

“ ASSESSMENT OF THE RISK FACTORS AND PROPORTION OF DEVELOPMENT OF DVT IN PATIENTS UNDERGOING MAJOR SURGERIES”

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• INTRODUCTION:

DEEP VEIN THROMBOSIS REPRESENTS A SIGNIFICANT GLOBAL HEALTH CONCERN, LEADING TO CONSIDERABLE MORBIDITY AND MORTALITY. ITS SPECTRUM OF CONSEQUENCES RANGES FROM VENOUS STASIS TO POTENTIALLY FATAL PULMONARY EMBOLISM, WITH DEEP LEG VEINS BEING THE MOST COMMONLY AFFECTED. WHILE THE POST-THROMBOTIC SYNDROME CONTRIBUTES TO LONG-TERM MORBIDITY, THE PRIMARY CONCERN REMAINS THE RISK OF THROMBUS EMBOLIZATION TO THE LUNGS. RECOGNIZED AS ONE OF THE MOST

PREVENTABLE CONDITIONS, DVT AND ITS REPERCUSSIONS ARE EXTENSIVELY STUDIED THROUGH LARGE COMMUNITY-BASED RESEARCH, PROVIDING VALUABLE INSIGHTS INTO ITS PREVALENCE AND ASSOCIATED RISK FACTORS. UNDERSTANDING THESE RISK FACTORS, INCLUDING AGE, OBESITY, SMOKING, MALIGNANCY, AND VARIOUS MEDICAL CONDITIONS, IS CRUCIAL AS THEY CONTRIBUTE TO TWO-THIRDS OF INITIAL DVT EPISODES. RUDOLPH VIRCHOW INITIALLY LINKED VENOUS STASIS, VASCULAR DAMAGE, HYPERCOAGULABILITY, AND VTE DEVELOPMENT. SURGERY-RELATED FACTORS, SUCH AS INTRAOPERATIVE VENOUS DISTENSION AND ENDOTHELIAL DAMAGE, SIGNIFICANTLY CONTRIBUTE TO DVT RISK, ALONG WITH GENETIC PREDISPOSITIONS TO HYPERCOAGULABILITY.

- **AIMS AND OBJECTIVES**

- ❖ 1) TO ASSESS THE PROPORTION OF DEVELOPMENT OF DEEP VEIN THROMBOSIS IN PATIENTS UNDERGOING MAJOR SURGERIES
- ❖ 2) TO IDENTIFY INDEPENDENT RISK FACTORS FOR DEEP VEIN THROMBOSIS
- ❖ 3) TO ESTIMATE THE MAGNITUDE OF EACH RISK FACTOR IN THE DEVELOPMENT OF DEEP VEIN THROMBOSIS.

- **REVIEW OF LITERATURE:**

HADAVI, M.S. (2014)¹ CONDUCTED A STUDY COMPARING COMPRESSION DEVICES AND PROPHYLACTIC ANTICOAGULANTS IN POSTOPERATIVE PATIENTS TO PREVENT DEEP VEIN THROMBOSIS (DVT). THEY REVIEWED LITERATURE ON DVT RISK FACTORS AND ASSESSED PREVENTION STRATEGIES, EMPHASIZING THE IMPORTANCE OF PATIENT COMPLIANCE AND CONSIDERING BLEEDING RISKS. PREOPERATIVE SCREENING USING THE CAPRINI SCORE² HELPS IDENTIFY HIGH-RISK PATIENTS. TUN ET AL.³ (YEAR) INVESTIGATED DVT PREVALENCE IN ASIAN GENERAL SURGERY PATIENTS, FINDING A LOWER INCIDENCE COMPARED TO WESTERN POPULATIONS.

ROSENZWEIG⁴ (YEAR) STUDIED POSTOPERATIVE DVT IN ALASKAN INDIGENOUS PATIENTS WITHOUT PROPHYLAXIS, REVEALING A LOW INCIDENCE. SALAHUDHEEN, M.K. (2018)⁵ CONDUCTED A PROSPECTIVE STUDY ON POSTOPERATIVE DVT, EMPHASIZING ITS SIGNIFICANT MORBIDITY AND MORTALITY. ASYMPTOMATIC DEEP VEIN THROMBOSIS (DVT)

OCCURRED IN 2% OF PATIENTS WHO UNDERWENT SURGERIES LASTING LONGER THAN THREE HOURS AND REQUIRED THREE DAYS OF IMMOBILITY, WITH BOTH PROLONGED SURGERY AND IMMOBILITY IDENTIFIED AS RISK FACTORS. TO PREVENT MORBIDITY AND MORTALITY ASSOCIATED WITH ASYMPTOMATIC DVT, SCREENING WITH DOPPLER IS ADVISED FOR PATIENTS UNDERGOING PROLONGED SURGERY (> 3 HOURS) AND IMMOBILIZATION (> 2 DAYS), FOLLOWED BY APPROPRIATE PROPHYLAXIS IN THE POSTOPERATIVE PERIOD.

YAMAGUCHI, T., MATSUMINE, A., NIIMI, R., NAKAMURA, T., MATSUBARA, T., ASANUMA, K., HASEGAWA, M., & SUDO, A. (2013)⁶ CONDUCTED A STUDY TO DETERMINE THE PREVALENCE OF VENOUS THROMBOEMBOLISM (VTE) AND RISK FACTORS FOR DVT FOLLOWING MUSCULOSKELETAL TUMOR REMOVAL. DVT WAS FOUND IN 22% OF PATIENTS, WITH THOSE OVER 70 YEARS OLD AT HIGHER RISK. MECHANICAL AND ANTICOAGULANT THERAPY POST-SURGERY IS RECOMMENDED FOR THESE PATIENTS.

RECENT STUDIES IN INDIA SUGGEST THAT DVT PREVALENCE IS HIGHER THAN PREVIOUSLY BELIEVED. SELVARAJ, AD (2018)⁷ CONDUCTED A STUDY ON ELECTIVE SURGICAL PATIENTS, FINDING A 4.3% INCIDENCE OF DVT AT 30 DAYS POST-SURGERY. HIGH-RISK INDIVIDUALS WITH A SCORE ABOVE 7 ON THE ADAPTED CAPRINI SCALE ARE MORE LIKELY TO DEVELOP DVT. BARIATRIC SURGERY INCREASES THE RISK OF VENOUS THROMBOEMBOLISM. BAJARDI ET AL.⁸ STUDIED PATIENTS WHO UNDERWENT BILIOPANCREATIC DIVERSION, FINDING A LOW INCIDENCE OF DVT (1.6%), BUT EMPHASIZING THE IMPORTANCE OF PREVENTION DUE TO THE DIFFICULTY IN DIAGNOSING DVT IN OBESE INDIVIDUALS.

ELDERLY INDIVIDUALS UNDERGOING MAJOR SURGERY ARE AT INCREASED RISK OF DVT DUE TO POSTOPERATIVE BLOOD COAGULATION CHANGES, AS FOUND IN CAPORALE ET AL. STUDY⁹. ADDITIONALLY, SARKER, M.A., ET AL.¹⁰ FOUND A HIGH PREVALENCE OF DVT IN PATIENTS UNDERGOING LAPAROTOMY AND HERNIOPLASTY, ESPECIALLY IN THOSE WITH COMORBIDITIES LIKE CANCER AND DIABETES. HEBERT, K.J., MATTA, R., HORNS, J.J., PAUDEL, N., DAS, R., KOHLER, T.S., PASTUSZAK, A.W., MCCORMICK, B.J., HOTALING, J.M., & MYERS, J.B. (2022)¹¹ FOUND THAT PRIOR HISTORY OF DVT OR PE SIGNIFICANTLY INCREASED THE RISK OF POSTOPERATIVE VTE IN MEN UNDERGOING SURGERY FOR UROLOGICAL CONDITIONS, HIGHLIGHTING THE IMPORTANCE OF PREOPERATIVE RISK ASSESSMENT.

