

# The effectiveness of atorvastatin for deep vein thrombosis prevention in cancer patients undergoing chemotherapy

<b>Submission date</b> 15/12/2020	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 17/12/2020	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 25/03/2025	<b>Condition category</b> Circulatory System	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Venous thromboembolism (VTE) is a condition in which a blood clot forms in the deep veins of the leg, groin or arm and travels in the blood circulation. The incidence of VTE is increased in cancer patients and even more in patients who undergo chemotherapy. Most occur right after the chemotherapy is started.

VTE is a leading cause of increased death and illness, delay of care, and economic burden in cancer patients. One of the most common VTEs is deep vein thrombosis (DVT) and there is a three times higher risk of death in patients with asymptomatic DVT.

Previous studies have proven the effectiveness and safety of thrombo-prophylaxis (preventing the formation of blood clots) in medically ill and cancer patients, so a recommendation for this has been made for clinical practice. However, there are still a lot of clinicians not using thrombo-prophylaxis in daily use, the most common reasons are the cost, bleeding risk, and lack of knowledge, confidence, and awareness to use an anticoagulant drug as thrombo-prophylaxis.

The immune system and inflammation have long been recognized as playing roles in cancer-related VTE. Statins have an anti-inflammatory effect so might have a benefit with a lower bleeding risk, lower cost, and easier use compared to conventional anticoagulants. There is still limited data about statins and their role in preventing VTE cancer patients who undergo chemotherapy still needs to be confirmed.

Rivaroxaban is an anticoagulant with a relatively convenient use, a single dose orally daily. A previous study has proven that rivaroxaban could reduce thrombosis events with a low bleeding risk. Rivaroxaban also does not need daily coagulation monitoring.

The study aims to compare the effectiveness of atorvastatin and rivaroxaban for DVT prevention, inflammation and coagulation in cancer patients who have a high risk of thrombosis while undergoing chemotherapy.

### Who can participate?

Patients aged 18-60 with cancer and no previous chemotherapy

### What does the study involve?

Participants are randomly allocated to take either atorvastatin or rivaroxaban daily for 3 months

for DVT prevention. Participants are assessed with Doppler ultrasonography at the start of the study and after 3 months.

What are the possible benefits and risks of participating?

The researchers think that atorvastatin will be as effective as rivaroxaban in DVT prevention but at a lower cost. The common side effects of atorvastatin are increased liver function tests, myopathy, joint pain, and muscle weakness. However, these side effects are usually well-tolerated and severe adverse events are rarely found. The most common side effect of rivaroxaban is bleeding in the gums, skin and with urinating or defecating. Participants will be monitored for the adverse events and will be treated.

Where is the study run from?

Dr. Kariadi Hospital (Indonesia)

When is the study starting and how long is it expected to run for?

November 2020 to March 2022

Who is funding the study?

Investigator initiated and funded

Who is the main contact?

Dr Budi Setiawan

boedhi\_smg73@yahoo.com

## Contact information

**Type(s)**

Scientific

**Contact name**

Dr Budi Setiawan

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## Additional identifiers

**Clinical Trials Information System (CTIS)**

Nil known

**ClinicalTrials.gov (NCT)**

Nil known

## Protocol serial number

BS-VTE-001

# Study information

## Scientific Title

Comparing the effectiveness between the use of atorvastatin and rivaroxaban for deep vein thrombosis prophylaxis, inflammatory responses, and coagulation activities in cancer patients who have a high risk of thrombosis while undergoing chemotherapy: focus on IL-6, CRP, TF, F1+2, D-dimer, NF-kB, and TNF-alpha serum level and Doppler ultrasonography

## Study objectives

1. Atorvastatin 20 mg administration for 3 months can be used as an alternative for thrombo-prophylaxis in cancer patients who have a high risk of thrombosis while undergoing chemotherapy
2. Atorvastatin 20 mg is as effective as rivaroxaban and has better cost-effectiveness for thrombo-prophylaxis in cancer patients who have a high risk of thrombosis while undergoing chemotherapy
3. Atorvastatin 20 mg administration for 3 months is not inferior compared to rivaroxaban as a thrombo-prophylaxis in cancer patients who have a high risk of thrombosis while undergoing chemotherapy
4. Atorvastatin 20 mg administration for 3 months will reduce the IL-6, CRP, TF, F1+2, D-dimer, NF-kB, and TNF-alpha serum level and reduce DVT incidence measured by Doppler ultrasonography

## Ethics approval required

Old ethics approval format

## Ethics approval(s)

Approved 24/11/2020, Health Research Ethics Committee RSUP Dr. Kariadi Semarang (Sutomo St no. 16, Indonesia; +62 (0)24 8413476; kepk.rskariadi@gmail.com), ref: 665/EC/KEPK-RSDK /2020

## Study design

Single-center interventional double-blinded randomized controlled trial

## Primary study design

Interventional

## Study type(s)

Prevention

## Health condition(s) or problem(s) studied

Prevention of deep vein thrombosis in cancer patients who have high risk of thrombosis while undergoing chemotherapy

## Interventions

Participants who meet the inclusion criteria will be randomized with simple randomization into the study group (atorvastatin 20 mg daily orally) or the control group (rivaroxaban 10 mg daily orally) for 3 months.

