

INCIDENCE OF DEEP VENOUS THROMBOSIS IN LAPAROSCOPIC CHOLECYSTECTOMY WITHOUT THROMBOPROPHYLAXIS

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ABSTRACT

Objective: To determine the incidence of clinically detectable deep venous thrombosis (DVT) in patients undergoing laparoscopic cholecystectomy without a standard DVT prophylaxis regimen.

Study Design: Prospective observational study.

Place and Duration of Study: All the patients included in the study underwent laparoscopic cholecystectomy from Nov 2014 to Nov 2016 in Hepatobiliary department Pak Emirates Military Hospital Rawalpindi under general anaesthesia.

Material and Methods: The study was carried out on 723 patients undergoing laparoscopic cholecystectomy. Data was collected on a specially designed proforma. Quantitative D-dimers and 3 risk stratification (Wells score) for deep venous thrombosis was done 24 hrs preoperatively 24 hrs, 72 hrs and 14 days postoperatively.

Results: The study population comprised of 723 patients. Twenty seven patients were converted to undergo open cholecystectomy and were excluded from the study. Forteen patients were lost to follow-up. 03 pts with preop high probability of DVT were excluded from further postoperative screening. During postoperative screening, 05 out of 679 pts had a Wells score of more than 03, which showed a high probability of DVT in these patients. Out of these 05 pts, four had raised D-dimers as well. For definitive diagnosis, all these 05 patients underwent duplex scan, which confirmed deep venous thrombosis.

Conclusion: We conclude that there is no significant risk of DVT after laparoscopic cholecystectomy. Thromboprophylaxis is not recommended in patients undergoing elective laparoscopic cholecystectomy without any risk factors of DVT. Preoperative risk stratification for DVT and D-dimers are effective screening tools for pts undergoing laparoscopic cholecystectomy.

Keywords: Deep venous thrombosis, Laparoscopic cholecystectomy, Thromboprophylaxis.

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INTRODUCTION

Deep venous thrombosis and pulmonary embolism are manifestations of venous thromboembolism (VTE). In the surgical setting, VTE has been extensively studied as a phenomenon which occurs postoperatively. Age group, duration of surgery, intraperitoneal pneumatic pressure and immobility after surgery are some of the factors that contribute to surgery. With the advent of laparoscopic surgery the debate on thromboprophylaxis has been renewed. The optimal method for deep venous thrombosis (DVT) prophylaxis is still unknown¹. Theoretically, laparoscopic surgery of all types causes serum

hypercoagulability of varying degrees^{1,2}. However, shorter (less than one hour) and less complex laparoscopic procedures such as simple laparoscopic cholecystectomy probably have low risk of VTE disease². An increased intraperitoneal pressure caused by the laparoscopic surgery leads to an induced pneumoperitoneum. This condition reduces lower limb venous blood flow significantly³, which is an extra risk factor for deep vein thrombosis. The incidence of DVT is the highest in the first two weeks after surgery³. The question is whether these changes during laparoscopic surgery are clinically significant enough to predispose the patient to DVT. The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES)⁴ guidelines suggest that none or some measure of prophylaxis can be given in pts with no or very low risk for venous

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thromboembolism. Many studies support these guidelines⁵⁻⁷. However, in the standard textbook of surgery, Bailey and Love advocates that DVT prophylaxis should be given to all pts undergoing laparoscopic cholecystectomy⁸. The purpose of this study was to determine the incidence of clinically detectable DVT in patients undergoing laparoscopic cholecystectomy with-out a standard DVT prophylaxis regimen before surgery.

To determine the incidence of clinically detectable DVT in patients undergoing laparoscopic cholecystectomy without a standard DVT prophylaxis regimen.

Operational Definitions

Deep venous thrombosis

A patient developing thrombi in the deep veins, usually of the lower extremity or in the pelvis. DVT is screened with wells score and D-dimers. Diagnosed on venous duplex.

