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Original Research Article

Risk profile and thromboprophylaxis practices among patients undergoing laparotomy at Moi teaching and referral hospital

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ABSTRACT

Background: Venous thromboembolism (VTE) significantly causes hospital mortality worldwide, with abdominal surgery a risk factor. Venous thromboprophylaxis can reduce VTE risk, but has adverse effects. Local research on risk profile and practice helps individualize thromboprophylaxis and develop local protocols.
Methods: A prospective study was conducted at Moi teaching and referral hospital (MTRH) on adult laparotomy patients. The minimal sample size was 325 patients, using consecutive sampling. DVT was assessed using Well's score perioperatively, 2 weeks and 4 weeks postoperatively. A lower limb Doppler ultrasonography was performed on patients with a score of 2 or greater to rule out DVT.
Results: The mean age of study participants was 38 years, with a 1.5:1 male-to-female ratio. Infection in the abdomen was the main reason for laparotomy. All procedures were open, and 75.4% of individuals had high or moderate VTE risk. Within 72 hours, 82.7% of patients were mobilized. Chemoprophylaxis was limited to enoxaparin post-op. Enoxaparin duration was unstandardized, and MTRH VTE risk categorization chart use was not reported. 3% of individuals received chemoprophylaxis against ACCP guidelines and 12% received enoxaparin despite contraindications. Only 13% and 24% of intermediate and high-risk patients got chemoprophylaxis. No mechanical prophylaxis was used. Symptomatic DVT was 6.8%. Advanced age, Caprini score, and enoxaparin prescription increased symptomatic DVT risk.
Conclusions: Despite increased laparotomies for intra-abdominal infection and middle-aged patients, VTE is common in MTRH patients. Poor VTE risk stratification and MTRH protocol failure led to improper thromboprophylaxis. Prescribers should employ MTRH VTE regimen for proper prophylaxis. Providing prescribers with thromboprophylaxis choices to customize prescriptions.

Keywords: VTE, Thromboprophylaxis, Risk profile

INTRODUCTION

Venous thromboembolism (VTE) kills 5-10% of hospitalized patients.[1] Most VTEs are identified in the hospital or days after release. Hospitalized or discharged patients account for 60% of VTE.[2] PE causes 14.2% of cardiovascular deaths in Kenya.[3] About half of PE patients have complications, 28.1% die, and 18.8% develop corpumonale.[4] Prevention is crucial for patients at risk of VTE due to its high prevalence, quiet clinical character, high treatment cost, and sudden mortality.

Surgery patients have a 64% probability of VTE, while medical ward patients have 41.5%.[21] Limiting risk requires risk assessment and surgical patient management. Surgical indication, comorbidities, genetics, and support systems increase VTE risk. These factors may increase VTE in surgical patients. Iodine 125-marked fibrinogen testing shows a 25% global DVT risk in general surgery patients without prophylaxis.[5]

Major abdominal surgery and related reasons increase VTE risk. Abdominal surgery increases

hypercoagulability and DVT risk. VTE risk is 23.7% for laparotomy patients.[22] In Kampala, Uganda, laparotomy caused 5% DVT.[23] Laparotomy VTE mortality is reduced by VTE risk assessment and thromboprophylaxis. Over time, VTE risk factors have been identified and classified by likelihood. Multiple variables raise VTE risk. Surgery, cancer, and trauma are known VTE risk factors. Caprini risk assessment model and Roger scoring system are used to stratify non-orthopedic surgery patients by VTE risk. Roger score, validated in one study, is 'cumbersome'. Since 1991, the Caprini risk assessment model has been validated in over 100 clinical trials globally, including South Africa.[6] Testing surgical procedures or specialties affect VTE risk interpretation. Caprini score is a reliable, complete, and effective technique for VTE risk assessment and prophylactic selection.

