Prevenzione e Terapia del Tromboembolismo Venoso in Gravidanza

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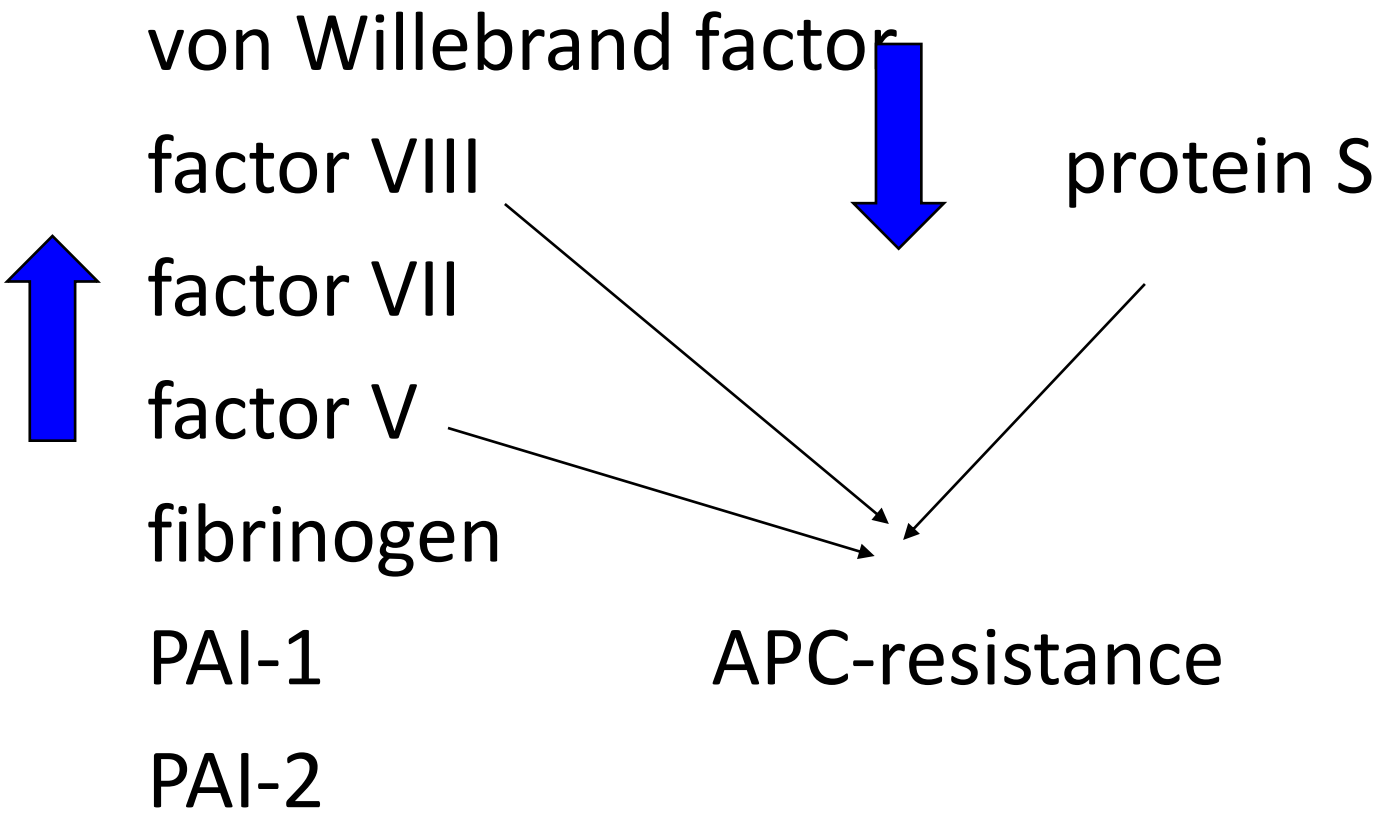
Cremona, 10 MARZO 2017
CENTRI EMOSTASI E TROMBOSI, SPECIALISTI OSPEDALIERI E MEDICINA DEL TERRITORIO NELLA GESTIONE DELLE MALATTIE EMORRAGICHE E TROMBOEMBOLICHE

Epidemiology and Risk Factors

HEMOSTATIC CHANGES DURING PREGNANCY

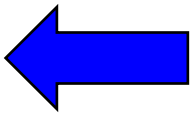


INCIDENCE PER YEAR OF DVT (/ 1,000)
J. Int. Med. 232, 155, 1992

- Males < 40 years 0.08
- Males 40 - 60 years 1.10
- Males > 60 years 4.66

Overall 1.58

- Females < 40 years 0.12
- **Females 15 - 40 years 0.18**
- Females 40 - 60 years 1.00
- Females > 60 years 4.20



INCIDENCE OF VTE DURING PREGNANCY AND PUERPERIUM (PER 1,000 DELIVERIES)

- 72.201 deliveries (Glasgow, Scotland)

51 cases of DVT and 11 cases of PE

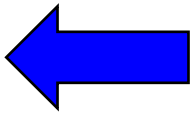
(of 50 investigated, 12% AT defect, 8% FV Leiden, 8% FII 20210A)

