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ASSESSMENT ORTHOPEDIC PATIENTS AT HIGH RISK FOR VENOUS THROMBOEMBOLISM DESPITE THROMBOPROPHYLAXIS IN MILITARY HOSPITAL

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ABSTRACT

Introduction: Venous thromboembolism, including both deep-vein thrombosis and pulmonary embolism, is an important complication of major orthopedic surgery, and is associated with significant morbidity and mortality. A variety of factors related to the clinical setting and patient influence the risk of venous thromboembolism in orthopedic surgery patients. **Objective:** To assess orthopedic patients at high risk for venous thromboembolism despite thromboprophylaxis in military hospital. To evaluate risk factors for venous thromboembolism, Prevalence, Risk factors, Doses, Interaction, role of the clinical pharmacists, type of anticoagulation used, Compliance and Cost effectives. **Material and method:** This study was carried in military hospital Omdurman by a questionnaire for patients in December 2013 – January 2014 Study was conducted among Patients in risk of DVT in military hospital in Khartoum state. A pre designed and tested questionnaire were used for collect the data. **Results:** 40% from the patient's undergone orthopedic surgeries were in age above 60 years, while 35% from patients were aged between 30-60 years. 76% from the patients were male while 73% from the patients were married. 97% from the patients were governmental employed. About their residence, 64% from the patients were rural. More than half from patients (67%), the orthopedic surgery was hip arthoplasty. The majority from the patients (82%) have surgical factors while 9% from the patients have patient's related factors and the remaining have the both. 42% from patient has undergone orthopedic surgery, the thrombophrophylaxis drug given to them for less than 14 days. In the study, 38% from them the prophylaxis done by aspirin only while 4% done by physical prophylaxis (elastic stoking) and enoxaparin and this regimen does not match the guidelines. Only 52% from the orthopedic surgeries patients were given enoxaparin as

thromboprophylactic agent, which matches the guidelines. **Conclusion:** Despite the availability of effective thromboprophylaxis, the prevention of venous thromboembolism in orthopedic surgery patients remains an important clinical problem. Because the increased risk of venous thromboembolism after orthopedic surgery can persist for several weeks, and discontinuation of anticoagulation therapy can lead to a second wave of thromboembolic complications, extended-duration thromboprophylaxis may be required during this period. Accurate prediction of thromboembolic risk in orthopedic patients should also facilitate the appropriate use of extended-duration thromboprophylaxis, thereby reducing the burden of venous thromboembolism. Improved risk-assessment models are therefore required to identify patients who will benefit from extended-duration thromboprophylaxis. The higher a patients risk of VTE, the greater the reliance on pharmacologic prophylaxis.

INTRODUCTION

Venous thromboembolism, including both deep-vein thrombosis and pulmonary embolism, is an important complication of major orthopedic surgery, and is associated with significant morbidity and mortality.[1] A variety of factors related to the clinical setting and patient influence the risk of venous thromboembolism in orthopedic surgery patients.[2,3,4,5,6]

Procedural or exposing surgical factors: It is well established that orthopedic surgery is associated with a higher risk of venous thromboembolism than is general surgery.[4] This increased risk can be understood in terms of the so-called Virchow's triad that defines the mechanisms responsible for the development of thrombosis: vessel trauma, hypercoagulability, and stasis.[4,6] Damage to muscle and bone during orthopedic surgery triggers the release of tissue factor and plasminogen activator inhibitor, thereby initiating the coagulation process, while endothelial damage resulting from bone fracture exposes the sub-endothelium to circulating coagulation factors, resulting in thrombogenesis. Distortion of the femoral vein impairs venous return from the legs, leading to stasis in the lower limbs, which is exacerbated by prolonged immobilization.[(4,6] The type of anesthesia used can also influence thromboembolic risk. In patients undergoing hip fracture surgery, for example, the incidence of geographically documented deep-vein thrombosis is approximately twice as high with general anesthesia as with subarachnoid blockade.[6,7]

Patient-related or predisposing factors: Clinical factors that increase the risk of venous thromboembolism include a history of previous deep-vein thrombosis or varicose veins, age,

use of oral contraceptives, pregnancy, and comorbidity; in particular, cancer, myocardial infarction and stroke are associated with a high risk of venous thromboembolism.[8,6]