Heparin with graded compression stockings (GCS) and intermittent pneumatic compression (IPC) are used to lower VTE risk. This may be used alone or in combination based on VTE risk, bleeding risk, and expected side effects. Thromboprophylaxis, whether pharmacological or mechanical, reduces VTE by 67% in colorectal surgery patients.[24] However, studies show underuse of venous thrombus prevention strategies. Only 26.7% of general surgery patients at risk of VTE received prophylaxis at Kenyatta national hospital (KNH), while 4% received inappropriate prophylaxis.[25] VTE pharmaco-prophylaxis increases bleeding and wound dehiscence risk. No COSECSA surgeon reported limb ischemia or nerve damage from mechanical thromboprophylaxis.[26] Surgeons must assess risk versus benefit when using prophylactic.

Thromboprophylaxis begins after surgery depending on agent and bleeding risk. The length of prophylaxis may also reduce VTE risk. Low-risk surgery requires 7-10 days of postoperative or VTE prophylaxis till mobilization.[27] Moderate and high-risk VTE patients may stay longer than a week. A larger, double-blind multicenter experiment found that prolonged LMWH prophylaxis from 1 week to 4 weeks reduced DVT in abdominal or pelvic cancer patients.[28]

VTE may be a quiet killer, causing deadly pulmonary embolism first. Surgical procedures are known VTE risk factors. An effective thromboprophylaxis approach reduces this risk with minimal side effects.[29] With dose adjustment, most anticoagulants can be used for prophylaxis. Meta-analyses and major clinical trials show that low-dose UFH reduces DVT from 25% to 8% and clinically overt and fatal PE by 50% and 90%, respectively.[30]

Despite the data supporting thromboprophylaxis, surgeons may overlook treatment because they believe the risk of VTE is not significant enough to outweigh the hemorrhagic risks of anticoagulants. VTE may not be suspected before death, indicating that fatal PE can be the first sign of asymptomatic DVT. Undiagnosed DVT can cause post-thrombotic syndrome, pulmonary hypertension, and recurrent VTE. 2001.[24] Post-thrombotic syndrome causes limb edema, discomfort, purpura, dermatitis, ulceration, itching, and cellulitis. This may deteriorate and require amputation, lowering the patient's quality of life. DVT and PE management involves hospitalization, several injections, and often intensive care, making it more expensive than prophylaxis.[5]

At MTRH a national teaching and referral hospital, laparotomies are done on a daily basis. From a local study, more than 50% of surgical patients are at moderate or high risk of VTE. Perceived low incidence of VTE has led to failed or suboptimal stratification of laparotomy patients. This results in inappropriate thromboprophylaxis.[8]

Anecdotal evidence has revealed underutilization of availed MTRH VTE risk forms, on patient admission files. The forms are never filled or are incomplete at the point of patient discharge from the hospital. This may lead to inappropriate or inadequate prescription of necessary venous thromboprophylaxis in laparotomy patients who are at increased risk of VTE. VTE prevention is not only best but cheaper.[5]

Deep venous thrombosis (VTE) is a preventable, life-threatening condition that affects millions of people worldwide.[9] A global review identified 0.75-2.69 VTE cases per 1000, with 60% of preventable hospital deaths occurring within 90 days of admission. In Africa, the prevalence of post-operative DVT varies from 2.4-9.6%, with diagnosis of PE having a case fatality rate of 60%. In Kenya, PE accounts for 14.2% of cardiovascular mortality.[31] The clinical presentation of VTE varies, ranging from symptomatic to asymptomatic DVT and PE or a combination of both. Rudolf Virchow's triad, characterized by venous stasis, hyper-coagulable states, and vascular endothelial injury, is a pathogenic condition triggered by body insults.

Major general surgery, such as abdominal or thoracic surgery lasting more than 45 minutes, is one of the highest risks of developing VTE, with an incidence of up to 30%. Other surgeries have variable VTE risk, with major orthopedic procedures having the highest odds of venous thrombus formation. Patient factors and surgical compilations may increase the risk of VTE associated with surgery, such as inflammation, advanced age, sepsis, long duration of surgery, and coagulopathy.[32]

Other risk factors include congestive heart failure and respiratory failure. Obesity or overweight may increase the risk of VTE, but the association is weak. Immobility as a risk factor is evident in hemiplegic studies, where asymptomatic DVT has been reported in 60% of the paralyzed limb of stroke patients vs. 7% in the non-paralyzed limb. Prolonged immobilization combined with other major risk factors increases the likelihood of the VTE.

