancer growth and metastasis .cancer cells express several components involved in coagulation for example, tissue factor a key activator of coagulation cascade,is expressed on the endothelial cells ,monocytes and most importantly on the tumour cells it play a pivotal role in cancer induced hypercoagulability and it can produce cysteine proteinase termed as cancer pro coagulant ,which directly cleaves factor x to xa leading to the generation of thrombin and thrombus formation .Von Willebrandfactor promote the platelet adhesion during the thrombus formation and elevated von willebrand factor levels can be detected in various cancers. GlycoproteinIIb /IIIa receptors which are involved in platelet activation and adhesion and serve to promote and stabilise thrombi,is also observed ontumour cells.In cancer patients there may be abnormal expression of a number of factors which are crucial for normal haemostasis, resulting in a general state of hypercoagulability. Many components of coagulation cascade are also involved in tumourneovascularization, tumour cell growth, and metastasis [4].

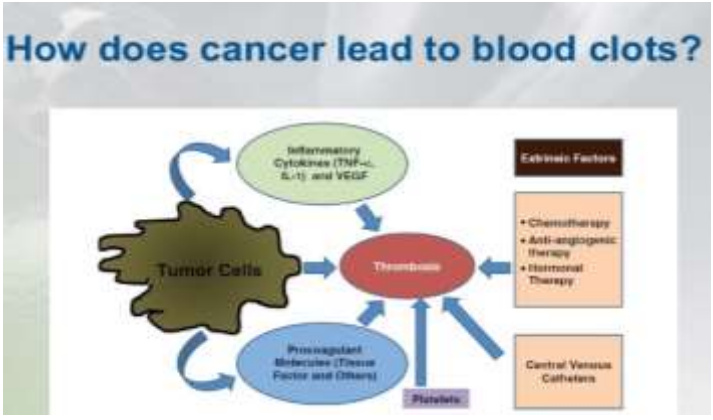

Fig-2: Venousthromboembolism

RECOGNISING DVT DURING CANCER CARE

The common symptoms are pain and swelling around the area where the clot has formed and skin may be reddened and feel warmth .If the clot moves to lungs patient experience trouble breathing and pain in chest or upper back. Coughing up blood is a rare and serious symptom [5].

ANTICOAGULATION THERAPY

The indications and contraindications for the treatment of venous thromboembolism (VTE) in patients with cancer are the same for patients without cancer. The goal of therapy is to prevent recurrent VTE as well as a higher risk of bleeding with anticoagulation treatment.In general the same principles of immediate anticoagulation with initial low molecular weight heparin (LMWH)and unfractionated heparin (UFH) and long term anticoagulation (LMWH and vitamin K antagonists) apply to patients with cancer who present with acute VTE [6].

CHOOSING THE APPROPRIATE THROMBOPROPHYLATIC AGENTS

The principle role of antithrombotic in surgical patients is to provide effective anticoagulation over the course of the increased risk of VTE (during and post-surgery)with the minimum of adverse effects such as bleeding. For cancer patients there is increased evidence that antithrombotic may possess antineoplastic effects and are potentially associated with a reduced incidence of cancer and increased survival times when given for long term prophylaxis such findings reinforce the importance of thromboprophylaxis in oncology patients.Thromboprophylatic agent choice based up on the efficacy and safety profiles, practicality of use, and cost effectiveness [7].

COMPARISON OF LOWMOLECULAR WEIGHT HEPARIN AND WARFARIN

Low molecular weight heparins providethe most convenient efficacious and safe option. Compared with LMWHS, Unfractionated heparin requires 3 times daily injection and has a higher risk of heparin induced thrombocytopenia[8].

The use of warfarin sodium for treating venous thromboembolism in patients with cancer is associated with a significant risk of recurrence and bleeding. The use of low molecular weight heparin for secondary prevention of venous thromboembolism in cancer patients may reduce the complication rate [9].

CONCLUSION

LMWH is currently the standard of care for cancer related deep vein thrombosis, and guidelines recommend continuation of treatment as long as neoplasm is active. However cancer populations differ substantially in terms of type,stage, histology, and treatment of choice thus the duration of LMWH treatment for individual patients is unclear .the optimal treatment duration of anticoagulant therapy should be based on tailoring treatment according to the risk of recurrent venous thromboembolism.

REFERENCES

1. Napolitano M, Saccullo G, Malato A, Sprini D; Optimal Duration of Low Molecular Weight Heparin for the Treatment of Cancer Related Deep Vein Thrombosis. Journal of Clinical Oncology, 2014; 10: 3596-3599.
2. Kelly JC, Zwicker J; Thromboprophylaxis in Cancer Patients.Journal ofClinical Oncology, 2014; 5(8): 1754-1756.
3. Brown A; Preventing Venous Thromboembolism in Hospitalized Patients with Cancer. American Journal of Health System pharmacy, 2012; 69(6):469-481.
4. Robert F; The Potential Benefits of Low Molecular Weight Heparins in Cancer Patients. Robert Journal of Haematology and Oncology, 2010;3:8722-8733.
5. Thompson D,Sohrabi F; Cancer Linked to Blood Clots of Deep vein thrombosis. Every day health journal, 2016; (14): 25-29.
6. Bauer KA, Leung LLK, Mandel J; Treatment of Venous Thromboembolism in Patients with Malignancy. Pulmonary and Critical Care Medicine, 2016;8:27
7. Pabinger CA; Venous Thromboembolism Risk Assessment in Cancer Who Needs Prophylaxis Who Does Not. Hamostaseologie, 2015;35(4): 297-388.
8. Brose KMJ, Agnes Y; Cancer Associated Thrombosis Prevention and Treatment. Current Oncology, 2008; 15 (1):58-67.
9. Meyer G, Marjanovic Z, Valke J; Comparison of Low Molecular Weight Heparin and Warfarin for the Secondary Prevention of Venous Thromboembolism.Jama Internal Medicine, 2002; 162(15):1729-1735.