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RESEARCH ARTICLE

PERI-OPERATIVE MANAGEMENT OF DENTAL PATIENTS RECEIVING ORAL ANTICOAGULANT THERAPY

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ABSTRACT

Anticoagulant drugs are commonly prescribed to patients with atrial fibrillation, pulmonary embolism, deep vein thrombosis, venous thromboembolism, congestive heart failure, stroke, myocardial infarction, genetic or acquired hypercoagulability, prosthetic heart valves and cardiac stents placement. On the other hand, this may increase the risk of bleeding during invasive dental surgical procedures. This article briefly reviews on perioperative guidelines and management of dental patients receiving oral anticoagulant drugs**.**

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INTRODUCTION

Oral anticoagulants, haemostasis, bleeding, prothrombin time, dental procedures, dental extraction. Oral anticoagulant therapy has been used to decrease the risk of thrombo-embolism for more than half a century, prolonging and saving the lives of thousands of patients. Anticoagulant drugs are commonly prescribed to patients with atrial fibrillation, pulmonary embolism, deep vein thrombosis, venous thromboembolism, congestive heart failure, stroke, myocardial infarction, genetic or acquired hypercoagulability, prosthetic heart valves and cardiac stents placement. Some patients will have certain medical condition like atherosclerosis and cardiac arrhythmias that can cause blood clot (thrombus) which blocks a blood vessel either at site of formation or after travelling to another critical site with possibility of stroke or heart attack. In such cases anticoagulants and antiplatelet drugs are prescribed to reduce risk of such even events (Wright, 1954). Adequate haemostasis is compromised after invasive dental treatment in such patients, resulting in profuse bleeding which is associated with morbidity and mortality (Ziffer, 1957).

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A thorough knowledge of mechanism of haemostasis is very important for management such patients who are under anticoagulant therapy. Blood vessels which have been damaged from injury or invasive procedure naturally trigger clotting of blood. Platelets from the blood become activated locally and resulting in tendency to adhering to each other and to damaged blood vessel endothelium, this is also known as primary haemostasis. Next will be the initiation of a coagulation cascade system converting inactive coagulation factors to their active form and produce protein fibrin which stabilises primary platelet plug and this is known as secondary haemostasis.

Haemostasis

Haemostasis is the process by which the body stops bleeding from cut or injury. This involves forming a clot to plug the hole in the blood vessel and repairing the blood vessel. When a blood vessel is injured platelets sticks together to form a plug. Proteins, called clotting factors will interact to form a fibrin mesh to hold the platelets in place. This allows the injury to heal while preventing blood from escaping the blood vessel. Tissue damage is generally associated to vascular injury which may result in mild bleeding or heavy bleeding. Haemostasis is achieved through different phases (Jover-Cervero, 2007). First will be vasoconstrictor phase in which the damaged blood

vessel gets constricted by vascular smooth muscle and reduces the blood loss from damage vessel. Duration of this would last for 20 minutes. It will then trigger the second phase by facilitating platelet adhesion secondary to exposure of the sub-endothelial collagen fibres and basal membrane. In the platelet phase, the platelet will stick to the sub-endothelial collagen and aggregate to form a platelet clot that contributes to reduce blood loss. Next will be the plasmatic phase, in which complex series of proteolytic reaction known as coagulation cascade happens. The cascade comprises of extrinsic and intrinsic pathway. The intrinsic pathway is started by activation of factor XII through contact of sub-endothelial tissues in the damage zone. The extrinsic pathway in turn gets activated when blood comes in contact with the tissue thromboplastin released by the damaged tissue. By this, thrombin formation occurs after different coagulation factors are generated. Finally the blood clot gets dissolved in the fibrolytic phase.

Anticoagulants and antiplatelet drugs exert their effect at different stages in the coagulation process (Wahl, 1998). Antiplatelet drug such as aspirin, dipyridamole and clopidogrel interferes with platelet aggregation reversibly or irreversibly, inhibiting various steps in platelet activation required for primary haemostasis. The various anticoagulant drugs inhibit the production or activity of the factors that are required for coagulation cascade. For example warfarin and other vitamin k antagonists work by inhibiting the vitamin k dependent modification of prothrombin and other coagulation factors and impair secondary haemostasis. Many of the commonly prescribed anticoagulation drugs inhibit enzyme vitamin k reductase, so that formation of coagulation factors dependent on this active form is inhibited, thus the activity of these factors and the whole coagulation process will be blocked (Ansell, 2008).

