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Research Article

ROLE OF ANTICOAGULANTS AFTER TOTAL KNEE REPLACEMENT

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Abstract:

Aim: To study and evaluate the role of anticoagulants in patients undergoing tkr and to assess the risk of the complications developed following total knee replacement procedure.

Objective: the primary objective is to study the patients undergoing tkr and assess the risk of dvt. To study the prophylactic anticoagulants prescribed their doses, duration and their benefit in preventing dvt and associated complications.

Background: the principle diagnosis for tkr is osteoarthritis. Although knee replacement is said to be a safe procedure, complications like vte may arise even after using prophylactic methods.

Methodology: a prospective observational study was carried out in aster prime hospital for duration of 6 months. 84 patients of osteoarthritic knee were selected who had undergone tkr surgery. Their history, anticoagulant therapy, lab monitoring parameters were routinely checked for any complications. Follow up was done through phone calls.

Results: out of 84 patients, the common age group in which tkr was performed in oa patients was 61-70yrs. The percentage of females was found to be higher (62%) than males (38%). The most common anticoagulants prescribed to the patients were enoxaparin (lmwh) and aspirin. Some patients developed complications like dvt (1.19%), pe (1.20%), sepsis (1.17%), thrombocytopenia (1.10%) and wound complications (2.38%) for which specific treatment was given.

Conclusion: the role of prophylactic anticoagulants for dvt in elective tkr has been constantly evolving. Hence an equilibrium should be maintained between the efficacy and safety of anticoagulant therapy as inappropriate anticoagulation leads to excessive bleeding and other complications.

Keywords: *osteoarthritis, total knee replacement, deep vein thrombosis, pulmonary thromboembolism, venous thromboembolism.*

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INTRODUCTION:

The aim of our study is to evaluate the role of anticoagulants in patients undergoing TKR and to assess the risk of complications.

Osteoarthritis, also known as degenerative joint disease or degenerative arthritis, occurs when the productive cartilage on the ends of the bones wears down over time. It may damage any joint but mostly affects joints of the hands, knees, hips and the spine [1]. In persons between 65 and 74 years of age, 33% have moderate to severe knee OA, and 50% have moderate to severe hip OA. Women are more often affected by OA, with older women being twice as likely as men to develop OA of the knee and hands [2]. The risk factors for OA are old age, gender, obesity, occupation, sports, trauma, genetic factors, and bone deformities [3]. The diagnosis done is based on the signs like crepitus, joint stiffness, flexion deformity and by performing tests like X-ray or MRI. The treatment of OA is done both by non-pharmacological and pharmacological management but if it progresses to last stage (stage-IV) then a total knee replacement should be performed.

TKR is a surgical procedure in which knee joints are replaced with artificial parts made from metals or plastic. The knee cap is mainly restructured in the surgery using a knee prosthesis made up of combination of metal and plastics [4]. It is performed for patients suffering from osteoarthritis or in case of any accidental damage to the knee. Though it is a safe procedure, complications may arise in some patients like internal bleeding of tissues or bleeding at incision point (thrombocytopenia), infection at the incision, prostheses loosening or wearing out, pain and stiffness at operated knee site, occurrence of blood clots in lungs and legs (DVT and PE).[4]

The most common complication seen after TKR is VTE. Venous Thromboembolism (VTE) is a condition in which a blood clot is formed in the deep veins of the leg, groin or arm and then travels in the circulation, accumulating in the lungs. VTE comprises of Deep vein thrombosis (DVT) and pulmonary embolism (PE). DVT is the formation of one or more blood clots (fibrin) in the veins that occur usually in the lower limbs. A PE is the blockage of pulmonary artery or one of its branches caused by a moving clot or a thrombus (embolus) causing either complete or partial obstruction of pulmonary blood flow [5]. The risk for developing DVT extends for at least 3 months after TKR. The risk is greater 2-5 days after surgery. Death from PE can occur within minutes after the onset of symptoms, before effective treatment can be given.