IN A RETROSPECTIVE REVIEW, HEIT ET AL.¹² FOUND THAT INSTITUTIONALIZATION, HOSPITALIZATION FOR SURGERY, AND MEDICAL ILLNESS WERE MAJOR RISK FACTORS FOR VENOUS THROMBOEMBOLISM, WITH THESE FACTORS ACCOUNTING FOR OVER 50% OF CASES IN THE COMMUNITY. FLORDAL ET AL.¹³ IDENTIFIED SEVERAL INDEPENDENT PREDICTORS FOR MAJOR POSTOPERATIVE THROMBOEMBOLISM, INCLUDING PREVIOUS THROMBOEMBOLISM, LEG FRACTURE, OR ARTHROPLASTY, AMONG OTHERS. BERGQVIST ET AL.¹⁴ CONDUCTED A TRIAL SHOWING THAT ENOXAPARIN SIGNIFICANTLY REDUCED THE INCIDENCE OF VENOUS THROMBOEMBOLISM AFTER CANCER SURGERY WITHOUT INCREASING BLEEDING RISK, HIGHLIGHTING THE EFFICACY OF PROPHYLACTIC ANTICOAGULATION IN THIS POPULATION.

- **AGE**

THE RISK OF VENOUS THROMBOEMBOLISM (VTE) INCREASES WITH AGE, APPROXIMATELY TRIPLING PER DECADE. THIS RESEARCH INDICATES THAT AS INDIVIDUALS AGE, THE PROPORTION OF VTE ACCOUNTED FOR BY PULMONARY EMBOLISM (PE) ALSO RISES. MOREOVER, A SUB-ANALYSIS FOCUSING ON THE PREVENTION OF DVT IN HOSPITALIZED PATIENTS WITH ENOXAPARIN FOUND THAT INDIVIDUALS OVER 75 YEARS OLD ARE AT AN INCREASED RISK OF VTE. CONSEQUENTLY, OLDER SURGICAL PATIENTS ARE MORE SUSCEPTIBLE TO DEVELOPING DVT.

- **OBESITY**

PREVIOUS STUDIES ON OBESITY-RELATED DVT HAVE LACKED CONSIDERATION OF HOSPITALIZATION OR OTHER RISK FACTORS. DUE TO THE WIDESPREAD PREVALENCE OF OBESITY, THE ASSOCIATION BETWEEN OBESITY AND DVT OBSERVED IN SIX INDIVIDUALS WAS DEEMED LESS SIGNIFICANT. FINDINGS FROM THE NURSES HEALTH STUDY REVEALED THAT WOMEN WITH A HIGHER BODY MASS INDEX FACED A SIGNIFICANTLY ELEVATED RISK OF PULMONARY EMBOLISM COMPARED TO LEANER COUNTERPARTS. ADDITIONALLY, RESEARCH FROM THE FRAMINGHAM HEART STUDY INDICATED AN INDEPENDENT RELATIONSHIP BETWEEN METROPOLITAN RELATIVE WEIGHT AND PULMONARY EMBOLISM IN WOMEN. SIMILARLY, A STUDY INVOLVING MALES IN 1913 FOUND A SUBSTANTIALLY HIGHER RISK OF DVT AMONG THOSE WITH A LARGER WAIST CIRCUMFERENCE. OBESITY

CONTRIBUTES TO HEMOSTATIC ISSUES, INCLUDING ELEVATED LEVELS OF VARIOUS COAGULATION FACTORS SUCH AS PLASMA FIBRINOGEN AND VON WILLEBRAND FACTOR.

- **SMOKING**

SMOKERS HAVE AN INCREASED LIKELIHOOD OF DEVELOPING DVT, AS SMOKING AFFECTS COAGULATION. NICOTINE PRESENT IN CIGARETTES ENHANCES COAGULATION BY ELEVATING PLASMA FIBRINOGEN⁷ LEVELS AND INCREASING FACTOR XIII ACTIVITY, WHICH STABILIZES FIBRIN CLOTS. FURTHERMORE, NICOTINE MAY STIMULATE THE PLASMINOGEN ACTIVATOR INHIBITOR-1, WHICH REGULATES FIBRINOLYSIS. WHILE THE PRECISE EXTENT TO WHICH NICOTINE PROMOTES COAGULATION REMAINS UNCERTAIN, SMOKING SIGNIFICANTLY HEIGHTENS THE RISK OF FATAL DEEP VEIN THROMBOSIS.

- **VARICOSE VEINS**

THE ROLE OF VARICOSE VEINS IN DVT RISK REMAINS UNCERTAIN; HOWEVER, SOME STUDIES HAVE IDENTIFIED VARICOSE VEINS AS AN INDEPENDENT RISK FACTOR FOR VENOUS THROMBOEMBOLISM, WITH ITS SIGNIFICANCE DIMINISHING WITH AGE. SUB-ANALYSES, SUCH AS THOSE CONDUCTED IN THE MEDENOX STUDY, FOUND A NOTABLE PREVALENCE OF VTE AMONG PATIENTS WITH VARICOSE VEINS, OFTEN ACCOMPANIED BY ADDITIONAL RISK FACTORS FOR VENOUS THROMBOEMBOLISM.

- **CONGENITAL HYPERCOAGULABLE STATE**

ANTITHROMBIN PLAYS A CRUCIAL ROLE IN INHIBITING SEVERAL COAGULATION FACTORS, INCLUDING THROMBIN, THEREBY PREVENTING CLOT FORMATION. ANTITHROMBIN DEFICIENCY CAN LEAD TO THROMBOSIS, PARTICULARLY IN THE MESENTERIC AND LOWER EXTREMITY VEINS. SIMILARLY, DEFICIENCIES IN PROTEIN C AND PROTEIN S, BOTH OF WHICH ARE VITAL ANTICOAGULANT PROTEINS, CAN INCREASE THE RISK OF DVT AND PULMONARY EMBOLISM. THESE DEFICIENCIES, WHETHER INHERITED OR ACQUIRED, DISRUPT THE BODY'S NATURAL ANTICOAGULATION MECHANISMS, PREDISPOSING INDIVIDUALS TO THROMBOTIC EVENTS.

- **FACTOR V LEIDEN MUTATION AND ACTIVATED PROTEIN C RESISTANCE**

THE FACTOR V LEIDEN MUTATION, CHARACTERIZED BY A POINT MUTATION IN THE LIVER GLYCOPROTEIN FACTOR V¹⁵, SIGNIFICANTLY INCREASES THE RISK OF DEEP VEIN THROMBOSIS. SIMILARLY, THE PROTHROMBIN G20210A MUTATION¹⁶, WHICH RESULTS IN SUPRANORMAL LEVELS OF PROTHROMBIN, HEIGHTENS THE RISK OF ARTERIAL AND VENOUS THROMBOSIS. BOTH GENETIC VARIATIONS CONTRIBUTE TO THROMBOTIC EVENTS, AFFECTING VARIOUS VEINS AND POTENTIALLY LEADING TO LIFE-THREATENING COMPLICATIONS.

- **COAGULATION FACTORS**

ELEVATED LEVELS OF COAGULATION FACTORS VIII, IX, AND XI ARE ASSOCIATED WITH AN INCREASED RISK OF THROMBOSIS. INDIVIDUALS WITH HIGH PLASMA LEVELS OF THESE FACTORS ARE MORE LIKELY TO EXPERIENCE VENOUS THROMBOSIS, PARTICULARLY IN THE ABSENCE OF OTHER THROMBOPHILIC CONDITIONS. GENETIC FACTORS LIKELY PLAY A ROLE IN DETERMINING THESE ELEVATED LEVELS, ALTHOUGH THE PRECISE MECHANISMS REMAIN UNCLEAR. GIVEN THEIR IMPACT ON THROMBOTIC RISK, FURTHER RESEARCH INTO THE MANAGEMENT OF VENOUS THROMBOSIS, INCLUDING TREATMENT STRATEGIES AND FAMILY SCREENING, IS WARRANTED.

