

International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2017; 3(3): 140-144
© 2017 IJOS
www.orthopaper.com
Received: 11-05-2017
Accepted: 12-06-2017

Dr. Nachiketan K Dore
Senior Resident, Dept. of
Orthopedics, ESICMC and
PGIMS, Bangalore,
Karnataka, India

Dr. Gopi M
Consultant Orthopedician, Dept.
of Orthopedics, Devadoss
Multispeciality Hospital,
Madurai, Tamil Nadu, India

Dr. Sathish Devadoss
Consultant Orthopedician, Dept.
of Orthopedics, Devadoss
Multispeciality Hospital,
Madurai, Tamil Nadu, India

Dr. A Devadoss
Consultant Orthopedician, Dept.
of Orthopedics, Devadoss
Multispeciality Hospital,
Madurai, Tamil Nadu, India

Incidence of post-operative deep vein thrombosis in patients undergoing joint replacement surgeries of lower limb

Dr. Nachiketan K Dore, Dr. Gopi M, Dr. Sathish Devadoss and Dr. A Devadoss

DOI: <http://dx.doi.org/10.22271/ortho.2017.v3.i3c.21>

Abstract

Introduction: The selection of a prophylactic regimen involves a balance between efficacy and safety. Surgeons are particularly concerned about bleeding because it can lead to hematoma formation, infection, a reoperation, and a prolonged hospital stay. The selection of a prophylactic agent is also influenced by the more frequent use of regional anesthesia.

Methodology: The total cases include 51 cases of total hip arthroplasties, 40 cases of knee arthroplasties and 10 cases of hip hemiarthroplasty. The indications for hip arthroplasties in this study include fracture proximal femur, avascular necrosis, secondary or primary osteoarthritis. Knee arthroplasties had been performed for either primary osteoarthritis or rheumatoid arthritis patients. A thorough detailed history regarding factors that influence DVT incidence had been elicited from all patients.

Results: One hundred and one patients who underwent joint replacement surgery for various indications have been included in our study. There were 58 women and 43 men in our study. Eight patients in our study had sonographically proven deep vein thrombosis. Two among those had developed pulmonary embolism as a sequel to DVT. One patient had a fatal pulmonary embolism and died on the 6th postoperative day

Conclusion: Deep vein thrombosis is no longer to be considered a rarity among Indian patients.

Keywords: DVT, Rheumatoid Arthritis, Lower Limb Surgery

Introduction

Orthopaedic surgeries constitute the high-risk group of patients to develop Deep vein thrombosis (DVT). DVT may lead on to life threatening complications like fatal pulmonary thromboembolism (PTE) in the immediate course or may lead to a post thrombotic syndrome in the long term. The incidence of DVT among these cases is significant in spite of the various prophylactic measures such as physiotherapy and pharmacological measures [1].

Due to the lack of set standard protocols with regards to investigations and prophylactic measures to be followed this condition often goes misdiagnosed and mismanaged resulting in fatal complications at times. The belief that Asian population is immune to DVT has become a myth now. The only reason for such belief is the ignorance of the surgeon and difficulty to diagnose accurately DVT by clinical history and physical examination [2].

The selection of a prophylactic regimen involves a balance between efficacy and safety. Surgeons are particularly concerned about bleeding because it can lead to hematoma formation, infection, a reoperation, and a prolonged hospital stay. The selection of a prophylactic agent is also influenced by the more frequent use of regional anesthesia. However, in our current environment of risk management, it would be wise to remember that the weight of evidence supports the view that thromboembolism is a potentially serious complication and that on the balance of probability, the risk can be diminished. There is no evidence that careful prophylaxis cause major wound bleeding, infection, loosening of the implant or death [3].

Since there is a paucity of Indian data regarding the extent to which patients are affected with DVT and due to the major drive of pharmaceutical industries in marketing their

Correspondence

Dr. Nachiketan K Dore
Senior Resident, Dept. of
Orthopedics, ESICMC and
PGIMS, Bangalore,
Karnataka, India

thromboprophylactic drugs, this study has been undertaken to evaluate the incidence of DVT in postoperative patients who had undergone joint replacement surgeries with physiotherapeutic as well as pharmacologic thromboprophylactic agents [4].

Methodology

Orthopaedic surgeries constitute the high-risk group of patients to develop Deep vein thrombosis (DVT). DVT may lead on to life threatening complications like fatal pulmonary thromboembolism (PTE) in the immediate course or may lead to a post thrombotic syndrome in the long term. The incidence of DVT among these cases is significant in spite of the various prophylactic measures such as physiotherapy and pharmacological measures.

