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Investigation of the Incidence Rate of Deep Vein Thrombosis in Patients Undergoing Laparoscopic Cholecystectomy with and without Prophylaxis

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Background and Aim: It has been suggested that thromboembolism occurs more frequently after laparoscopic cholecystectomy. This study aimed to evaluate the incidence of Deep Vein Thrombosis (DVT) in patients undergoing laparoscopic cholecystectomy with and without prophylaxis in hospitals affiliated to Azad University from 2011 to 2014.

Materials and Methods: This retrospective cohort study was performed on 150 patients in two groups of 75 who underwent laparoscopic cholecystectomy in hospitals affiliated to Azad University from 2011 to 2014. A pre-made checklist was used to record patient's information such as age, gender, body mass index, treatment complications, and DVT. Furthermore, the patients were evaluated based on Wells score; moreover, a quantitative D-dimer test, and three risk classifications (Wells score) for DVT were performed 72 h and 14 days after surgery. Patients with a high preoperative probability score and a positive preoperative D-dimer were excluded from the study. All images with a high probability postoperative score for DVT and/or positive postoperative D-dimers were scanned for definitive diagnosis of DVT. Finally, the data were analyzed in SPSS software (version 22) through the Chi-square test. A p-value less than 0.05 was considered statistically significant.

Results: The DVT was not observed in any of the patients in the two groups. Moreover, 40% and 20% of the patients in the case and control groups had coronary artery disease, respectively, which was statistically a significant difference (P=0.008). Furthermore, 48% and 20% of the cases in the case and control groups had hypertension, respectively, which was statistically significant (P=0.0001). In addition, 28% and 6.7% of the patients in the case and control groups had hyperlipoproteinemia, respectively, which showed a significant difference between the two groups in this regard (P=0.001). In total, 20% and 6.7% of the individuals in the case and control groups were sedentary, respectively, which showed a statistically significant difference (P=0.016).

Conclusion: In this study, even those who were supposed to receive DVT according to the instructions did not receive it and did not develop DVT; therefore, it is not necessary to prescribe prophylaxis for DVT.

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Introduction

One of the most common causes of abdominal pain is gallstone (1). This disorder is usually manifested by acute abdominal pain, especially after eating, and is more common in women and overweight people; moreover, it has a more unfavorable prognosis after the age of 65 (2).

However, in 12% of patients, acute cholecystitis is not caused by gallstones (3). The main treatment for these patients is cholecystectomy, which can be performed in two methods of open and laparoscopic; however, in 5% of cases, open laparoscopic is the only option (4, 5). Laparoscopic cholecystectomy often has successful outcomes; however, sometimes it is followed by complications, such as perforation and bleeding (6). It is always tried to prevent the prevalence of complications in patients undergoing surgery to increase their satisfaction with the treatment results.

Venous thromboembolism (VTE) is one of the common complications of the surgery. However, it can be prevented by the recognition of the risk factors and the adoption of preventive measures. Age range, duration of surgery, intraperitoneal pressure, and postoperative immobility are some of the factors that influence the outcome of the surgery. With the emergence of laparoscopic surgery, the discussions around thromboprophylaxis have revived (7). However, the optimal method for the prevention of deep vein thrombosis (DVT) is still unknown (8).

Theoretically, any type of laparoscopic surgery greatly increases the blood's ability to coagulate to varying degrees by 1/2. However, shorter (less than 1 h) and less complex laparoscopic procedures, such as simple laparoscopic cholecystectomy, have a lower risk of VTE (9). Increased intraperitoneal pressure due to laparoscopic surgery leads to pneumoperitoneum which significantly reduces venous blood flow to the lower extremities (10). The American College of Chest Physicians (ACCP) in 1986 issued guidelines for the prevention of VTE in a specific group of medical and surgical patients at the risk of VTE. These guidelines include recommendations for the type (mechanical, pharmacological, or combination), dosage, and duration of the usage of thrombotic prophylaxis. The importance of thromboprophylaxis in the prevention of VTE in hospitalized patients has been officially recognized by the Joint Commission on Accreditation of Health Organization and the National Quality Association (11, 12).