In addition to these clinical factors, a number of congenital or acquired molecular factors that result in a hypercoagulable state have been identified, and it is estimated that 20-30% of patients with deep-vein thrombosis have such conditions.[3] Inherited risk factors include activated protein C resistance and deficiencies in antithrombin III, protein C, and protein S. The relative impact of these factors on the risk of venous thromboembolism has been investigated in a retrospective family cohort study.[9] Antithrombin III deficiency was associated with a higher risk of venous thromboembolism than other congenital conditions, being associated with a lifetime risk 4.4 times higher than that seen with activated protein C resistance, and 2-3 times higher than that seen with protein C or protein S deficiency. Acquired thrombophilic conditions include lupus anticoagulants, anticardiolipin antibodies, and hyperhomocysteinemia.[6] Current data suggest that, in the absence of thromboprophylaxis, geographically documented deep-vein thrombosis occurs in approximately 50% of patients undergoing elective hip or knee arthroplasty, and fatal pulmonary embolism may occur in up to 1.7% of patients undergoing knee arthroplasty and up to 2% of those undergoing hip arthroplasty.

Approximately half of all cases of deep-vein thrombosis after orthopedic surgery involve proximal leg veins.[1,10] Therefore, patients undergoing major orthopedic surgery, such as knee or hip arthroplasty, are at high risk or very high risk of venous thromboembolism; hence, current management guidelines recommend that thromboprophylaxis should be used routinely in such patients.[10,8] The risk of deep-vein thrombosis after hip surgery persists for longer than after abdominal surgery, and there is evidence that the risk may extend for up to several months after surgery.[12]

The peak incidence of clinical deep-vein thrombosis appears to occur 5-10 days after hip or knee replacement surgery, and hence thromboprophylaxis is normally administered until discharge from hospital.[38] However, even among patients receiving thromboprophylaxis in hospital, the incidence of geographically confirmed deep-vein thrombosis at discharge is 15-30%, and a further 10-25% of patients develop asymptomatic deep-vein thrombosis in the 3-4 weeks after discharge.

Although the need for thromboprophylaxis in orthopedic surgery patients is widely accepted, the optimal duration of therapy remains the subject of much debate.[13,12,14] There is increasing evidence that extending the duration of thromboprophylaxis beyond the in-hospital period offers important clinical benefits. Specifically, several case-control studies have assessed the incidence of deep-vein thrombosis occurring post-discharge. Asymptomatic deep-vein thrombosis was reported in about 50% of patients.[13,15] Symptoms of deep-vein thrombosis occurred 4-5 weeks after surgery for total hip arthroplasty and total knee arthroplasty, and 1 day after knee arthroscopy.[16] Moreover, patients undergoing total hip arthroplasty or total knee arthroplasty had a higher mortality rate compared with a control population.[17]

Despite the existence of national and international guidelines, it is clear that thromboprophylaxis is still inadequately used in orthopedic surgery patients. In one study, for example, only 19% of high risk patients in non-teaching hospitals and 44% of those in teaching hospitals received adequate thromboprophylaxis.4 More recently, a review of the medical records of ten hospitals in the USA showed that the percentage of patients receiving appropriate thromboprophylaxis according to the American College of Chest Physicians (ACCP 1995) guidelines was 84% for total hip arthroplasty, 76% for total knee arthroplasty, and 45% for hip fracture surgery.[11] The significance of such under use of therapy is underlined by the fact that pulmonary embolism remains the most common preventable cause of death in hospitalized patients;6 data suggest that approximately 20,000-30,000 deaths could be prevented each year in the USA alone by the use of appropriate thromboprophylaxis.[2,3,18]

A number of factors contribute to the inadequate use of thromboprophylaxis in this patient group.[8,2,3] First, the incidence of symptomatic thromboembolic events is relatively low, around 5%, during the perioperative period.[12] As a result, some surgeons may consider deep-vein thrombosis or pulmonary embolism to be rare complications that do not warrant routine thromboprophylaxis.[3]

