

# Increased Bleeding Risk with Enoxaparin Venothromboembolism Prophylaxis Compared with Heparin in Patients Undergoing Bariatric Surgery

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## BACKGROUND

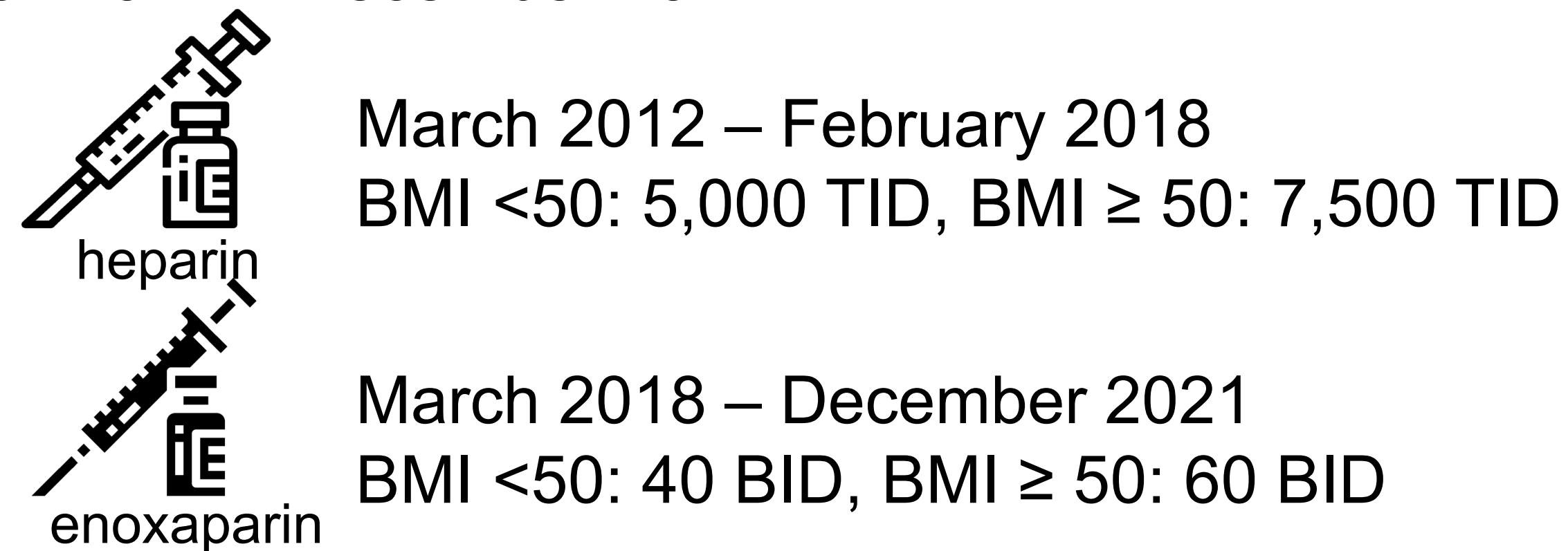
- Rates of venothromboembolism (VTE) after bariatric surgery are 0.3% to 3.5%
- Fatal pulmonary embolism (PE) occurs 0.2% to 0.4% of the time but is the cause of up to half of deaths after bariatric surgery
- Perioperative VTE chemoprophylaxis is an established tenant of bariatric surgery
- Few data exist comparing efficacy and bleeding risk of VTE prophylaxis
- In 2012 the Michigan Bariatric Surgery Collaborative found enoxaparin to be better than heparin for VTE prophylaxis

## RESEARCH OBJECTIVES

- Determine if an institutional change in VTE prophylaxis from heparin to enoxaparin was associated with differing rates of postoperative bleeding and VTE occurrence after bariatric surgery

