Volume 2, Issue 4, April 2024 ISSN (E): 2938-3765

A COMPARATIVE STUDY BETWEEN HEPARIN AND ENOXIPARIN EFFECTIVENESS IN PATIENTS WITH TOTAL KNEE REPLACEMENT IN PREVENTING DEEP-VEIN THROMBOSIS

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Abstract

Background Several recent studies have demonstrated that the prevalence of deep-vein thrombosis after total knee arthroplasty in the eastern population is similar to that in the Western population (1, 2). However,the locations of the thromboses in the patients have differed,with a predominance of distal clots (in the calf) and very few proximal clots (in the thigh or pelvis) or pulmonary emboli.

PATIENTS AND METHODS

This was a prospective randomized controlled clinical trial conducted from August 2010 through August 2011 at the orthopedic department of Nursing Home Hospital, Baghdad Medical City, on patients undergoing primary elective knee arthroplasty. Fifty-eight (58) patients (23 women and 35 men) scheduled to undergo total knee replacement were selected. Patients range in age (43-71 years), weight (60-113) kg, height (145-181 cm), and BMI (19.84-38.45 kg/m^2).

RESULTS The patients who participated in this study were 36 males (64.3%) with a mean age of 53.8± 12.5 years and a mean body mass index (BMI) of 28.7 ± 5.2 kg/m2, and 20 females (35.7%) with a mean age of 51.5±9.1 years and a mean BMI of 29.85±5.1 kg/m2. The association between enoxaparin use and a reduction in the incidence of DVT is highly significant at a P value ⩽ 0.01. There is no statistically significant association between DVT development and BMI, age, site of operation, or sex distribution. Preoperative ultrasonography clarified that the overall prevalence of asymptomatic DVT was 3.45%, with 2 of 58 patients with asymptomatic DVT in the calf (they had been excluded from our study). For the remaining 56 patients (in both groups), there were 31 operations on the left side and 25 on the right side. **Conclusions**: . DVT is one of the most common and serious medical conditions that occur after being hospitalized for a serious illness or undergoing major surgery. Enoxparin is effective in preventing DVT after total knee arthroplasty. The incidence of DVT is not associated with age,sex, BMI, or site of operation in

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both males and females. The DVT occurs in the calf veins... The bedside diagnosis of venous thrombosis is insensitive and inaccurate, and the absence of these symptoms and signs doesn't exclude DVT in patients with total knee replacement. Doppler sensitivity is 85% and accuracy is 96.

Keywords Total knee replacement, enoxparin, heparin, and deep-vein thrombosis.

Introduction

Recent research has shown that deep-vein thrombosis following total knee arthroplasty is just as common in Eastern populations as it is in Western ones (1, 2). The risks of deep-vein thrombosis after total kneearthroplasty have not been fully appreciated, and the importance of prophylaxis against this complication has not been stressed. However, the locations of the thromboses in the patients have differed, with a predominance of distal clots in the calf and very few proximal clots in the thigh or pelvis (2). Pharmaceutical prophylaxis against deep-vein thrombosis is not regular in most Eastern institutions, in contrast to Western nations, where it is conventional practice following total joint replacement (3, 5). As a result, Eastern countries continue to debate the best course of prevention following major orthopedic surgeries (4, 7, and 10). When it comes to preventing deep vein thrombosis, the pharmacological agent most often employed in North America and Europe is low-molecular-weight heparin (11). But as far as we are aware, its effectiveness in our demographic has not been shown (9). The researchers in this prospective clinical trial set out to determine if heparin or a low-molecular-weight heparin group was better at preventing deep-vein thrombosis following total knee arthroplasty.

Presentation: Assessment in the clinic and for diagnosis:

A. Signs and Symptoms: While symptoms specific to the site of deep vein thrombosis (DVT) may not manifest at all, the traditional signs of the condition include leg discomfort, redness, swelling, and surface vein enlargement. Unless pulmonary embolism occurs, deep vein thrombosis (DVT) is typically not clinically noticeable in as many as 25% of hospitalized patients. Examining the afflicted and contralateral limbs' circumferences at a fixed place (to objectively measure edema) and palpating the venous tract, which is often painful, are two physical examination approaches that might boost the detection rate of deep vein thrombosis (DVT). The exclusion of deep vein thrombosis by physical examination is not trustworthy. A pale, cold leg with a decreased arterial pulse owing to spasm is the hallmark of phlegmasia alba dolens. It often happens when deep vein thrombosis causes the iliac and femoral veins to become suddenly occluded. The iliac and femoral veins, as well as the whole extremity outflow, are abruptly and practically completely blocked in phlegmasia cerulea dolens. Pain, cyanosis, and swelling are common symptoms in the leg. Over time, venous gangrene can spread. Incorporating the risk of pulmonary embolism into the medical history is critical since it may necessitate further testing.

Physical examination

1. According to Homans' test, the posterior calf should hurt when the foot is dorsiflexed. Although it may be potentially risky due to the potential dislodging of a loose clot, it is not very useful for diagnostic purposes.

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2. Pratt's sign: When you squeeze your back leg, it hurts.