- **HYPER-HOMOCYSTEINEMIA**

ELEVATED LEVELS OF HOMOCYSTEINE, RESULTING FROM INHERITED ABNORMALITIES IN CERTAIN ENZYMES, CAN LEAD TO ENDOTHELIAL DYSFUNCTION AND THROMBOSIS. BOTH HEREDITARY AND ACQUIRED CONDITIONS CAN CAUSE THROMBOPHILIA, WITH CONDITIONS SUCH AS ANTIPHOSPHOLIPID SYNDROME AND MYELOPROLIFERATIVE DISEASES PREDISPOSING INDIVIDUALS TO ARTERIAL AND VENOUS THROMBOSIS. THE PREVALENCE OF DVT IN ANTIPHOSPHOLIPID SYNDROME PATIENTS UNDERSCORES THE IMPORTANCE OF RECOGNIZING AND MANAGING THESE ACQUIRED THROMBOPHILIC CONDITIONS.

- **CANCER**

THE IMPACT OF MALIGNANCY ON DVT RISK IS NOT FULLY UNDERSTOOD DUE TO ITS ASSOCIATION WITH VARIOUS OTHER RISK FACTORS¹⁷. HOWEVER, ADVANCED STAGES OF BREAST, LUNG, BRAIN, PELVIC, RECTAL, PANCREATIC, AND GASTROINTESTINAL CANCERS ARE FREQUENTLY LINKED TO DVT. CHEMOTHERAPY CAN SIGNIFICANTLY INCREASE THE

RISK OF DVT, PARTICULARLY IN PATIENTS WITH MULTIPLE MYELOMA RECEIVING THALIDOMIDE AND MULTIAGENT CHEMOTHERAPY. PANCREATIC CANCER PATIENTS HAVE NOTABLY HIGH RATES OF DVT, FOLLOWED BY GASTRIC CANCER PATIENTS AND THOSE WITH TESTICULAR AND LUNG CANCER METASTASES. ADDITIONALLY, ADVANCED-STAGE CANCER AND CERTAIN HISTOLOGICAL SUBTYPES ARE ASSOCIATED WITH ELEVATED DVT RISK.

- **CHEMOTHERAPY/RADIOTHERAPY**

THE RISK ASSESSMENT FOR DVT IN CANCER PATIENTS HEAVILY RELIES ON CHEMOTHERAPY AND RADIOTHERAPY. LARGE POPULATION-BASED STUDIES HAVE DEMONSTRATED THAT CHEMOTHERAPY INCREASES THE RISK OF DVT¹⁸, ESPECIALLY IN SPECIFIC CANCER TYPES AND WITH CERTAIN ANTI-NEOPLASTIC DRUGS. BREAST CANCER PATIENTS UNDERGOING CHEMOTHERAPY, SURGERY, OR RADIOTHERAPY ARE PARTICULARLY SUSCEPTIBLE TO DVT. ADJUVANT HORMONAL THERAPY ALSO RAISES THE INCIDENCE OF DVT IN BREAST CANCER PATIENTS.

- **CHRONIC DISEASES**

CHRONIC LIVER DISEASE, REGARDLESS OF ITS CAUSE, HEIGHTENS THE RISK OF DVT DUE TO ITS IMPACT ON COAGULATION FACTOR SYNTHESIS. SIMILARLY, HYPOTHYROIDISM¹⁹ AND MYOCARDIAL INFARCTION ARE ASSOCIATED WITH AN INCREASED LIKELIHOOD OF DVT. SYSTEMIC INFLAMMATION, OFTEN PRESENT IN AUTOIMMUNE DISEASES, CAN ALSO CONTRIBUTE TO DVT RISK BY DISRUPTING NORMAL HEMOSTASIS.

- **SURGERY**

SURGERY, BOTH IN CANCER AND NON-CANCER PATIENTS, IS A KNOWN RISK FACTOR FOR DVT. CANCER PATIENTS UNDERGOING GENERAL SURGERY HAVE A HIGHER INCIDENCE OF DVT COMPARED TO NON-CANCER PATIENTS. IMMOBILITY, TISSUE DAMAGE, AND VENOUS STASIS FOLLOWING SURGERY FURTHER ELEVATE THE RISK OF DVT. WHILE LAPAROSCOPIC SURGERIES ARE GENERALLY CONSIDERED LOW-RISK FOR DVT, PROPHYLAXIS SHOULD BE TAILORED TO INDIVIDUAL PATIENT FACTORS, INCLUDING THE DURATION OF SURGERY AND COMORBIDITIES.

- **IMMOBILIZATION**

PROLONGED BED REST OR IMMOBILITY SIGNIFICANTLY INCREASES THE RISK OF DVT, PARTICULARLY IN PATIENTS WITH CONDITIONS SUCH AS HEMIPLEGIA. PREVENTIVE ANTICOAGULANT THERAPY IS NOT ROUTINELY RECOMMENDED FOR SHORT PERIODS OF IMMOBILITY, BUT IT IS ESSENTIAL TO ADDRESS IMMOBILITY-RELATED DVT RISK FACTORS. TRAVEL-RELATED THROMBOSIS, OFTEN REFERRED TO AS "ECONOMY CLASS SYNDROME,"²⁰ HAS GARNERED ATTENTION; CLINICALLY RELEVANT DVT FOLLOWING AIR TRAVEL IS RARE. HOWEVER, INDIVIDUALS WITH PREDISPOSING CONDITIONS SUCH AS DVT SHOULD TAKE PRECAUTIONARY MEASURES DURING LONG-DISTANCE FLIGHTS, SUCH AS REGULAR LEG MOVEMENT AND ADEQUATE HYDRATION, UNTIL FURTHER RESEARCH SUPPORTS ALTERNATIVE STRATEGIES.

- **MECHANICAL DVT PREVENTION METHODS**

1. ANTI-EMBOLISM STOCKINGS: THESE STOCKINGS EXERT PRESSURE ON THE LEGS, ENHANCING BLOOD FLOW, BUT SHOULD BE AVOIDED IN CERTAIN CONDITIONS²¹. THIGH-LENGTH STOCKINGS MIGHT BE MORE EFFECTIVE THAN KNEE-LENGTH ONES.

2. INTERMITTENT PNEUMATIC COMPRESSION: THIS METHOD INVOLVES APPLYING PRESSURE TO THE CALF OR THIGH MUSCLES PERIODICALLY TO PREVENT DVT.

3. PHARMACOLOGICAL APPROACHES: VARIOUS MEDICATIONS, INCLUDING UNFRACTIONATED AND LOW-MOLECULAR-WEIGHT HEPARIN, WARFARIN, ASPIRIN, AND NEWER XA INHIBITORS, ARE UTILIZED FOR DVT TREATMENT.

4. UNFRACTIONATED HEPARIN: DERIVED FROM ANIMAL SOURCES, UNFRACTIONATED HEPARIN IS EFFECTIVE BUT COMES WITH RISKS SUCH AS BLEEDING AND THROMBOCYTOPENIA.

5. LOW-MOLECULAR-WEIGHT HEPARIN: THESE NEWER FORMS OF HEPARIN OFFER MORE PREDICTABLE DOSING AND FEWER SIDE EFFECTS COMPARED TO UNFRACTIONATED HEPARIN.

6. WARFARIN: WHILE EFFECTIVE, WARFARIN REQUIRES CAREFUL MONITORING DUE TO ITS POTENTIAL FOR INTERACTIONS AND VARIABLE RESPONSE.

7. XA INHIBITORS: RIVAROXABAN AND DABIGATRAN ARE ORAL MEDICATIONS THAT DIRECTLY INHIBIT FACTOR XA, PROVIDING AN ALTERNATIVE TO TRADITIONAL ANTICOAGULANTS.

8. ASPIRIN: WHILE ASPIRIN CAN REDUCE DVT RISK, IT ALSO INCREASES THE RISK OF BLEEDING, AND ITS OPTIMAL DOSAGE FOR PROPHYLAXIS IS UNCERTAIN.

9. OTHER MEDICATIONS: DANAPAROID, FONDAPARINUX, AND DEXTRANS ARE ADDITIONAL OPTIONS FOR DVT PREVENTION, EACH WITH ITS OWN BENEFITS AND RISKS.