Yet, post-thrombotic complications generally develop over a period of months or years after an acute venous thrombosis, and are usually treated by vascular specialists. Second, concern about potential bleeding complications during anticoagulant therapy may limit the use of thromboprophylaxis.[2,3] However, extensive data from meta-analyses and controlled clinical trials have shown that this risk is largely overestimated: the risk of clinically important

bleeding is either not increased or increased only slightly in patients receiving prophylactic doses of low molecular weight heparin (LMWH), low dose unfractionated heparin (LDUH), or a vitamin K antagonist (VKA).[3] There is now sufficient evidence to show that appropriately used thromboprophylaxis has a desirable risk/benefit ratio and is cost effective. Therefore, thromboprophylaxis provides an opportunity to both improve patient outcome and to reduce hospital costs.[8] Improved professional education about the risks of venous thromboembolism is central to overcoming clinicians' reservations regarding the use of thromboprophylaxis and increases the use of such therapy.[2,3,4] Despite the use of recommended thromboprophylaxis, however, some high risk patients (particularly those undergoing total hip or knee arthroplasty) remain at significant risk of deep-vein thrombosis.[4] In a recent meta-analysis, for example, the 3-month incidence of nonfatal, symptomatic venous thromboembolism and fatal pulmonary embolism was 3.2% and 0.1%, respectively, in patients receiving short-term thromboprophylaxis (7-10 days) after hip or knee arthroplasty.[19] Accurate risk assessment is, therefore, necessary both to identify high-risk patients who might benefit from prolonged thromboprophylaxis, and to prevent the overuse of therapy in patients at moderate or low risk, which incurs increased bleeding risk. Risk assessment may also be useful in the diagnosis of venous thromboembolism and in identifying risk factors that may be used to guide decisions about the duration of thromboprophylaxis.[4]

Accurate risk assessment is difficult, however. In an individual patient, the level of risk will depend on a variety of interacting clinical-setting-related (exposing or procedural) and patient-related (clinical, inherited, or acquired) risk factors, described below. Nevertheless, in view of the substantial costs of treating venous thromboembolism,[20] effective risk stratification and targeting of thromboprophylaxis to patients at a higher risk is essential to optimize the clinical efficacy and cost effectiveness of thromboprophylaxis. It can be anticipated that this process may lead to increased understanding of specific risk factors, which, together with the emergence of new therapeutic strategies, will necessitate the regular updating of existing consensus guidelines.

The establishment of the Committee on DVT/PE Prophylaxis was triggered by an increase in the incidence of in-hospital postoperative pulmonary emboli (PE) from approximately 0.3% to 0.97% of inpatient surgeries in the third quarter of 2002 at the Hospital for Special Surgery (HSS). The increase in incidence occurred equally among knee, hip, and spine patients.

Creation of this committee was also motivated by a lack of consensus among the HSS medical and surgical attending staff as to the best approach to prophylaxis of venous thromboembolism (VTE) following orthopedic surgery. The committee was therefore asked to make evidence-based recommendations regarding VTE prophylaxis for patients hospitalized at HSS who are at high risk for VTE.

Support for the committee's mandate has not been unanimous (although there is universal agreement that every person undergoing major orthopedic surgery should receive some form of prophylaxis). Some physicians have expressed concern that firm guidelines might be misused in a medico-legal setting. Others have argued that rates of VTE are so low at HSS that changes in the system are not necessary. The committee did find that rates of postoperative VTE at HSS are low, and comparable to those in the published literature from other institutions. Nonetheless, the recent increase in PE incidence necessitated an examination of the problem. In addition, surgeons at HSS who perform a small volume of joint arthroplasties, or manage a small number of fracture patients, for example, will benefit from the establishment of guidelines for VTE prophylaxis. There are also a number of "special instances" such as bilateral or staged arthroplasties, or complex spine cases, where the risk of VTE may be high and guidelines will be beneficial. Guidelines can also be helpful medico-legally. For example, these guidelines, supported by the published experience at HSS, allow for the use of aspirin alone as VTE prophylaxis in certain instances where the outside medical literature recommends warfarin or low molecular weight heparin (LMWH).