B. DIAGNOSTIC IMAGING:

1.Ultrasonography Now, the initial evaluation for deep vein thrombosis (DVT) is done using ultrasound. It can screen postoperatively high-risk individuals or identify proximal deep vein thrombosis. Patients undergoing therapy, those without treatment for calf vein thrombosis, and those with a high clinical likelihood of deep vein thrombosis (DVT) but an initial normal result can all benefit from serial scans. Patients suspected of having PE can also undergo ultrasound screening for deep vein thrombosis (DVT); however, a negative result does not rule out PE. With color duplex ultrasonography, venous flow may be detected, and deep veins can be seen directly. There is little risk, it is easy to repeat, and it is non-invasive. A blood clot diagnosis is based on: It's because the vein can't collapse. There is a thrombus present.When the calf is compressed, there is no increase in venous flow.When it comes to proximal deep vein thrombosis (DVT), the most sensitive and specific trait (>95%) is the vein's non-compressibility.

2-Venography may still have a role in diagnosing acute DVT in patients with recurrent thrombosis and screening for DVT in asymptomatic high-risk patients.

3-Impedance plethysmography (IPG):

In IPG, a thigh cuff is inflated and deflated to quantify the limb's volume change. You don't need any special training, and it won't harm you in any way. Taking serial measurements is a breeze, and the test may be performed right at the patient's bedside. For symptomatic proximal deep vein thrombosis, the test is quite sensitive (92% specific), but for calf vein thrombosis, the sensitivity of the IPG is modest (20%).

3-Iodine-125 Fibrinogen Scan: With an 80% sensitivity and 75% specificity, this helped diagnose calf vein thrombosis. When isotope counts increased by 20% relative to the equivalent spot on the opposite leg, a diagnosis was rendered.

4-Magnetic resonance venography: The sensitivity and specificity for deep vein thrombosis (DVT) are around 90% with this innovative method. It may be helpful in identifying deep vein thrombosis (DVT) that affects the pelvis and abdomen.

5-D-Dimmer: Venous thromboembolism is characterized by an increase in D-dimmer, a fibrinolysis byproduct. The sensitivity and negative predictive value of this blood test are both above 95%, whereas the specificity and positive predictive value are below 50%.

Treatment: 1-Medical Treatment Since heparin was introduced in the 1930s, anticoagulation has been the backbone of medical treatment. Over time, other anticoagulant medications, such as low-molecular-weight heparin and vitamin K antagonists, have been included in the therapy. With the rise of endovascular therapy, mechanical thrombolysis has lately seen a surge in usage. If you have recently undergone surgery on your brain, eyes, or spinal cord, if you have significant active bleeding, or if you have malignant hypertension, you should not use anticoagulants. Recent cerebrovascular accidents, severe thrombocytopenia, and recent major surgery are relative contraindications. Until sufficient systemic anticoagulation is obtained, initial anticoagulation treatment often entails continuous intravenous heparin. In order to reduce the incidence of recurrent venous thrombosis during the first three months from 25% to 5%, rapid anticoagulation must be administered within the first 24 hours of diagnosis. Low-molecular-weight heparin (LMWH) injections given once or twice daily have largely replaced continuous intravenous heparin as the method of therapy initiation. LMWH's antithrombotic effects are weight-related, so

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patients can take a set dose without needing laboratory monitoring; patients with simple deep vein thrombosis (DVT) can be treated outpatiently. To avoid the high incidence of thromboembolic events or recurrent venous thrombosis, long-term anticoagulation is required. Warfarin, an oral vitamin K antagonist, is still the therapy of choice for this purpose. The hepatic synthesis of coagulation factors that are dependent on vitamin K is inhibited by warfarin. Until the current circulating coagulation factors are either used up or eliminated, the impact is postponed by 72 hours. Anticoagulation with heparin is crucial at this time to stop thrombosis from getting worse. Higher ratios do not improve efficacy, and lower ratios do not reduce bleeding problems; hence, it is advised to maintain an INR between 2.0 and 3.0. A number of prospective randomized clinical studies have assessed the optimal length of warfarin treatment. and The length of treatment is conditional on the patient's risk factors and the suspected cause. An individual should undergo treatment for first-episode venous thrombosis or a thrombotic event caused by a temporary reversible risk factor for a minimum of three months. A duration of 6–12 months is recommended for the treatment of first-episode idiopathic venous thrombosis. Many doctors, however, choose to keep patients on anticoagulant medication forever because the drug stops working after a year of therapy. With treatment evaluation at regular intervals, the choice to maintain anticoagulation should be personalized to each patient, including bleeding risk and patient desire.Prothrombin 20210A gene mutations, coupled factor V Leiden, or two or more thrombophilic disorders (such as first-episode venous thrombosis) need therapy for a minimum of twelve months. For certain patient groups, indefinite treatment is also being studied. (29) Patients experiencing recurring episodes of venous thrombosis, irrespective of their underlying etiology, are advised to undergo indefinite treatment. Continuing anticoagulation decreased the incidence of recurrent thromboembolism from 21% to 3% over a 4-year follow-up period. On the other hand, serious bleeding occurred more frequently, rising from 3% to 9%. Except for individuals with concomitant cancer, long-term LMWH medication is just as effective as warfarin in treating venous thrombosis. Results showed that LMWH outperformed oral treatment in this category. Although LMWH has demonstrated some success in preliminary investigations of pregnant patients,no large-scale randomized trials that last for an extended period of time have been conducted. Bleeding and thrombocytopenia are the primary side effects of heparin treatment. There is an estimated 13% fatality rate per episode of major bleeding. Clinicians must be alert to the diagnosis of heparin-induced thrombocytopenia (HIT) when thrombocytopenia develops; this can happen in up to 3% of patients treated with heparin for more than 4 days. Approximately 2% of patients experience major bleeding within the first 3 months of therapy and 1–3% thereafter per year. There are two kinds; the first is a nonimmune-mediated thrombocytopenia that goes away on its own once treatment stops. A potentially fatal thromboembolic consequence can occur in the less common immune-mediated thrombocytopenia.