Laparoscopic cholecystectomy

Minimally invasive surgical technique for the removal of the gall bladder by inducing pneumoperitoneum and avoiding the traditional incision.

PATIENTS AND METHODS

A prospective observational study with a sample size of 723 was carried out at Pak Emirates Military Hospital Rawalpindi for two years from Nov 2014 to Nov 2016. The sample size was determined by the consecutive non probability sampling. It included all the patients, meeting the inclusion criteria, who underwent cholecystectomy during the study period.

Patients ranging from age 18 to 70 years undergoing elective cholecystectomy with ASA (American Society of Anesthesiology) physical status classification class I and II and body mass index (BMI) <30 kg/m² were included in the study.

Patients with a history of venous thromboembolism (VTE), varicose veins, malignant disease, severe infection, chronic renal failure,

more than three pregnancies, peri-pregnancy, Chronic liver disease, history of myocardial infarction (MI), inflammatory bowel disease, hormone replacement therapy, oral contraceptive use, obesity, inherited or acquired thrombophilia (e.g. protein C or S deficiency, factor V Leiden, antithrombin deficiency, conversion to open surgery and an operative time more than 2 hours were excluded from the study.

After approval from the hospitals ethical and research committee, informed consent was obtained from those fulfilling the inclusion criteria after explaining the purpose and benefits of the study. Quantitative D-dimers and 3 risk stratification (Wells score) for deep venous thrombosis was done 24 hrs preoperatively, 24 hrs, 72 hrs and 14 days postoperatively. The patients with a preoperative high probability score and a positive preoperative D-dimer were excluded from the study. All the pts having a post op high probability score for DVT and/or post operative positive D-dimers underwent duplex scan for the definitive diagnosis of DVT.

Data was collected on a specially designed proforma. All the pts underwent laparoscopic cholecystectomy in Pak Emirates Military Hospital Rawalpindi under general anaesthesia. The surgeries were performed by three classified surgeons in the above mentioned hospital. Statistic analysis was performed by SPSS 19. The quantitative data like age was expressed as mean \pm standard deviation (SD). Frequencies and percentages were calculated for the incidence of deep venous thrombosis.

RESULTS

The study population comprised of 723 patients. Twenty seven patients were converted to undergo open cholecystectomy and were excluded from the study. Fourteen patients were lost to followup. The mean age and SD for the total patient sample was 45 ± 9.65 . The minimum age was 25 years and maximum age of patient was 65 years. Three pts with preoperative high probability of DVT were excluded from further postoperative screening with wells score

and postoperative D-dimers. Summary of the characteristics of the sample size is given in table-I while the preoperative and postoperative evaluation of deep venous thrombosis is given in table-II & III.

The post operative screening of 679 patients at 24 hrs after surgery revealed no change in the probability score and the D-dimers were also in the normal range.

Out of 679 patients screened 72 hrs postoperatively, Wells score of 04 pts was found to be in the high probability range. 03 of these 04 pts had raised D- dimer levels. Duplex scan of

probability score. The D-dimers were also raised. Duplex scan revealed calf vein thrombosis. All pts diagnosed with DVT underwent thrombophilic screening which turned out to be normal. All the pts with DVT were treated with enoxaparin and warfarin. No mortality was reported.

In summary, out of 679 patients which were negative for deep venous thrombosis in preoperative screening, 05 (0.73%) patients were diagnosed to have deep venous thrombosis post-operatively after laparoscopic cholecystectomy without any thromboprophylaxis.

Table-I: Summary- Characteristics of patients in the sample group.

Characteristics	Total(723)
Age \pm SD	45 \pm 9.654
Male	203 (28.07%)
Female	520 (71.92%)
M:F ratio	0.39:1
Preop high dvt probability	03
Conversion to open surg	27 (3.73%)
Operative time \pm SD (in min)	30 \pm 12.563
Mobilization out of bed time since surgery	08 hrs \pm 3.765
Lost to follow up	14 (1.93%)

Table-II: Summary- Wells score of patients in the sample group n=682.

