



RESEARCH ARTICLE

ASSESSMENT OF SUBCLINICAL DEEP VEIN THROMBOSIS IN POST LAPAROTOMY PATIENTS

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ARTICLE INFO

Article History:

Received 22<sup>nd</sup> July, 2017  
Received in revised form  
12<sup>th</sup> August, 2017  
Accepted 24<sup>th</sup> September, 2017  
Published online 17<sup>th</sup> October, 2017

Key words:

Deep Vein Thrombosis,  
Subclinical phase,  
Post laparotomy patients,  
Pulmonary embolism,  
Malignancy.

ABSTRACT

**Background:** DVT, in post surgical patients, is less prevalent among the Indians and Asians, varying from 1.3% in spinal surgery to 41.7% following colorectal surgery. The majority of the patients developing post-operative DVT are subclinical and asymptomatic. Subclinical DVT means presence of thrombus (semi-solid coagulum) in deep veins of lower limb without any signs and symptoms. DVT can be prevented more successfully in its subclinical phase than that in its clinical phase.

**Aim:** The present study "Assessment Of Subclinical Deep Vein Thrombosis In Post Laparotomy Patients" was undertaken to estimate the occurrence and associated risk factors of subclinical deep vein thrombosis at our institute after exploratory laparotomy in both elective and emergency surgeries.

**Methods:** This is a prospective study of 175 patients who underwent exploratory laparotomy, for acute or chronic conditions, and includes both elective and emergency cases. Patients of age <18 years, haematological disorders, on anticoagulant treatment including aspirin, having history of Myocardial Infarction, Congestive heart failure, pregnancy and postpartum, intake of oral contraceptives or Hormone Replacement Therapy, and duration of surgery <1 hour 30 minutes were excluded. On 5th and 10th postoperative days, duplex venous ultrasound of bilateral lower limbs were performed in every patients to look for presence of thrombus in the deep veins.

**Results:** Out of 175 patients, 3 (1.714%) developed subclinical deep vein thrombosis. Incidence was maximum in the age group 51-70 years (5.88 %). The incidence of subclinical DVT was found to be more in females (4.08%) as compared to males (0.79 %). The incidence was maximum in patients undergoing surgery for duration longer than 5 hours (25%) leading to longer periods of immobilization. Among the various pathologies, incidence was more in patients of malignancies (11.76 %).

**Conclusion:** It can be concluded that incidence of subclinical deep vein thrombosis is very low in the post operative period among the Indian population undergoing major abdominal surgeries. However, patients of old age, those with duration of surgery longer than five hours, those with malignancies and those with longer periods of immobilization need anticoagulant prophylaxis. It has also been found that VTE, if develops, is maximum between 5th and 10th postoperative period depending upon various compounding factors and is easily cured by giving LMWH (Low Molecular Weight Heparin). Thus routine prophylaxis against DVT with anticoagulants is not warranted in patients with moderate risk undergoing major abdominal surgery in Indian scenario.

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Citation: Vaibhav Vikas and Sanjay Jain, 2017. "Assessment of subclinical deep vein thrombosis in post laparotomy patients", *International Journal of Current Research*, 9, (10), 58864-58867.

INTRODUCTION

Venous thromboembolism (venous thrombosis and pulmonary embolism) is a serious and potentially fatal disorder that usually complicates the course of sick hospitalized patients following post operative deep vein thrombosis. Screening studies with iodine-125 fibrinogen leg scanning, impedance plethysmography and perfusion lung scanning have shown that the majority of venous thrombi and pulmonary emboli that occur in postoperative patients are small and asymptomatic, and it is likely that most are clinically insignificant.

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Post operative Deep Vein thrombosis has a prevalence rate of 15% to 40% in various series involving Western population among patients undergoing major general surgical procedures (Hirsh and Hoak, 1996). The autopsy studies state that 50% of all patients dying in hospitals have DVT (Bergqvist and Lindblad, 1985) of which 10–30% have pulmonary embolism secondary to proximal DVT (Sandler *et al.*, 1989). DVT is less prevalent among the Indians and Asians (Tinkler, 1964), varying from 1.3% in spinal surgery to 41.7% following colorectal surgery (Nandi *et al.*, 1980; Lee *et al.*, 2000; Lee *et al.*, 2001; Pookarnjanamorakot *et al.*, 2004; Nathan *et al.*, 2003). The reason for very low incidence of DVT among the Indian patients could be racial, genetic or rheological. Traditional risk factors for VTE include immobility, trauma,

age (>40years of age), malignancy, obesity, and surgery (Thromboembolic Risk Factors, 1992; Geerts *et al.*, 2001; Seligsohn *et al.*, 2001; Federman and Kirsner, 2001; Heit, 2002; Geerts *et al.*, 2004). Within the field of surgery, one of the common risk factors is longer surgical procedures with long operative duration (Geerts *et al.*, 2004; Sue-Ling *et al.*, 1986; Flordal *et al.*, 1996; Huber *et al.*, 1992; Wille-Jorgensen and Ott, 1990; Nicolaides *et al.*, 1973; Hendolin *et al.*, 1981; Caggiati *et al.*, 2002).