4: Intraventricular filter placement:Several situations call for the use of a vena caval filter to prevent PE. One such indication is a patient who develops PE when adequately anticoagulated.Implantation of an intravenous filter may also be necessary in patients who experience bleeding complications that necessitate the termination of anticoagulation.Patients with large free-floating clots or those who are intolerant to anticoagulation (due to neurological or ocular injuries, for example) may warrant the placement of a vena caval filter due to the increased risk of embolization.Patients having had pulmonary embolectomy or those whose sickness severity would likely render them unbearable to the consequences of PE. Another comparable indication

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is a patient with septic emboli or a propagating iliofemoral clot.Patients at high risk of deep vein thrombosis (DVT) and percutaneous embolism (PE) due to severe trauma are being examined for a novel indication as a solely preventative device, even in cases where no recorded DVT has occurred.

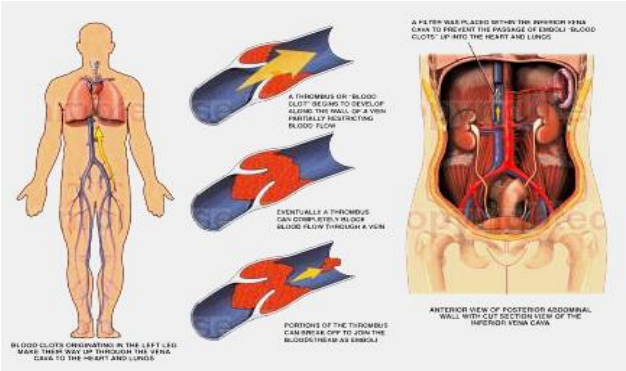

Fig. 6: Greenfield Filter Placement for Deep Vein Thrombosis (DVT)—Medical Illustration, Human Anatomy Drawing.

A condition known as deep vein thrombosis (DVT). Blood clots, or deep vein thrombosis, are depicted in this medical art series. Right here, you may see: 1. A man's anatomy and the main veins of his legs, feet, lower extremities, lower vena cava, core, and lungs, 2. Three perspectives through a normal vein reveal the development of a thrombus and embolus. 3. Last but not least, a Greenfield filter is inserted into the inferior vena cava in order to prevent blood clots from traveling to the lungs and heart, as can be seen in a single abdominal image.

3-Compression stocking: Within one month of a proximal deep vein thrombosis (DVT) diagnosis and for at least one year thereafter, patients should start using elastic compression stockings. Perhaps you'll get better results if you start within a week. The stockings used in the majority of trials were knee-high and produced blood pressure readings of 20–30 mm Hg or 30–40 mm Hg, which is stronger than anti-embolism stockings. A meta-analysis of randomized controlled trials conducted by the Cochran collaboration revealed a decrease in the incidence of post-phlebitic syndrome. The number of patients that need to be treated is relatively high, with four to five patients treated to prevent one case of post-phlebitic syndrome.

4: Medical care is successful in treating deep vein thrombosis (DVT), and there is a high prevalence of residual or recurrent venous blockage and valvular incompetence that occurs after surgical correction. Therefore, the usefulness of surgery in treating DVT is restricted. When the limb's immediate or long-term function is at risk, or if there is a significant blockage of the subclavian, iliac, or femoral vein, surgery may be necessary. If the patient does not react quickly enough to leg elevation and heparinization or thrombolytic therapy (or both), thrombectomy may be necessary to prevent venous gangrene, which can develop from ileofemoral thrombosis that has progressed to the point of near total occlusion, along with tenderness, massive edema, and cyanosis (phlegmasia cerulean dolens).Surgery loses its use after 7–10 days, and thrombectomy yields the best benefits when done within 48 hours of symptom onset; therefore, timing is of the essence. Proper technique and full thrombus removal are also critical for a successful venous thrombectomy.

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Prognosis:

Fifteen percent of patients with deep vein thrombosis (DVT) have post-phlebitic syndrome, which manifests as swelling of the legs, discomfort, cramping at night, venous claudication, darkening of the skin, dermatitis, and ulceration (often on the inside of the lower leg).

Knee replacement:

The weight-bearing surfaces of the knee joint are replaced during a knee replacement, also known as knee arthroplasty, a surgical procedure. This helps alleviate the pain and disability caused by osteoarthritis, but it can also be done for other knee diseases like rheumatoid arthritis or psoriatic arthritis. Patients with severe deformities due to advanced rheumatoid arthritis, trauma, or long-standing osteoarthritis may have a more complicated and risky surgery. Knee replacement surgery usually involves removing the damaged or diseased knee joint surfaces and replacing them with metal or plastic components designed to allow the knee to continue moving freely. This procedure can be either partial or total.