The main question that arises is whether these changes during laparoscopic surgery are clinically significant enough to predispose the patient to DVT? Moreover, one of the complications of laparoscopic cholecystectomy is DVT (13, 14) which is usually prevented by the prescription of anticoagulant prophylaxis. However, it has not been established yet whether or not prophylaxis can effectively prevent DVT. Therefore, this study aimed to investigate the incidence rate of DVT in patients undergoing laparoscopic cholecystectomy with and without prophylaxis in hospitals affiliated to the Islamic Azad University, Tehran Branch, Iran during 2011-14.

Materials and Methods

The present retrospective cohort study was performed on the medical records of patients who underwent laparoscopic cholecystectomy in hospitals affiliated to the Islamic Azad University during 2011-14. The subjects were selected using the convenience sampling method and the minimum required sample size was calculated using the ratio formula and based on the results of a study performed by Schaepkens et al. (15). Moreover, the values of alpha, beta (type II error), P1 (incidence of DVT in case of not receiving anti-DVT prophylaxis in previous studies), and P2 (incidence of DVT in case of receiving anti-DVT prophylaxis in previous studies) were 0.05, 0.1, 1.7%, and 0.4%, respectively. Finally, the sample size was calculated at 150 participants who were divided into two groups of 75 subjects.

All cases of acute cholecystitis, chronic cholecystitis, symptomatic gallstones, and biliary pancreatitis who had undergone laparoscopic cholecystectomy as well as patients who could be followed up were included in this study. On the other hand, patients who had undergone other procedures at the same time as laparoscopic cholecystectomy (e.g., patients who had simultaneously undergone ventral hernia repair surgery and cholecystectomy were excluded from the study) and patients with a history of VTE, varicose veins, malignant diseases, severe infection, chronic renal failure, more than three pregnancies, pre-pregnancy, chronic liver disease, inflammatory bowel disease, hormone therapy, usage of oral contraceptives, obesity, hereditary or acquired thrombophilia (e.g., protein C or S deficiency), factor V Leiden, antithrombin deficiency, open surgery, and operation time of more than 2 h were excluded from the research.

Information of the patients, such as age, gender, Body mass index, treatment complications, and DVT were obtained through the study instrument which was a pre-made checklist whose validity was confirmed by internal medicine and surgery specialists. The patients were evaluated based on Wells score; moreover, a quantitative D-dimer test and three risk classifications (Wells score) for DVT were performed 72 h and 14 days after surgery. The patients with a high preoperative probability score and a positive preoperative D-dimer were excluded from the study. All images with high probability postoperative scores for DVT and/or positive postoperative D-dimer were scanned for definitive diagnosis of DVT. Finally, the collected data were analyzed in the SPSS software (version 22) using

descriptive statistics, including mean, percentage, and frequency. The Chi-square test was used to compare the incidence rate of DVT in the two study groups which were with and without prophylaxis. It should be noted that a p-value of less than 0.05 was considered statistically significant.

Results

Based on the results, the frequency distribution of age, gender, obesity, diabetes, varicose veins frequency, oral contraceptive pill consumption, and anticoagulant consumption were the same in the two groups (P<0.05). Moreover, DVT was not observed in any of the participants in the two groups. Furthermore, 40% and 20% of the subjects in the case and control groups had coronary artery disease, respectively, which was a significant difference (P=0.008). Besides, 48% and 20% of the patients in the case and control groups had hypertension, respectively, which indicated a significant difference (P=0.0001). The findings also revealed that 28% and 6.7% of the participants in the case and control groups had hyperkeratosis lenticularis perstans, respectively, which was statistically a significant difference (P=0.001). In addition, 20% and 6.7% of the patients in the case and control groups were sedentary, respectively, which showed a statistically significant difference between the two groups in this regard (P=0.016).