VTE in pregnancy 0.57

VTE in puerperium 0.29

VTE in pregnancy and puerperium 0.86

T&H 78,1183,1997 - BJOG 107,565,2000



Venous thromboembolism in pregnant and puerperal women in Denmark 1995–2005

A national cohort study

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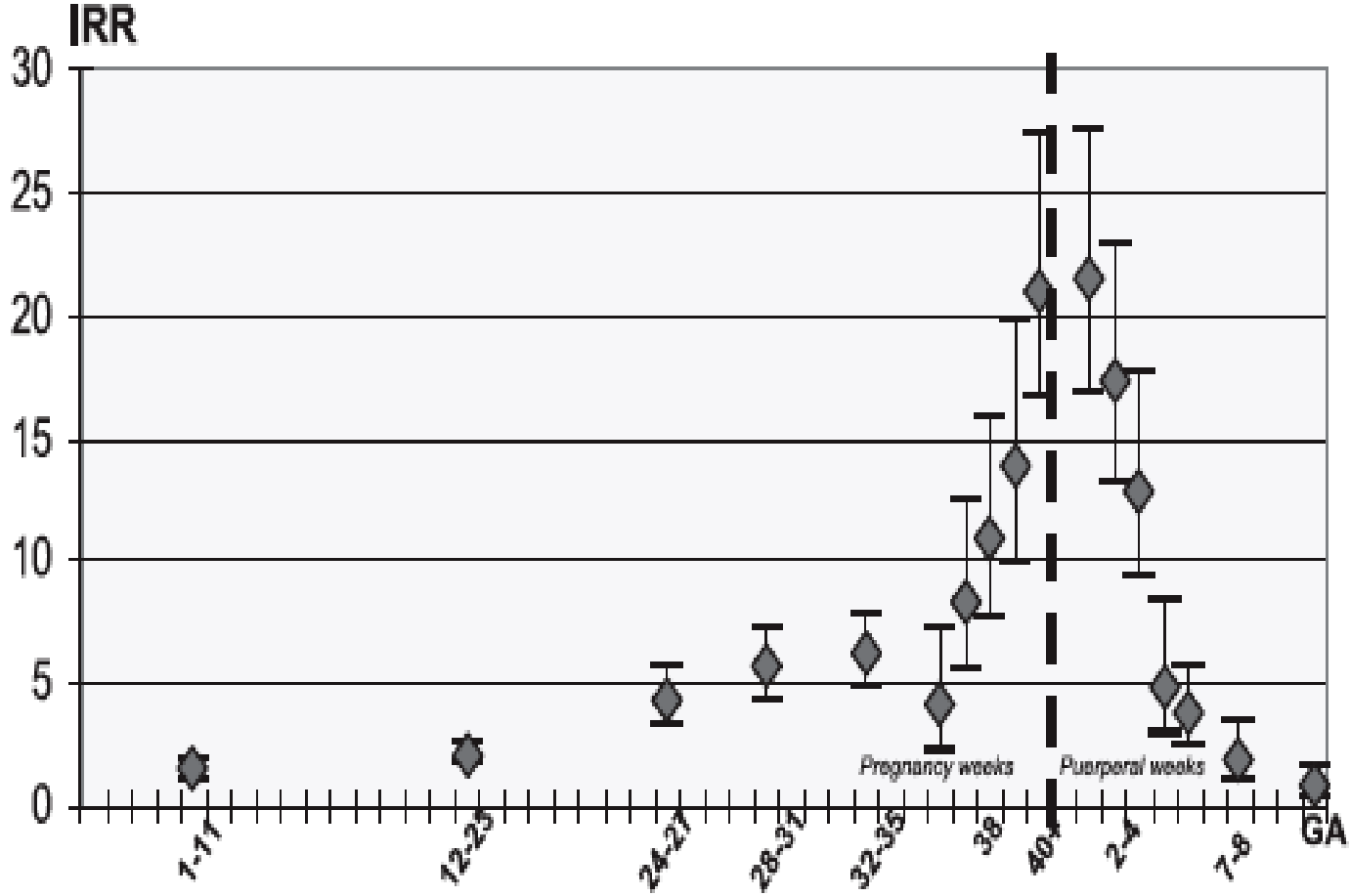

Figure 1: Adjusted* incidence rate ratios (IRR) of thromboembolism in pregnant and puerperal women versus non pregnant women not using oral contraceptives.
*Adjusted for age, calendar year and education.

Virkus RA et al, Thromb Haemost 2011

Maternal mortality in Italy: a record-linkage study

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Maternal Mortality in Italy (2000-2007)

- The leading causes of **direct death** were **haemorrhage and thromboembolism**, followed by hypertensive diseases in pregnancy. All of these causes should be preventable to a large extent and may indicate the need for an improvement in the quality of care.

- It is noteworthy that in Lazio and Piedmont, where stratification by mother's **educational level** was possible, MMR among women with low educational level was twice that among women with high educational level (RR = 1.9;
- 95% CI 1.1–3.6).

Donati S. et al., BJOG 2011

Maternal Mortality in Italy

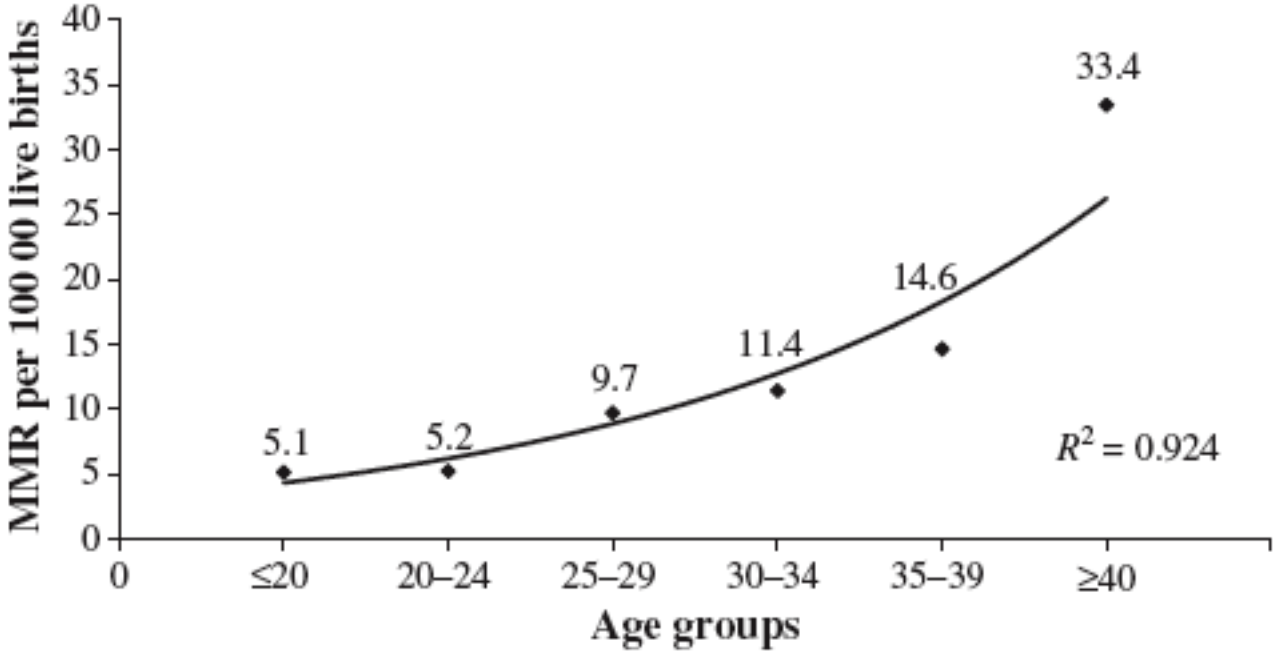


Figure 1. Maternal mortality ratios by age groups.