There is a lot of discomfort after the operation, and you'll have to do a lot of physical therapy to get back on your feet. You'll need a walker and eventually a cane for at least six weeks after the procedure

Prognosis:

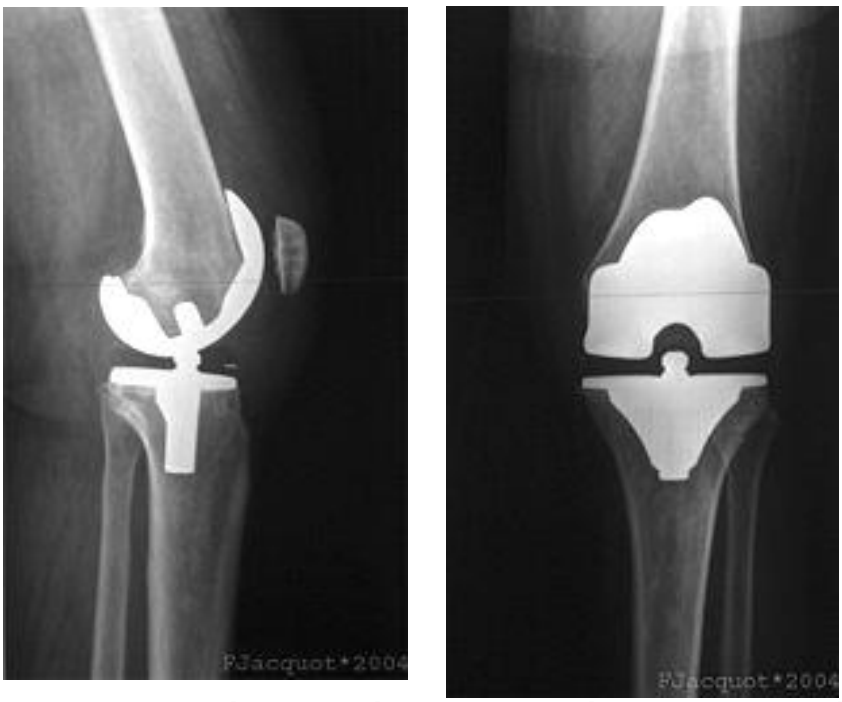

FIG. 8:Total Knee Replacement: Lateral View (X-rays) and AP View

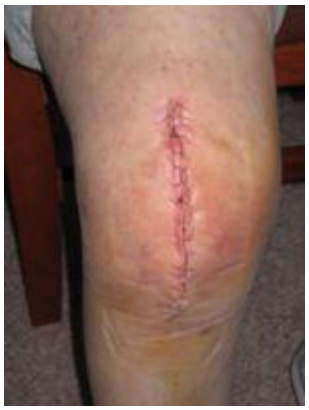

FIG. 9: The incision for knee replacement surgery

Alternative Knee Replacement Options:

In general, four types of knee replacements may be distinguished based on the level of mechanical stability offered by the prosthetic knee:

Free from limitations, Limited in scope, Restrictive or hinges, A acinonodular

The most popular kind of prosthetic knee, the very effective non-constrained implant, uses the patient's own muscles and ligaments to provide stability. If the surgeon needs to remove all of the inner knee ligaments, the semi-constrained implant can be utilized to increase knee stability. When the knee is very unstable and the ligaments cannot support other types of knee replacements, a constraint or hinged knee replacement may be an option for treatment of severely damaged knees. This type of knee replacement involves linking the two components of the joint with a hinged mechanism. Half of the knee joint is replaced in a unicondylar knee replacement, which is done when damage is localized to only one side of the joint and the other half is reasonably unharmed.

Technique:

The surgery involves exposure of the front of the knee and detachment of part of the quadriceps (vastus medialis) from the patella. The patella is displaced to one side of the joint, allowing exposure of the distal end of the femur and the proximal end of the tibia. The ends of these bones are then accurately cut to shape using cutting guides oriented to the long axis of the bones. The cartilages and the anterior cruciate ligament are removed; the posterior cruciate ligament may also be removed, but the tibial and fibular collateral ligaments are preserved. Metal components are then impacted onto the bone or fixed using polymethylmethacrylate (PMMA) cement. A round-ended implant is used for the femur, mimicking the natural shape of the bone. On the tibia, the component is flat, although it often has a stem that goes down inside the bone for further stability. A flattened or slightly dished high-density polyethylene surface is then inserted onto the tibial component so that the weight is transferred from metal to plastic, not metal to metal. During the operation, any deformities must be corrected and the ligaments balanced so that the knee has a good range of movement and is stable. In some cases, the articular surface of the patella is also removed and replaced by a polyethylene button cemented to the posterior surface of the patella. In other cases, the patella is left unaltered.

After the procedure:

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The leg is raised for a further 24 hours while the cricket splint and compression bandaging remain in place to help alleviate edema and any potential limitations on mobility. The dressings are gradually lowered for 24 hours following surgery. The drain is then withdrawn, and, under the guidance of a physical therapist, vigorous weight-bearing mobility can begin. If the patient's blood work after surgery is normal, they can be released as soon as they are able to move around without risk (usually around day 5).

Indication:

Knee prostheses can be either total or unicompartmental, with the former replacing the whole knee and the latter just half of it. The cartilage in the knee joint deteriorates, leading to osteoarthritis. Rheumatoid arthritis is an inflammatory disorder affecting the knee joint's lining. Traumatic arthritis, which develops after physical damage to the knee, Mild abnormalities of the ankle, knee, or hip, such as valgus, bowleggedness, or bending. Vascular necrosis, in which blood supply is cut off to the femoral condyle, a component of the lower leg bone, can cause microscopic fractures and eventual collapse. When other surgical procedures have failed, this one will hopefully succeed. Some shattered bones in the knee (fractures).

