

Brought to you by [INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA](#)

Scopus

[Back](#)

SARS-CoV-2 infection and venous thromboembolism after surgery: an international prospective cohort study

[Anaesthesia](#) • Article • [Open Access](#) • 2022 • DOI: 10.1111/anae.15563 [Agastra, Ervis](#)^a; [Thereska, Dariel](#)^b; [Dajti, Irida](#)^c; [Lucchini, Sergio Martin](#)^{d, aay}; [Laudani, Veronica](#)^e; [+14,996 authors](#)^a Regional Hospital of Durres, Durres, Albania[Show all information](#)

112 98th percentile

Citations

13.51

FWCI

[View PDF](#)[Full text](#) [Export](#)[Save to list](#)[Document](#)[Impact](#)[Cited by \(112\)](#)[References \(15\)](#)[Similar documents](#)

Abstract

SARS-CoV-2 has been associated with an increased rate of venous thromboembolism in critically ill patients. Since surgical patients are already at higher risk of venous thromboembolism than general populations, this study aimed to determine if patients with peri-operative or prior SARS-CoV-2 were at further increased risk of venous thromboembolism. We conducted a planned sub-study and analysis from an international, multicentre, prospective cohort study of elective and emergency patients undergoing surgery during October 2020. Patients from all surgical specialties were included. The primary outcome measure was venous thromboembolism (pulmonary embolism or deep vein thrombosis) within 30 days of surgery. SARS-CoV-2 diagnosis was defined as peri-operative

(7 days before to 30 days after surgery); recent (1–6 weeks before surgery); previous (≥ 7 weeks before surgery); or none. Information on prophylaxis regimens or pre-operative anti-coagulation for baseline comorbidities was not available. Postoperative venous thromboembolism rate was 0.5% (666/123,591) in patients without SARS-CoV-2; 2.2% (50/2317) in patients with peri-operative SARS-CoV-2; 1.6% (15/953) in patients with recent SARS-CoV-2; and 1.0% (11/1148) in patients with previous SARS-CoV-2. After adjustment for confounding factors, patients with peri-operative (adjusted odds ratio 1.5 (95%CI 1.1–2.0)) and recent SARS-CoV-2 (1.9 (95%CI 1.2–3.3)) remained at higher risk of venous thromboembolism, with a borderline finding in previous SARS-CoV-2 (1.7 (95%CI 0.9–3.0)). Overall, venous thromboembolism was independently associated with 30-day mortality (5.4 (95%CI 4.3–6.7)). In patients with SARS-CoV-2, mortality without venous thromboembolism was 7.4% (319/4342) and with venous thromboembolism was 40.8% (31/76). Patients undergoing surgery with peri-operative or recent SARS-CoV-2 appear to be at increased risk of postoperative venous thromboembolism compared with patients with no history of SARS-CoV-2 infection. Optimal venous thromboembolism prophylaxis and treatment are unknown in this cohort of patients, and these data should be interpreted accordingly. © 2021 The Authors. Anaesthesia published by John Wiley & Sons Ltd on behalf of Association of Anaesthetists.

Author keywords

COVID-19; deep vein thrombosis; pulmonary embolism; SARS-CoV-2; venous thromboembolism

Indexed keywords

MeSH

Adolescent; Adult; Age Distribution; Aged; Cohort Studies; COVID-19; Female; Humans; Internationality; Male; Middle Aged; Postoperative Complications; Prospective Studies; SARS-CoV-2; Sex Distribution; Venous Thromboembolism; Young Adult

EMTREE drug terms

immunoglobulin G antibody; immunoglobulin M antibody

EMTREE medical terms

adult; aged; Article; cohort analysis; comorbidity; confounding variable; controlled study; coronavirus disease 2019; COVID-19 testing; deep vein thrombosis; elective surgery; emergency patient; emergency surgery; female; groups by age; human; lung embolism; major clinical study; male; multicenter study; nasopharyngeal swab; observational study; outcome assessment; pneumonia; postoperative complication; practice guideline; prospective study; reverse transcription polymerase chain reaction; risk assessment; Severe acute respiratory syndrome coronavirus 2; surgical patient; thrombosis prevention; venous thromboembolism; adolescent; age distribution; complication; international cooperation; middle aged; postoperative complication; sex ratio; venous thromboembolism; young adult

Funding details

Details about financial support for research, including funding sources and grant numbers as provided in academic publications.

Funding sponsor	Funding number	Acronym
National Institute for Health Research (NIHR) Global Health Research Unit		
Association of Upper Gastrointestinal Surgery of Great Britain and Ireland See opportunities by AUGIS ↗		AUGIS
Urology Foundation See opportunities by TUF ↗		TUF
Association of Breast Surgery See opportunities by ABS ↗		ABS
Sarcoma UK See opportunities by SUK ↗		SUK
British Gynaecological Cancer Society See opportunities by BGCS ↗		BGCS
National Institute for Health and Care Research See opportunities by NIHR ↗		NIHR
Bowel and Cancer Research See opportunities ↗		
Bowel Disease Research Foundation See opportunities by BDRF ↗		BDRF

Funding sponsor	Funding number	Acronym
Vascular Society See opportunities by VSGBI ↗		VSGBI
European Society of Coloproctology See opportunities by ESCP ↗		ESCP
Yorkshire Cancer Research See opportunities ↗		
Medtronic See opportunities ↗		
Association of Coloproctology of Great Britain and Ireland		
Japan Society for the Promotion of Science See opportunities by JSPS ↗	20K09242	JSPS
Japan Society for the Promotion of Science See opportunities by JSPS ↗		JSPS
National Institute of Diabetes and Digestive and Kidney Diseases See opportunities by NIDDK ↗	T32DK060442	NIDDK
National Institute of Diabetes and Digestive and Kidney Diseases See opportunities by NIDDK ↗		NIDDK

Funding text

This study was registered prospectively at clinicaltrials.gov (NCT04509986). Funding was provided by: National Institute for Health Research (NIHR) Global Health Research Unit; Association of Coloproctology of Great Britain and Ireland; Bowel and Cancer Research; Bowel Disease Research Foundation; Association of Upper Gastrointestinal Surgeons; British Association of Surgical Oncology; British Gynaecological Cancer Society; European Society of Coloproctology; Medtronic; NIHR Academy; Sarcoma UK; The Urology Foundation; Vascular Society for Great Britain and Ireland; and Yorkshire Cancer Research. The views expressed are those of the authors and not necessarily those of the funding partners. No other competing interests declared.

Corresponding authors

Corresponding author

E. Li

Email address

elizabeth.li@nhs.net

© Copyright 2026 Elsevier B.V., All rights reserved.

Abstract

Author keywords

Indexed keywords

Funding details

Corresponding authors

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語版を表示する](#)

[查看简体中文版本](#)

[查看繁體中文版本](#)

[Просмотр версии на русском языке](#)

Customer Service

[Help](#)[Tutorials](#)[Contact us](#)

ELSEVIER[Terms and conditions](#) ↗ [Privacy policy](#) ↗ [Cookies settings](#)

All content on this site: Copyright © 2026 [Elsevier B.V.](#) ↗, its licensors, and contributors. All rights are reserved, including those for text and data mining, AI training, and similar technologies. For all open access content, the relevant licensing terms apply.