Due to the lack of set standard protocols with regards to investigations and prophylactic measures to be followed this condition often goes misdiagnosed and mismanaged resulting in fatal complications at times. The belief that Asian population is immune to DVT has become a myth now. The only reason for such belief is the ignorance of the surgeon and difficulty to diagnose accurately DVT by clinical history and physical examination.

The selection of a prophylactic regimen involves a balance between efficacy and safety. Surgeons are particularly concerned about bleeding because it can lead to hematoma formation, infection, a reoperation, and a prolonged hospital stay. The selection of a prophylactic agent is also influenced by the more frequent use of regional anesthesia. However, in our current environment of risk management, it would be wise to remember that the weight of evidence supports the view that thromboembolism is a potentially serious complication and that on the balance of probability, the risk can be diminished. There is no evidence that careful prophylaxis cause major wound bleeding, infection, loosening of the implant or death.

Since there is a paucity of Indian data regarding the extent to which patients are affected with DVT and due to the major drive of pharmaceutical industries in marketing their thromboprophylactic drugs, this study has been undertaken to evaluate the incidence of DVT in postoperative patients who had undergone joint replacement surgeries with physiotherapeutic as well as pharmacologic thromboprophylactic agents.

The total cases include 51 cases of total hip arthroplasties, 40 cases of knee arthroplasties and 10 cases of hip hemiarthroplasty. The indications for hip arthroplasties in this study include fracture proximal femur, avascular necrosis, secondary or primary osteoarthritis. Knee arthroplasties had been performed for either primary osteoarthritis or rheumatoid arthritis patients. A thorough detailed history regarding factors that influence DVT incidence had been elicited from all patients. Their Body Mass Index (BMI) and other co-morbidities were recorded. The preoperative workup included a complete blood-cell count, coagulation and chemistry profiles, electrocardiography, chest radiographs, radiographs of the affected joints and echocardiography.

Inclusion criteria

We included in our study all patients who underwent the following elective surgeries for varied indications.

- 1) Total hip arthroplasty
- 2) Total knee replacements
- 3) Hemiarthroplasty of hip

Exclusion criteria

1. Patients with documented history of Deep vein thrombosis and on anticoagulant therapy, prior to admission.
2. Patients with a known history of bleeding diathesis, with prolonged prothrombin time and prolonged bleeding and clotting time.
3. Patients who had suffered single or multiple intracranial hemorrhagic episodes within 3 months, unrelated to the surgical procedure.
4. Patients with thrombocytopenia.
5. Patients with disseminated intravascular coagulation (DIC).

Results

One hundred and one patients who underwent joint replacement surgery for various indications have been included in our study. There were 58 women and 43 men in our study. Eight patients in our study had sonographically proven deep vein thrombosis. Two among those had developed pulmonary embolism as a sequel to DVT. One patient had a fatal pulmonary embolism and died on the 6th postoperative day.

Thus, incidence of dvt in our study = 7.92 %.