Contraindications:

Contamination.

The bone is either too weak or there isn't enough bone to hold the prosthesis. Damage to specific nerves and/or networks of nerves around the knee. Knee muscles that are injured or do not work. Knee ligament instability may be to blame for the extreme instability of the knee. Diseases affecting the spine. The knee joint has a functional and painless fusion, also known as arthrodesis. Furthermore, a unicompartmental knee implant should not be done if: Rheumatoid arthritis is one example. Deformity of the varus or valgus beyond 15 degrees. Chondrocalcinosis, often known as pseudo-gout, is characterized by the deposition of calcium in the joint cartilage. Unhealthy Reactions Additional surgical operations may be necessary to address the following occurrences, which are potential consequences after knee replacement surgery. A condition of venous thromboembolism in which blood clots form in one or more veins. Parts of the prosthetic knee might come loose or break. The prosthetic knee is dislocating and/or becoming unstable. The parts of the prosthetic knee are not properly aligned. Parts of the prosthetic knee are being dismantled. damage to the nerves or a broken bone. bloating sensation.

Infection: There are four forms of prosthetic infections, according to the current AAOS categorization. First category (confirmation of intraoperative culture positivity): two such cultures The second kind of infection is known as an early postoperative infection, and it happens during the first month following surgery. Type 3 (acute hematogenous infection): blood clot formation at the location of a prosthesis that was previously working normally In Type 4 (late chronic infection), the infection has been present for more than a month and has a persistent, mild clinical history. The type of prosthetic infection dictates the course of treatment. Positive cultures found during surgery: antibiotics only Second, debridement, antibiotics, and prosthesis retention for early postoperative infections. Delay in exchange arthroplasty: conventional treatment for late-chronic cases; surgical debridement and parenteral antibiotics alone have little success Rapid hematogenous infection treatment: debridement, antibiotics, prosthesis retention. Differences in leg length. Minimal flexibility.

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It hurts. Additionally, the following issues may arise: Potential problems with the materials used to make the prosthetic knee, such as an allergic response, cancer, or tumors. If you have a family history of allergies, metal sensitivity, or Paget's disease, it is important to discuss these concerns with your doctor. Accidental wear and tear on a prosthetic knee can lead to osteolysis, a process when bone breaks down, and loosening of the knee's components, which can necessitate further surgery. Additional surgical procedures may be necessary if corrosion develops in the prosthetic knee components.

Patients and Methods

Prior to participating, every single patient gave their informed permission. Recent thromboembolic disease (a history of deep vein thrombosis) was one of the exclusion criteria. Thrombocytopenia and coagulopathy in the past. There is a problem with the execution of duplex ultrasonography.

Total knee replacement on both sides.

Technical Approach from August 2010 to August 2011, the orthopedic department of Nursing Home Hospital in Baghdad Medical City was the site of a prospective randomized controlled clinical study. upon patients having primary elective knee arthroplasty. We chose 58 patients, 23 of whom were female and two of whom were male, who were all set to have complete knee replacements. There is a wide range of patient age (43–71 years), body weight (60–113 kg), and height (145–181 cm), as well as a wide range of body mass index (BMI) (19.84–38.45 kg/m2). All patients were evaluated with electrocardiograms, chest x-rays, radiographs of the afflicted knee, full blood-cell counts, coagulation and chemistry profiles, and electrocardiograms prior to surgery. Investigations using ultrasound technology: Every patient had bilateral duplex ultrasonography no later than one week before surgery. However, we did not include two patients who had asymptomatic preoperative deep-vein thromboses in the calf. When the collaterals opened, the vein dilated, compressibility reduced or disappeared, flow was low or nonexistent, and the valsalva maneuver failed to restore blood flow, a diagnosis of deep-vein thrombosis was made. Based on their admission dates, the remaining 56 patients were randomly assigned to one of two groups: one group received heparin (20 patients), while the other group received enoxaparin (36 patients). The draw was used to randomly allocate groups to each drug. Subcutaneous administration of 4000 IU of enoxaparin began six hours following surgery and continued for two weeks. Six hours following the procedure, the patient was started on a two-week course of subcutaneous heparin injections at a dose of 5,000 IU each day. Out of the total number of knee arthroplasties, 25 were done on the right side and 31 on the left. All patients had the procedures while under general anesthesia with tourniquet control. All components of the knee prosthesis were cemented. As a prophylactic measure against infection, patients were given intravenous targocid. Physiotherapy, including partial weight-bearing on the operatively treated leg, range-of-motion, quadriceps, and hamstring exercises, and bedside continuous passive motion, were all part of the postoperative regimen for all patients. Patients were also instructed to pump their calves on both sides. Examinations with ultrasound No deep vein thrombosis (DVT) was detected in the first two duplex studies done 7–10 days following surgery on both lower limbs; however, a third examination done three weeks later found that one patient in the heparin group had been experiencing DVT. Our investigation did not find any instances of pulmonary embolism; however, there were asymptomatic cases of deep vein thrombosis. We compared the results from the Heparin and Enoxprin groups, which are

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shown in tables and graphs. Applications such as SPSS (Statistical Package for the Social Sciences) for Windows, version 16.3, and the necessary tests were employed for statistical analysis. A significant p-value is less than 0.01.