Donati S. BJOG 2011

bjh research paper

Thrombophilia in pregnancy: a systematic review

Factor V Leiden (homo)

Factor V Leiden (hetero)

PT 20210A (homo)

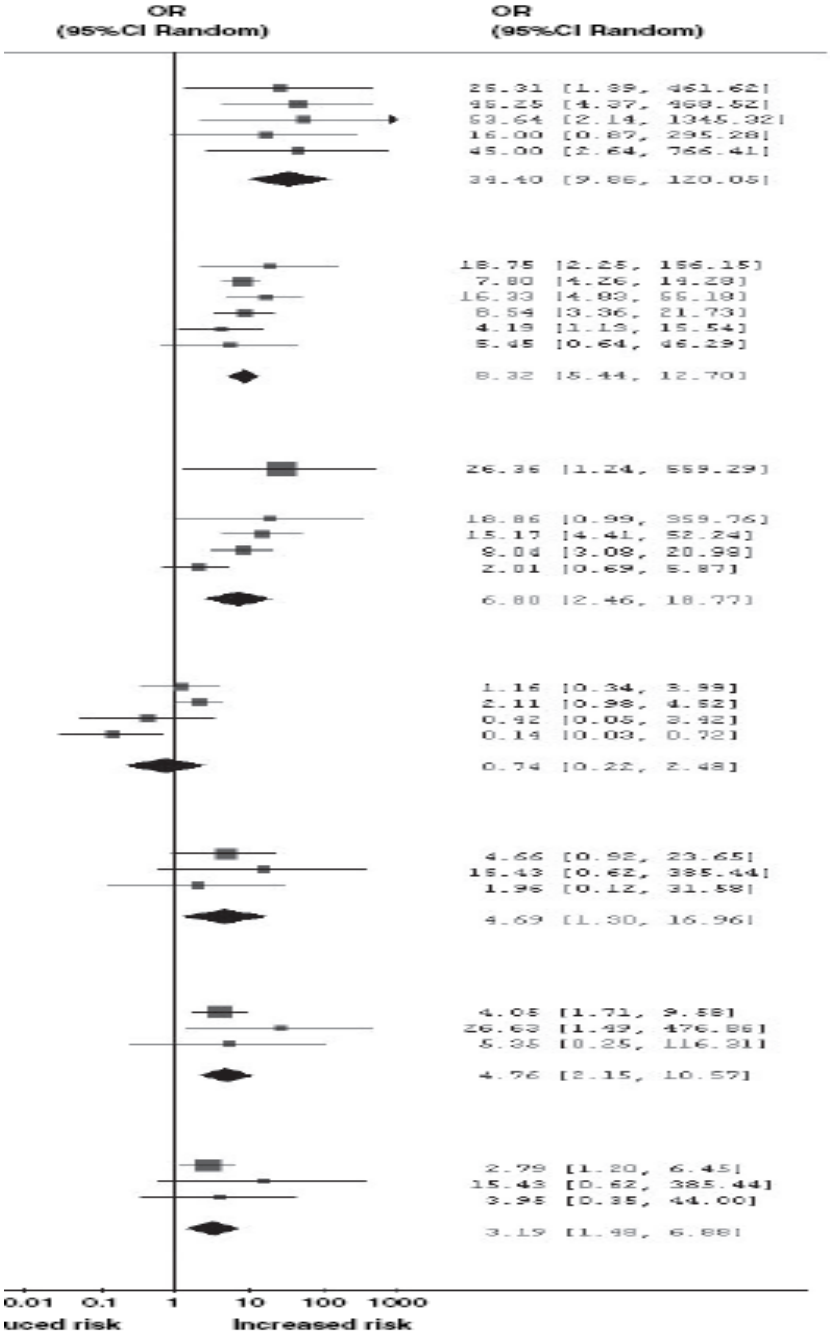
PT 20210A (hetero)