## METHODS

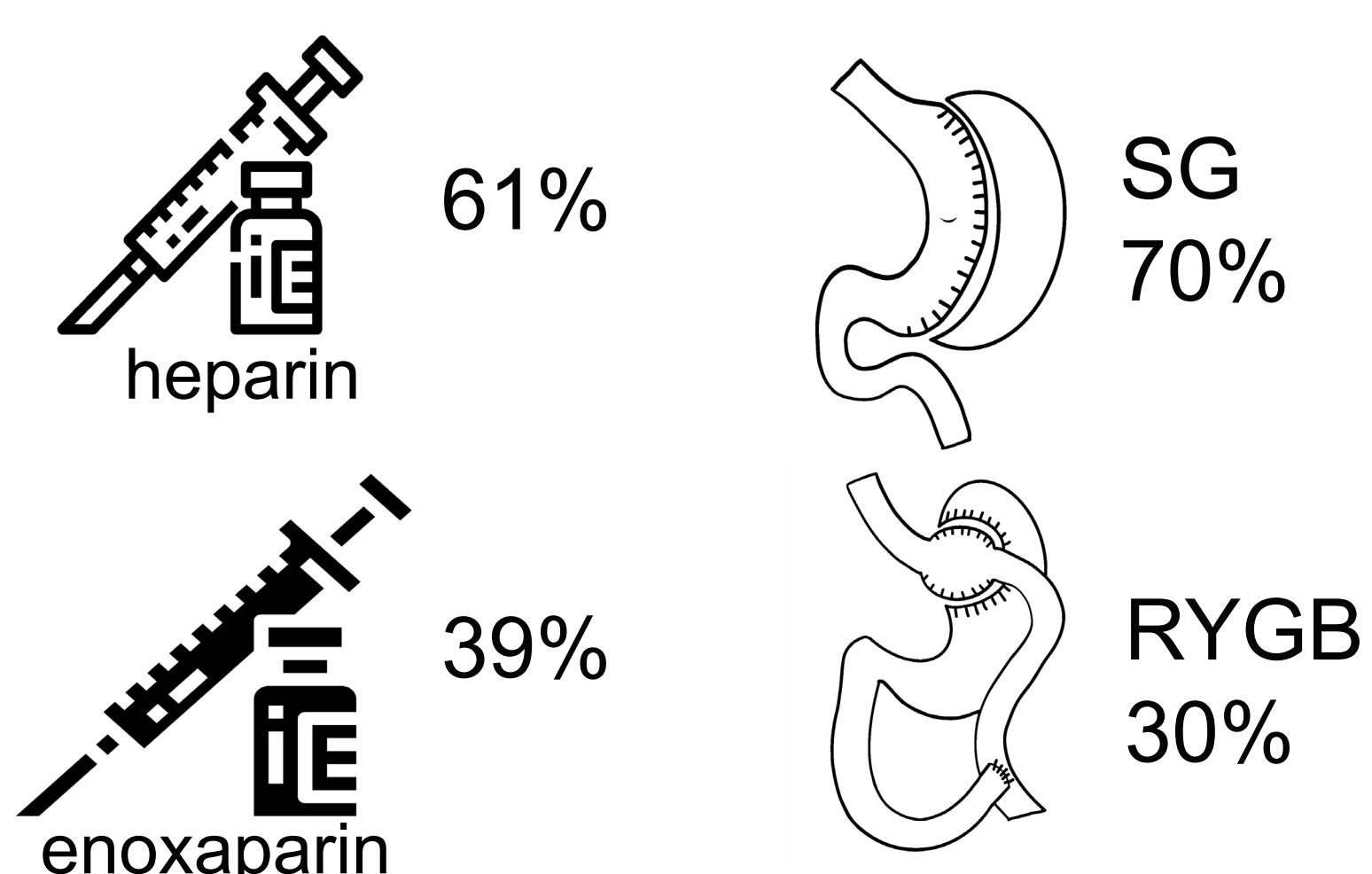
- Retrospective cohort study using a clinical database maintained by a trained surgical clinical reviewer as well as data from the Northwestern Enterprise Data Warehouse
- 18 years or older
- Primary bariatric surgery (sleeve gastrectomy [SG] or Roux-en-Y gastric bypass [RYGB])
- March 2012 – December 2021



- Postoperative bleeding defined as requiring a blood transfusion or reoperation for bleeding within 30 days of surgery
- VTE occurrence defined as DVT or PE that required treatment
- Chi-squared for differences between groups

## RESULTS

- 2,159 patients underwent bariatric surgery



The ratio of SG to RYGB was not different in the two VTE prophylaxis groups

**An institutional change from heparin to enoxaparin was associated with a significant increase in postoperative bleeding with no difference in VTE complications**

*Further studies examining the specific dosing and timing of varying VTE prophylaxis regimens are needed to clarify the optimal regimen for minimizing bleeding while protecting against VTE after bariatric surgery*