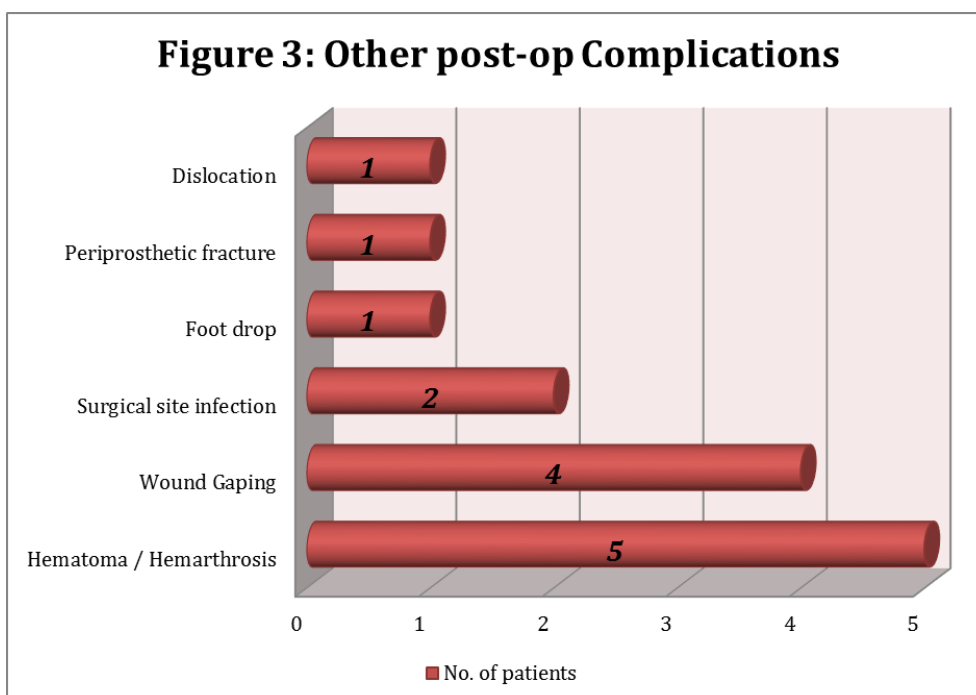
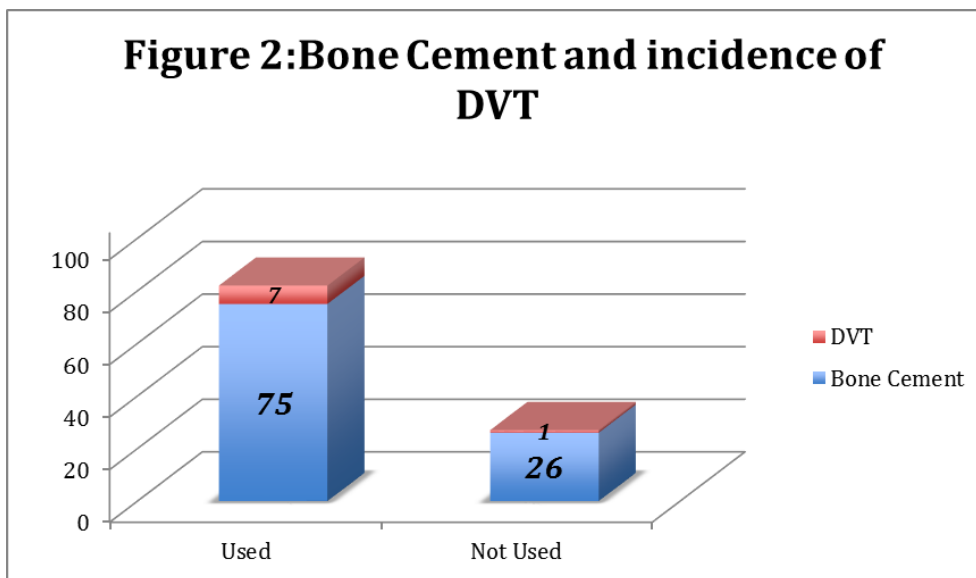
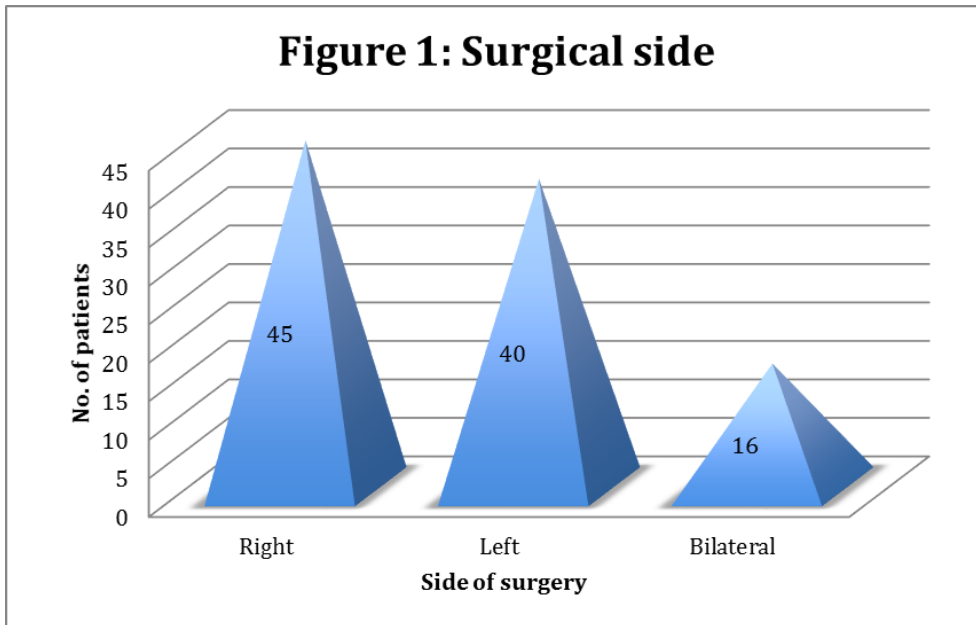
Among the eight patients who had sonographically proven DVT two were asymptomatic. Rest six had symptomatically proven DVT. Hence the incidence of non-symptomatic DVT amounts to 1.98% (2/101) in comparison to symptomatic DVT that has an incidence of 5.94% (6/101).