MTHFR 677 TT

AT deficiency

PC deficiency

PS deficiency



Robertson et al, BJH 2006

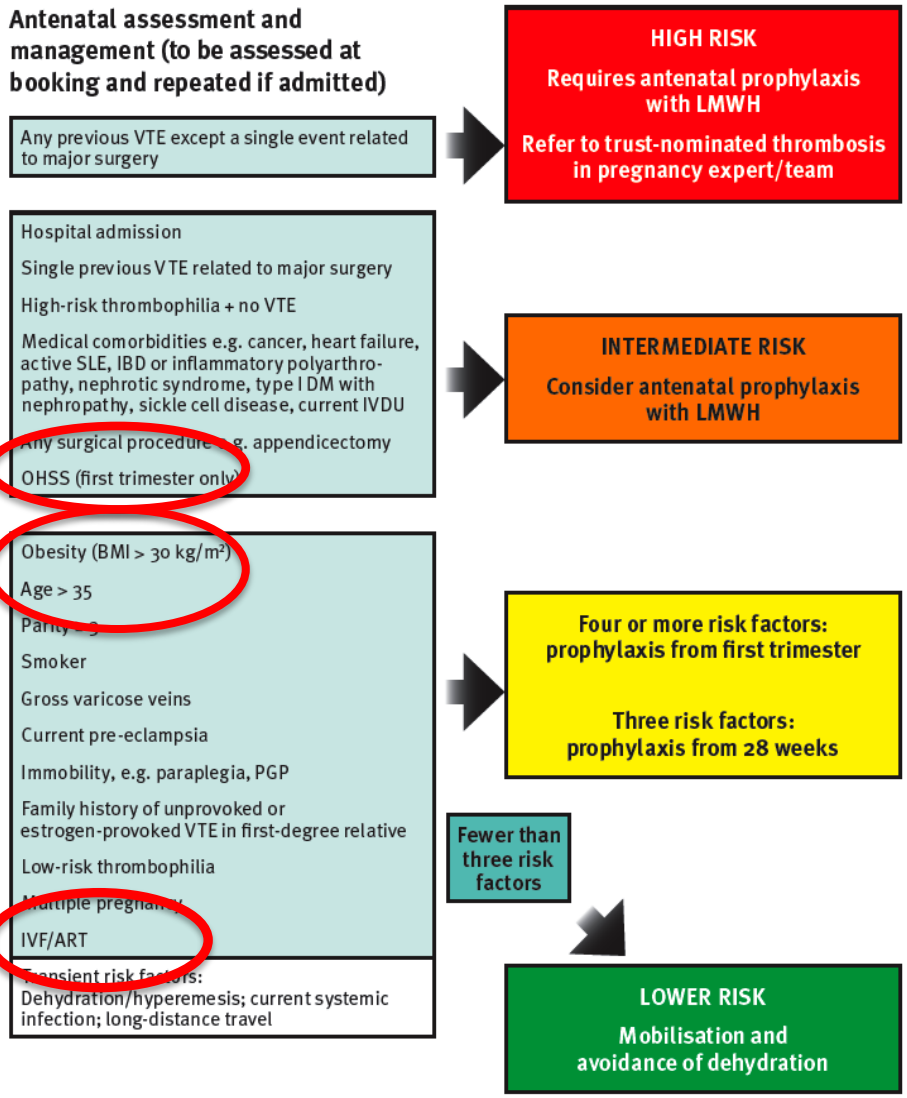
Table 2b: Estimated absolute risk of pregnancy-associated VTE with different thrombophilic defects in women with one or more symptomatic first-degree relatives

Thrombophilic defect	Pregnancy		Antenatal		Postpartum	
	%/pregnancy	95% CI	%/pregnancy	95% CI	%/pregnancy	95% CI
Antithrombin, protein C or protein S deficiency[48]	4.1	1.7–8.3	1.2	0.3–4.2	3.0	1.3–6.7
Antithrombin deficiency type 1 (range)[49–53]*	15–50 (range)	–	0–40	–	11–28	–
V Leiden heterozygous[48]	2.1	0.7–4.9	0.4	0.1–2.4	1.7	0.7–4.3
Prothrombin G20210A heterozygous[48]	2.3	0.8–5.3	0.5	0.1–2.6	1.9	0.7–4.7
V Leiden homozygous or compound heterozygosity V Leiden andprothrombin G20210A (range)[54,55]	1.8–15.8 (range)	–	0–5	–	1–10	–

* From population-based not family study

From RCOG 2009 and 2015

Appendix I: Obstetric thromboprophylaxis risk assessment and management



APL = antiphospholipid antibodies (lupus anticoagulant, anticardiolipin antibodies, β_2-glycoprotein 1 antibodies); ART = assisted reproductive technology; BMI based on booking weight; DM = diabetes mellitus; FHx = family history; gross varicose veins = symptomatic, above knee or associated with phlebitis/oedema/skin changes; high-risk thrombophilia = antithrombin deficiency, protein C or S deficiency, compound or homozygous for low-risk

RCOG 2015

Postnatal assessment and management (to be assessed on delivery suite)

- Any previous VTE
- Anyone requiring antenatal LMWH
- High-risk thrombophilia
- Low-risk thrombophilia + FHx

→ **HIGH RISK**
At least 6 weeks' postnatal prophylactic LMWH

- Caesarean section in labour
- BMI ≥ 40 kg/m²
- Readmission or prolonged admission (≥ 3 days) in the puerperium
- Any surgical procedure in the puerperium except immediate repair of the perineum
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy; nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU

→ **INTERMEDIATE RISK**
At least 10 days' postnatal prophylactic LMWH

NB If persisting or > 3 risk factors consider extending thromboprophylaxis with LMWH

- Age > 35 years
- Obesity (BMI ≥ 30 kg/m²)
- Parity ≥ 3
- Smoker
- Elective caesarean section
- Family history of VTE
- Low-risk thrombophilia
- Gross varicose veins
- Current systemic infection
- Immobility, e.g. paraplegia, PGP, long-distance travel
- Current pre-eclampsia
- Multiple pregnancy
- Preterm delivery in this pregnancy (< 37⁺⁰ weeks)
- Stillbirth in this pregnancy
- Mid-cavity rotational or operative delivery
- Prolonged labour (> 24 hours)
- PPH > 1 litre or blood transfusion