Oral Anticoagulant Drugs

The medications used for oral anticoagulant therapy are: (Ansell, 2004):

Anticoagulant with indirect action (coumarin derivatives)

- Acenocoumarol- derivative of coumarin and vitamin K antagonist
- Warfarin sodium- it is also a derivative of coumarin
- Phenindione

The novel oral anticoagulant (NOAC's) or direct acting oral anticoagulant (DOAC's) are:

Direct thrombin inhibitors

a. Dabigatran- is a selective, reversible direct inhibitor
b. Argatroban

Direct factor Xa inhibitors

a. Apixaban – is apotent, reversible, highly se;ective direct inhibitor
b. Rivaroxaban
c. Edoxaban

Certain guidelines are followed for patients who are under these medications and they are based upon the risk assessment associated with the dental procedures and International normalized ratio (INR).

Anticoagulation assessment

A standardized system of anticoagulation activity has been developed by World Health Organization because of the variability of prothrombin time (PT) values in different reagents.

INR- INTERNATIONAL NORMALIZED RATIO
INR= (PT test / PT normal)

This is now used widely for monitoring anticoagulant therapy and dosage planning (Kirkwood, 1983). INR for healthy patient is 1 and the therapeutic INR for those on anticoagulant therapy typically ranges from 2 to 4, depending on the reason for anticoagulant. INR values should be obtained within 24 hours before the dental procedure for evaluation and decision making regarding dosage alteration or stoppage of medications (Sacco, 2007).

Dental management considerations in patients on oral anticoagulant therapy

According to British committee for standard in haematology (BCSH), British dental association (BDA) and National patient safety agency (NPSA), few guidelines were reviewed and are followed by dental practitioners and healthcare professionals for providing primary care to their patients (Randall, 2005) According to UC Davis health system, anticoagulation service recommendation and management were according to the categories of presumed bleeding risk of dental procedures. Low presumed bleeding risk includes supragingival scaling, simple restoration, local anaesthetic injection. Moderate presumed bleeding risk would be subgingival scaling, subgingival preparation for restoration, standard root canal treatment, simple extraction, regional anaesthetic injection. High presumed bleeding risk would be extensive surgery, apicoectomy and alveolar surgery. Anticoagulants were recommended to be continued for low and moderate presumed bleeding risk procedures and it has to be reduced for higher presumed risk bleeding procedures (Gould, 2006).

Literature review on dental management considerations

In research of English literature, there have been more than 2014 dental surgical procedures documented in 26 case reports and studies of more than 774 patients receiving continuous oral anticoagulant therapy. These procedures include single and multiple simple extractions, surgical extraction, full mouth extraction, alveolectomies, and other surgical procedures. It was found that oral anticoagulant therapy interfered with normal haemostasis after invasive dental procedures (Sindet-Pedersen, 1989). Without these medications, medically compromised patients are at higher risk for blood clot development which could result in thomboembolism, stoke or myocardial infarction. Adverse effects associated with these anticoagulant drugs include prolonged bleeding or bruising. The serious risk of stopping or reducing these medication regimens is thromboembolism and the risk of continuing these medications is postoperative bleeding (Al□Mubarak, 2006). Both of these factors must be analyzed and balanced during dental treatment. In a study by Elad et al, bleeding complication rates were reported in 18 randomized controlled trials comparing the new agents with conventional anticoagulants or placebo and case report of patients undergoing dental intervention while receiving novel