The patients in our study group ranged between 25 to 88 years with a mean age of 59.7 years. Of 101 patients, 7 were less than 40 yrs of age; 11 were between 41 to 50 yrs of age; 33 were between 51 to 60 yrs of age; 37 were between 61 to 70 yrs of age and 13 were above 70 yrs of age. The incidence of DVT was high, 2.97% (3/101) among the 51 to 60 yrs age group and 61 to 70 yrs of age group. The incidence was 0.99% (1/101) among the 41 to 50 yrs age group and above 70 yrs age group.

Of the 58 women in our study 6 had proven DVT and 2 had pulmonary embolism. The incidence of DVT among females undergoing arthroplasty surgeries is 5.94% (6/101) and that of pulmonary embolism is 1.98% (2/101). Among the 43 men, 2 had proven DVT resulting in an incidence of 1.98% (2/101) in men undergoing joint replacement surgeries in our study.

The Body Mass Index of the patients in our study group ranged between 14.49 and 39.88 with a mean value of 26.78. Of the 101 patients in our study, 2 were underweight (BMI < 18.5); 37 were normal weight (BMI 18.5 to 25); 39 were overweight (BMI 25 to 29.9) and 23 were obese (BMI =>30). Of the 8 patients with proven DVT, five patients were overweight (4.95%); two were normal weight (1.98%); one was underweight (0.99%).

Of the 101 patients in our study, 47 underwent primary total hip arthroplasty; 40 underwent primary total knee arthroplasty; 9 underwent bipolar hemi arthroplasty; 4 underwent revision total hip arthroplasty and 1 underwent unipolar hemiarthroplasty. Of the 51 patients who had undergone total hip replacement surgery, 3 developed DVT (2.97%). Of the 40 patients who had undergone total knee replacement, 4 had developed DVT (3.96%). Of the 10 patients who had undergone hemiarthroplasty, 1 had developed DVT (0.99%).



- Incidence of dvt in our study = 7.92 %
- Incidence of pulmonary embolism in our study = 1.98%
- Incidence of DVT in patients above 50 years of age = 6.93%
- Incidence of DVT among women was 5.94% whereas in men it was 1.98%.
- Incidence of DVT among overweight individuals was 4.95%; whereas in normal weight patients it was 1.98%; and in underweight patients it was 0.99%.

Table 1: Types of Surgery

Type Of Surgery	No. of patients	Incidence of DVT
Total hip replacement	51	3/101 (2.97%)
Total Knee replacement	40	4/101 (3.96%)
Hemiarthroplasty	10	1/101 (0.99%)

- All the patients who developed DVT in our study had some medical or surgical comorbidity as a risk factor.
- Incidence of DVT among cemented arthroplasties was 6.93% as compared to 0.99% incidence in uncemented arthroplasty.
- The blood loss in the patients of our study group ranged between 180ml to 1250ml and mean blood loss averaged to 505.64 ml.

Discussion

Joint replacement surgeries rank the top priority as stimulus for thrombogenesis. While reviewing the studies on the incidence of DVT in Indian patients, we noted the paucity of material both in terms of number of patients studied and number of studies compared to patients and studies reported in the Western literature.

Previously the Asian population was considered immune to deep vein thrombosis. Various authors had attributed the cause to be genetic differences between the populations as well as differences in diet and lifestyle^[5]. Recently, factor V Leiden has been postulated as a risk factor for thrombosis. The relative risk of thrombosis in patients with factor V Leiden has been shown to be more than 10 times greater than for those with a deficiency of protein C, protein S, or antithrombin III^[6]. It was found in 5.27% of white people compared with 0.45% of Asians during the screening of 4047 people in the United States^[7]. This difference in prevalence of factor V Leiden may be responsible for difference in incidence of DVT.

However, the study by Kim *et al* detected DVT in 10% of 146 Korean patients undergoing cementless THA^[8]. Atichartakaran *et al* did not find any cases of DVT in a study of 19 Thai patients undergoing THA. Dhillon *et al* did a study on a multiethnic population undergoing THA and TKA in Malaysia^[9]. They detected DVT in 64.3% of 14 patients undergoing THA and in 76.5% of 34 those undergoing TKA. Fujita *et al* detected DVT in 22.6% of 164 patients undergoing THA and in 48.6% of 138 patients undergoing TKA^[10]. Ko *et al* reported DVT in four out of 22 cases of THA and 18 out of 58 cases of TKA in Chinese patients^[11]. Sudo *et al* detected DVT in 9.1% of 33 patients undergoing THA and in 4% of 25 patients undergoing TKA^[12].