These guidelines are meant to provide a consistent and evidence-based approach to the management of VTE prophylaxis at HSS. Guidelines are not meant to supersede clinical judgment, however, and may at times require tailoring to an individual patient. Thus, for example, an elderly patient undergoing joint arthroplasty who is felt to be at unacceptably high risk for bleeding on warfarin or LMWH, might be have to be treated with aspirin (assuming it is not contraindicated).

MATERIALS AND METHOD

This study was carried in military hospital Omdurman by a questionnaire for patients in December 2013 – January 2014.

Study was conducted among Patients in risk of DVT in military hospital in Khartoum state. A pre designed and tested questionnaire were used for each category to collect the data needed.

A pre designed and tested questionnaire were used for each category to collect the data. The data was collected, entered, cleaned and analyzed using Microsoft Windows Excel. Permission to access the data in the patient records anonymously was obtained from the hospitals manager.

RESULTS

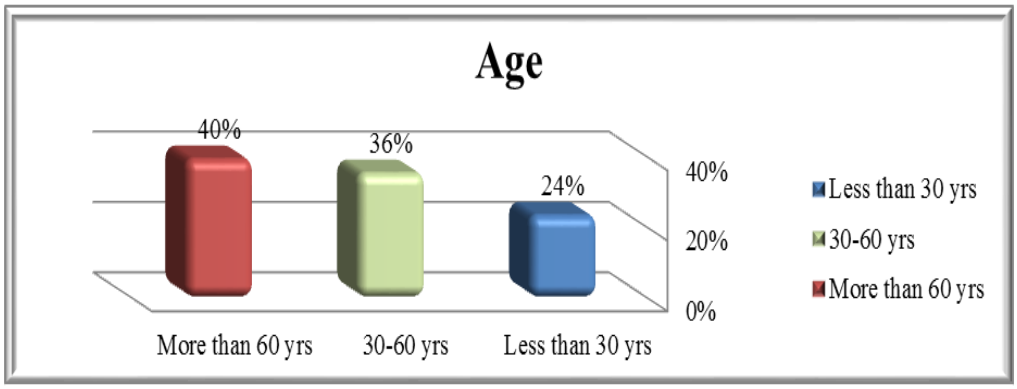

Figure 1: Represent the Age of Patients Undergone Orthopedic Surgery.

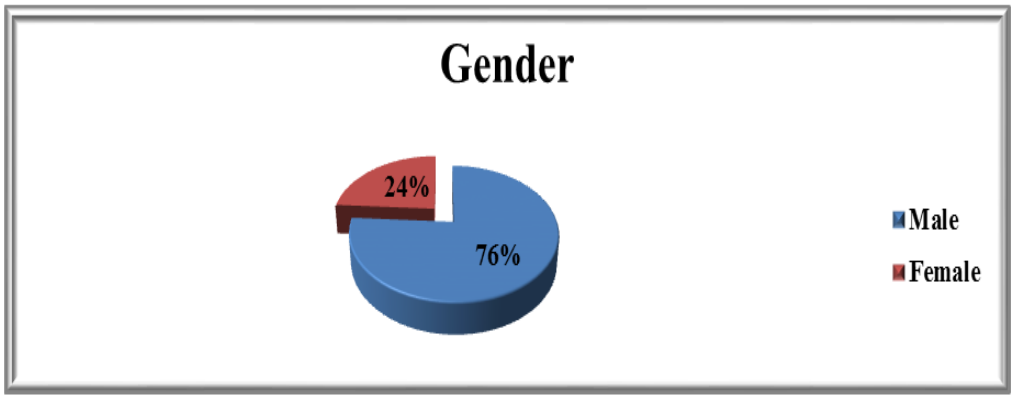

Figure 2: Represent the Gender of Patient's Undergone Orthopedic Surgery.