Statistical evaluation All patient data was entered and processed with suitable statistical tests using SPSS V16, 3, and 1 US software for windows. An independent t test was performed to compare continuous variables, such as age and BMI, in both groups. For the purpose of comparing categorical data, such as the distribution of sexes and the frequency of DVT among patient groups, we utilized the Chi-square and Fisher exact tests. The significance of DVT incidence may be assessed using the McNemar and Wilcoxon tests. Table 7 displays the P-values of the associations between the occurrence of DVT and other factors, indicating the importance of these associations.

RESULTS

There were 36 men (64.3%) and 20 females (35.7%) who took part in the study. The men's average age was 53.8±12.5 years, and their average body mass index (BMI) was 28.7±5.2 kg^m2. The females' average age was 51.5±9.1 years, and their average BMI was 29.85±5.1 kg^m2. The data and breakdown of patients by age, sex, and body mass index are presented in Table 1.

Table 1: Mean age and mean BMI of patients distributed by sex.

Sex	N	percent	Parameter	Mean	Standard Deviation
Male	36	64.3%	Age years	53.8	12.5
			BMI kg\m²	27.9	5.3
Female	20	35.7%	Age years	51.5	9.1
			BMI kg\m²	29.9	5.1
Total	56	100%	Age years	52.95	11.4
			BMI kg\m²	28.7	5.2

Regarding the age group distribution, there were 17 patients (30.4%) in the age group ≤49 years, 26 patients (46.4.6%) in the age group 50–60 years, and 13 patients (23.2%) in the age group >60 years. So the majority of patients are in the age range of 50–60 years. table (2).

Table 2: Patients' distribution by age groups.

Age group years	Number	Percent%
≤ 49	17	30.4
50 -60	26	46.4
> 60	13	23.2
Total	56	100.0

Patients were divided randomly into two groups according to the type of anticoagulant given (heparin groups consisted of 20 patients (11 male and 9 female) and enoxaparin groups consisted of 36 patients (25 male and 11 female). The demographic characteristics and statistics of both groups are shown in Table 3..

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Table (3): **Demographic characteristics' of Patients Distribution among groups (Heparin and Enoxaparin group)**

Statistic	*Enoxaparin group (n=36)*	*Heparin group (n=20)*	*Total*
Male	25 (44.64%)	11 (19.64%)	36 (64.28%)
Female	11 (19.64%)	9 (16.08%)	20 (35.72%)
Mean age ±SD years	53.11 ± 11.2	52.65 ± 11.9	52.95 ± 11.4
Mean BMI ±SD Kg\m²	27.9 ± 4.58	26.8 ± 6.17	28.8 ± 5.35

Preoperative ultrasonography clarified that the overall prevalence of asymptomatic DVT was 3.45%, with 2 of 58 patients with asymptomatic DVT in the calf (they had been excluded from our study). For the remaining 56 patients (in both groups), there were 31 operations on the left side and 25 on the right side (table 4).

Table 4: Distribution of patient groups by site of operation and sex.

Anticoagulant	Site of operation	Sex	Frequency	Percent
Heparin Group	Right Side	Male	6	54.5
		Female	5	45.5
		Total	11	100.0
	Left Side	Male	5	55.6
		Female	4	44.4
		Total	9	100.0
Enoxparin Group	Right Side	Male	8	57.1
		Female	6	42.9
		Total	14	100.0
	Left Side	Male	17	77.3
		Female	5	22.7
		Total	22	100.0
Total			56	100

The Doppler study was performed 7–10 days postoperatively on all patients in both groups, and no cases of DVT had been reported among both groups.

In an ultrasonographic study repeated after 3 weeks postoperatively, one patient in the Heparin group had been diagnosed as a DVT case (female, 56 years, BMI 37.3) in the operatively treated limb (left side).

The overall incidence of asymptomatic deep vein thrombosis is 1.78 percent (1 of 56 patients); it represents 5% among Heparin group patients (1 of 20 patients), while no cases are reported among Enoxaparin group patients (Tables 5 and 6).. The odds ratio (OR) is (1.8) and the P value is

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(0.0002), which is statistically highly significant, i.e., patients using Heparin are about twofold (OR = 1.8) more likely to be liable to develop DVT than those who are using Enoxaparin. Enoxaparin has a more effective prophylactic role in the prevention of DVT postoperatively.

Table (5): Number and incidence of DVT seen on ultrasonography three weeks postoperatively, among patient groups; distributed by sex.

Patients group	Sex	N	DVT	Incidence	*P. value**
Enoxaparin	male	25	0	0	-
	female	11	0	0	-
Total		36	0	0	-
Heparin	male	11	0	0	-
	female	9	1	11.1% (with in females)	-
Total		20	1	5% (with in group)	-
Total		56	1	1.78% (with in all patients)	0.0002

**P. value* ≤ 0.01considered as significant ,

Table (6) : 2 ×2 table of incidence of DVT among patients groups **.

	DVT			OR	*P. value*
Patients group	*Positive*	*Negative*	*Total*		
Enoxaparin group	0 (0%)	36 (64.3%)	36 (64.3%)	*1.8*	*0.0002*
Heparin group	1 (1.8%)	19 (33.9%)	20 (35.7%)		
Total	1 (1.8%)	55 (98.2%)	56 (100%)		

** The percentage in between brackets represents the overall incidence of DVT among the total number of patients in both groups.