VTE is not usually developed in the absence of pathophysiologic processes included in the Virchow's triad (vascular endothelial damage, stasis of blood flow and hypercoagulability of blood). Venous stasis is the slowing of the blood flow in the deep veins of the legs that results from damage to venous valves, vessel obstruction, prolonged periods of immobility, or increased blood viscosity. Major orthopaedic surgery (e.g., knee and hip replacement), trauma (especially fractures of the pelvis, hip, or leg), or indwelling venous catheters may result in vascular injury. The Hypercoagulability risk is increased in malignancy; activated protein C resistance; deficiency of protein C, protein S, or antithrombin; factor VIII or XI excess; and other situations. [6, 7]

Hence non pharmacological (mechanical) prophylaxis like ambulation with walker support, physiotherapy should be given along with anticoagulant therapy (according to guidelines) as both prophylaxes after TKR to prevent DVT and as pharmacological management for DVT and PE. The therapy includes drugs like enoxaparin (LMWH), UFH, aspirin, dabigatran, rivaroxaban etc. [8, 9, 10]

AIM: To study and evaluate the role of anticoagulants in patients undergoing TKR and to assess the risk of the complications developed following Total Knee Replacement procedure.

OBJECTIVE: The primary objective is to study the patients undergoing TKR and assess the risk of DVT. To study the prophylactic anticoagulants prescribed their doses, duration and their benefit in preventing DVT and associated complications.

MATERIALS AND METHODS:

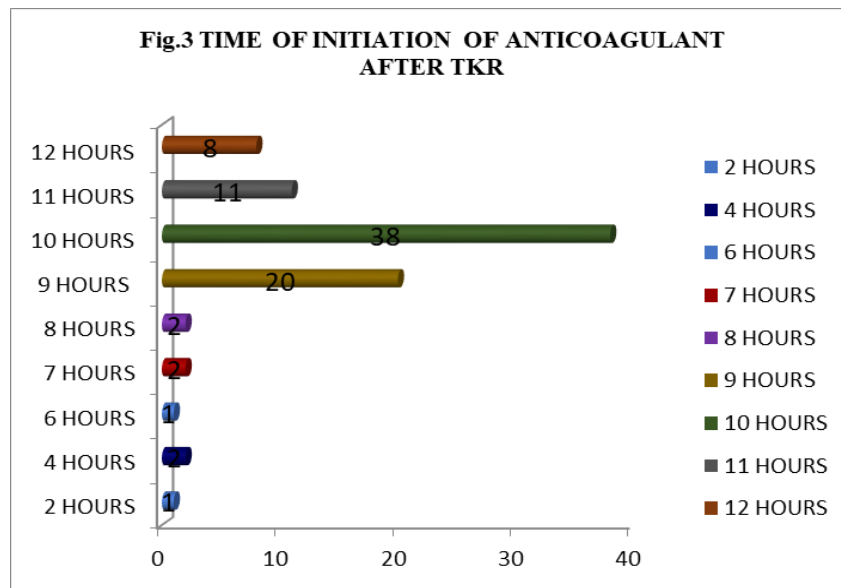
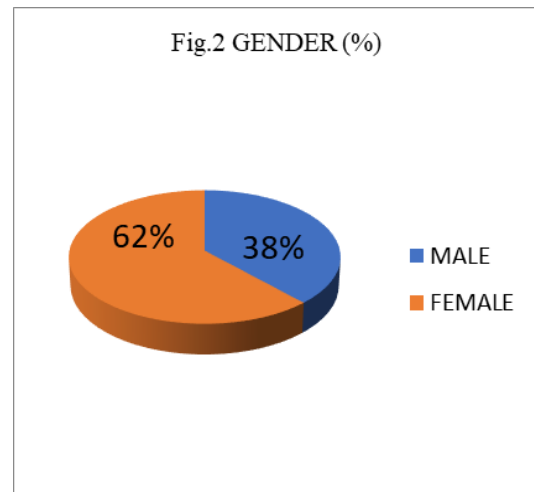
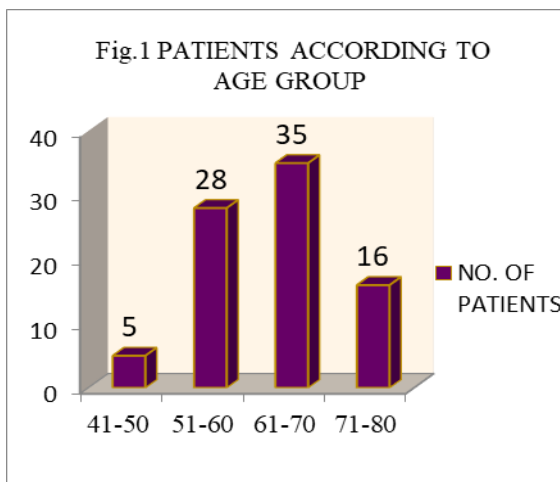
This is a prospective observational study carried out for a period of six months in orthopaedic department. A total of 84 cases of knee replacement were collected. These were noted in the data collection form. Data pertaining to age, gender, diagnosis, lab reports and anticoagulant therapy (drug prescribed, brand/generic, dose, route, frequency and duration) was collected. The inclusion criteria were patients of both genders aged above 40yrs who have undergone total knee replacement and the exclusion criteria is patients with rheumatoid arthritis, pregnant and lactating women and patients who are contraindicated to thrombo- prophylactic therapy. The anticoagulant therapy and the laboratory parameters of these patients were followed during hospitalization and after discharge, follow up was done for a month through phone calls to detect any signs and symptoms of DVT, surgical wound healing, and possible local complications, such as bruising and superficial or