DVT commonly develops in the lower limbs, but patients with risk factors like upper limb catheters may develop DVTs in the upper limb. Diagnosis of DVT can be challenging due to differential diagnoses and scoring systems.[10] The 2018 Kenya cardiovascular diseases guidelines recommend compression ultrasonography (CUS) as the gold standard for diagnosing extremity DVT. Plasma D-dimers are elevated in VTE and are a marker of fibrin degradation.[2] However, the predictive value of D-dimers in the diagnosis of DVT post-surgery is low.

Post-operative VTE incidence varies globally, depending on thromboprophylaxis practices and patient risk profiles. In Africa, the prevalence of DVT is estimated to be 2.4 to 9.6%, while in Nigeria, it is 2.2%.[11] In Denmark, the incidence of VTE is 1.1%, and all patients receive pharmacological prophylaxis. In the Middle East, the incidence is 7.1% in critically ill patients post-surgery.[12]

Several quantitative risk assessment models exist for clinical practice, including the Rogers score and Caprini score.[24] However, these models are cumbersome and not easy to follow, making them unsuitable for routine use in clinical practice. The Caprini score is more sensitive in surgical patients than the Padua score.

Despite these risk categorization models, most surgeons still use 'one dose fits all' prophylaxis for postoperative venous thromboprophylaxis.[13] Risk assessment scores are an objective way to determine who requires prophylaxis and to what extent based on the patient's risk profile.

The Caprini risk assessment tool for VTE was first published in 1991 and has been validated in over 100 clinical trials worldwide. It assigns points based on the relative risk of resulting in thrombotic events, with patients categorized as low, moderate, and high risk to determine the type, duration, and strength of prophylaxis. The Caprini score is considered acceptable by most bariatric and vascular surgeons and is applicable to other surgical fields, such as endocrine surgery, gynecological, and neurosurgery.[14]

The Caprini score is associated with a higher incidence of post-operative DVT, and failure to use risk stratification can result in high-risk patients receiving inadequate prophylaxis and low-risk patients receiving unwarranted prophylaxis with increased risks of adverse effects.[15]

Mechanical thromboprophylaxis includes graduated compression stockings (GCS), elastic stocking, IPC, and venous foot pump.[16] The American college of chest physician recommends the use of IPC, but no data shows superiority in these methods. Elastic stockings reduce the odds of DVT development by 65%, while GCS are effective in reducing the risk of DVT and are more effective when combined with other methods of prophylaxis.[17]

There are different guidelines on thromboprophylaxis in surgical patients, most developed for major orthopedic surgeries. The effectiveness and safety of the thromboprophylaxis method employed is the goal of effective venous thrombus formation prevention.[18] Clinical practice guidelines have been published by various professional bodies and some hospitals have established their own protocols.

Despite the availability of guidelines on thromboprophylaxis (VTE) prophylaxis, adherence to guidelines remains suboptimal in most clinical areas. Only 60.3% of eligible patients receive appropriate prophylaxis, and up to 80.1% receive inappropriate prophylaxis in hospitalized medical patients.[19] Challenges include multiple staff involvement, interruptions of prescriptions, lack of policy awareness among caregivers, time pressure, and complexity of assessment tools.

In a study, only 39% of surgical patients received VTE prophylaxis as per ACCP 2008 guidelines, while 93% of patients undergoing major surgery were at risk of VTE but only 62% received prophylaxis as per ACCP recommendation.[33] Preventing VTE morbidity and mortality is crucial, and active interventions like alerts and a service-specific VTE decision support tool have been advocated for.