The majority of the patients developing post-operative DVT are subclinical and asymptomatic; however it's complications like pulmonary embolism carries a very considerable mortality rate (Lowe 1981, Gillinov *et al.* 1992); hence prevention of DVT assumes paramount importance. Other complications, resulting from incompetent or destroyed valves, include chronic venous insufficiency with subsequent development of varicose veins in about 60% of patients (Strandness *et al.*, Widmer *et al.*, Heldal *et al.*, Beyth *et al.*), lipodermatosclerosis and venous ulcers causing considerable disability, incidence being as low as 0-6.5 % (Killewich *et al.*, Widmer *et al.*, Lagerstedt *et al.*, Beyth *et al.*). Subclinical DVT is a condition of presence of thrombus (semi - solid coagulum) within flowing blood in the deep veins (beneath the deep fascia of lower limbs) without any clinical features. Complications of DVT can be prevented more successfully when detected in its subclinical phase rather than after development of clinical signs and symptoms. Although there is a large body of research describing the incidence of VTE following orthopedic, neurosurgical, gynaecological and cardiovascular surgery, there has been minimal research describing the incidence and risks associated with occurrence of subclinical deep vein thrombosis after major abdominal surgeries in Indian population (Seligsohn *et al.*, 2001; Federman and Kirsner, 2001; Heit, 2002; Geerts *et al.*, 2004; Sue-Ling *et al.*, 1986; Flordal *et al.*, 1996; Huber *et al.*, 1992; Wille-Jorgensen and Ott, 1990; Nicolaides *et al.*, 1973; Hendolin *et al.*, 1981; Caggiati *et al.*, 2002). So, this study was undertaken to estimate the occurrence and associated risk factors of subclinical deep vein thrombosis at our institute after exploratory laparotomy in both elective and emergency surgeries.

## MATERIAL AND METHODS

This a prospective clinical study of 175 patients who underwent exploratory laparotomy, for acute or chronic conditions, and includes both elective and emergency cases which were admitted in Department of Surgery, Gandhi Medical College and associated Hamidia Hospital, Bhopal during February 2013 to October 2013.

### Inclusion criteria

- Age more than 18 years.
- Duration of surgery more than 1 hour 30 minutes.

### Exclusion criterias

- Hematological disorders, anticoagulant treatment including aspirin, acute myocardial infarction, congestive heart failure, pregnancy and postpartum, intake of oral contraceptives or Hormone Replacement Therapy.
- Duration of surgery less than 1 hour 30 minutes.

Detailed clinical history and physical examination of all patients were done followed by routine hematological investigations and supportive radiological investigations like X-ray abdomen, USG abdomen and CT scan (in few). All patients underwent exploratory laparotomy and the following data were recorded - age, sex, diagnosis, elective/ emergency, intraoperative findings, system involved (Gastrointestinal/ Urological/ Others), procedure performed and duration of surgery. On 5<sup>th</sup> and 10<sup>th</sup> postoperative days, duplex venous ultrasound of bilateral lower limbs were performed in every patients to look for presence of thrombus in the deep veins. Criteria for detecting thrombus on duplex ultrasound were compressibility of vein and augmentation of blood flow on distal compression. Patients who showed any evidence of DVT were administered intravenous LMWH (in recommended dosage as per body weight) and repeat duplex venous ultrasound of bilateral lower limbs was done on 10<sup>th</sup> postoperative day.

## RESULTS

Table No. 1 shows that of the 175 cases studied, (72%) cases were male and remaining (28%) cases were females. The ratio of male to female was found to be 2.57:1. Of 126 male patients, 1 (0.79%) tested positive for subclinical DVT and of 49 female patients 2 (4.08%) patients tested positive for subclinical DVT.