deep infection that would require surgical treatment were evaluated.

TAB.1

TABLE: TITLES FOR COLLECTING DATA
Patient Details: IP No., age, DOA, DOD, BMI, history, comorbidities
Preoperative and postoperative lab findings like CBP, coagulation profile, ECG, serum creatinine, Chest radiographs and radiographs of affected joints, echocardiography
Surgery details: type, duration, date
Type of non pharmacological prophylaxis given
Initiation of therapy after surgery- drug prescribed and time
Anticoagulant therapy during hospitalization and after discharge - dose, Route, Frequency, Duration
In case of symptomatic DVT/PE – Symptom onset, date of test, and test used

RESULTS AND DISCUSSION:



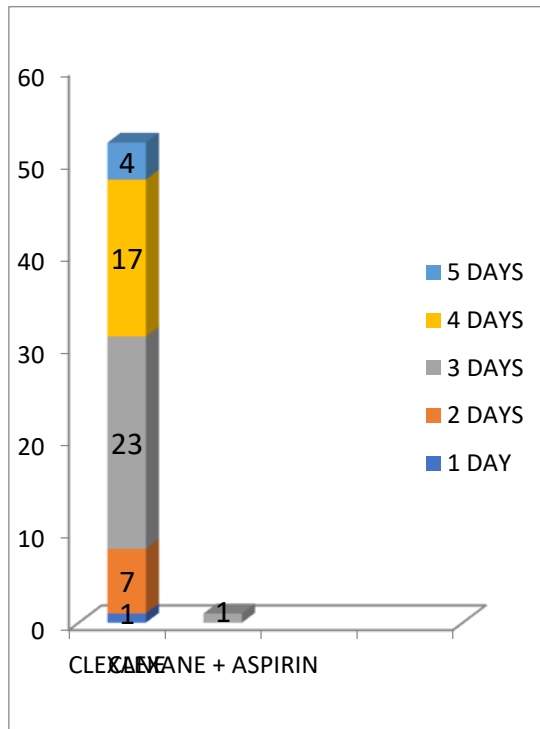


Fig.4 Duration of anticoagulants during hospital

Data of 84 patients undergoing knee replacement was collected. There were 32 (38%) males and 52 (62%) female patients.

The maximum number of patients undergoing knee arthroplasty was found to be in the age group between 61-70yrs.

16 Patients underwent right TKR, 17 underwent left sided TKR and 51 patients underwent bilateral TKR. The most common co-morbidities found in the patients were hypertension and type-II diabetes mellitus.

Some patients developed complications after TKR like thrombocytopenia, wound complications, sepsis, DVT and PE. One patient developed PE on third post-operative day and thrombocytopenia was seen on 4th post-operative day to which effective treatment was provided.

The body mass index of the study population in this study ranged between 15.23-38.88.

The anticoagulants prescribed during hospitalization were clexane (enoxaparin), clopidogrel, aspirin.