10. NEURAXIAL BLOCK: REGIONAL ANESTHESIA CAN REDUCE DVT RISK BY IMPROVING BLOOD FLOW IN THE LOWER LIMBS DURING SURGERY.

11. PATIENT EDUCATION: HEALTHCARE PROVIDERS SHOULD INFORM PATIENTS ABOUT DVT RISKS AND PREVENTIVE MEASURES BEFORE SURGERY.

12. FILTERS: INVASIVE PROCEDURES MAY INVOLVE PLACING FILTERS IN THE VENA CAVA TO PREVENT EMBOLIZED THRO

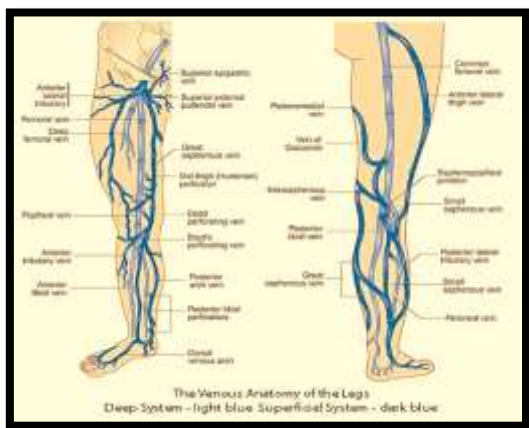


FIGURE1: VENOUS ANATOMY OF LOWER LIMB

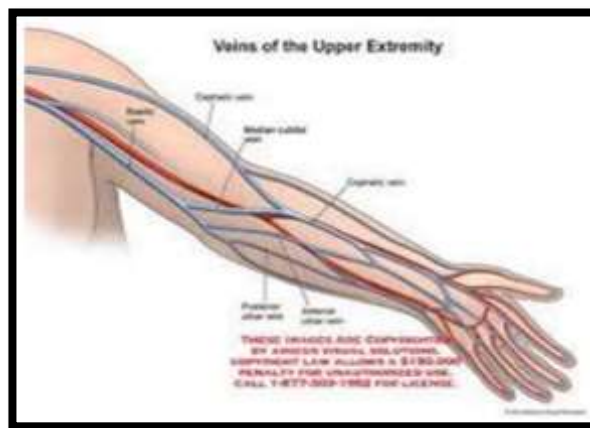


FIGURE2: VENOUS ANATOMY OF UPPER LIMB



FIGURE3:DVT CLINICAL PHOTO



FIGURE 4:DOPPLER STUDY OF DVT IN RIGHT BASILICVEIN

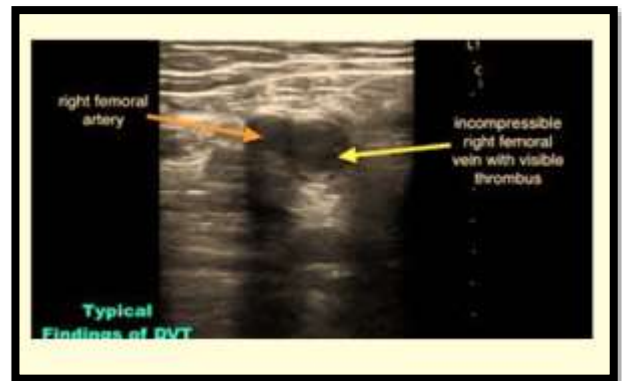


FIGURE 5:DOPPLER STUDY OF DVT IN RIGHT FEMORAL VEIN

MATERIALS AND METHODS

STUDY DESIGN: PROSPECTIVE STUDY

- **METHODOLOGY:**DOPPLER EXAMINATIONS OF PATIENTS UNDERGOING MAJOR ABDOMINAL OPERATIONS AND INDIVIDUAL ASSESSMENTS OF RISK FACTORS FAVORING DEEP VEIN THROMBOSIS WERE CONDUCTED ON HOSPITALIZED SURGICAL PATIENTS OVER A TWO-YEAR PERIOD AT THE GOVERNMENT GENERAL HOSPITAL IN ANANTAPURAMU.

- **SAMPLE SIZE:** 50

- **INCLUSION CRITERIA:** ALL SURGICAL PATIENTS WHO ARE1.PATIENTS IN THE AGE GROUP ABOVE 15 YEARS WHO UNDERWENT MAJOR SURGICAL INTERVENTION, 2.CANCER PATIENTS, 3.OBESE INDIVIDUALS.

- **EXCLUSION CRITERIA:**1.PATIENT WHO UNDERWENT HEART OR VASCULAR SURGERY.2.PATIENTS WITH DVT-SUGGESTIVE SYMPTOMS SUCH AS UNILATERAL LOWER LIMB EDEMA AND CALF PAIN.3.PATIENTS WHO TOOK ANTIPLATELETS LIKE,ASPIRIN,OR CLOPIDOGREL WITHIN A WEEK OF BEING ADMITTED TO THE HOSPITAL.4.PATIENTS WHO HAD DVT PRIOR TO SURGERY.5.COAGULOPATHY THAT IS IRREVERSIBLE.6.PATIENT WHO IS ON HEPARIN AND WARFARIN

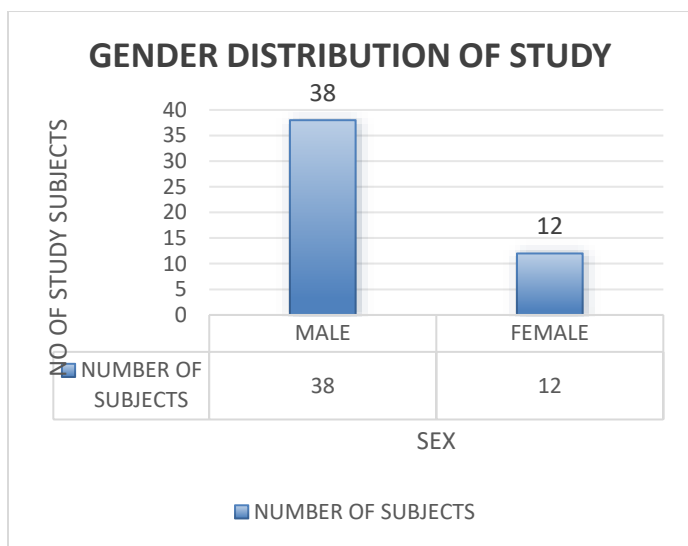
- **RISK FACTOR ASSESSMENT TOOL**

FACTOR/SCORE	<u>1</u>	<u>2</u>	<u>3</u>	<u>2</u>
Age in years	30–40	40-60	>70	History of smoking
Obesity bmi	25-30	30-35	>35	Cancer patients underwent surgery
Anesthesia	Spinal	General		Previous history of DVT
Duration of surgery	30 min to 1 hour	1 hour to 3 hours	>3 hours	Family history of thrombosis
Immobilization duration	<7 days	7–14 days	>14 days	History of varicose veins`
<u>RISK ASSESMENT SCORE</u>				History of chronic medical illness
1–6	LOW RISK			History of connective tissue disorder
7–12	MODERATE RISK			History of underwent the chemo/radiotherapy
>12	HIGH RISK			