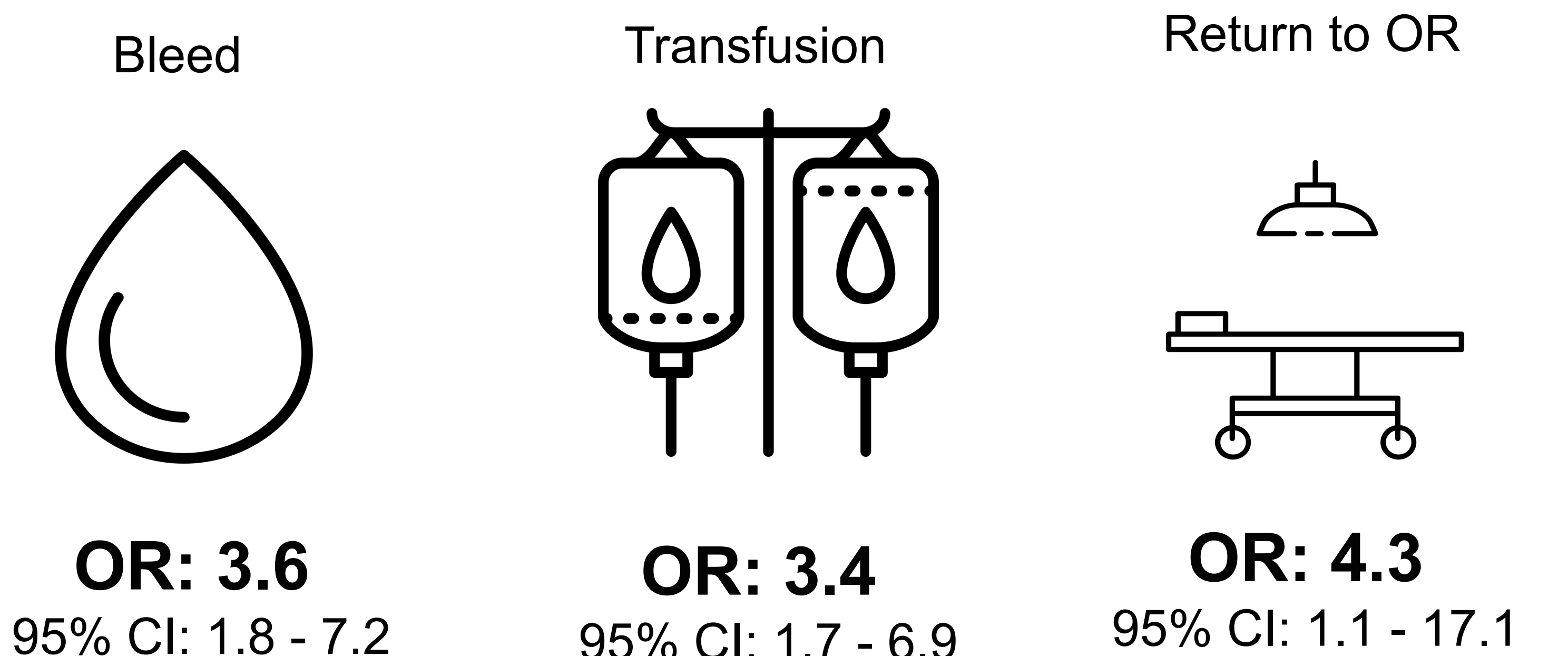
## RESULTS

- 79% female
- Median age: 43 years (IQR: 41-50)
- Median BMI: 45 (IQR: 36-52)

Complications	Heparin		Enoxaparin		p-value
	n	%	n	%	
Postoperative Bleed	12	0.9	26	3.1	<0.001
Postoperative Transfusion	12	0.9	26	3.1	<0.001
Return to OR for Bleed	3	0.2	7	0.8	0.041
VTE Occurrence	14	1.1	7	0.8	0.613

Table: Rate of complications in the heparin and enoxaparin groups

## REGRESSION SHOWED HIGHER ODDS OF COMPLICATIONS IN ENOXAPARIN AS COMPARED TO HEPARIN GROUP



controlled for age, race, Hispanic ethnicity, and hypertension (which were significant on univariate analyses)

## LIMITATIONS

- Single-center retrospective review
- Use of other medications might have influenced bleeding risk
- Sample size may be too small to detect small differences in VTE occurrences
- GI bleeding events that did not require transfusion or reoperation were not captured so the bleeding rate may be underestimated