



ASSESSMENT OF THE RISK OF VENOUS THROMBOEMBOLISM (VTE) AFTER LAPAROSCOPIC SURGERY ACCORDING TO CAPRINI SCORE GUIDELINES.

General Surgery

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ABSTRACT

Design: Prospective nonrandomised control trial

Setting: Tertiary care multispecialty Hospital

Introduction: Laparoscopic procedures have rapidly become most performed method throughout world. Laparoscopic procedure provides shorter hospital stay, early recovery, reduced wound infection rate and reduce post operative complications. VTE is a major cause of morbidity and mortality in patients undergoing gastrointestinal surgery. The incidence of fatal PE ranges from 0.1% to 0.8% in patients undergoing elective general surgical procedures (1). Despite wide acceptance of laparoscopic procedures for many general surgeries cases, the incidence of VTE is not well defined. We outline the prophylaxis strategies based on the calculated risk for VTE. As per Caprini guidelines score.

Patients and methods: Patients intended to undergoing laparoscopic procedure were prospectively enrolled between march 2015 to march 2016. The laparoscopic procedure were cholecystectomy, Appendicectomy, ventral hernia repair, Lap assisted vaginal hysterectomy (LAVH) or combined surgery. Patients demography, procedure details, time, any co morbid illness and caprini score for venous thromboembolism (VTE) were recorded. Also grading of risk for VTE was recorded.

Results: Eighty patients were enrolled for the study. In this study n=57 were for laparoscopic cholecystectomy, n=11 for appendicectomy, n=4 for ventral hernia repair, n=3 for LAVH, and n=5 were for combined. There was no statistically significant difference for age, sex, height and weight. The mean duration of surgery was 117.27±28.31, 142±45, 126.60±28.86, and 164±26 respectively. We assessed the risk of VTE for all eighty patients using caprini score and level the risk according to total risk factor score. We found that the level of risk as per caprini score were between moderate to high (n=20, n=56 respectively) and n=4 as highest.

Conclusion: Laparoscopic surgeries may have an increased risk for development of VTE, due to abdominal pressure, reverse trendelenberg position as well as prolonged surgery time. Patients with comorbid illness like varicose veins, h/o thromboembolism, may increase the risks of development of thrombotic complications. Assessment of risk postoperatively and recommendations of VTE prophylaxis is considered in moderate to highest group.

KEYWORDS

Sages Guideline, Caprini Score Guidelines, laparoscopic Surgeries, vte Prophylaxis.

INTRODUCTION:

Laparoscopic procedures have rapidly become most performed method throughout world. Laparoscopic procedure provides shorter hospital stay, early recovery, reduced wound infection rate and reduce post operative complications. VTE is a major cause of morbidity and mortality in patients undergoing gastrointestinal surgery. The incidence of fatal PE ranges from 0.1% to 0.8% in patients undergoing elective general surgical procedures (1). The scope of laparoscopic surgery has been expanded to cholecystectomy, appendectomy, nephrectomy, hysterectomy, colon surgery, bariatric surgery. Despite wide acceptance of laparoscopic procedures for many general surgeries cases, the incidence of VTE is not well defined. SAGES (society of American Gastrointestinal and endoscopic surgery) 2007 has developed risk for stratification for patient undergoing laparoscopic surgeries. Since the publication of the SAGES guidelines, the American college of chest physicians (ACCP) has their comprehensive guidelines that address VTE prophylaxis for non orthopaedic surgery patients (2). The ACCP guidelines uses the VTE risk stratification systems by Rogers and Caprini (3,4). We adopted Caprini guidelines (2005) to stratify the risk of VTE for our cases. We have used numerous points from caprini guidelines according to clinical condition and individual patient factors (table:3). Laparoscopic surgeries of all types causes serum hypercoagulability of varying degree (5,6). Shorter (less than one hour) and less complex procedure like simple laparoscopic cholecystectomy, probably has low risk of VTE disease (6). Longer or complex procedure like laparoscopic rou-en-y gastric bypass are higher risk (7). Along with operative factors, patient factors like age, immobility, history of VTE, varicose vein, CRF, CHF, history of MI, hormone replacement therapy and obesity, all increases risk (8,9).

We outline the prophylaxis strategies based on the calculated risk for VTE. As per Caprini guidelines score with 0 to 1 are low risk with incident of DVT, 10%. For score 2, moderate risk with DVT risk of 10 to 20%. For score 3-4, high risk level with DVT risk of >20-40%. And for score ≥5, highest level of risk with DVT RISK OF 40-60%. (Table-6).