Table 1 RISK FACTORS OF DVT ASSESMENT TOO

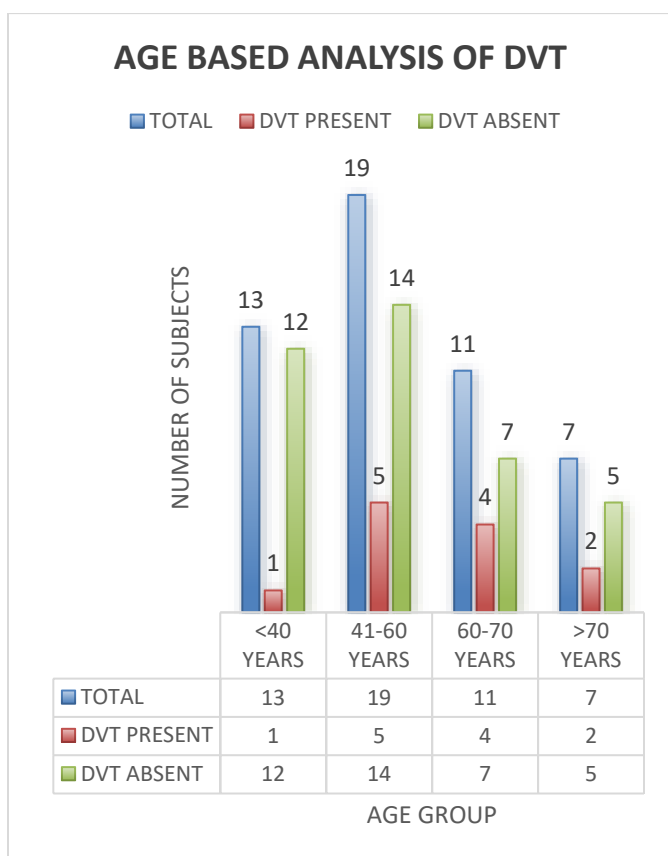
OBSERVATION AND ANALYSIS

THE STUDY ASSESSED 50 SUBJECTS TO IDENTIFY THE PREVALENCE AND POTENTIAL RISK FACTORS OF DEEP VEIN THROMBOSIS (DVT).VARIOUS DEMOGRAPHIC AND HEALTH-RELATED PARAMETERS WERE ANALYZED TO UNDERSTAND THEIR ASSOCIATION WITH DVT.

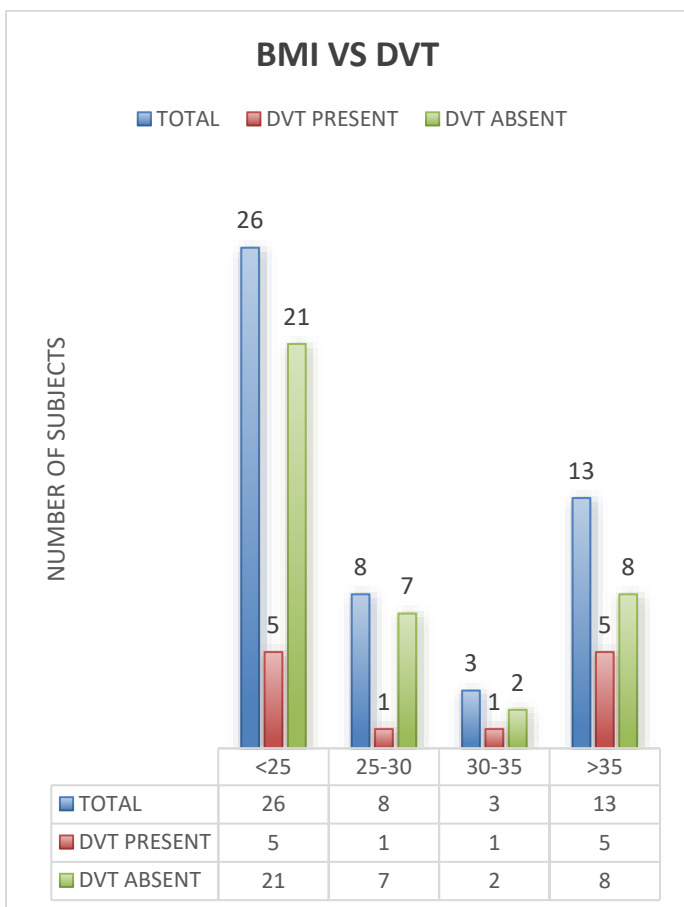


➤ OVERALL PREVALENCE OF DVT,OUT OF THE 50 SUBJECTS,12(24%)WERE DIAGNOSED WITH DVT,WHILE 38(76%)WERE NOT.

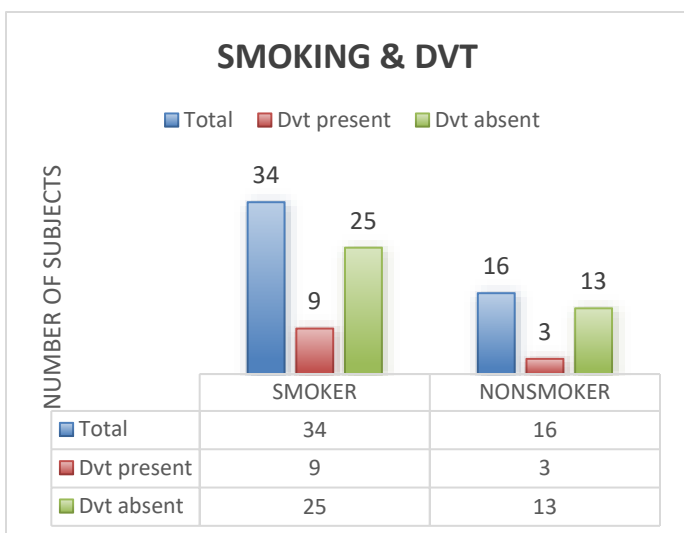
➤ GENDER DISTRIBUTION ANALYSIS:AMONG THE 39 MALE PARTICIPANTS,9(23%)WERE DIAGNOSED WITH DVT,AND 30(77%)WERE FREE FROM DVT.AMONG THE 11 FEMALE PARTICIPANTS,3(27%)HAD DVT,AND 8(73%)DID NOT.



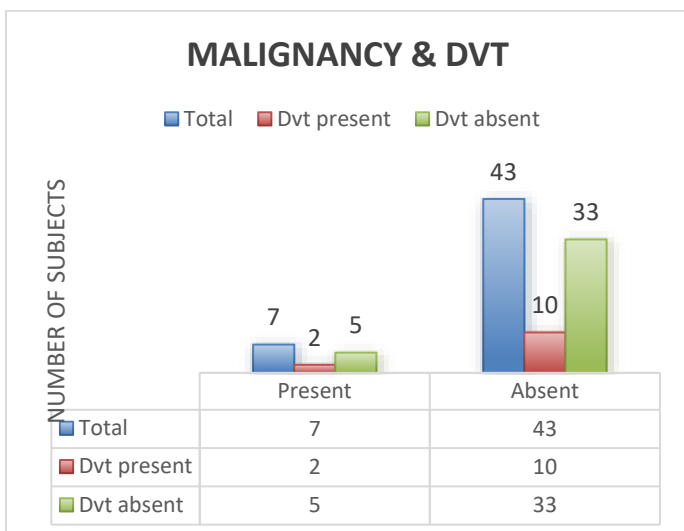
➤ AGE-BASED ANALYSIS:OUT OF 13 SUBJECTS AGED UNDER 40 YEARS,ONLY 1(8%)HAD DVT,WHILE 12(92%)DID NOT,INDICATING A LOWER RISK IN YOUNGER INDIVIDUALS.AMONG 19 SUBJECTS AGED 41-60 YEAR,5(26%)WERE DIAGNOSED WITH DVT,AND 14(74%)WERE NOT,SHOWING AN INCREASED RISK COMPARED TO THE YOUNGER GROUP.61-70 YEARS:OUT OF 11 SUBJECTS,4(36%)HAD DVT,WHILE 7(64%)DID NOT,SUGGESTING A FURTHER INCREASED RISK WITH AGE.OVER 70 YEARS:AMONG 7 SUBJECTS,2(28%)WERE DIAGNOSED WITH DVT,AND 5(72%)WERE NOT,INDICATING A HIGH PREVALENCE IN THE ELDERLY.



