

Global practice variation in pharmacologic thromboprophylaxis for general and gynaecological surgery: systematic review

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Dear Editor

Venous thromboembolism (VTE) and bleeding are serious complications of surgery. Pharmacological prophylaxis decreases VTE but increases bleeding¹. The decision to use thromboprophylaxis requires balancing decreasing VTE *versus* increased risk of bleeding². Expert recommendations regarding VTE prophylaxis in surgery vary³, but the extent of practice variation remains uncertain.

We performed comprehensive literature searches in Embase, MEDLINE, Web of Science, and Google Scholar for observational studies with procedure-specific information on VTE and/or bleeding for 16 general abdominal and 22 gynaecological surgery procedures until November 2020³ (PROSPERO CRD42021234119) ([Supplementary material](#)). Two reviewers independently assessed eligibility and extracted data using standardized, piloted data forms, guided by written instructions. We included surgical procedures that had been investigated in at least five studies, with the majority of participants enrolled from 2000 onwards ([Supplementary material](#)). For each study, we extracted data on the proportion of patients receiving pharmacological prophylaxis, and the duration of prophylaxis. For each procedure, we calculated the proportion of discretionary use of pharmacological prophylaxis, and the mean or median duration of prophylaxis.

Of 32 523 potentially relevant titles and abstracts, 4082 warranted full-text review, of which 50 reports addressing five general and two gynaecological procedures were eligible: laparoscopic cholecystectomy (7 studies), open gastric bypass (7), open groin hernia repair (6), open liver resection (6), open ovarian cancer surgery (9), open radical hysterectomy (5), and laparoscopic sleeve gastrectomy (10) ([Figs. S1](#) and [S2](#) and [Table S1](#)). [Table S2](#) presents study characteristics.

All 50 studies reported whether prophylaxis was used; 29 of 46 (63 per cent) studies in which prophylaxis was used, also reported the duration of use.

Studies consistently reported high rates of prophylaxis in open gastric bypass, laparoscopic sleeve gastrectomy, open radical hysterectomy (one exception), and open ovarian cancer surgery (one exception). The duration of pharmacological prophylaxis varied between 4 and 20 days after open gastric bypass, between 4 and 35 days after laparoscopic sleeve gastrectomy, between 4 and 12 days after open radical hysterectomy, and between 7 and 28 days after open ovarian cancer surgery ([Fig. 1](#)).

The proportion receiving prophylaxis varied widely in laparoscopic cholecystectomy, open groin hernia repair, and open liver resection. The duration of pharmacological prophylaxis varied between 2 and 3 days after laparoscopic cholecystectomy, between 6 and 27 days after open liver resection, and only one study reported the duration for hernia repair ([Fig. 1](#)).

Studies of laparoscopic cholecystectomy, open hernia repair, and open liver resection reported large variation in the use of pharmacological prophylaxis ([Fig. 1](#)). Studies in cancer and obesity surgery consistently reported high rates of use of pharmacological prophylaxis, but with substantial variation in the duration of prophylaxis.

Earlier studies have addressed pharmacological prophylaxis in one or more centres^{4,5}, but our study examines variation in practice across studies. The other strengths of this review include a thorough search of contemporary studies, application of explicit eligibility criteria, and standardized piloted data forms for data collection.

This article has limitations. Although we screened many potential studies, only a small proportion proved eligible (1.4 per cent of full