At baseline Doppler ultrasonography is performed on the lower extremities; IL-6, CRP, TF, F1+2, D-dimer, NF-kB and TNF-alpha serum levels are measured and re-measured after 3 months.

### **Intervention Type**

Drug

### **Phase**

Not Applicable

### **Drug/device/biological/vaccine name(s)**

Atorvastatin, rivaroxaban

### **Primary outcome(s)**

Deep vein thrombosis event measured using Doppler ultrasonography at baseline and 3 months

### **Key secondary outcome(s)**

1. IL-6 is measured using ELISA at baseline and 3 months
2. NF-kB is measured using ELISA at baseline and 3 months
3. CRP is measured using a spectrophotometer at baseline and 3 months
4. TF is measured using ELISA at baseline and 3 months
5. F1+2 is measured using ELISA at baseline and 3 months
6. D-dimer is measured using ELISA at baseline and 3 months
7. TNF-alpha is measured using ELISA at baseline and 3 months
8. Cost effectiveness is measured using the total cost for each subject

### **Completion date**

28/02/2022

## **Eligibility**

### **Key inclusion criteria**

1. Cancer patient with a definite diagnosis of cancer based on anatomy pathological examination
2. Cancer patients who have not received any chemotherapy
3. Khorana risk score  $\geq 2$
4. Age 18-60 years old
5. Has signed the participant agreement

### **Participant type(s)**

Patient

### **Healthy volunteers allowed**

No

### **Age group**

Adult

**Lower age limit**

18 years

**Upper age limit**

60 years

**Sex**

All

**Total final enrolment**

86

**Key exclusion criteria**

1. Deep vein thrombosis diagnosed with Doppler ultrasonography examination at baseline
2. Within 14 days post-surgery
3. Pregnancy
4. Taking an anti-thrombotic drug
5. Congenital altered coagulation system
6. Creatinine clearance <30 ml/minute
7. Patients with AST level >3x upper normal limit
8. Patients with total bilirubin total >5 mg/dl
9. Patients with CK >3 x upper normal limit
10. Performance status ECOG  $\geq$ 3
11. Patients with cardio-cerebrovascular disease
12. Patients with infection
13. Patients with active, major, serious, life-threatening bleeding that can not be overcome with medical or surgical intervention, esp in a critical area (intra-cranial, pericardial, retroperitoneal, intra-ocular, intra-articular, intraspinal)
14. Malignant hypertension
15. Congenital coagulopathy or severe platelet dysfunction
16. Severe and persistent thrombocytopenia (<20,000/ $\mu$ l)

**Date of first enrolment**

04/01/2021

**Date of final enrolment**

30/11/2021

**Locations****Countries of recruitment**

Indonesia

**Study participating centre**

**Dr. Kariadi Hospital**

Sutomo St, no. 16

Semarang

Indonesia

50244

# Sponsor information

## Organisation

Dr. Kariadi Hospital

## ROR

<https://ror.org/040f86t49>

# Funder(s)

## Funder type

Other

## Funder Name

Investigator initiated and funded

# Results and Publications

## Individual participant data (IPD) sharing plan

Current individual participant data (IPD) sharing statement as of 21/02/2022:

The data sets generated during and/or analysed during the current study are/will be available upon request via email to Budi Setiawan (boedhi\_smg73@yahoo.com) when the data will become available. The raw data will be available for 2 years.

Previous individual participant data (IPD) sharing statement:

The datasets generated during and/or analysed during the current study are/will be available upon request (please email your request to boedhi\_smg73@yahoo.com, Budi Setiawan).

## IPD sharing plan summary

Available on request

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>	Primary efficacy end point	08/05/2023	09/05/2023	Yes	No
<a href="#">Results article</a>	Secondary outcome results	19/03/2025	25/03/2025	Yes	No
<a href="#">Participant information sheet</a>		16/12/2020	22/12/2020	No	Yes
<a href="#">Preprint results</a>		21/10/2022	27/10/2022	No	No
<a href="#">Protocol file</a>			23/08/2022	No	No