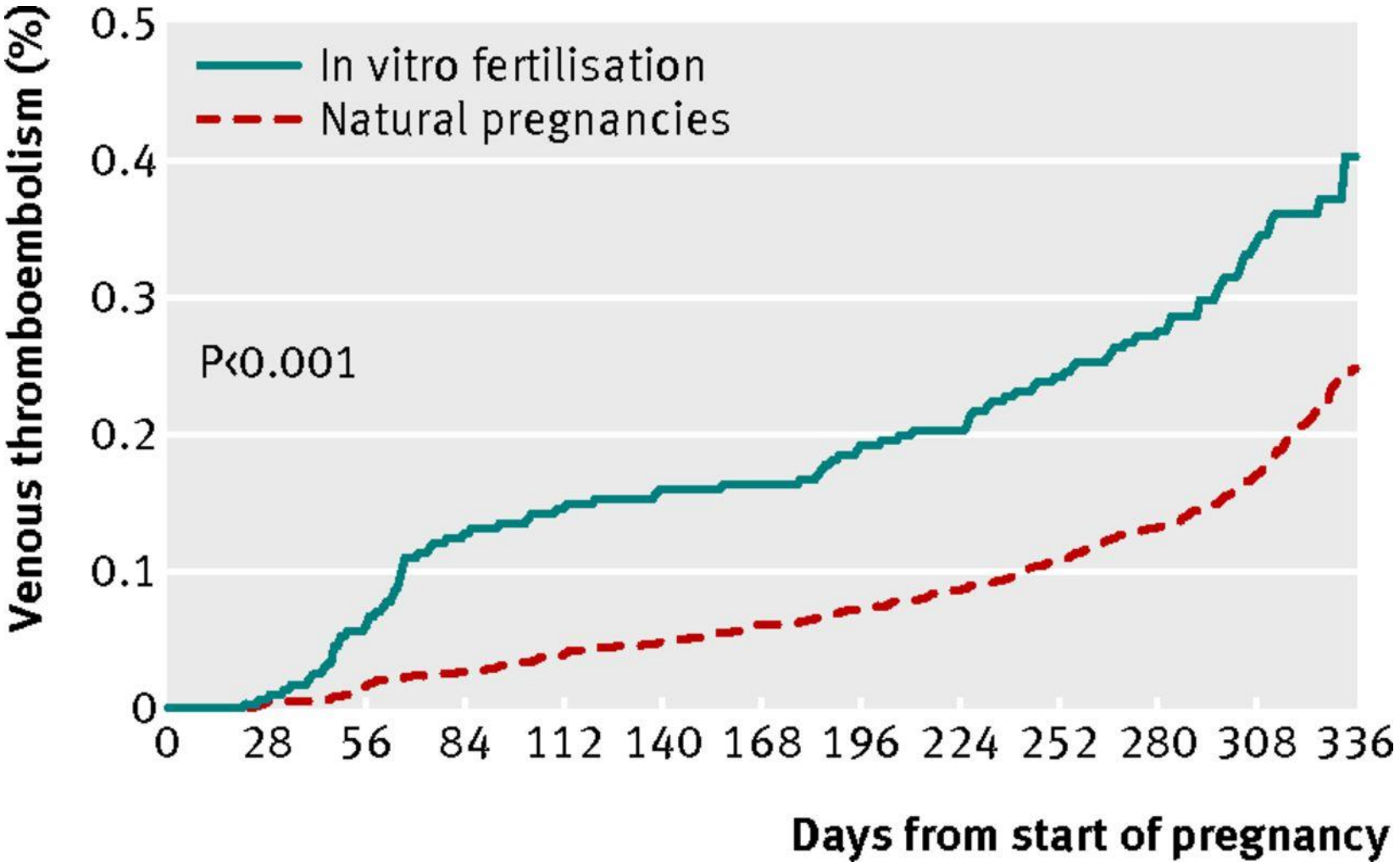
→ **Two or more risk factors** → **INTERMEDIATE RISK** (as above)

→ **Fewer than two risk factors** → **LOWER RISK**
Early mobilisation and avoidance of dehydration

Antenatal and postnatal prophylactic dose of LMWH

Weight < 50 kg = 20 mg enoxaparin/2500 units dalteparin/3500 units tinzaparin daily
Weight 50–90 kg = 40 mg enoxaparin/5000 units dalteparin/4500 units tinzaparin daily
Weight 91–130 kg = 60 mg enoxaparin/7500 units dalteparin/7000 units tinzaparin daily
Weight 131–170 kg = 80 mg enoxaparin/10 000 units dalteparin/9000 units tinzaparin daily
Weight > 170 kg = 0.6 mg/kg/day enoxaparin/ 75 u/kg/day dalteparin/ 75 u/kg/day tinzaparin