The association between enoxaparin use and a reduction in the incidence of DVT is highly significant at a P value ≤ 0.01. There is no statistically significant association between DVT development and BMI, age, site of operation, or sex distribution. (7)

Table (7): The association between the incidence of DVT and different parameters of study patients.

Parameters	Odds ratio	*P. value**	significance
Anticoagulants	1.8	0.0002	Highly significant
Site of operation	-	0.374	No significant association
Sex	-	0.182	No significant association
Age	-	0.148	No significant association
BMI	-	0.793	No significant association

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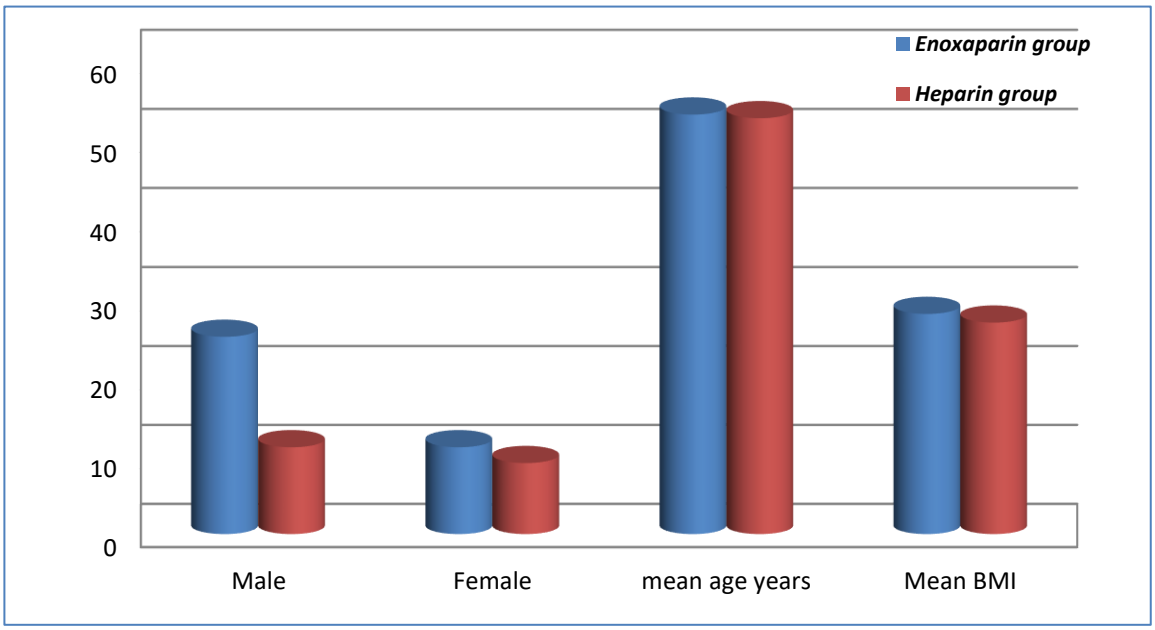

Figure(10): Demographic characteristics' of Patients Distribution among groups (Heparin and Enoxaparin group).

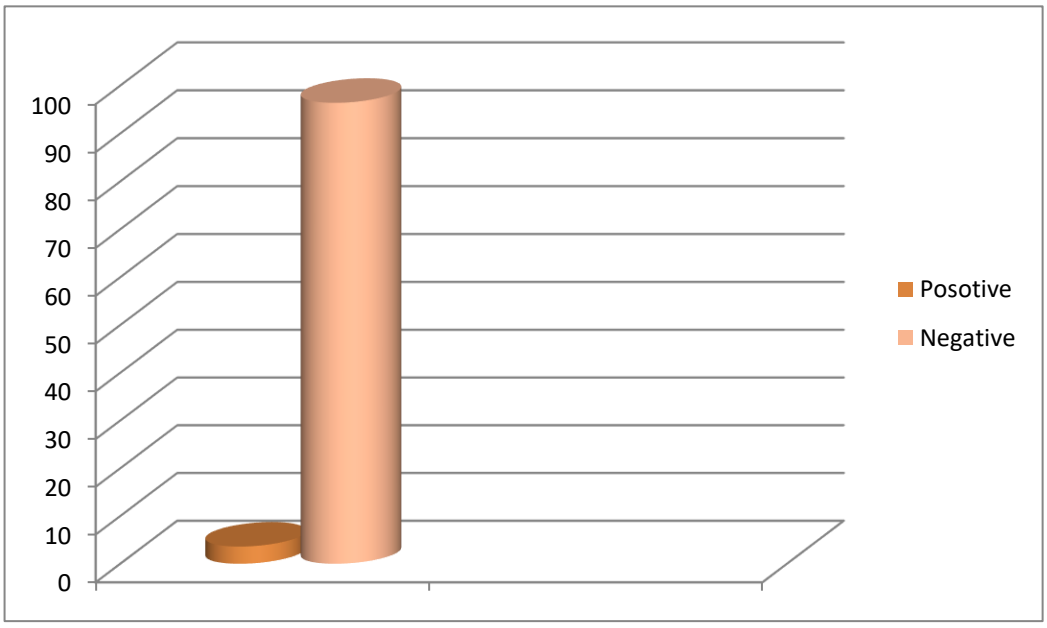

Figure (11) : prevalence f DVT among all patient (n=56).

