Original article:

Efficacy of Different Treatment Protocols of Low Molecular Weight Heparin for Prevention of Deep Vein Thrombosis in Patients Undergoing Orthopaedic Surgery: A Comparative Study

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Abstract

Background: The basis for utilizing low atomic weight heparins in thrombosis counteractive action does not lie just in the inadequate action which these heparins show as for Factor III of the coagulation course, additionally in the frail or aggregate absence of professional aggregant platelet action. In patients undergoing DVT, there is risk of development of occurrence of Deep vein thrombosis (DVT). Hence; we planned the present study to assess the prophylactic efficacy of low molecular weight heparin (LMWH) in preventing DVT in patients undergoing total hip replacement surgery.

Materials & methods: The present study included assessment of 30 patients who underwent total hip replacement surgery. All the patients underwent surgery under general anaesthesia. After finishing of the treatment, all patients remained in the hospital for follow-up for a minimum time of twenty days. All the patients were randomly divided into two study groups with fifteen patients in each group. Group I included patients who received preventive therapy of sub-cutaneously administered LMWH two hours before surgery, while Group II included patients who received LMWH two hours after the hip replacement surgery. After one week of operation, in all the patients, a single dose of LMWH was given sub-cutaneously. Calculation of auto-transfused blood in each patient during the surgical procedure and immediately after the surgical procedure was done for evaluating the amount of blood loss. All the results were analysed by SPSS Software.

Results: Mean age of the patients in group I and II was 63.45 and 61.50 years respectively. Out of 15, 8 patients in group I were males while remaining were females. In group II, 9 patients were males while remaining were females. During the surgical procedure, quantity of blood loss in group I and II was found to be 452.30 and 395.10 ml respectively.2 and 3 patient in group I and II were found to be positive on clinical examination for presence of DVT. On Phlebography examination, 1 patient in each group was found to be positive for presence of DVT.

Conclusion: Heparin given pre-operatively or post0operatively has equal efficiency in controlling the risk of development of DVT

Key words: Deep vein thrombosis, Heparin, Hip surgery

INTRODUCTION

Most hospital inpatients are at danger of Deep vein thrombosis (DVT) and the related complications of lethal or non-deadly aspiratory embolism and post- thrombotic disorder.[1,2] Perceived hazard components for DVT are by and large identified with at least one components of Virchow's group of three features, and incorporate surgery, injury, immobilization, danger, utilization of oestrogens, cardiac or pulmonary failure, and smoking.[3,4]

The basis for utilizing low atomic weight heparins in thrombosis counteractive action does not lie just in the inadequate action which these heparins show as for Factor III of the coagulation course, additionally in the frail or aggregate absence of professional aggregant platelet action.[5,6] Truth be told, it has been demonstrated that, dissimilar to conventional calcium heparin, low sub-atomic weight heparins don't actuate thrombopenia and decrease fundamentally the danger of haemorrhage.[7,8]

Hence; we planned the present study to assess the prophylactic efficacy of low molecular weight heparin (LMWH) in preventing DVT in patients undergoing total hip replacement surgery.

MATERIALS & METHODS

The present study was conducted in theDepartment of Orthopaedics, Chennai Medical College Hospital & Research Centre, Trichy, Tamilnadu (India) and included assessment of 30 patients who underwent total hip replacement surgery. Ethical approval was taken from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. All the patients underwent surgery under general anaesthesia. After finishing of the treatment, all patients remained in the hospital for follow-up for a minimum time of twenty days. All the patients were randomly divided into two study groups with fifteen patients in each group. Group I included patients who received preventive therapy of sub-cutaneously administered LMWH two hours before surgery, while Group II included patients who received LMWH two hours after the hip replacement surgery. After one week of operation, in all the patients, a single dose of LMWH was given sub-cutaneously.Calculation of auto-transfused blood in each patient during the surgical procedure and immediately after the surgical procedure was done for evaluating the amount of blood loss. Daily clinical examination was carried out in each patient with the purpose of evaluating the efficacy of treatment therapy involved in preventing the development of DVT. Along with this daily clinical examination, patients also underwent a plethysmographic examination of the operated limb on the seventh day after the surgery. In case of any sign of positivity in these examination parameters, phlebography was done for confirming the diagnosis of DVT. Assessment of various haematological parameters was done at the baseline time (on the day of surgery) and at the end of therapy (One week post-operatively). For assessment of local tolerance of LMWH, following parameters were assessed on the seventh day after surgery:

