



Clinical DVT Treatment for Geriatrics in Asia

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Mini Review

It is well known that DVT formation increases with age. The risk is estimated to increase at 1% per year in the elderly. Since the cause for thrombus formation is known to be multifactorial, there are many risk factors associated with it. Commonly studied DVT risk factors are sarcopenia, malignancy, congestive heart failure, chronic medical conditions and hormone replacement therapy [1].

In geriatric population, sarcopenia is common. Lack of exercise, handicapped to perform physical activity, loss of interest to engage in social networks and hormonal imbalances all contribute to development of sarcopenia. Sarcopenia does not only affect physical activity status but is also associated with blood circulation, specifically venous blood return to heart [2]. With decrease in muscle mass vessels surrounding, it cannot be squeezed properly leading to hemodynamic insufficiency and therefore more prone to thrombus formation.

Inner walls of vessels are also known to change with aging. There are studies pointing out that patients with VTE (spontaneous venous thromboembolism) have impaired endothelial function. Impaired endothelium leads to inappropriate secretion of vWf (von willibrand factor) and P-selectin, both of which contribute to a prothrombotic status [3]. Patient with VTE also commonly have venous insufficiency. Valves on venous walls begins to have more collagen deposits and lose smooth muscle cells leading to prothrombotic status [4].

Immobilization also leads to prothrombotic status. According to one study, residents in nursing homes had 8-fold more risk of VT as compared to not institutionalized [1]. Formation of DVT sometimes does not end with swollen and painful legs, it can sometimes be devastating. Thrombus can travel to the heart or to the brain resulting in ischemic heart disease or stroke.

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Current guidelines on use of antiplatelet and anticoagulation therapy mainly focuses on the extent of CAD (coronary artery disease) or ACS (Acute coronary syndrome) and is dependent on treatment options such as PCI (Percutaneous coronary interventions), CABG (Coronary artery bypass grafting) or medical treatment. But not much attention is given to DVT prophylaxis [5].

There are several risk assessment scoring system for guidance of DVT prophylaxis. Most commonly recognized scoring system is Well's criteria, others are ASH (American Society of Hematology) guidelines, NICE (National Institute for Health and Care Excellence), ACCP (American College of Clinical Pharmacy) guidelines and CHEST (American College of Chest Physicians) guidelines. Each guidelines have different risk assessments systems but overall follow some common treatment guidelines. Most guidelines recommend the use of VKA (Vitamin K Antagonist), LMWH (Low Molecular Weight Heparin), IV

unfractionated heparin or DOAC (Direct Oral Anticoagulant) for the treatment of DVT [6].

Generally for inpatient treatments VKA and LMWH is preferred and for outpatient treatments DOAC is preferred. But LMWH treatment is only available at inpatient hospital settings. VKA treatment requires INR monitoring and for those with renal impairments or in the elderly, frequency of INR monitoring is increased. For the above reasons there are studies favoring the use of DOAC due to its predictable pharmacokinetics and pharmacodynamics profile [7,8].

Differences in metabolism of medications also play a role in deciding which antiplatelet or anticoagulation therapy to use. Studies suggest that there is a difference among ethnicity in dosing of antiplatelet or anticoagulants to meet the anti-ischemic purposes [9]. Studies have shown that levels of active metabolite concentrations in asians were lower for clopidogrel, higher for prasugrel, ticagrelor, dabigatran, rivaroxaban [10]. Apixaban metabolite levels were relatively the same between east asians and caucasians. Edoxaban metabolite levels were lower in east asians compared to Caucasians [11]. There are studies suggesting higher rate of aspirin resistance in asians and also higher rate of genetic polymorphism [12].

Clinically, there are laboratory tests that can be useful in detection of prothrombotic status. When D-dimer is elevated, it favors prothrombotic status, when BUN is elevated with no definite dehydration sign or without concurrent Cr elevation and it favors prothrombotic status, when BNP is markedly elevated it favors prothrombotic status. In nursing hospitals or long-term care hospitals, many patients are on aspirin and clopidogrel dual anti platelet therapy. Still, with the onset of infection or development of cancer, signs of DVT or ischemia develop and physicians have to decide whether to add another type of anticoagulant or not. When bleeding risk assessments are done, LMWH or DOAC is administered depending on the severity of thrombosis. There seems

to be a better outcome in patients using LMWH or DOAC agents in means of faster decrease in CRP and heart rate normalization.

Since there are different metabolism of medications between each individuals, physicians should carefully decide when and how to start anticoagulation and antiplatelet therapy for the better outcome of their patients.

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