Discussion

Laparoscopic cholecystectomy is often successful; however, sometimes it has complications, such as perforation and bleeding (5). Therefore, it has always been tried to prevent such complications in patients undergoing surgery to increase their satisfaction with the treatment outcome. One of the most important complications of laparoscopic cholecystectomy is DVT (6) which is usually prevented by the prescription of anticoagulant prophylaxis. However, whether prophylaxis can be effective in the prevention of DVT is a matter of debate.

In this regard, the present study aimed to investigate the incidence rate of DVT in patients who undergo laparoscopic cholecystectomy with and without prophylaxis in hospitals affiliated to the Azad University during 2011-14. According to the results, none of the subjects developed DVT. Pakaneh et al. conducted a study on 100 patients who underwent laparoscopic cholecystectomy in Iran in 2012. In the follow-up through Doppler ultrasound, they found that only 1% of these patients developed DVT (6). Therefore, laparoscopic cholecystectomy was considered a low-risk

Table 1. Studied variables in both groups

Variable		DVT prophylaxes		p-value
		Positive	Negative	
Age	<50 >50	28 (37.3%) 47 (62.7%)	39 (52%) 36 (48%)	P>0.05
Gender	Male Female	9 (12%) 66 (88%)	4 (5.3%) 71 (94.7%)	P>0.05
Weight	Overweight Underweight	54 (72%) 21 (28%)	60 (80%) 15 (20%)	P>0.05
Coronary artery disease	Yes No	30 (40%) 45 (60%)	15 (20%) 60 (80%)	P=0.008
Diabetes mellitus	Yes No	20 (26.7%) 55 (73.3%)	12 (16%) 63 (84%)	P>0.05
Hypertension	Yes No	36 (48%) 39 (52%)	15 (20%) 60 (80%)	P=0.0001
Hyperkeratosis lenticularis perstans	Yes No	21 (28%) 54 (72%)	5 (6.7%) 70 (93.3%)	P=0.001
Varicose vein	Yes No	12 (16%) 63 (84%)	7 (9.3%) 68 (90.7%)	P>0.05
Neoplasm	Yes No	3 (4%) 72 (96%)	3 (4%) 72 (96%)	P>0.05
Immobility	Yes No	15 (20%) 60 (80%)	5 (6.7%) 70 (93.3%)	P=0.016
Oral contraceptives	Yes No	9 (12%) 66 (88%)	4 (5.3%) 71 (94.7%)	P>0.05
Anticoagulant medications	Yes No	18 (24%) 57 (76%)	11 (14.7%) 64 (85.3%)	P>0.05

procedure in this regard (6) which is consistent with the results of the present study that indicated the risk was very low and close to 0.

Beekman et al. (8) in their study which was performed in Canada in 2006 found that prophylactic surgeons prescribed DVT for 73.8% of patients undergoing laparoscopic cholecystectomy (8); however, based on the results of the present research, this is completely unnecessary. Schaepkens et al. carried out a study in Belgium in 2002 on 238 patients undergoing laparoscopic cholecystectomy who were divided into two groups that did and did not receive anticoagulant prophylaxis. They found that 1.68% and 0.42% in the groups that did and did not receive the placebo developed DVT, respectively (9), which is slightly higher than the results of this study.

Moreover, Blake et al. performed a study in the United States in 2001 on 587 patients, 18 of whom had received anticoagulant prophylaxis, and found that none of the patients developed DVT (16). Lord et al. also conducted a study in Australia in 1998 on 100 patients, 59 of whom underwent laparoscopic cholecystectomy. They found that only one out of the 59 patients who underwent laparoscopic cholecystectomy developed DVT and that patient had not received prophylaxis (17).

Conclusion

As can be observed, the number of people with DVT was very low in most studies as well as the present study. Overall, in this study, even the patients who were supposed to receive DVT prophylaxis according to the prescrptions and did not receive it did not develop DVT; therefore, it is not necessary to prescribe DVT prophylaxis. However, it is recommended to conduct more studies in this regard to confirm the findings of this study with larger sample size and, if possible, with intervention designs. It should also be noted that there were no limitations in the present research.

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Conflicts of interest

The authors of the present article did not use any funding to conduct this research and have no conflict of interest.

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