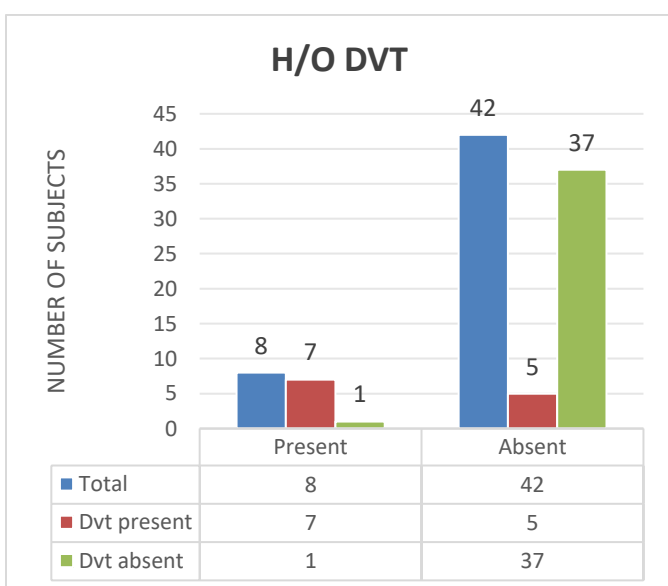
➤ **BMI-BASED ANALYSIS:** AMONG 26 SUBJECTS WITH BMI<25, 5(19%) HAD DVT, AND 21(81%) DID NOT, INDICATING A RELATIVELY LOWER RISK IN INDIVIDUALS WITH NORMAL WEIGHT. OUT OF 8 SUBJECTS BMI 25-30, 1(12%) WAS DIAGNOSED WITH DVT, AND 7(88%) WERE NOT, SHOWING A SLIGHTLY LOWER RISK IN THE OVERWEIGHT CATEGORY. AMONG 3 SUBJECTS BMI 30-35, 1(33%) HAD DVT, AND 2(67%) DID NOT, INDICATING A HIGHER RISK IN THIS OBESE CATEGORY. OUT OF 13 SUBJECTS BMI>35, 5(38%) HAD DVT, AND 8(62%) DID NOT, SHOWING THE HIGHEST PREVALENCE AMONG THOSE WITH SEVERE OBESITY.



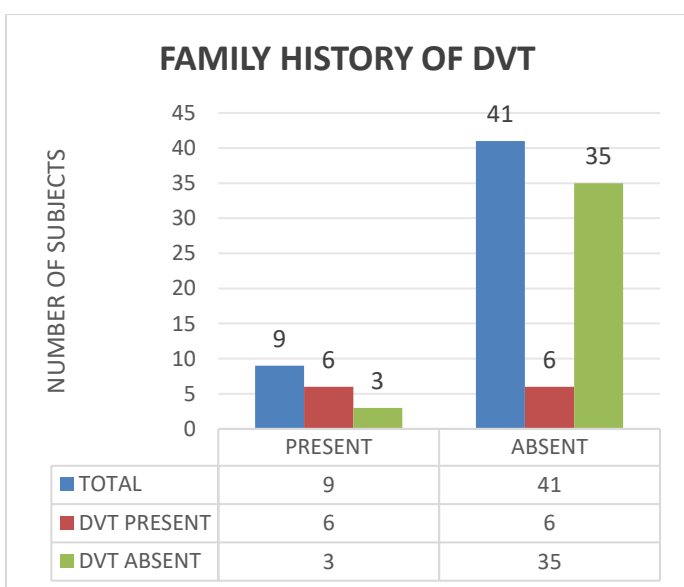
➤ **SMOKING STATUS:** AMONG 34 SUBJECTS WHO SMOKED, 9(26%) HAD DVT, AND 25(74%) DID NOT, INDICATING A HIGHER PREVALENCE IN SMOKERS. OUT OF 16 SUBJECTS WHO DIDN'T SMOKE, 3(18%) WERE DIAGNOSED WITH DVT, AND 13(82%) WERE NOT, SUGGESTING A LOWER RISK COMPARED TO SMOKERS.



➤ MALIGNANCY:AMONG 7 SUBJECTS WITH MALIGNANCY,2(28%)HAD DVT,AND 5(72%)DID NOT,INDICATING A HIGHER RISK IN THOSE WITH CANCER.OUT OF 43 SUBJECTS WITHOUT MALIGNANCY,10(23%)WERE DIAGNOSED WITH DVT,AND 33(77%)WERE NOT,SHOWING A SLIGHTLY LOWER RISK COMPARED TO THOSE WITH CANCER.

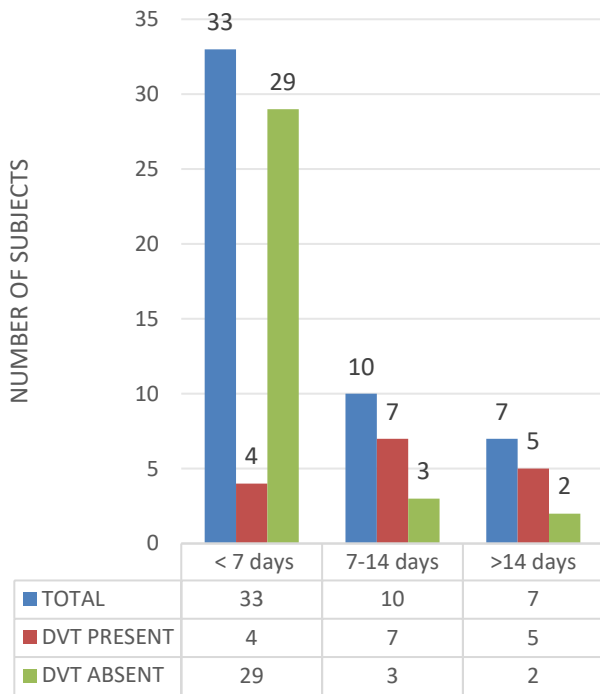


➤ HISTORY OF DVT:AMONG 8 SUBJECTS WITH A PREVIOUS HISTORY OF DVT,7(88%)HAD DVT AGAIN,AND ONLY 1(12%)DID NOT,INDICATING A VERY HIGH RECURRENCE RISK.OUT OF 42 SUBJECTS WITH NO PRIOR DVT,5(11%)WERE DIAGNOSED WITH DVT,AND 37(89%)WERE NOT,SHOWING A SIGNIFICANTLY LOWER RISK COMPARED TO THOSE WITH A PREVIOUS HISTORY.



➤ FAMILY HISTORY OF DVT:AMONG 9 SUBJECTS WITH A FAMILY HISTORY OF DVT,6(66%)HAD DVT,AND 3(34%)DID NOT,SUGGESTING A HIGH GENETIC PREDISPOSITION.OUT OF 41 SUBJECTS WITHOUT A FAMILY HISTORY,6(14%)WERE DIAGNOSED WITH DVT,AND 35(86%)WERE NOT,INDICATING A LOWER RISK COMPARED TO THOSE WITH A FAMILY HISTORY.

IMMOBILISATION PERIOD & RISK OF DVT



➤ IMMOBILIZATION DURATION:

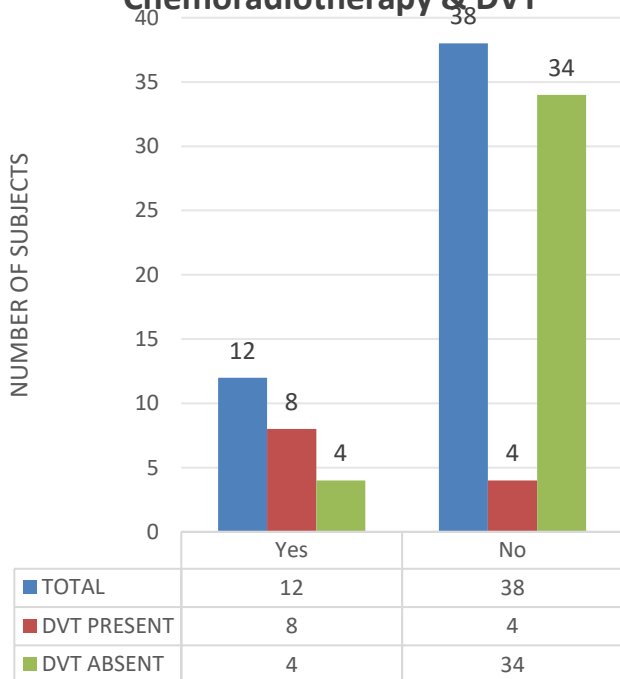
-SHORT-TERM IMMOBILIZATION (<7 DAYS) IS ASSOCIATED WITH A LOWER RISK OF DVT(12%).