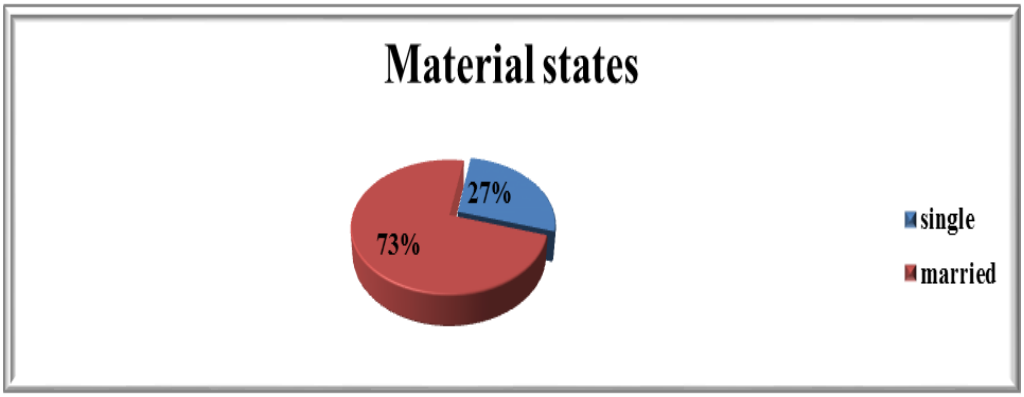

Figure 3: Represent The Marital Status of The Orthopedic Patients.

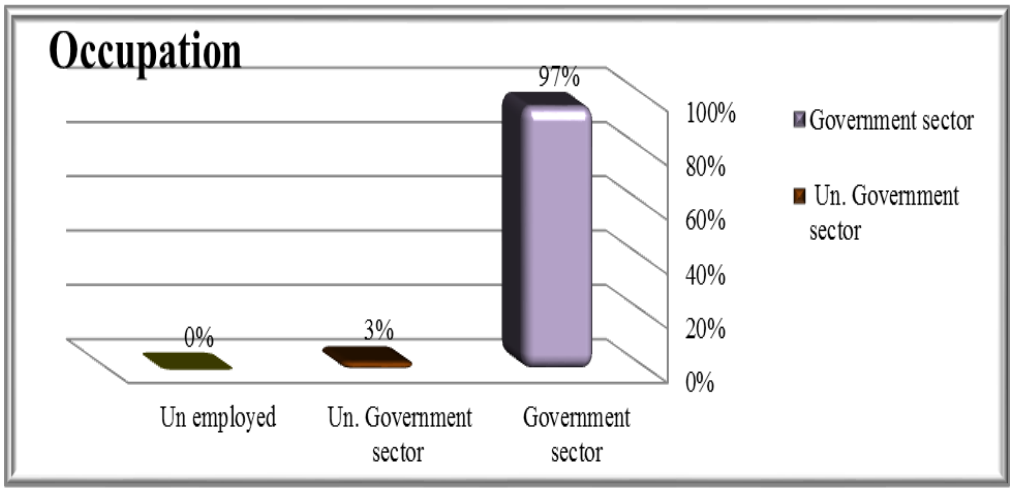

Figure 4: Represent the Occupation Of The Patients Undergone Orthopedics Surgery.

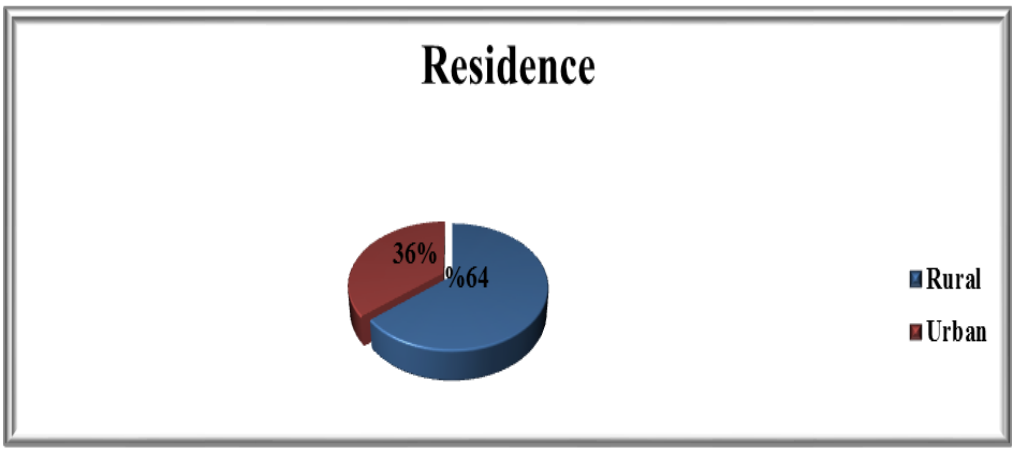

Figure 5: Represent the Residence of The Patients.