**Table 1. Sex wise incidence of subclinical DVT**

Category	Number	Percentage	Positive for DVT	Percentage positive
Female	49	28%	2	4.08%
Male	126	72%	1	0.79%

**Table 2. Age wise incidence of subclinical DVT**

Age Group	No. of Patients	Percentage	Positive for DVT	Percentage positive
18-30	76	43.43 %	1	1.31 %
31-50	62	35.43 %	0	0
51-70	34	19.43 %	2	5.88 %
Above 70	3	1.71 %	0	0
TOTAL	175	100%	3	1.714 %

Table No. 2 shows that maximum number of patients were enrolled in the age group of 18-30 years, followed by below 31-50 years and least in the age group of Above 70 years. Incidence of subclinical DVT was maximum in the age group 51-70 years (5.88 %) followed by 18-30 years and none in the age group 31-50 years and above 70 years. Table No. 3 (Category I) shows that of the 175 cases studied, 29 patients (16.57 %) were operated on selective basis and remaining 146 patients (82.43 %) were operated on emergency basis. Of 29 patients of elective surgeries, 2 (6.90 %) tested positive for subclinical DVT and of 146 patients of emergency surgeries, 1 (0.68 %) tested positive for subclinical DVT. Table No. 3 (Category II) shows that of the 175 cases studied, 79 patients (45.14 %) were operated for less than 3 hours, 88 patients (50.29 %) were operated for more than 3 hours but less than 5 hours and remaining 8 patients were operated for more than 5 hours. Out of 79 patients which were operated for less than 3 hours, 1 (1.26 %) was positive for subclinical DVT, out of 88 patients which were operated for more than 3 hours but less than 5 hours, none were positive for subclinical DVT and out of the remaining 8 patients which were operated for more than 5 hours, 2 (25 %) were positive for subclinical DVT.

Table 3. Various categories wise incidence of subclinical DVT

Category	Number	Number of patients positive for subclinical DVT	Percentage
I. Elective	29	2	6.90 %
Emergency	146	1	0.68 %
II. 1 hour 30 minutes - 3 hours	79	1	1.26 %
3 hours - 5 hours	88	0	0
More than 5 hours	8	2	25 %
III. Gastrointestinal	146	2	1.37 %
Urosurgical	10	1	0.1 %
Others	19	0	0
IV. Neoplastic	17	2	9.71 %
Non-neoplastic	158	1	90.29 %
V. Perforation Peritonitis	78	1	44.57 %
Intestinal Obstruction	30	0	17.14 %
Trauma (Penetrating + Blunt)	31	0	17.71 %
Pyoperitoneum	9	0	5.14 %
Abdominal Lump	5	0	2.86 %
KUB pathology	10	1	5.72 %
Others	12	1	6.86 %

Table No. 3 (Category III) shows that of the 175 cases studied, in 146 patients (83.43 %) gastrointestinal procedures were performed, in 10 patients (5.71 %) urological procedures were performed and in remaining 19 patients (10.86 %) procedures other than gastrointestinal and urological were performed. Out of 146 patients of gastrointestinal procedures, 2 (1.37 %) tested positive for subclinical DVT, out of 10 patients of urological procedures, 1 (0.1 %) tested positive for subclinical DVT) and out of the 19 patients of other procedures, none tested positive for subclinical DVT). Table No. 3 (Category IV) shows that of the 175 cases studied, 17 patients (9.71 %) had neoplastic pathology involving some system of the body (of which 2 tested positive for subclinical DVT) and remaining 158 patients (90.29 %) had non-neoplastic pathology (of which 1 tested positive for subclinical DVT). Table No. 3 (Category V) shows that of the 175 cases studied, 78 patients were diagnosed as perforation peritonitis, 30 patients as intestinal obstruction, 31 patients presented as blunt or penetrating injury of abdomen, 9 patients with pyoperitoneum, 5 patients as abdominal lump, 10 patients with pathology of KUB region and remaining 12 patients with some other diseases.

### Conclusion

Deep Vein Thrombosis is a potentially lethal complication in post operative patients. The majority of the patients developing post-operative DVT are subclinical and asymptomatic; however it's complications like pulmonary embolism carries a very considerable mortality rate. It is easily preventable if detected in its subclinical phase rather than after development of clinical signs and symptoms. It can be concluded that incidence of subclinical deep vein thrombosis is very low in the post operative period among the Indian population undergoing major abdominal surgeries.

However, patients of old age, those with duration of surgery longer than five hours, those with malignancies and those with longer periods of immobilization need anticoagulant prophylaxis. It has also been found that VTE, if develops, is maximum between 5<sup>th</sup> and 10<sup>th</sup> postoperative period depending upon various compounding factors and is easily cured by giving LMWH (Low Molecular Weight Heparin). Thus routine prophylaxis against DVT with anticoagulants is not warranted in patients with moderate risk undergoing major abdominal surgery in Indian scenario.