Further, the routine use of VTE chemoprophylaxis was likely to be unnecessary and suggested in only higher risk patients based on risk stratification (10). The overall incidence of clinically evident DVT was 1.6% without prophylaxis. The risk of DVT is higher in patients undergoing colon surgery. It has been shown that a 1.7% risk of VTE with laparoscopic left vs 0.5% for right colectomy (11). In another study showed that VTE is lower for laparoscopic compared with open bariatric surgery patients (0.34% versus 1.54%) (12).

The objective of this study was to assess the risk of VTE following laparoscopic surgeries like, cholecystectomy, appendicectomy, hysterectomy, hernia repair according to Caprini guidelines.

PATIENTS AND METHODS

We analyzed eighty patients, aged between 24 years to 80 years and who underwent one of four commonly performed procedures like cholecystectomy, appendectomy, ventral repair, LAVH or combined. Approval from hospital ethics committee and written consent was taken prior to the study. This study was conducted march 2015 to march 2016 as a prospective, randomised study. Demographic data like, age, sex, height, weight, duration of surgery, comorbidities were recorded in preformed proforma. All patients were given points according to Caprini guidelines for VTE prophylaxis. The procedure were done by surgeon consultant in our hospital. The peritoneum was insufflated with carbon dioxide gas a maximum intraabdominal pressure of 14mmHg. The pneumoperitoneum was deflated as soon as the procedures was completed. The duration of surgery started from insertion of first port to closure of last port.

All data were analysed using chi square test, student; t; test.

RESULTS:

Eighty patients were enrolled in this study. ASA 1 and 2 patients undergoing Laparoscopic procedure i.e. cholecystectomy, Appendicectomy, ventral hernia repair, LAVH or combined, were included in this study. No patients were excluded from the study.

In the present research we observed that n=57 patients operated for cholecystectomy, n=11 for appendicectomy, n=4 for ventral hernia, n=3 LAVH and n=5 for combined. (Table-1). The average age were 46.89±12.87, 41.36±12.50, 45±1.04, 46.38±2.08 and 42.6±13.44 for cholecystectomy, appendicectomy, ventral hernia repair, LAVH and combine respectively.

There was no statistically difference in age, sex, height and weight between the groups. Duration of surgery were, 116.40±29.02, 117.27±28.31, 142.5±45, 126.66±28.86, 164±26 for cholecystectomy, appendicectomy, ventral hernias repair, LAVH, and combine surgery respectively. Further we assess the risk of VTE for all eighty patients by using Caprini score (Table:4) and level the risk according to risk factors. (Table-3). Two patients in laparoscopic group fall into ≥5 score, but majority were between 3-4 of risk factor score among the groups. So According to the score n=20, n=56, were between moderate to high score and n=4 were in highest risk as per risk level of Caprini score. (table-5,6)

DISCUSSION

Laparoscopic procedure has gained its access to many procedure likes cholecystectomy, appendicectomy, ventral hernia repair, LAVH, or colon surgeries. Other diseases has also gained accessed like hiatus hernia repair, large bowel surgeries, and gynaecological surgeries(13). It has been considered as an less invasive and lower risk after operation in terms of hospital stay, VTE, bile leak(14,15).

Severe thromboembolic complication has been reported after laparoscopic procedure (16,17). Despite this, there is a controversy about the use of prophylaxis for VTE in laparoscopic surgeries (18,19).

TABLE-1 DEMOGRAPHY

	Lap cholecystectomy(n=57)	Lap appendicectomy(n=11)	Lap ventral hernia (4)	LAVH (3)	Combined (5)
AGE	46.89±12.87	41.36±12.50	45±10.42	46.33±2.08	42.6±13.44
M:F	32:29	4:7	1:3	0:3	0:3
WEIGHT	62.47±7.74	57.54±6.5	65.25±11.52	60.66±3.05	55.4±6.5
HEIGHT	161.6±9.1	161.45±10.65	164.25±5.90	157.66±2.51	152.4±5.59
Duration of surgery	116.40±29.02	117.27±28.31	142.5±45	126.66±28.86	164±26.07