During our study DVT was found in three cases of THA, and four patients who had undergone TKA. Since a standard thromboprophylaxis protocol with physiotherapy and low molecular weight heparin administered to all the patients of our study group, a low incidence of 7.92% (8/101) was attained. We did find a statistically significant correlation

between the type of operation and the incidence of DVT, with the highest incidence after total knee replacement.

In cases of bilateral simultaneous TKA, Stulberg *et al* reported DVT in 73.6% of their patients^[13] and Dhillon *et al* reported DVT in all six patients who underwent bilateral TKA^[14]. In our series there were 15 cases of bilateral TKA, and one case of bilateral THA. Two among the 15 patients who underwent bilateral simultaneous TKA developed DVT.

The gold standard for detecting DVT in asymptomatic patients is bilateral venography. However, it is an invasive procedure and is associated with venous thrombosis, skin irritation, necrosis secondary to contrast injection, and radiation exposure. Poor renal function and hepatic clearance are absolute contraindications for venography. Doppler ultrasonography is non-invasive and provides good sensitivity (89%) and specificity (100%) for detecting proximal DVT. Nonetheless, it is operator dependent. When compared to distal DVT, proximal DVT is more often associated with pulmonary embolism and is deemed to be more clinically significant.

Preoperative Doppler ultrasonography prevents any false positive cases but, since it is possible to assess the age of the thrombus depending upon the echogenicity of the thrombus plaque it is not necessary at all times. However the identification of the thrombus whether it is acute, sub acute or chronic requires experienced sonographic hands.

Conclusion

Strong clinical suspicion and thorough physical and imaging assessment is essential in ruling out deep vein thrombosis or pulmonary embolism.

References

1. Green L, Lawrie AS, Patel S, Hossain F, Chitolie A, Mackie IJ *et al*. The impact of elective knee/hip replacement surgery and thromboprophylaxis with rivaroxaban or dalteparin on thrombin generation. *Br J Haematol*. 2010.
2. Cao YB, Zhang JD, Shen H, Jiang YY. Rivaroxaban versus enoxaparin for thromboprophylaxis after total hip or knee arthroplasty: a meta-analysis of randomized controlled trials. *Eur J Clin Pharmacol*. 2010; 66(11):1099-108.
3. Enden T, Haig Y, Kløw NE *et al*. Long-term outcome after additional catheter-directed thrombolysis versus standard treatment for acute iliofemoral deep vein thrombosis (the CaVenT study): a randomized controlled trial. *Lancet*. 2011.
4. Athanasoulis CA, Kaufman JA, Halpern EF, Waltman AC, Geller SC, Fan CM. Inferior vena caval filters: review of a 26-year single-center clinical experience. *Radiology*. 2000; 216(1):54-66.
5. Atichartakaran V, Pathepchoti Wong K, Kerachana S *et al*. Deep vein thrombosis after hip surgery among Thai. *Arch Intern Med*. 1988; 148:1349-53.
6. Bertina RM, Koeleman BP, Koster T *et al*. Mutation in blood coagulation factor V associated with resistance to activated protein C. *Nature*, 1994; 369:64-7.
7. Ridker PM, Miletich JP, Hennekens CH *et al*. Ethnic distribution of factor V Leiden in 4047 men and women. *JAMA*. 1997; 277:1305-7.
8. Kim YH, Suh JS. Low incidence of deep vein thrombosis after cementless total hip arthroplasty. *J Bone Joint Surg Am*. 1988; 70:878-82.
9. Dhillon KS, Askander A, Doraisamy S. Postoperative

deep vein thrombosis in Asian patients is not a rarity. *J Bone Joint Surg Br.* 1996; 78:427-430.

10. Fujita S, Hirota S, Oda T *et al.* Deep vein thrombosis after total hip or total knee arthroplasty in patients in Japan. *Clin Orthop.* 2000; 375:168-74.
11. Ko PS, Chan WF, Siu TH *et al.* Duplex ultrasonography after total hip or knee arthroplasty. *Int Orthop* 2003; 27:168-71.
12. Sudo A, Sano T, Horikawa K *et al.* The incidence of deep vein thrombosis after total hip and knee arthroplasties in Japanese patients: a prospective study. *J Orthop Surg.* 2003; 11:174-7.
13. Stulberg BN, Insall JN, Williams GW, Ghelman B. Deep vein thrombosis following total knee replacement. *J Bone Joint Surg Am.* 1984; 66:194-201.