The American heart association has called for action to decrease VTE by 20% in hospitalized patients by 2030. Policy guidelines include performing VTE risk assessment and reporting the level VTE risk in all hospitals, integrating preventable VTE as a benchmark for hospital comparison and pay-for-performance programs, supporting public awareness, tracking VTE nationally, and developing centralized data stewardship.[20]

METHODS

This is a prospective study, as it involves following a group of patients over time (up to 28 days post-surgery) to observe outcomes such as the incidence of deep vein thrombosis (DVT) after laparotomy. The study was conducted at the MTRH, in Eldoret, Kenya. All MTRH, Eldoret emergency or elective laparotomy patients over 18 were included in the study. The study included 325 patients over one year, from September 1, 2021, to August 31, 2022. Approval and permission were granted by IREC and MTRH, written informed consent was obtained, participants who declined or withdrew faced no repercussions, and confidentiality and anonymity were maintained throughout the study.

STATA 16.1 was used as the analysis software. Results were presented in frequency tables with proportions for given and type. Clinical DVT incidence was calculated by dividing the number of participants by the incidence proportion, and Chi Square was utilized to link risk factors.

RESULTS

Social demographics and clinical characteristics of the participants

The study included 323 participants aged 18-97 (mean age 38.76), with a male-to-female ratio of 1.5:1. All abdominal surgeries were performed openly, with intestinal resection and anastomosis/repair being the most common (67.7%), followed by appendectomy (17.2%). Most surgeries lasted over 45 minutes (99.3%) and were considered major. Senior residents led 53.5% of surgeries, consultants 24.5%, and residents 22.0%. Post-surgery, 82.7% of patients were mobilized within 72 hours, while 17.3% remained bedridden.

Caprini risk assessment score

The Caprini risk assessment stratified laparotomy patients into various VTE risk categories, with most participants at moderate (37.7%) and high risk (37.7%), and fewer at low (20.4%) and very low risk (3.7%). Among high-risk patients, the majority were aged between 35 and 65 years, while the moderate-risk group had nearly equal numbers of patients below 35 years and those aged 35-65.

Thromboprophylaxis practices

None of participants received thromboprophylaxis before surgery, but one participant was given enoxaparin intra-operatively. On 1st postop day, 55 participants (17%) on thromboprophylaxis, specifically enoxaparin, which had median duration of 3.88 days, 6 (10.9%) didn't receive enoxaparin as prescribed. Most prescriptions lacked a defined duration, and decisions to stop administration were often made by nurses without prescriber input. Contraindications to pharmacological prophylaxis were rare, with hepatic impairment being the most common. No adverse reactions to enoxaparin were reported. Mechanical thromboprophylaxis not utilized, and no risk stratification scores were filled for laparotomy patients. Records department stopped including thrombo-prophylaxis risk score page due to its underutilization.

Early mobilization within 72 hours of laparotomy was implemented in 76.8% of postop patients. Chemoprophylaxis was primarily administered post-op to those at high risk of developing VTE. Table 2 showed details frequency of prophylaxis across different VTE risk groups.

Table 1: Thromboprophylaxis practices.

Variables	N (%)
Thromboprophylaxis preoperatively	
No	323 (100)
Thromboprophylaxis intraoperatively	
No	322 (99.7)
Yes	1 (0.3%)
Thromboprophylaxis day 1 postoperatively	
No	268 (83)
Yes	55 (17)
Thromboprophylaxis on discharge	
No	323 (100)
Pharmacological drug, n=55	
Sc clexane/enoxaparin	55 (100
Duration in days, n=55	
Mean (SD)	3.88 (1.62)
Range	1.00-10.00
Whether drug was administered, n=55	
No	6 (10.9)
Yes	49 (89.1)
Mechanical	
No	323 (100)
Upper GI bleeding	
No	322 (99.7)
Yes	1 (0.3)
Hepatic impairment	
No	318 (98.5)
Yes	5 (1.5)
Bleeding disorder	
No	322 (99.7)
Yes	1 (0.3)
Thromboprophylaxis drug reaction	
No	323 (100)
Lower limb ulceration	
No	320 (99.1)
Yes	3 (0.9)
Vascular disease of lower limb	
No	323 (100)

Table 2: Proportion of patient at risk receiving VTE chemoprophylaxis.