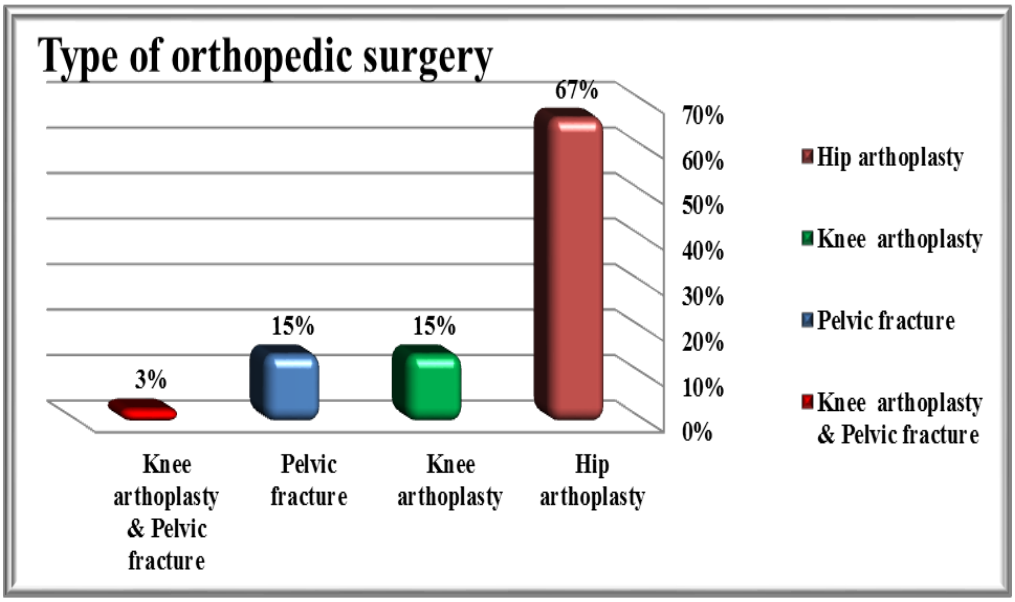

Figure 6: Represent the Type of The Orthopedic Surgery That Done To The Patients.

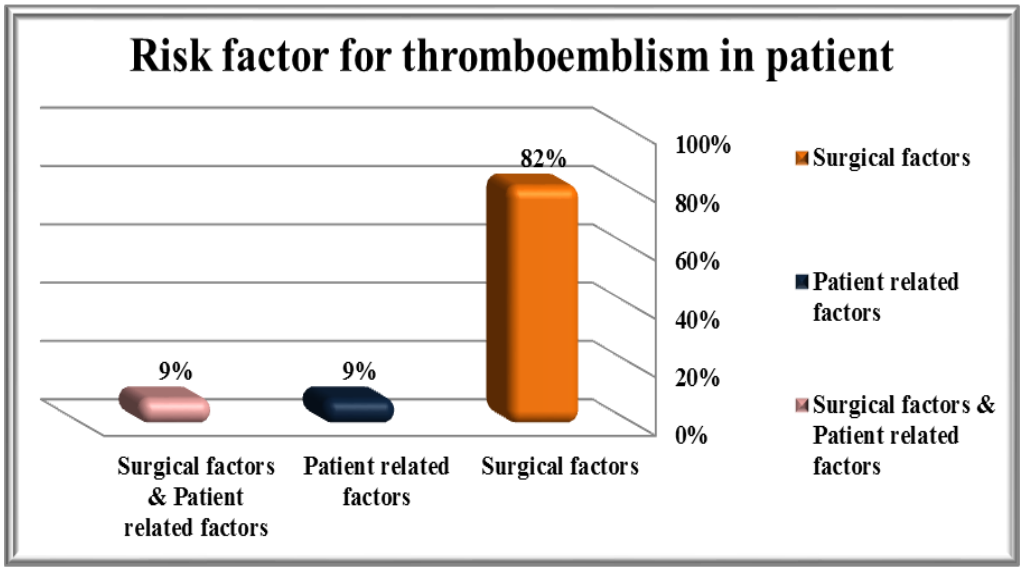

Figure 7: Represent the Risk Factors For the Patients Were Gone to Orthopedic Surgeries.