- Presence or absence of pain at site of injection,
- Presence or absence of burning sensation at site of injection,
- Appearance of haematoma at site of injection

All the results were analysed by SPSS Software. Chi- square test and student t test were used for the assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

Graph 1 shows the demographic details of the patients. Mean age of the patients in group I and II was 63.45 and 61.50 years respectively. Out of 15, 8 patients in group I were males while remaining were females. In group II, 9 patients were males while remaining were females. Mean weight of the patients in group I and II was 70.80 and 73.41 kg respectively. Table 1 shows the quantity of auto-transfused blood in patients of both the groups. During the surgical procedure, quantity of blood loss in group I and II was found to be 452.30 and 395.10 ml respectively. Table 2 shows the number of patient in which diagnosis of DVT was made at

time of follow-up. 2 and 3 patient in group I and II were found to be positive on clinical examination for presence of DVT. On Phlebography examination, 1 patient in each group was found to be positive for presence of DVT.

Graph 1: Demographic details of the patients

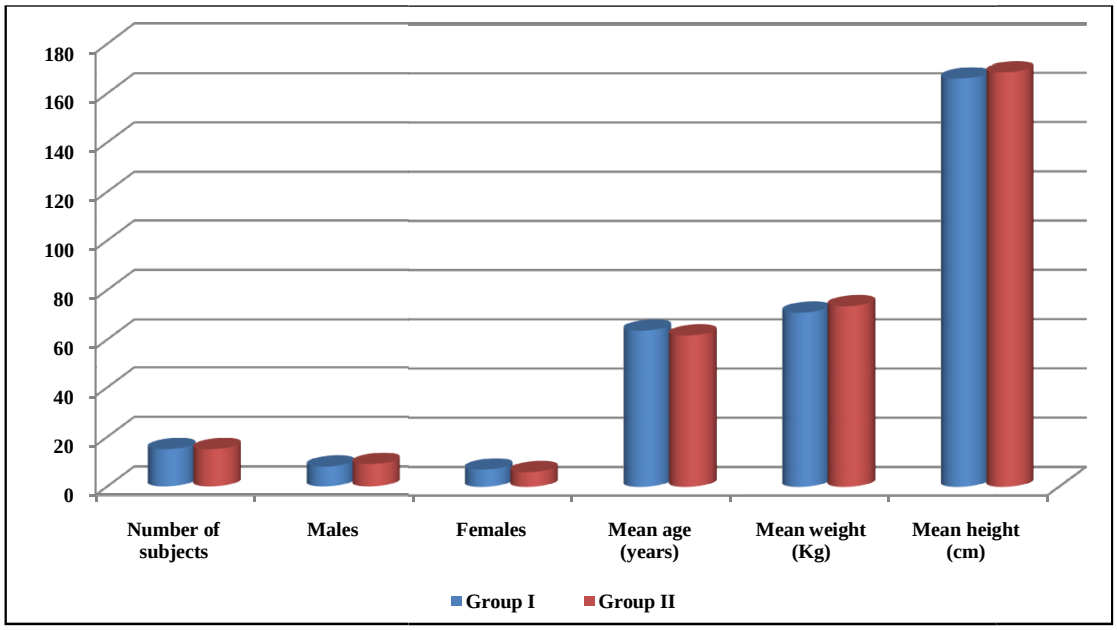

Table 1: Quantity of auto-transfused blood in patients of both the groups

Quantity (ml)	Group I	Group II
During the surgical procedure	452.30	395.10
Immediately after the surgical procedure	1001.50	1098.30

Table 2: Diagnosis of DVT at time of follow-up (Number of patients)

Parameter		Group I	Group II
Clinical examination	Positive	2	3
	Negative	13	12
Plethysmography	Positive	2	3
	Negative	13	12
Phlebography (carried out in Plethysmography positive cases)	Positive	1	1
	Negative	1	2

DISCUSSION

DVT is a typical condition that can prompt complexities, for example, postphlebitic disorder, aspiratory embolism and passing.[9] The way to deal with the conclusion of DVT has advanced throughout the years.[10] As of now a calculation procedure consolidating pretest likelihood, D-dimer testing and pressure ultrasound imaging considers sheltered and advantageous examination of suspected lower-furthest point thrombosis.[11]