### REFERENCES

- Bergqvist D, Lindblad B. 1985. A 30-year survey of pulmonary embolism verified at autopsy: an analysis of 1274 surgical patients. *Br J Surg.*, 72(2):105-8. doi: 10.1002/bjs. 1800720211.
- Caggiati A, Bergan JJ, Gloviczki P, et al., 2002. Nomenclature of the veins of the lower limbs: An international interdisciplinary consensus statement. *J Vasc Surg.*, 36:416-422.
- Federman DG, Kirsner RS. 2001. An update on hypercoagulable disorders. *Arch Intern Med.*, 161:1051-1056. doi:10.1001/archinte. 161.8.1051.
- Flordal PA, Bergqvist D, Burmark US et al. 1996. Risk factors for major thromboembolism and bleeding tendency after elective general surgical operations. The Fragmin Multicentre Study Group. *Eur J Surg.*, 162:783-789.
- Geerts WH, Heit JA, Clagett GP. et al. 2001. Prevention of venous thromboembolism. *Chest*, 119:132S-175S. doi:10.1378/chest. 119.1\_suppl.132S.
- Geerts WH, Pineo GF, Heit JA et al. 2004. Prevention of venous thromboembolism: the seventh ACCP conference, 126:338S-400S. doi:10.1378/chest.126.3\_suppl.338S.
- Heit JA. 2002. Venous thromboembolism epidemiology: implications for prevention and management. *Semin Thromb Hemost*, 28 (Suppl 2): 3-13. doi:10.1055/s-2002-32312.
- Hendolin H, Mattila MA, Poikolainen E. 1981. The effect of lumbar epidural analgesia on the development of deep vein thrombosis of the legs after open prostatectomy. *Acta Chir Scand.*, 147:425-429.
- Hirsh J, Hoak J. 1996. Management of deep vein thrombosis and pulmonary embolism: a statement for healthcare professionals from the council on thrombosis (in consultation with the council on cardiovascular radiology) *Am Heart Assoc Circ.*, 93:2212-2245.
- Huber O, Bounameaux H, Borst F et al. 1992. Postoperative pulmonary embolism after hospital discharge. An underestimated risk. *Arch Surg.*, 127:310-313.
- Lee FY, Chu W, Chan R, Leung YF, Liu KH, Ng SM, Lai PB, Metreweli C, Lau WY. 2001. Incidence of deep vein thrombosis after colorectal surgery in a Chinese population. *ANZ J Surg.*, 71(11):637-40. doi: 10.1046/j. 0004-8682.2001.02227.x.
- Lee HM, Suk KS, Moon SH, Kim DJ, Wang JM, Kim NH. 2000. Deep vein thrombosis after major spinal surgery:

- incidence in an East Asian population. *Spine*, 25(14):1827–30. doi: 10.1097/00007632-200007150-00014.
- Nandi P, Wong KP, Wei WI, Ngan H, Ong GB. 1980. Incidence of postoperative deep vein thrombosis in Hong Kong Chinese. *Br J Surg.*, 67(4):251–3. doi: 10.1002/bjs.1800670407.
- Nathan S, Aleem MA, Thiagarajan P, Das S. 2003. The incidence of proximal deep vein thrombosis following total knee arthroplasty in an Asian population: a Doppler ultrasound study. *J Orthop Surg (Hong Kong)*, 11(2):184–9.
- Nicolaides A, Irving D, Pretzell M et al. 1973. The risk of deep-vein thrombosis in surgical patients. *Br J Surg.*, 60:312.
- Pookarnjanamorakot C, Sirisriro R, Eurvilaichit C, Jaovisidha S, Koysoombatolan I. 2004. The incidence of deep vein thrombosis and pulmonary embolism after total knee arthroplasty: the screening study by radionuclide venography. *J Med Assoc Thai.*, 87(8):869–76.
- Sandler DA, Martin JF. 1989. Autopsy proven pulmonary embolism in hospital patients: are we detecting enough deep vein thrombosis? *J R Soc Med.*, 82(4):203–5.
- Seligsohn U, Lubetsky A. 2001. Genetic susceptibility to venous thrombosis. *N Engl J Med.*, 344:1222–1231. doi:10.1056/NEJM 200104193441607.
- Sue-Ling HM, Johnston D, McMahon MJ et al. 1986. Pre-operative identification of patients at high risk of deep venous thrombosis after elective major abdominal surgery. *Lancet*, 1:1173–1176. doi:10.1016/S0140-6736(86)91158.
- Thromboembolic Risk Factors (THRIFT) Consensus Group, 1992. Risk of and prophylaxis for venous thromboembolism in hospital patients. *BMJ*, 305:567–574.
- Tinkler LF. 1964. Absence of pulmonary embolism in Asians. *Br Med J.*, 1:502. doi: 10.1136/bmj.1.5381.502-c.
- Wille-Jorgensen P, Ott P. 1990. Predicting failure of low-dose prophylactic heparin in general surgical procedures. *Surg Gynecol Obstet.*, 171:126–130.

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