-MEDIUM-TERM IMMOBILIZATION (7-14 DAYS) SIGNIFICANTLY INCREASES THE RISK, WITH 70% OF PATIENTS DEVELOPING DVT.

-LONG-TERM IMMOBILIZATION (>14 DAYS) SHOWS THE HIGHEST RISK, WITH 71% OF PATIENTS AFFECTED.

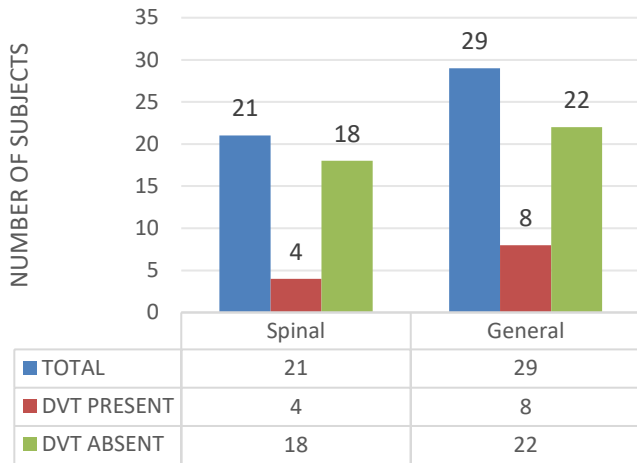
LONGER DURATIONS OF IMMOBILIZATION AND CHEMORADIOTHERAPY SIGNIFICANTLY INCREASE THE RISK OF DVT.

Chemoradiotherapy & DVT



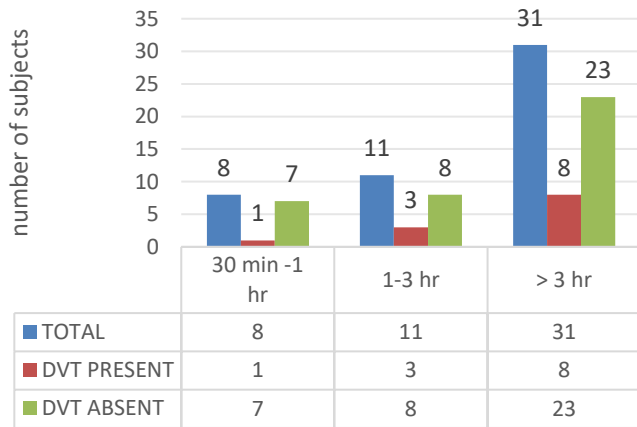
➤ PATIENTS UNDERGOING CHEMORADIOTHERAPY HAVE A MUCH HIGHER PREVALENCE OF DVT (67%) COMPARED TO THOSE NOT UNDERGOING SUCH TREATMENTS (11%)

ANESTHESIA & DVT



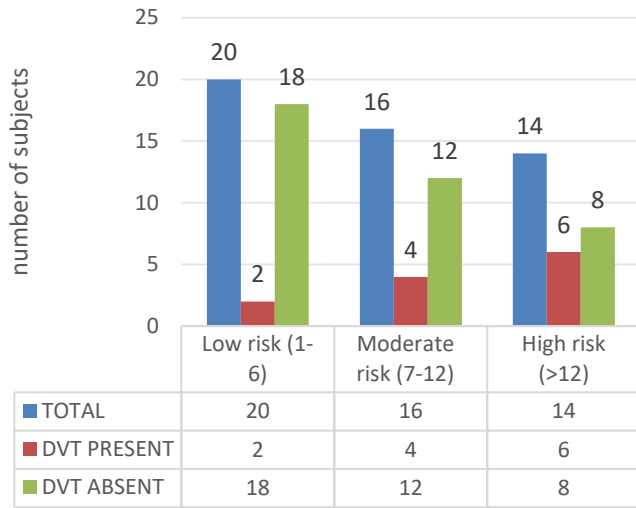
- PATIENTS RECEIVING SPINAL ANESTHESIA HAVE A LOWER PREVALENCE OF DVT (19%) COMPARED TO THOSE RECEIVING GENERAL ANESTHESIA (28%).
- GENERAL ANESTHESIA IS ASSOCIATED WITH A HIGHER RISK OF DVT COMPARED TO SPINAL ANESTHESIA.

DURATION OF SURGERY VS DVT



- DURATION OF SURGERY:
- -SHORT SURGERIES (30 MIN-1 HR) ARE ASSOCIATED WITH A LOWER RISK OF DVT (13%).
- -INTERMEDIATE SURGERIES (1-3 HR) SHOW A MODERATE RISK (27%).
- -LONGER SURGERIES (>3 HR) HAVE A SLIGHTLY LOWER RISK (26%) COMPARED TO INTERMEDIATE SURGERIES.

Risk score & DVT association



- RISK SCORE:
- -PATIENTS WITH A LOW-RISK SCORE (1-6) HAVE THE LOWEST PREVALENCE OF DVT (10%).
- -MODERATE-RISK PATIENTS (7-12) HAVE A HIGHER PREVALENCE (25%).
- -HIGH-RISK PATIENTS (>12) SHOW THE HIGHEST PREVALENCE OF DVT (43%).

STUDY GROUP	Parameter	Total	DVT present	DVT absent	Percentage with DVT
	Total subjects	50	12	38	24%
SEX	Male	39	9	30	23%
	Female	11	3	8	3%
AGE	<40 years	13	1	12	8%
	41-60years	19	5	14	26%
	61-70years	11	4	7	36%
	>70years	7	2	5	28%
BMI	<25	26	5	21	19%
	25-30	8	1	7	12%
	30-35	3	1	2	33%
	>35	13	5	8	38%
SMOKING	Smoker	34	9	25	26%
	Non-smoker	16	3	13	18%
MALIGNANCY	Present	7	2	5	28%
	Absent	43	10	33	23%
PREVIOUS H/O OF DVT	Present	8	7	1	88%
	Absent	42	5	37	11%
FAMILY H/O DVT	Present	9	6	3	66%
	Absent	41	6	35	14%

Table 2 RISK FACTORS VS DVT ANALYSIS

FACTOR	Factors causing DVT	Total number of patients	DVT present	DVT absent
Immobilisation	<7 days	33	4	29
	7-14 days	10	7	3
	>14 days	7	5	2
Chemoradiotherapy	Yes	12	8	4
	No	38	4	34
Anesthesia	Spinal	21	4	18
	General	29	8	22
Duration of surgery	30 min-1 hr	8	1	7
	1-3 hr	11	3	8
	>3 hr	31	8	23
Risk score	Low risk(1-6)	20	2	18
	Moderate risk(7-12)	16	4	12
	High risk(>12)	14	6	8

Table 3 RISK FACTORS VS DVT ANALYSIS

- **DISCUSSION**

THIS STUDY AIMS TO IDENTIFY RISK FACTORS CONTRIBUTING TO DVT AFTER SURGERY IN PATIENTS WITHOUT PREOPERATIVE PROPHYLAXIS, AS DVT IS A PREVENTABLE CAUSE OF HOSPITAL MORTALITY THAT OFTEN OCCURS POST-SURGERY WITHOUT PROPHYLAXIS, LEADING TO SEVERE CONSEQUENCES AND ECONOMIC BURDEN. DVT RISK VARIES ACROSS SURGERIES, WITH RATES RANGING FROM 15% TO 30% WITHOUT PROPHYLAXIS. OUR STUDY, INVOLVING 50 PATIENTS UNDERGOING SURGERY WITHOUT DVT PROPHYLAXIS, REVEALED A 24% PREVALENCE OF POST-OPERATIVE DVT. UNDERSTANDING THESE RISK FACTORS IS CRUCIAL FOR EFFECTIVE PREOPERATIVE PREVENTION STRATEGIES.