Table 2. Caprini Risk Assessment Model¹

1 Point	2 Points	3 Points	5 Points
Age 41-60 y	Age 61-74 y	Age ≥75 y	Stroke (<1 mo)
Minor surgery	Arthroscopic surgery	History of VTE	Elective arthroplasty
BMI >25 kg/m ²	Major open surgery (≥45 min)	Family history of VTE	Hip, pelvis, or leg fracture
History of major surgery (<1 mo)	Laparoscopic surgery (>45 min)	Positive factor V Leiden	Multiple trauma (<1 mo)
Varicose veins	Cancer (past or present)	Positive prothrombin 20210A	Acute spinal cord injury (<1 mo)
Swollen legs	Patient confined to bed (>72 h)	Elevated serum homocysteine	
Acute myocardial infarction	Immobilizing plaster cast (<1 mo)	Positive lupus anticoagulant	
Congestive heart failure (<1 mo)	Central venous access	Elevated anticardiolipin antibodies	
Sepsis (<1 mo)		Heparin-induced thrombocytopenia	
Serious lung disease, such as pneumonia (<1 mo)		Other congenital or acquired thrombophilia	
Chronic obstructive pulmonary disease			
Medical patient on bed rest			

BMI = body mass index; VTE = venous thromboembolism.
¹ From Caprini JA. Risk assessment as a guide for the prevention of the many faces of venous thromboembolism. *Am J Surg.* 2010;199:53-10. For use of this table, see text on prevention of VTE in hospitalized surgical patients.

TABLE-4 Caprini score assessment of individual procedure

Caprini score points	Lap cholecystectomy (n=57)	Lap appendicectomy (n=11)	Lap ventral hernia (4)	LAVH (3)	Combined (5)
0	0	0	0	0	0
2	15	5	0	0	3
3-4	40	6	4	3	2
≥5	02	0	0	0	0

TABLE.5 Risk assessment as per Caprini score

0-1	0	Low
2	20	Moderate
3-4	56	High
≥5	4	highest

TABLE-6 Risk levels and Recommendations as per Caprini score for Venous Thromboembolism(2005)

Total risk factor score	Incidence of DVT	Risk level	Prophylaxis regimen
0 - 1	<10%	Low	No specific measures, early ambulation
2	10 - 20%	Moderate	ES, IPC, LDUH or LMWH
3 - 4	20 - 40%	High	IPC, LDUH or LMWH
≥5	40 - 60% (1 - 5% mortality)	Highest	Pharmacological, LDUH, LMWH, warfarin or Pta inhibitor alone or in combination with ES or IPC

ESGCS = elastic stockings/gabulated compression stockings; IPC = intermittent pneumatic compression; LDUH = low-dose unfractionated heparin; LMWH = low molecular weight heparin.

Bradbury et al considered that only 20% has got thromboembolic complication(20).

It has demonstrated that long operative time and reverse trendelberg position are adding factor for DVT (21,22). In our case the operative time is one of the major risk factor of falling majority of patients in moderate to high group (n=20, n=56).

Guidelines has been made to assess VTE prophylaxis during laparoscopic surgery like SAGES GUIDELINES(2007)(2), Caprini score guidelines(3). These guideline is intended to assist surgeon in making decision regarding VTE prophylaxis. The ACCP guidelines, utilizes the VTE risk stratification system by Caprini and Rogers and outline prophylaxis strategies based on the calculated risk of VTE. The 2012 ACCP guidelines are easy to use, are more comprehensive, and are based on stronger evidence than the 2007 SAGES VTE preventive guidelines. But they are not specifically directed at laparoscopic surgical patients. Nguyen NT et al reported that there was a statistically significant reduction in risk of VTE after laparoscopic surgeries compared to open surgery.(23).

CONCLUSION:

Laparoscopic surgeries may have an increased risk for development of VTE, due to abdominal pressure, reverse trendelberg position as well as prolonged surgery time. Patients with comorbid illness like varicose veins, h/o thromboembolism, may increase the risks of development of thromembolic complications. Assessment of risk postoperatively and recommendations of VTE prophylaxis is considered in moderate to highest group.

TABLE-3 Points taken from Caprini Score Guidelines for VTE in the present study.

age	<40 Years (0)	61-74(2)
	>41-60 years(1)	≥75(3)
Time of Surgery	<45 min(1)	
	>45 min(2)	
Recent events		
	HTN(1)	
	DM(1)	
	DVT PROPYLAXIS(3)	
	BMI>25(1)	
	VARICOSE VEIN(1)	
	STROKE(5)	
	MOBILITY(0)	
	COPD(1)	
	ACUTE MI(1)	

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