Type of prophylaxis	Variables	Grade risk			
		Very low risk	Low risk	Moderate risk	High risk
Mobilization	Early ambulation	7	52	101	88
Chemoprophylaxis	Pre operative	0	0	0	0
	Intra operative	0	0	0	1
	Post operative	5	4	16	30
	Duration				
Mechanical		0	0	0	0

Continued.

Risk	No. of patient at risk	No. of those receiving enoxaparin	Proportion of those receiving prophylaxis
Very low risk	11	5	45%
Low risk	65	4	6%
Moderate risk	120	16	13%
High risk	121	30	25%

Some patients in the very low risk group for VTE unnecessarily received enoxaparin, with 45% of them receiving it compared to 25% in the high-risk group. Additionally, 4 low risk patients received enoxaparin instead of the recommended mechanical prophylaxis, despite no recorded contraindications. High risk VTE patients received only chemoprophylaxis, without the recommended combination of mechanical prophylaxis, with only 25% of high-risk laparotomy patients receiving prophylaxis.

Incidence of clinical DVT

Within 48 hours of abdominal surgery, 9.3% of participants had a Wells score of 2 or more, increasing to 12.2% at 14 days post-operatively, and at 28 days post-operatively, 5.1% of participants had a Wells score of 2 or more.

Table 3: Incidence of clinical DVT.

Time	Wells' score	
	<2	**≥2**
48 hours	292 (90.7%)	30 (9.3%)
14 days	274 (87.8%)	38 (12.2%)
28 days	242 (94.9%)	13 (5.1%)

A Doppler ultrasound study of 81 patients' post-surgery found that within 48 hours, 2 had confirmed DVT. By 14 days post-laparotomy, 17 participants had DVT, and by 28 days post-surgery, an additional 5 patients were diagnosed with DVT.

Table 4: DVT among those with Wells' score >2.

Time	DVT, N (%)		Cumulative % of 323
	Yes	**No**	
48 hours	2 (6.7)	28 (93.3)	0.62
14 days	17 (44.7)	21 (55.3)	5.88
28 days	5 (38.5)	8 (61.5)	7.43

Clinical DVT incidence proportion in patients undergoing laparotomy at MTRH was calculated as follows; incidence proportion of clinical DVT=number of new DVT cases over study period/total number of patients undergoing laparotomy over the study period.

The number of new DVT cases was determined by subtracting the number of patients with positive DVT at 48 hours (2 patients, assumed to be pre-laparotomy cases) from the total number of laparotomy patients with positive DVT over a 28-day follow-up period (24 patients), then dividing this by the total number of patients undergoing laparotomy (323). The total number of patients with DVT included 2 patients at 48 hours, 17 patients at 14 days, and 5 patients at 28 days, summing up to 24 patients.

Number of new DVT cases (24-2)/Total no. of participants (323)=0.068

As a percentage=0.068×100, the incidence proportion of clinical DVT in patients undergoing laparotomy at MTRH is=6.8%

Table 5: Association between DVT vs Caprini, age, gender, diagnosis, chemoprophylaxis use.

Variables	DVT at 14 days, N (%)		P value
	No, (n=295)	**Yes, (n=17)**	
Age (in years)			
N	294	17	
Median	34.50	40.00	0.137[1]
Q1 and Q3	25, 47	30., 71	
Sex			
Female	113 (93.4)	8 (6.6)	0.485[3]
Male	180 (95.2)	9 (4.8)	
Diagnosis			
Appendicitis	60 (100)	0 (0.0)	
Blunt abdominal injury	20 (95.2)	1 (4.8)	
Gall stone disease	12 (100)	0 (0.0)	
Intestinal obstruction	83 (94.3)	5 (5.7)	0.022[2]
Penetrating abdominal injury	16 (100)	0 (0.0)	
Peritonitis/abscess	69 (93.2)	5 (6.8)	
Tumour	28 (82.4)	6 (17.6)	
Caprini			
Highest risk	98 (86.7)	15 (13.3)	
Moderate risk	119 (99.2)	1 (0.8)	<0.001[2]
Low risk	62 (100)	0 (0.0)	
Very low risk	10 (90.9)	1 (9.1)	
Clexane			
No	253 (97.7)	6 (2.3)	<0.001[2]
Yes	41 (78.8)	11 (21.2)	