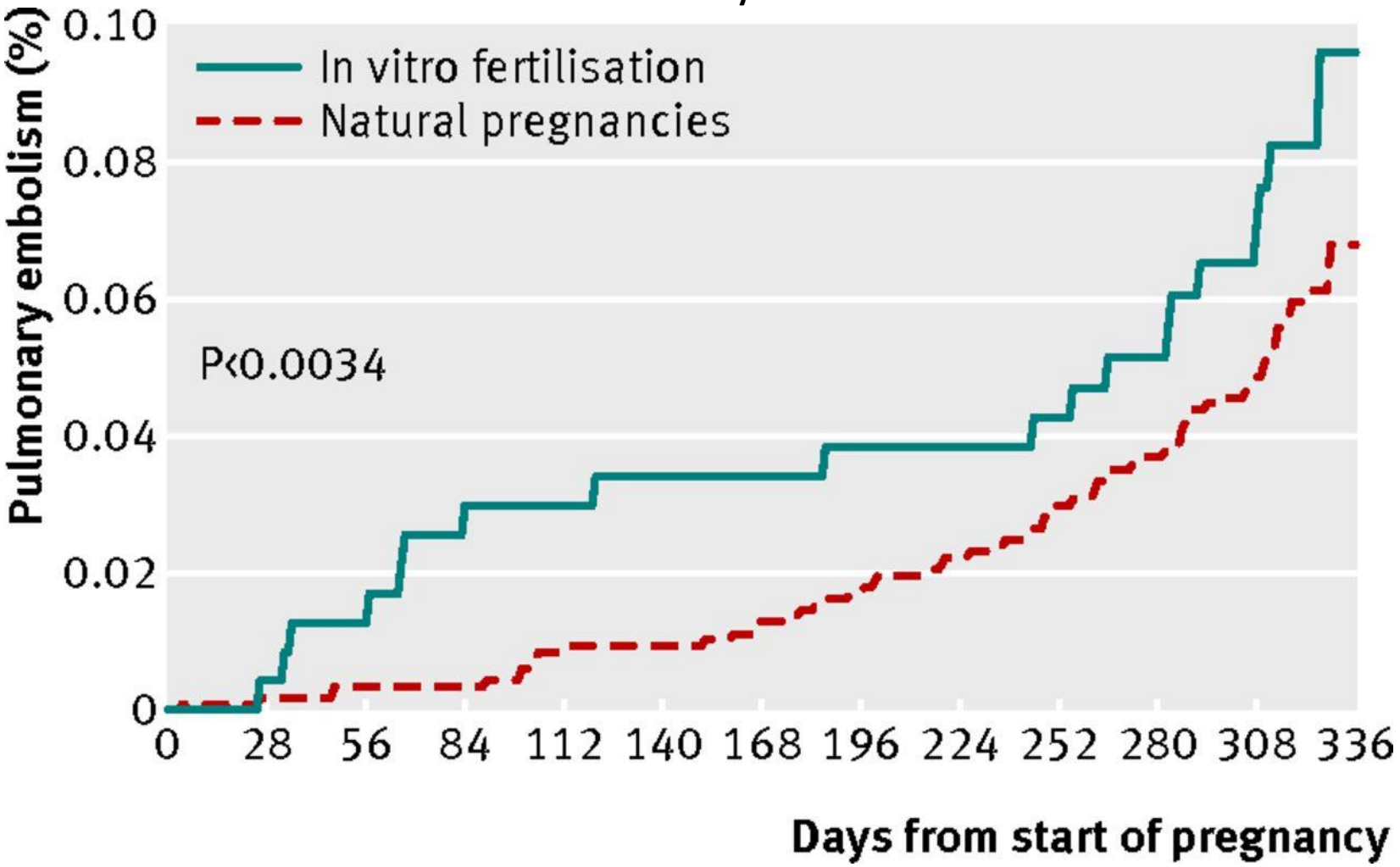
VTE IN PREGNANCIES AFTER ART



Henriksson P et al. BMJ 2013;346:bmj.e8632

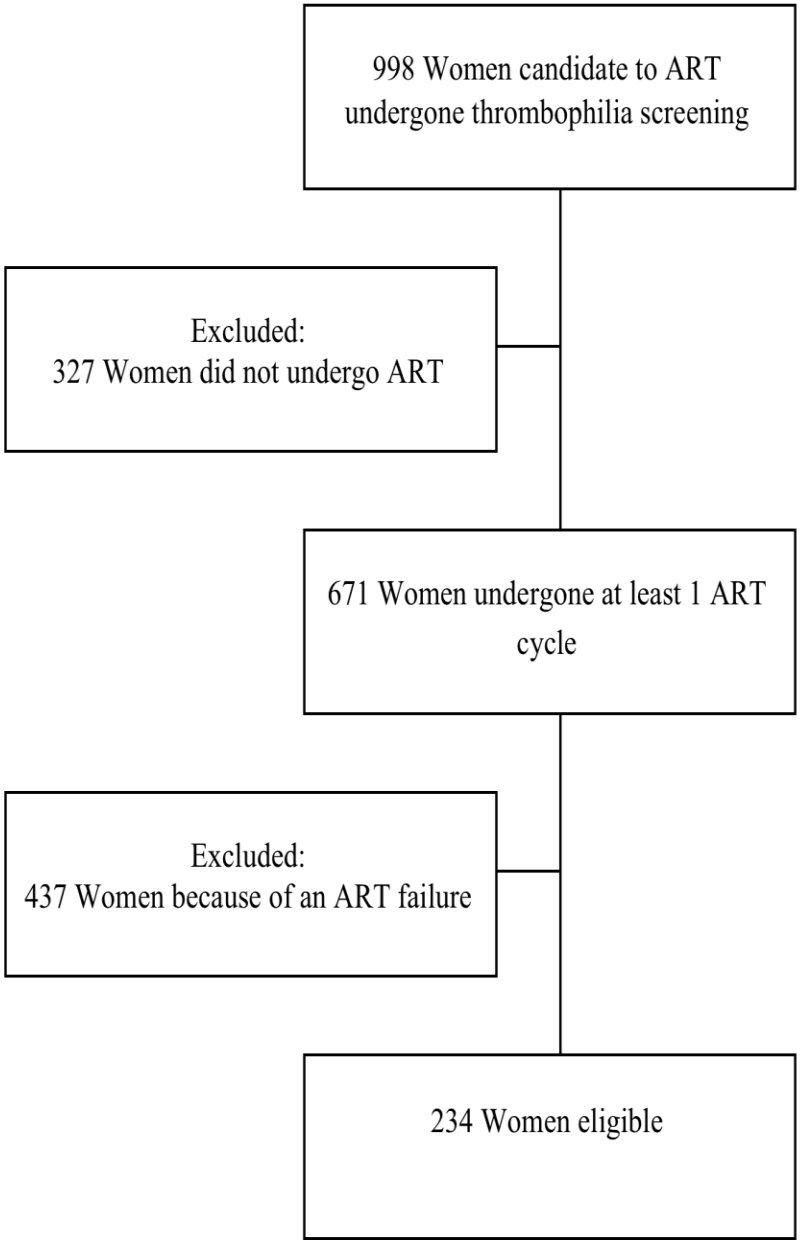
BMJ

Fig 2 Proportional hazard regression of pulmonary embolism in pregnant women after in vitro fertilisation (n=23 498) and in women with natural pregnancies (n=11 960) matched on age and calendar period of delivery.



Henriksson P et al. BMJ 2013;346:bmj.e8632

Figure 1. Study cohort (April 2002 – July 2011)



Villani M, et al, BMJ Open

Age and live births in the reference cohort and general population from the same geographical area

Maternal age yrs	15	20-29	30-39	40	Live births number
Reference cohort (n= 3359), % 2010-2012	3.7	34.4	55.1	6.8	3451
General population from the same geographical area (n= 106265) , % 2008-2010	2.3	32.4	59.5	5.8	107 461

Patients	Age at events	BMI	tHcy	Cycle	Type of event	Thrombophilia OHSS	Antithrombotic prophylaxis
1	31	37.1	n.a.	-	SVT in the left leg	no	none
2	33	18.3	n.a.	-	DVT in the left leg	Previous SVT after Caesarean section	none
3	28	17.3	n.a.	-	DVT in one leg at 37 weeks of pregnancy	FVL heterozygous	LMWH*
4	33	n.a.	n.a.	-	SVT in the right leg	n.a.	n.a.
5	37	n.a.	n.a.	-	Bilateral SVT	n.a.	n.a.
6	43	n.a.	n.a.	-	DVT in the left leg	n.a.	none
7	22	n.a.	n.a.	-	DVT in the left leg	n.a.	n.a.
8	35	n.a.	n.a.	-	Bilateral SVT	n.a.	none
9	36	21.3	n.a.	-	DVT in the left leg at 21 weeks of pregnancy	FVL + PC deficiency Previous DVT	LMWH* (the event occurred during a suspension period)
10	33	18.7	n.a.	-	DVT in the left leg at 11 weeks of pregnancy	FVL heterozygous	n.a.
11	35	n.a.	n.a.	-	SVT in the right leg	n.a.	n.a.