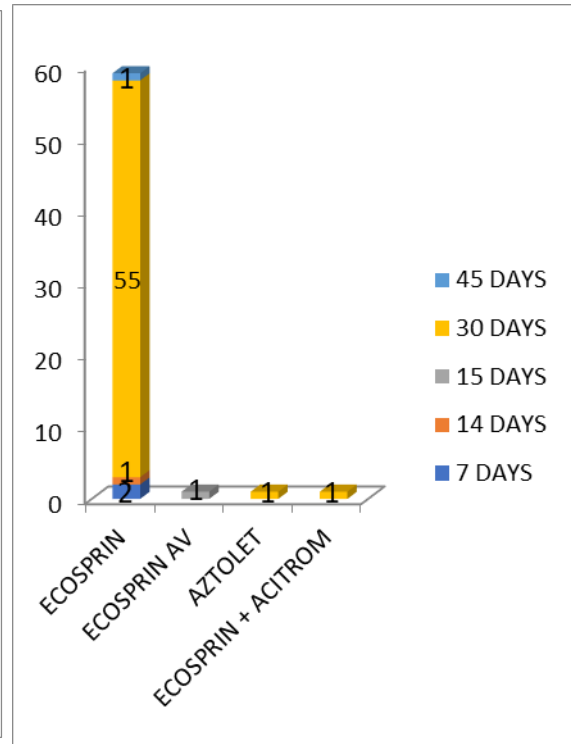


Fig.5 Duration of anticoagulants after hospital stay discharge.

Anticoagulants prescribed at the time of discharge were ecospirin (aspirin), aztolet (atorvastatin + clopidogrel), ecospirin- AV (aspirin + atorvastatin), and acitrome (nicoumalone).

Out of 84 cases the most commonly prescribed anticoagulant as prophylactic measure during hospitalization was clexane (Enoxaparin). After discharge, Ecospirin (Aspirin) was the most common prescribed anticoagulant.

In patient who developed thromboembolism, anticoagulant therapy given was heparin rivaroxaban, nicoumalone, enoxaparin.

The anticoagulant therapy was initiated after a time period of 10 hrs post operatively in most of the patients.

The duration of anticoagulant therapy during hospitalization was for 2-5 days and for most patients it was given for 3 days.

In the study carried by Yngve Falck-Ytter et al., thromboprophylaxis should be extended for a minimum of 10-14 days and suggest LMWH in

preference to other anticoagulants. It is against to use Doppler ultrasound for asymptomatic patients who have undergone TKR. The time of initiation of anticoagulant should be 6-10hrs post operatively to minimise bleeding risk.

CONCLUSION:

The role of prophylactic anticoagulants for DVT in elective TKR is continuously developing. Selection of an anticoagulant must be based on its effectiveness and safety as inappropriate anticoagulation leads to complications.

One of the keys for a successful anticoagulant therapy is the appropriate management which is associated with significant reductions in bleeding and thromboembolic complications, with a fall in the rate of hospital admission.

For optimal use of available VTE prophylaxis methods there are several guidelines published that should be endorsed in the daily clinical setting.

ACKNOWLEDGEMENT:

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CONFLICT OF INTEREST:

The authors state there is no conflict of interest.

JUSTIFICATION:

TKR has been proved to be one of the most successful surgeries in terms of improving the quality of life of the patients with stage-IV osteoarthritis. The most common cause for morbidity in patients after TKR is venous thromboembolism (VTE). VTE is an often clinically silent and potentially fatal complication. Hence, there is a need to prevent DVT in the populations at risk, to improve patient outcomes.

Despite the immense body of literature that supports the pharmacological and non-pharmacological strategies to prevent VTE, prophylaxis is underused in most hospitals. Even when prophylactic treatment

is given, many patients receive prophylaxis that is less than optimal. In this, we have aimed to study the utilization patterns of anticoagulant agents after knee replacement, i.e. anticoagulant prescribed, it's dose,time of initiation after surgery and duration of therapy. The Primary efficacy outcome was DVT and primary safety outcome was major bleeding and other complications.

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ABBREVIATIONS:

TAB.2

ABBREVIATION	FULL FORM
BMI	Body Mass Index
CBP	Complete Blood Picture
DOA	Date of Admission
DOD	Date of Discharge
DVT	Deep Vein Thrombosis
ECG	Electrocardiogram
LMWH	Low Molecular Weight Heparin
MRI	Magnetic Resonance Imaging
OA	Osteoarthritis
PE	Pulmonary embolism
TKR	Total Knee Replacement
VTE	Venous thromboembolism