WITHIN THE INITIAL 24 TO 36 HOURS POST-SURGERY, TWELVE PATIENTS WERE DIAGNOSED WITH DEEP VEIN THROMBOSIS (DVT), NONE SHOWING SYMPTOMS. OUR RESEARCH REVEALED A 24% DVT PREVALENCE AMONG SURGICAL PATIENTS. AMONG THE FIFTY PATIENTS STUDIED, 13 WERE UNDER 40 (PREVALENCE 26%), 19 WERE 40-60 (PREVALENCE 38%), 11 WERE 60-70 (PREVALENCE 22%), AND 7 WERE OVER 70 (PREVALENCE 14%). DVT OCCURRED IN ONE PATIENT UNDER 40, FIVE AGED 41-60, AND FOUR AGED 60-70. TWO OVER 70S ALSO DEVELOPED DVT.

AMONG THE 50 PATIENTS WHO UNDERWENT SURGERY IN OUR STUDY, 11 WERE FEMALE AND 39 WERE MALE, ACCOUNTING FOR 22% AND 78% RESPECTIVELY. AMONG THE MALE PATIENTS, 9 DEVELOPED DVT, WHILE 3 OF THE FEMALE PATIENTS DEVELOPED IT POST-SURGERY. FIVE OUT OF 26 PATIENTS WITH BMI UNDER 25 EXPERIENCED DVT. ONE PATIENT WITH BMI BETWEEN 25 AND 30 AND ONE WITH BMI BETWEEN 30 AND 35 DEVELOPED DVT. AMONG THOSE WITH BMI OVER 35, 5 OUT OF 13 DEVELOPED DVT, INDICATING A HIGHER RISK FOR MORBIDLY OBESE PATIENTS. ADDITIONALLY, 34 PATIENTS (68%) WERE SMOKERS, WHILE 16 WERE NON-SMOKERS. AMONG THE 34 PATIENTS WITH A HISTORY OF SMOKING WHO UNDERWENT SURGERY, 9 DEVELOPED DVT. SEVEN OUT OF 50 PATIENTS HAD A HISTORY OF MALIGNANCY AND UNDERWENT SURGERY; 2 OF THEM DEVELOPED DVT, CONSTITUTING 14% OF THE STUDY POPULATION. ONE OUT OF 12 PATIENTS WITH

PREVIOUS DVT DEVELOPED DVT POSTOPERATIVELY.THREE PATIENTS REPORTED A FAMILY HISTORY OF THROMBOSIS.

PATIENTS PREVIOUSLY TREATED WITH CHEMOTHERAPY OR RADIATION HAD A NOTABLY HIGHER RISK OF POSTOPERATIVE DVT.AMONG THE 21 PATIENTS WHO RECEIVED SPINAL ANESTHESIA,3 DEVELOPED DVT.GENERAL ANESTHESIA WAS ADMINISTERED IN 29 SURGERIES,WITH 7 RESULTING IN POSTOPERATIVE DVT,INDICATING A SIGNIFICANTLY INCREASED RISK COMPARED TO SPINAL ANESTHESIA.EIGHT PATIENTS UNDERWENT SURGERIES LASTING 30 MINUTES TO ONE HOUR,WHILE 11 UNDERWENT PROCEDURES LASTING ONE TO THREE HOURS.SURGERIES EXCEEDING THREE HOURS WERE PERFORMED ON 31 PATIENTS.IN OUR STUDY INVOLVING 50 SURGICAL PATIENTS, THOSE WHO HAD PROCEDURES LASTING 30 MINUTES TO 1 HOUR SAW ONE DVT CASE, WHILE 3 OUT OF 11 SURGERIES LASTING 1 TO 3 HOURS RESULTED IN DVT.AMONG THE 31 SURGERIES EXCEEDING 3 HOURS,8 PATIENTS DEVELOPED DVT.OF THE 33 PATIENTS IMMOBILIZED FOR LESS THAN 7 DAYS POST-SURGERY,4 DEVELOPED DVT.AMONG THE 10 IMMOBILIZED FOR 7 TO 14 DAYS,3 DEVELOPED DVT,AND 5 OUT OF 7 IMMOBILIZED FOR OVER 2 WEEKS DEVELOPED DVT.

RISK ASSESSMENT CATEGORIZED 20 PATIENTS AS LOW-RISK,WITH 2 DEVELOPING DVT;16 MODERATE-RISK PATIENTS SAW 3 DVT CASES,WHILE 14 HIGH-RISK PATIENTS EXPERIENCED 5 DVT CASES.PATIENTS OLDER THAN 35 YEARS,OVERWEIGHT,AND SMOKERS FACED INCREASED POSTOPERATIVE DVT RISK.THOSE WITH CANCER,CHRONIC ILLNESSES,OR PROLONGED IMMOBILIZATION WERE ALSO AT HIGHER RISK.PREOPERATIVE DVT PROPHYLAXIS IS CRUCIAL FOR MODERATE TO HIGH-RISK PATIENTS TO REDUCE DVT INCIDENCE POST-SURGERY.ACCP GUIDELINES RECOMMEND RISK ASSESSMENT AND GROUP-SPECIFIC PROPHYLAXIS.A NATIONAL HEART,LUNG,AND BLOOD INSTITUTE APPROACH CATEGORIZES PATIENTS INTO LOW,MODERATE,OR HIGH RISK,TAILORING PROPHYLACTIC TREATMENT ACCORDINGLY.PROPHYLACTIC MEASURES LIKE HEPARIN,WARFARIN, INTERMITTENT PNEUMATIC COMPRESSION,AND LOW-DOSE UNFRACTIONATED HEPARIN ARE EFFECTIVE, BUT CONTRAINDICATIONS INCLUDE ACTIVE BLEEDING OR ABNORMAL PLATELET COUNT.

PREOPERATIVE DVT PROPHYLAXIS SIGNIFICANTLY REDUCES POSTOPERATIVE DVT-RELATED MORTALITY AND MORBIDITY.INDIVIDUAL RISK ASSESSMENT AND PREOPERATIVE DVT PROPHYLAXIS ARE ESSENTIAL FOR ALL SURGICAL PATIENTS TO MITIGATE POSTOPERATIVE DVT RISK.

- **CONCLUSION**

THE PRESENT STUDY IS A PROSPECTIVE ANALYSIS OF 50 CASES OF PATIENTS WHO UNDERWENT MAJOR SURGERIES,EXAMINING THE INCIDENCE OF DEEP VEIN THROMBOSIS AT GOVERNMENT GENERAL HOSPITAL,ANATAPURAMU.ALTHOUGH A LARGER SAMPLE SIZE WOULD PROVIDE MORE CONCLUSIVE RESULTS,BASED ON THE DATA AND RESULTS OBTAINED IN THE PRESENT STUDY,THE FOLLOWING CONCLUSIONS CAN BE DRAWN:

1. THE PROPORTION OF DEVELOPING DVT IN PATIENTS UNDERGOING MAJOR SURGERIES IS 24%IN OUR STUDY.
2. MALES ARE MORE PRONE TO DEVELOP DVT.
3. THE MOST COMMON AGE GROUP AFFECTED IN OUR STUDY IS 61 TO 70 YEARS.
4. AN INCREASE IN BODY MASS INDEX IS A RISK FACTOR FOR DEVELOPING DVT.
5. SMOKING IS A SIGNIFICANT RISK FACTOR FOR DVT,WITH A PROPORTION OF 18%.
6. 30%OF PATIENTS WHO HAD MALIGNANCY DEVELOPED DVT.
7. .PREVIOUS HISTORY OF DVT, FAMILY HISTORY OF DVT,VARICOSE VEINS,AND MEDICAL ILLNESS ARE NOT SIGNIFICANT RISK FACTORS IN OUR STUDY.
8. PREOPERATIVE CHEMOTHERAPY OR RADIOTHERAPY IS ASSOCIATED WITH AN INCREASED RISK OF DEVELOPING DVT.
9. PATIENTS WHO UNDERWENT SURGERIES UNDER GENERAL ANESTHESIA ARE MORE PRONE TO DEVELOP DVT THAN THOSE WITH REGIONAL ANESTHESIA.
10. THE DURATION OF SURGERY INCREASES THE RISK OF DVT.
11. PROLONGED IMMOBILIZATION INCREASES THE RISK OF DEVELOPING DVT IN THE POSTOPERATIVE PERIOD.

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