DISCUSSION

Deep vein thrombosis represents one of the most commonly occurring and serious medical conditions following hospitalization for a serious illness or major surgery. . Thromboprophylaxis following total knee arthroplasty was shown to be more successful with enoxparin in avoiding venous thrombosis; no pulmonary emboli or mortality were reported.The incidence of deep vein thrombosis (DVT) was 1.78% in patients given enoxparin and 5% in patients who did not take the drug, according to this research. Lovenox and Clexane are brand names for the low-molecular-weight heparin enoxaparin. It is administered subcutaneously (either by the healthcare practitioner or the patient) and is used for the prevention or treatment of deep vein thrombosis. The intestinal

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mucosa of pigs is the source of synthesized enoxaparin. The binding and acceleration of antithrombin III's action can be facilitated by enoxaparin. In the US, low-molecular-weight heparin is suggested for the following: prevention of deep vein thrombosis in medically sick patients; total knee and hip replacement; abdominal surgery; and inpatient treatment of deep vein thrombosis (DVT) with or without percutaneous embolization (PE). While enoxaparin is acceptable to use while breastfeeding, it is not safe to use during pregnancy and does not change the INR, PT, or aPTT. To monitor enoxaparin action, anti-factor Xa levels can be monitored. Though it is not as effective as heparin, proton is a reversal agent of enoxaparin. Heparin, being an antithrombin III, prevents the development of blood clots by acting on factor Xa. Unlike other drugs, such as tissue plasminogen activators, it does not destroy the clot; therefore, the body is able to pass it on. To reduce the possibility of hematoma development, heparin should not be administered intramuscularly but rather through the paternal root. Compared to enoxaparin, which is given once daily, heparin is less convenient to use because it needs to be taken twice daily. Our results are in line with those of Johnson BF and Manzo RA, who also discovered that the incidence of deep vein thrombosis (DVT) decreased in the enoxparin group among 120 patients of varying ages who had total knee replacements for osteoarthritis and rheumatoid arthritis. The study also found a significant correlation between the two groups, with the heparin group having a higher incidence of asymptomatic DVT. The majority of patients in our research were arthritic, and they were all in the same age range (50–60) and body mass index (BMI). Additionally, the majority of these patients had long surgical procedures. Our study found that the incidence of deep vein thrombosis (DVT) increased in the heparin group in patients whose operations lasted more than 120 minutes, compared to individuals whose procedures lasted less than 120 minutes. Asymptomatic deep vein thrombosis occurred in 5% of the women in our research who were 56 years old and on the left side of the body. Compared to the findings of Hansson Po, Sorbo J, and Eriksson H, who found a decrease in the incidence of DVT in the enoxparin group of 85 patients with hospitalizations of less than one week and more than one week, our study found no difference in the incidence of asymptomatic DVT in groups with the same length of hospitalization, which is approximately one week. There is a very significant statistical relationship between the two variables; specifically, individuals using heparin had an almost twofold increased risk of developing deep vein thrombosis (DVT) compared to those on enoxaparin (OR = 1.8).

0Statistical analysis has not shown a correlation between the development of deep vein thrombosis and factors such as body mass index (BMI), age, surgical site, or sex distribution. Blood clots develop most frequently in people who have had lengthy surgical procedures. There was one occurrence of pulmonary embolism, and most deep vein thrombosis (DVT) occurred in the calf veins; no involvement of the femoral or iliac veins was seen. The left leg that was operated on had a 1.78 percent incidence of asymptomatic deep vein thrombosis.Diagnosing deep vein thrombosis (DVT) is crucial because prompt diagnosis and treatment reduce morbidity, but it is clinically challenging due to the lack of distinct symptoms. Though the lack of these symptoms and signs does not always rule out deep vein thrombosis (DVT), our study demonstrates that unilateral leg edema, calf discomfort, calf tenderness, and Homon's sign are helpful in diagnosing DVT in patients undergoing total knee replacement. Neither the heparin group nor the enoxaparin group experienced any statistically significant adverse effects. The supply lasted anything from two hours to two and a half hours.

Only when applying cement was a tourniquet used.

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Conclusions:

The results show that deep vein thrombosis (DVT) is a significant medical disorder that happens frequently when a person is hospitalized for a serious illness or major surgery. One way to avoid deep vein thrombosis (DVT) following total knee arthroplasty is to use enoxparin. No correlation was found between the incidence of deep vein thrombosis (DVT), age, sex, body mass index (BMI), or location of operation in either males or females.Blood clots in the calf veins In patients undergoing total knee replacement, the lack of these symptoms and signs does not rule out deep vein thrombosis (DVT), and the bedside diagnosis of VT is insensitive and erroneous. 95 percent accuracy and 85 percent Doppler sensitivity.

Recommendations:

People who have had a complete knee replacement are at a higher risk of getting deep vein thrombosis.Until release from the hospital (3–10 days), provide low-molecular-weight heparin (enoxparin) subcutaneously 6 hours after surgery. Step three: get back on your feet as soon as possible following a complete knee replacement. Reducing the risk of deep vein thrombosis (DVT) and subsequent knee replacement surgeries requires meticulous planning and execution from the outset. In individuals with several risk factors, it is extremely important to exclude deep vein thrombosis (DVT) whenever feasible with a duplex examination so that therapy may begin early. Additional, longer-term trials with larger patient populations

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