anticoagulant therapy. The authors offered options of drug management, such as to continue regular dose of administration of anticoagulant, or time the dental intervention as late as possible after last dose of anticoagulant, postpone the timing of daily dose after the dental treatment and or temporarily interrupt drug therapy for 24 hrs, 48 hours. They also stated that the first two options were very beneficial in the comparative clinical trial (Elad, 2016). In a study, the authors have provided management recommendation for invasive dental treatment in patient using oral anti-thrombotic medication including the target specific oral anticoagulants. They advised their patients not to take medications 1 to 3 hours immediately before dental treatment. They concluded that patients can undergo simple dental treatment up to 3 dental implant, scaling and root planning with newer anticoagulants. (Devani, 1998). Zanon et al in their study proposed that dental extractions can be safely carried out without any risk of bleeding in patients taking anticoagulant drugs with the INR maintained in the range of 0.8-4.0. There is no need for discontinuation of oral anticoagulant therapy. Local haemostatic measures like fibrin sponge, silk sutures, and gauze saturated with tranexamic acid were used successfully for the management of bleeding. Dental extractions thus, can be carried out on an outpatient basis with very minimal discomfort for the patients (Zanon, 2003). INR values must be evaluated before performing any dental and oral surgical procedures. According to most of the literature reported, patients with an INR till 3.5 can undergo simple dental extractions without any modifications in their oral anticoagulant therapy (Blinder, 2001). If the INR is more than 4.0, physicians consent has to be obtained for simple and invasive dental and oral surgical procedures. In such cases either the drug dosage has to be temporarily reduced or discontinued for performing dental procedures (Sacco, 2006). In some cases there will be a need for replacement of oral anticoagulants with heparin therapy for a shorter period, reverting back to anticoagulants after the dental procedure. The risk of thrombosis on stoppage of anticoagulants outweighs the risk of bleeding associated with continuation of anticoagulant therapy. Hence, oral anticoagulant therapy must be continued during dental procedures (Campbell, 2000; Evans, 2002 and Vicente, 2002) Postoperative bleeding can be easily controlled by local haemostatic measures (Carter, 2003).

Local haemostatic measures

Local haemostatic measures can be taken in order to control bleeding after extraction. It was recommended that dental surgery to be carried out in the morning in order to able to control bleeding throughout the day and patients are advised to apply pressure with piece of gauze for 30 to 40 minutes, avoid oral rinses during the first 24 hours. They must follow a soft and cold diet during the first 24 hours, avoid suctioning movements and avoid touching the socket with tongue (Sindet, 1987). In a study, patients were divided into three group of 50 patients each, in which group 1 consists of patients who has been treated with gelatine sponges and sutures, group 2 consists of patients who were treated with gelatine sponges, sutures and tranexamic acid mouthwash and group 3 who has been treated with fibrin glue, gelatine sponges and sutures. Results shows around 13 patients developed post operative bleeding, three in group 1, six in group 2 and four in group 3. Authors concluded that the resorbable gelatine sponges and suturing provides adequate haemostasis rather than tranexamic acid mouthwash or fibrin glue (Blinder, 1999). In a study of 26 patients undergoing dental extraction, groups were divided according to the patients who were packed with resorbable oxycellulose dressing in socket and other group with patients who were packed with fibrin adhesive in socket. One patient had post operative haemorrhage. The authors concluded that fibrin adhesive was also effective as oxycellulose dressing in control of haemorrhage (Ramström, 1993).

Anti-inflammatory drugs in patients receiving oral anticoagulants

Non steroidal anti-inflammatory drugs (NSAIDs) are not preferable for patients who are receiving oral anticoagulants, because of their anti platelet action and risk of haemorrhage. Cyclo-oxygenase-2 selective inhibitors are safer, but have the risk of producing upper gastrointestinal haemorrhage. Hence NSAIDs and COX-2 inhibitors should be cautiously prescribed as an analgesic following dental surgery to patients who are receiving anticoagulants (Pavithra sekhar, 2016).

Conclusion

Patients with INR values in the range till 3.5 or below can safely undergo simple dental extractions without any modifications in the oral anticoagulant therapy. The risk of thromboembolism on stoppage of anticoagulants outweighs the risk of bleeding associated with continuation of anticoagulant therapy. Hence, oral anticoagulant therapy must be continued during dental procedures in such medically compromised patients. Post-operative bleeding can be easily managed by local haemostatic measures such as sutures, gelatine foam, oxidized cellulose, collagen sponges, fibrin glue, thrombin and tranexamic acid mouthwash.

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