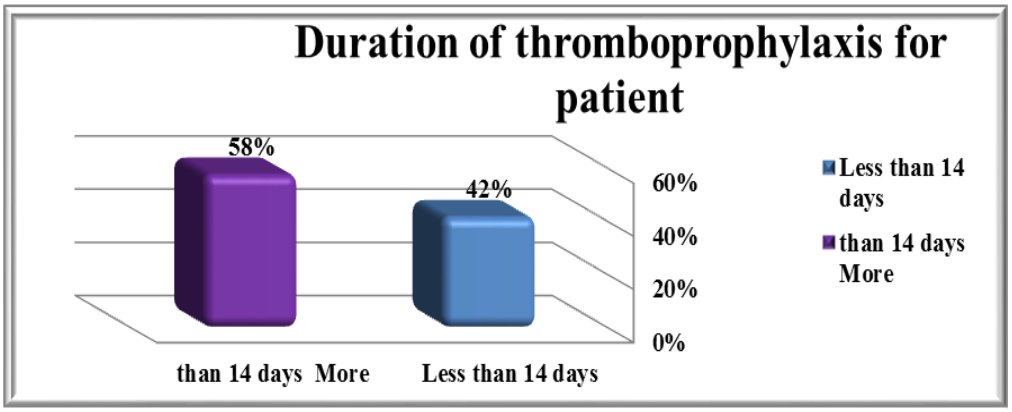

Figure 8: Duration of Thrombophrophylaxis for Patients Was Gone Orthopedic Surgeries.

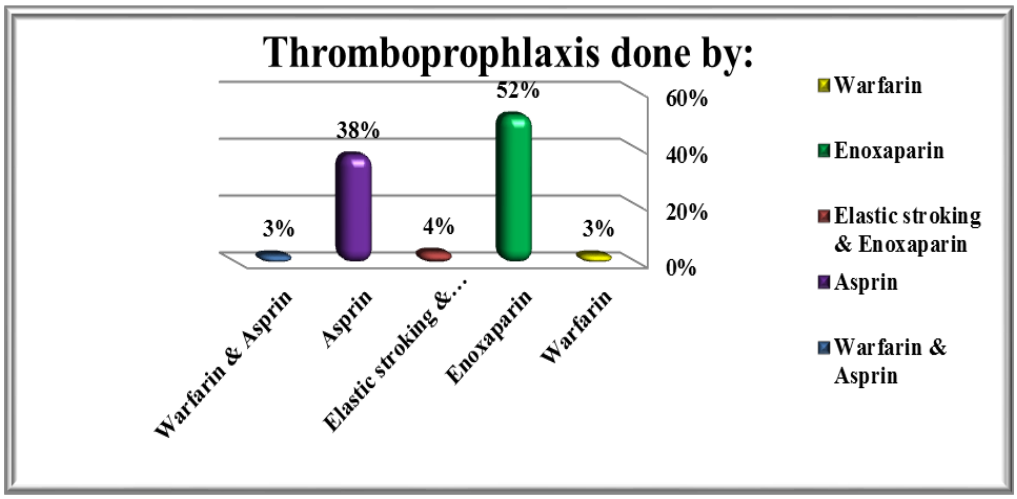

Figure 9: The Type of Drug Given To The Patients For Thrombophrophylaxis.

DISCUSSION

40% from the patient's undergone orthopedic surgeries were in age above 60 years, while 35% from patients were aged between 30-60 years. 76% from the patients were male while 73% from the patients were married. 97% from the patients were governmental employed. About their residence, 64% from the patients were rural.

More than half from patients (67%), the orthopedic surgery was hip arthoplasty.