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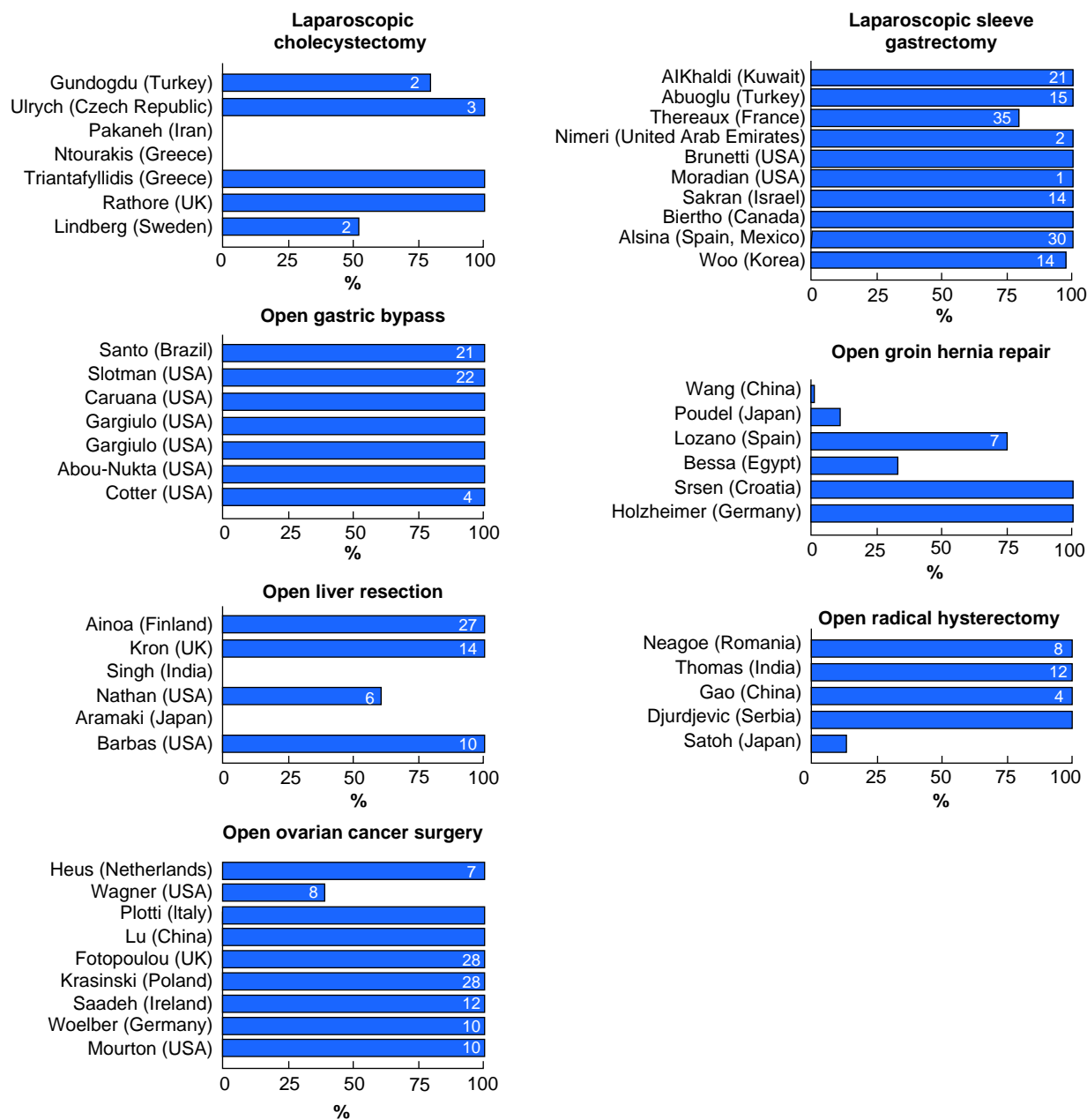


Fig. 1 Proportion (in percentages) of patients with reported use of pharmacological prophylaxis

Depending on the study, the mean or median duration of pharmacological prophylaxis (in days) for those who received any is noted on each bar (if reported in the article).

texts screened). These 50 studies (of which 15 had low risk of bias, 19 had moderate risk, and 16 had high risk of bias; [Tables S3](#) and [S4](#)) published between 2000 and 2020 represent seven procedures each with 5–10 studies.

We identified substantial practice variation, within and between countries, in the use of pharmacological prophylaxis in most types of benign surgery, and in the duration of prophylaxis after cancer surgery. Rationalization of practice will require evidence that provides a better understanding of procedure-specific risks of VTE and bleeding as well as creation of procedure-specific, evidence-based guidelines for thromboprophylaxis. Rationalization of current practice would decrease both under- and overuse of thromboprophylaxis improving patient outcomes.

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Disclosure

The authors declare no conflict of interest. R.C. and K.A.O.T. are panel members of the European Society of Anaesthesiology and Intensive Care Task Force for the European Guidelines on Venous Thromboembolism.

Supplementary material

[Supplementary material](#) is available at *BJS Open* online.

Data availability

The corresponding author is the custodian of the data and will provide access to data on request.

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