*1. Mann-Whitney U test, 2. Fishers exact test, 3. X^2 test.

The clinical diagnosis leading to laparotomy being done

was associated with a higher chance of developing DVT. There was statistically significant association of a higher caprine score and DVT development post operatively. Prescribing enoxaparin was associated with a higher chance of developing DVT post operatively.

Table 6: Association between enoxaparin prescription, diagnosis and lead surgeon.

Variables	Clexane, N (%)		P value
	No, (n=268)	Yes, (n=55)	
Diagnosis			
Appendicitis	58 (95.1)	3 (4.9)	<0.001[2]
Blunt abdominal injury	19 (90.5)	2 (9.5)	
Gall stone disease	11 (91.7)	1 (8.3)	
Intestinal obstruction	84 (90.3)	9 (9.7)	
Penetrating abdominal injury	13 (81.2)	3 (18.8)	
Peritonitis/abscess	53 (69.7)	23 (30.3)	
Tumour	26 (70.3)	11 (29.7)	
Lead surgeon			
Consultant	57 (74)	20 (26)	0.002[3]
Resident	52 (75.4)	17 (24.6)	
Senior resident	150 (89.8)	17 (10.2)	

*1. Mann-Whitney U test, 2. Fishers exact test, 3. X^2 test.

At MTRH, the decision to prescribe enoxaparin for laparotomy patients was significantly associated with a p<0.001. The senior surgeon present determined the prescription, with consultant surgeons more likely to prescribe enoxaparin compared to resident surgeons.

DISCUSSION

Most patients were middle-aged, with a mean age of 38 and SD of 16.7. This age group has a lower venous thromboembolism risk than the elderly. Patients in high-income countries are mostly older, with a median age of 64. The study indicated that men need abdominal surgery more than women. In Uganda, Senegal, and South Africa, laparotomy patients average 45 years old, 49 years in the ENDORSE trial, and 45 years in South Africa.

MTRH laparotomy is most often performed for appendicitis, the most common cause of intra-abdominal sepsis worldwide. In India, laparotomy is usually performed for acute cholecystitis, tumors, and intestinal obstruction. However, mechanical small bowel obstruction accounts for most emergency laparotomies in India and Slovenia.[34]

The study reported open abdominal surgery in all laparotomy cases, consistent with Uganda and South Africa. In high-income countries, 71% of surgeries are minimally invasive and conducted openly. Venous thromboembolism is more likely in open surgery than laparoscopic surgery. When possible, use minimally invasive procedures to avoid venous thromboembolism, which is more likely with open surgery.

The duration of abdominal procedures, particularly laparotomy, increases the risk of post-operative VTE. Most MTRH laparotomy patients had a higher risk of VTE after surgery, according to the Caprini score. Laparotomy patients with high-risk scores need personalized venous thromboembolism risk assessment and treatment.

VTE risk can be reduced by early mobilization. The majority of research participants-82.7%-mobilized within 72 hours of laparotomy. Early mobilization reduces postoperative pulmonary problems, bowel function losses, and hospital stays.

Enoxaparin, a pharmaco-prophylaxis, is usually given subcutaneously at 40 mg once a day for 3.88 days. However, patient preference, simplicity of administration, and cost should determine pharmaceutical choice. Enoxaparin was the most recommended chemoprophylaxis in the current study, with 83% treated on day one post-surgery. The study group did not standardize prophylactic administration, despite guidelines advising 7-10 days or until full mobilization. The administering nurse discontinued the enoxaparin treatment sheet without prescriber input. For those at highest risk of VTE with malignancy, thromboprophylaxis should last 3-4 weeks, however none of the MTRH laparotomy patients received it, presumably due to failing to use the institution's VTE risk classification score.