Occurrence of Vein Thromboses in women undergone ART (successful cycles)

Two-tailed Fisher exact test

p: 0.06, OR: 3.9, 95%CI: 0.87-15.3.

After the exclusion of women with previous VTE

p: 0.054; OR: 7.2, 95% CI 0.91 to 45.6.

Patients	Age at events	BMI	tHcy	Cycle	Type of event	Thrombophilia OHSS	Antithrombotic prophylaxis
1	30	22.3	7.23	1	SVT in the left leg at 12 weeks of pregnancy	no	LMWH*
2	38	20.4	6.0	3	PE during twin pregnancy ended with IUFD (22 weeks)	no	none
3	40	35.9	4.76	3	DVT in the right leg at 18 weeks of pregnancy	PTm heterozygous	none

* Started when pregnancy test was positive

Incidence: 8.5/1000 vs 1.8/1000

Villani M., et al, BMJ Open, 2015

VTE during Pregnancy
Treatment

7. Treatment of proven acute VTE during pregnancy

For pregnant women with acute VTE, we recommend therapy with adjusted-dose subcutaneous LMWH over adjusted-dose UFH **(Grade 1B)**.

For pregnant women with acute VTE, we recommend LMWH over vitamin K antagonist treatment antenatally **(Grade 1A)**.

Chest 2012, ACCP Guidelines

7. Treatment of proven acute VTE during pregnancy

For pregnant women with acute VTE, we suggest that anticoagulants should be continued for at **least 6 weeks postpartum (for a minimum total duration of therapy of 3 months)** in comparison with shorter durations of treatment **(Grade 2C).**

For pregnant women receiving adjusted-dose LMWH therapy and where delivery is planned, **we recommend discontinuation of LMWH at least 24 h prior to induction of labor or cesarean section** (or expected time of neuraxial anesthesia) rather than continuing LMWH up until the time of delivery **(Grade 1B)**.

Chest 2012

ANTITHROMBOTIC PRIMARY PROPHYLAXIS DURING PREGNANCY AND PUERPERIUM

PRIMARY PROPHYLAXIS

- No randomized study is so far available; however heparin prophylaxis in preventing first VTE among women carrying inherited thrombophilia is considered fully effective.
- Considering the low absolute risk of VTE during pregnancy among women carrying factor V Leiden or prothrombin G20210A the indication for primary antithrombotic prophylaxis during pregnancy is debated

Appendix I: Obstetric thromboprophylaxis risk assessment and management

Antenatal assessment and management (to be assessed at booking and repeated if admitted)

Any previous VTE except a single event related to major surgery → **HIGH RISK**
Requires antenatal prophylaxis with LMWH
Refer to trust-nominated thrombosis in pregnancy expert/team

- Hospital admission
- Single previous VTE related to major surgery
- High-risk thrombophilia + no VTE
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy, nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU
- Any surgical procedure e.g. appendicectomy
- OHSS (first trimester only)

→ **INTERMEDIATE RISK**
Consider antenatal prophylaxis with LMWH

- Obesity (BMI > 30 kg/m²)
- Age > 35
- Parity ≥ 3
- Smoker
- Gross varicose veins
- Current pre-eclampsia
- Immobility, e.g. paraplegia, PGP
- Family history of unprovoked or estrogen-provoked VTE in first-degree relative
- Low-risk thrombophilia
- Multiple pregnancy
- IVF/ART

→ **Four or more risk factors:** prophylaxis from first trimester
Three risk factors: prophylaxis from 28 weeks

Fewer than three risk factors → **LOWER RISK**
Mobilisation and avoidance of dehydration

Transient risk factors:
Dehydration/hyperemesis; current systemic infection; long-distance travel

APL = antiphospholipid antibodies (lupus anticoagulant, anticardiolipin antibodies, β_2-glycoprotein 1 antibodies); ART = assisted reproductive technology; BMI based on booking weight; DM = diabetes mellitus; FHx = family history; gross varicose veins = symptomatic, above knee or associated with phlebitis/oedema/skin changes; high-risk thrombophilia = antithrombin deficiency, protein C or S deficiency, compound or homozygous for low-risk thrombophilias; IBD = inflammatory bowel disease; immobility = ≥ 3 days; IVDU = intravenous drug user; IVF = in vitro fertilisation; LMWH = low-molecular-weight heparin; long-distance travel = > 4 hours; low-risk thrombophilia = heterozygous for factor V Leiden or prothrombin G20210A mutations; OHSS = ovarian hyperstimulation syndrome; PGP = pelvic girdle pain with reduced mobility; PPH = postpartum haemorrhage; thrombophilia = inherited or acquired; VTE = venous thromboembolism.

Postnatal assessment and management (to be assessed on delivery suite)

- Any previous VTE
- Anyone requiring antenatal LMWH
- High-risk thrombophilia
- Low-risk thrombophilia + FHx

→ **HIGH RISK**
At least 6 weeks' postnatal prophylactic LMWH

- Caesarean section in labour
- BMI ≥ 40 kg/m²
- Readmission or prolonged admission (≥ 3 days) in the puerperium
- Any surgical procedure in the puerperium except immediate repair of the perineum
- Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy; nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU

→ **INTERMEDIATE RISK**
At least 10 days' postnatal prophylactic LMWH
NB If persisting or > 3 risk factors consider extending thromboprophylaxis with LMWH

- Age > 35 years
- Obesity (BMI ≥ 30 kg/m²)
- Parity ≥ 3
- Smoker
- Elective caesarean section
- Family history of VTE
- Low-risk thrombophilia
- Gross varicose veins
- Current systemic infection
- Immobility, e.g. paraplegia, PGP, long-distance travel
- Current pre-eclampsia
- Multiple pregnancy
- Preterm delivery in this pregnancy (< 37+0 weeks)
- Stillbirth in this pregnancy
- Mid-cavity rotational or operative delivery
- Prolonged labour (> 24 hours)
- PPH > 1 litre or blood transfusion

Two or more risk factors → (to Intermediate Risk)

Fewer than two risk factors → **LOWER RISK**
Early mobilisation and avoidance of dehydration

Antenatal and postnatal prophylactic dose of LMWH

Weight < 50 kg = 20 mg enoxaparin/2500 units dalteparin/3500 units tinzaparin daily
Weight 50–90 kg = 40 mg enoxaparin/5000 units dalteparin/4500 units tinzaparin daily
Weight 91–130 kg = 60 mg enoxaparin/7500 units dalteparin/7000 units tinzaparin daily
Weight 131–170 kg = 80 mg enoxaparin/10 000 units dalteparin/9000 units tinzaparin daily
Weight > 170 kg = 0.6 mg/kg/day enoxaparin/ 75 u/kg/day dalteparin/ 75 u/kg/day tinzaparin

Racial and ethnic differences in the risk of postpartum venous thromboembolism: a population-based, case-control study

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J Thromb Haemost 2014; 12: 2002–9.