In the present study, we observed that the both the treatment protocols exhibited equal efficacy in preventing the risk of development of DVT in patients undergoing hip replacement surgery. Laguardia AM et al compared the efficacy of two treatment protocols with a low molecular weight heparin used for the prevention of post-operative deep vein thrombosis in 40 patients undergoing hip replacement surgery. The aim was to assess whether the different timing--2 hours before (Group A, 19 patients) or 2 hours after (Group B, 21 patients) the surgical operation--of the first dose administered (15,000 aXaU) of a therapeutic cycle of 7 days could affect the results, both with respect to the preventive efficacy and to the risk of haemorrhage often connected with antithrombotic therapy. The results showed that the incidence of deep vein thrombosis was very similar and extremely low in the two groups, only 1 patient in each group having a positive diagnosis on phlebography. The effectiveness of a single daily dose of 15,000 aXaU in orthopaedic surgery was also confirmed. This dose guaranteed effective prophylaxis against the onset of deep vein thrombosis and did not appear to have any local side-effects (such as burning or pain at the site of injection) which could diminish patient compliance.[12]Ahmad HA et al determined whether patients in The Canberra Hospital are receiving appropriate DVT prophylaxis, and to ascertain the awareness of appropriate treatment by clinicians. Part 1 of their study comprised of a point prevalence study of The Canberra Hospital inpatients. Patients were assessed for the risk of their developing DVT. The prophylaxis they were receiving was documented. In Part 2 of their study, clinicians at The Canberra Hospital filled out a questionnaire that outlined three case scenarios. They were required to identify the risk group and appropriate prophylaxis for each group. Consultants, registrars and junior medical officers were assessed separately. The results of Part 1 of the present study showed that the majority of inpatients in The Canberra Hospital are not receiving appropriate prophylaxes according to international guidelines. Graduated compression stockings are rarely used, and often ineffectively applied. All groups performed poorly in Part 2 of the present study. Participants were frequently unable to identify the risk group for a particular scenario. There was also confusion regarding the appropriate prophylaxis for a particular risk group. DVT is a major problem among hospitalized patients. However, despite its importance, there is a lack of appropriate prophylaxes being instituted. This, together with the poor performance of the participating clinicians in Part 2 of the present study, indicated that there are significant problems in The Canberra Hospital regarding DVT prophylaxes and that steps need to be taken to overcome these problems.[13]

O'Flaherty M et al evaluated DVT risk in eight clinical vignettes, describing actual patients cared for in general hospital. The vignettes included all possible levels of DVT risk. The degree of prophylaxis strategies accuracy was 63%. Overall agreement was 0.32 and for each level of risk kappa was 0.38; 0.1 and 0.5 for small, moderate and high risk group respectively. Their results showed that there is poor agreement when

physicians have to evaluate the risk for postoperative DVT, and in the cases of low and moderate risks of DVT there is the smallest agreement. In addition, the data also showed that the overall accuracy of DVT prophylaxis strategy was only moderate and the risk evaluation did not correlate to the selection of the strategy. The issue of inter-observers variability should be taken into account when clinical practice guidelines performance are analysed, especially when considering the risk-evaluation to choose the appropriate actions.[14]

Holley AB et al assessed how clinicians would rate a patient's risk for VTE and what recommendations they would make for prophylaxis. Internal medicine residents and staff at a tertiary care medical center were asked to identify risk factors, evaluate VTE risk, and recommend a method of prophylaxis for patients described in eight clinical vignettes created by the authors. Each vignette was designed to represent a patient at a specific level of risk. 35 physicians returned the survey. Responders were able to identify some risk factors and weigh them appropriately when assigning an overall risk level. There was good agreement on risk level among responders (k=0.62) and moderate agreement comparing responders with our pre-defined gold standard (GS) (k=0.42). Compared to the GS they underestimated the level of risk almost 50% of the time. The risk level they assigned affected the type of prophylaxis recommended, with fewer low risk patients receiving any type of heparin and more high risk patients receiving low-molecular weight heparin (LMWH). Although internal medicine physicians are able to identify some risk factors for in-hospital VTE, they consistently underestimate the overall risk, leading to less aggressive preventative measures. Continuing education is essential to combating this preventable inpatient complication.[15]

CONCLUSION

From the results, the authors concluded that heparin given pre-operatively or post0operatively has equal efficiency in controlling the risk of development of DVT. However, future studies with larger study group are recommended.

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