As suggested by ACCP recommendations, 66% of low-risk patients received chemoprophylaxis instead of mechanical prophylaxis. Lack of acquaintance with guidelines, resources, miscalculation of VTE risk, concern over bleeding, and view of guidelines as difficult and resource-intensive to follow contribute to underutilization. Surgical patients received prophylaxis 37.5-96.5% of the time, depending on specialty. Even though chemoprophylaxis increases bleeding risk, five low-risk subjects received needless treatment. This may be due to the lack of MTRH risk classification forms, which help choose thromboprophylaxis methods individually. Patients with severe bleeding risk or other contraindications to chemoprophylaxis should continue mechanical prophylaxis until the bleeding risk is low enough to safely utilize it. High-risk groups should use mechanical and pharmacological methods to reduce thrombi development. Symptomatic DVT was 6.8%, similar to Uganda and Africa. The increased risk of VTE and DVT in laparotomy patients at MTRH underscore the need for risk assessment and prevention. Enoxaparin prescription was linked to DVT risk, probably due to poor mechanical and chemical thromboprophylaxis. Consultant surgeons prescribed more chemoprophylaxis, probably because they manage or lose VTE patients.

Open abdominal surgery was performed in all laparotomy instances, however minimally invasive surgery is more common in high-income.[35] Venous thromboembolism is more likely in open surgery than laparoscopic surgery.[37] Most participants mobilize within 72 hours post-laparotomy to lower VTE risk. On day one post-surgery, 83% of patients receive pharmaco-prophylaxis like enoxaparin at 40mg subcutaneously once a day. The study group did not standardize prophylactic administration, despite guidelines advising 7-10 days or until full mobilization. 66% of low-risk patients received chemoprophylaxis instead of mechanical prophylaxis due to lack of familiarity with guidelines, resources, underestimation of VTE risk, bleeding concerns, and perception of guidelines being difficult and resource-intensive to implement. In high-risk categories, mechanical and pharmacological interventions are advised.

CONCLUSION

Although the Caprini scores indicated a high risk of VTE, the implementation of prophylaxis measures was variable. A considerable number of patients at high risk did not receive sufficient or any prophylaxis. Moreover, enoxaparin was commonly supplied without adequate risk stratification, resulting in both inadequate and excessive treatment in various risk groups.

The study's finding of a 6.8% occurrence of DVT is worrisome and emphasizes the necessity for uniform guidelines for preventing blood clots, especially in situations when both mechanical and pharmacological methods should be used together for patients at high risk. The correlation between the administration of enoxaparin and the occurrence of DVT implies that failure to adhere to guidelines could worsen the risk for patients.

This study contributes to the field by exposing deficiencies in current techniques for preventing blood clots and highlighting the need of following established protocols for assessing individual risk levels. Adopting standardized, guideline-based methods for preventing VTE could greatly decrease the occurrence of postoperative DVT, leading to better patient outcomes in settings with limited resources.

Recommendations

Identification of VTE-risk patients and reduction of prophylactic use require VTE risk classification. A committee, interventional programs, and medical education can improve MTRH venous thromboprophylaxis tool utilization. Active solutions like CDSS with integrated computer or human alert can help laparotomy caregivers stratify risk and prophylactic.

The study recommends utilizing the Caprini risk score for all laparotomy patients to select the best thromboprophylaxis. Establishing clear criteria ensures that high-risk patients receive pharmacological and mechanical prophylaxis and that low-risk patients are not overtreated with chemoprophylaxis. Pharmacological preventive treatments should be continued for 7-10 days after surgery, or longer if difficulties are likely. Minimally invasive procedures should be used more often to minimize venous thromboembolism. For optimal patient care, regular audits and staff training on VTE prevention recommendations are essential.

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