	Pts with wells score 0	Pts with wells score 1-2	Pts with wells score 3	Total pts
24 hr preop	471 (69%)	208 (30.4%)	03 (0.43%)	682
24 hr postop	471 (69%)	208 (30.6%)	0	679
72 hr postop	469 (69.07%)	206 (30.33%)	04 (0.58%)	679
14 dayspostop	468 (69.33%)	206 (30.51%)	01 (0.14%)	675

Table-III: Summary- D-dimer value of patients in the sample group n=682.

	D dimer value <0.25 μ g/ml	D dimer value >0.25 μ g/ml	Total pts
24 hrs pre op	680 (99.7%)	02 (0.29%)	682
24 hrs post op	679 (100%)	0	679
72 hrs post op	676 (99.5%)	03 (0.44%)	679
14 days post op	674 (99.8%)	01 (0.14%)	675

three out of the four pts revealed thrombosis of the calf veins while one pt had popliteal vein thrombosis. All these four patients were excluded from further study and treated for deep venous thrombosis. In case of smooth post operative recovery, the patient was discharged after 72 hours. The rest of the 675 pts were further screened after 14 days and one pt was found to have a high

DISCUSSION

Since the past decade and a half, laparoscopic cholecystectomy has replaced open cholecystectomy as the gold standard for cholecystectomy. This rise in popularity is attributed to the better cosmesis, less post Op pain and early post op recovery⁹. However the rise of laparoscopic cholecystectomy has opened

up a new debate on the increased incidence of postcholecystectomy syndrome and DVT as compared to open cholecystectomy. High intra-abdominal pressure and reverse trendelenberg position during laparoscopy are risk factors for venous stasis¹⁰. Laparoscopic cholecystectomy is generally performed in a 12mm hg pressured pneumoperitoneum. Donmez *et al*¹¹ showed that as the pressure of pneumoperitoneum was increased to 14 mmhg, the level of d dimers rose significantly. Caprini *et al*¹² concluded that there was significant increase in the hypercoagulability parameters after laparoscopic cholecystectomy. The question is whether this theoretical rise in hypercoagulable state translates into clinically significant risk of DVT or not.

Lindberg *et al*¹³ and rondelli *et al*¹⁴ concluded that laparoscopic cholecystectomy is a safe procedure, and the rate of clinically evident postoperative thromboembolic complications is probably even lower than conventional cholecystectomy. This might be attributable to the early mobilization due to less postop pain in patients undergoing laparoscopic cholecystectomy.

Persson *et al*¹⁵ argued that the risk of bleeding increased with the use of systemic thromboembolism prophylaxis while it did not decrease the incidence of DVT and hence identification of high and low risk patients is needed to help in the clinical decision regarding medical thromboprophylaxis. A large retrospective Swedish study of Strömberg *et al*¹⁶ concluded the incidence of DVT is low in pts undergoing lap cholecystectomy while thromboprophylaxis increases risk of bleeding. The same was concluded in a nation wide American study¹⁷.

Our study at Pak Emirates Military Hospital Rawalpindi concurs with the international studies. The incidence of DVT in our study was 0.73% which can be considered insignificant. Early mobilization plays a key factor in postoperative prevention of DVT. Thromboprophylaxis is not necessary in a patient undergoing elective cholecystectomy. However a

thorough history to assess the risk factors for DVT should be taken. Preoperative risk stratification for DVT and D-dimers are effective screening tools for pts undergoing laparoscopic cholecystectomy.

CONCLUSION

We conclude that there was no significant risk of DVT after laparoscopic cholecystectomy. Thromboprophylaxis is not recommended in patients undergoing elective laparoscopic cholecystectomy without any risk factors of DVT. Preoperative risk stratification for DVT and preoperative D-dimers are effective screening tools for pts undergoing laparoscopic cholecystectomy.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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