The majority from the patients (82%) have surgical factors while 9% from the patients have patient's related factors and the remaining have the both. 42% from patient's undergone orthopedic surgery, the thrombophrophylaxis drug given to them for less than 14 days this parallel to the study done by Juan I. Arcelus stated that guidelines recommend thromboprophylaxis for at least 10 days to prevent venous thromboembolism. However, the he recently updated ACCP guidelines also recommend extending the duration of thromboprophylaxis for 28-35 days following total hip replacement or hip fracture surgery as the risk of venous thromboembolism persists for up to 3 months after surgery, so this prophylaxis does not match the guidelines.

The guideline's state postoperative start times for dabigatran, rivaroxaban and fondaparinux, and preoperative start times for most LMWHs, although individual start times vary depending on the specific LMWH. In this guideline it is recommended that LMWH be started postoperatively, which is off-label use, because of concerns about the risk of bleeding into the joint. Patients would be protected preoperatively by mechanical VTE prophylaxis while in the patients in the study 38% from them the prophylaxis done by aspirin only while 4% done by physical prophylaxis (elastic stoking) and enoxaparin and this regimen does not match the guidelines. Only 52% from the orthopedic surgeries patients were given enoxaparin as thromboprophylactic agent, which matches the guidelines.

CONCLUSION

Despite the availability of effective thromboprophylaxis, the prevention of venous thromboembolism in orthopedic surgery patients remains an important clinical problem. Because the increased risk of venous thromboembolism after orthopedic surgery can persist for several weeks, and discontinuation of anticoagulation therapy can lead to a second wave of thromboembolic complications, extended-duration thromboprophylaxis may be required during this period. Accurate prediction of thromboembolic risk in orthopedic patients should

also facilitate the appropriate use of extended-duration thromboprophylaxis, thereby reducing the burden of venous thromboembolism. Improved risk-assessment models are therefore required to identify patients who will benefit from extended-duration thromboprophylaxis.

The higher a patients risk of VTE, the greater the reliance on pharmacologic prophylaxis. Aspirin or low dose UFH have no clear benefit for prophylaxis in hip or knee arthroplasty. LMWH is more efficacious than warfarin in these settings. The recommended duration of prophylaxis depends on the type of surgery as well as the patient's response to surgery and whether complications develop (e.g., prolonged immobility, dehydration, infection) as the risk of VTE extends beyond discharge.

RECOMMENDATIONS

1. To increase the awareness of our medical personal about the risk of pulmonary embolism.
2. To increase the awareness of the patient about the hazard of miss using the appropriate thromboprophylaxis.
3. Revising, amendment, and updating legislative laws and rules organizing the protocols of our national policy about the management and prevention of venous thrombo embolism (V.T.E).
4. The establishment of mechanical thromboprophylaxis once the patient has been admitted to the hospital for orthopedic surgery.
5. Starting the pharmacological thromboprophylaxis as the guidelines includes.
6. Reviewing patient related risk factors before starting any pharmacological treatment.
7. Insure the fulfillment of the patient file as indicated in the W.H.O guidelines, to help in the management of the case.
8. To include the thromboprophylaxis drugs in our national list of insurance.
9. Benefit from more aggressive postoperative physiotherapy and ambulation as well as adjunctive prophylactic measures such as intermittent pneumatic compression.
10. It is imperative that every hospital should develop a thromboprophylaxis strategy, Acetylsalicylic acid is not recommended as the sole method of thromboprophylaxis because other methods are more effective. Anticoagulants should be used with caution in patients having spinal puncture or epidural catheter insertion for regional anesthesia or analgesia.
11. Patients who undergo elective hip or knee arthroplasty or surgery for hip fracture should receive prophylaxis with LMWH (starting 12 h before the procedure, for 12–24 h after, or

at half-dose 4–6 h after the procedure followed by full-dose the next day) or warfarin (started after operation and titrated to achieve an INR of 2–3).

12. Intermittent pneumatic compression or elastic stockings combined with LMWH or warfarin may provide additional protection. They are unlikely to be as effective as LMWH or warfarin but provide a reasonable alternative in patients at high risk for bleeding.
13. Prophylaxis with LMWH or warfarin should be given for at least 10 days. Patients with risk factors for VTE (i.e., cancer, previous VTE, hormone use or biochemical abnormalities) or those who are not mobile should receive prophylaxis with LMWH or warfarin for 30 days.