Table 2 Characteristics of controls, stratified by race/ethnicity

	Non-Hispanic white controls (n = 7243)	Black controls (n = 436)	Asian controls (n = 856)	Hispanic controls (n = 1458)	American Indian or Alaska Native controls (n = 253)
Maternal characteristics					
Age, yrs, mean (SD)	27.8 (5.8)	26.4 (6.3)	29.5 (5.6)	26.0 (6.0)	25.2 (5.8)
Body mass index, kg m^{-2}, mean (SD)	26.1 (6.2)	27.5 (6.6)	24.4 (6.0)	27.5 (6.6)	28.9 (6.7)
Current smoking, n (%)	1153 (17.2)	58 (14.5)	37 (4.6)	54 (3.8)	57 (23.5)
Prepregnancy hypertension, n (%)	75 (1.1)	4 (1.0)	7 (0.9)	4 (0.3)	6 (2.5)
Prepregnancy diabetes, n (%)	28 (0.4)	0 (0)	8 (1.0)	6 (0.4)	4 (1.7)
Education above high school, n (%)	3567 (61.8)	152 (43.3)	501 (68.6)	261 (20.4)	56 (25.6)
Unemployed (including housewife), n (%)	2120 (31.7)	115 (31.8)	268 (36.0)	648 (52.3)	92 (41.3)
Obstetric characteristics					
Parity (before the index pregnancy), median (IQR)	1 (0–2)	1 (0–3)	1 (0–2)	1 (0–2)	2 (0–3)
Gestational diabetes, n (%)	230 (3.4)	20 (5.0)	54 (6.8)	69 (4.9)	14 (5.8)
Gestational hypertension/preeclampsia, n (%)	404 (5.9)	24 (6.0)	28 (3.5)	55 (3.9)	9 (3.8)
Multiple pregnancy, n (%)	116 (1.6)	10 (2.3)	10 (1.2)	15 (1.0)	5 (2.0)
Cesarean section, n (%)	1605 (22.2)	107 (24.5)	225 (26.3)	339 (23.3)	56 (22.1)
Maternal postpartum infection, n (%)	73 (1.0)	6 (1.4)	16 (1.9)	21 (1.4)	4 (1.6)
Postpartum hemorrhage or maternal transfusion, n (%)	229 (3.2)	20 (4.6)	27 (3.2)	64 (4.4)	12 (4.7)
Preterm birth (< 37 wks), n (%)	527 (7.4)	54 (12.5)	78 (9.3)	102 (7.1)	31 (12.4)
Stillbirth, n (%)	36 (0.5)	3 (0.7)	3 (0.3)	7 (0.5)	3 (1.2)
Newborn: small for gestational age, n (%)	339 (4.7)	45 (10.4)	60 (7.1)	71 (4.9)	12 (4.8)
Newborn: large for gestational age, n (%)	767 (10.7)	27 (6.2)	50 (5.9)	121 (8.3)	46 (18.3)

Numbers and percentages may not agree due to missing data.
IQR, interquartile range.

J Thromb Haemost 2014; **12**: 2002–9.

Table 5 Stratum-specific and combined associations of race/ethnicity and cesarean section

	Adjusted OR (95% CI)			
	Stratum-specific associations		Combined associations (among all women)	
Race/ethnicity	Among women with vaginal delivery	Among women with cesarean section	Vaginal delivery	Cesarean section
White	1.0 (ref)	1.0 (ref)	1.0 (ref)	2.69 (2.21–3.29)
Black	1.03 (0.61–1.74)	2.03 (1.34–3.07)	1.03 (0.61–1.74)	5.47 (3.63–8.25)
Asian	0.57 (0.34–0.96)	0.78 (0.50–1.21)	0.57 (0.34–0.96)	2.10 (1.36–3.25)
Hispanic	0.61 (0.40–0.92)	1.03 (0.72–1.46)	0.61 (0.40–0.92)	2.76 (0.77–4.05)
American Indian or Alaska Native	0.98 (0.50–1.93)	0.66 (0.29–1.50)	0.98 (0.50–1.93)	1.77 (0.77–4.04)

Adjusted for birth year (matching factor), maternal age, parity, smoking, preeclampsia, gestational diabetes, preterm delivery, small and large for gestational age newborn, postpartum infection, maternal body mass index, and educational status.
OR, odds ratio; CI, confidence interval.

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www.bjog.org

A comparison
pharmacologic
caesarean deli

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Table 1. Summary of major society guideline recommendations for obstetric thromboprophylaxis for patients who have undergone caesarean delivery

ACOG
Perioperative mechanical thromboprophylaxis recommended for all patients undergoing caesarean delivery
Pharmacologic prophylaxis (LMWH or UFH) recommended for
- High-risk thrombophilias
- Any prior VTE event
- A family history of VTE and a thrombophilia

Chest
Pharmacologic prophylaxis (LMWH) recommended for one major or two or more minor risk factors
Mechanical prophylaxis recommended for those with contraindications to pharmacologic prophylaxis
Major risk factors (one needed for prophylaxis)
Immobility (strict bed rest ≥1 week in the antepartum period)
Postpartum haemorrhage ≥1000 mL with surgery
Previous VTE
Pre-eclampsia with fetal growth restriction
Thrombophilia
- Antithrombin deficiency
- Factor V Leiden (homozygous or heterozygous)
- Prothrombin G20210A (homozygous or heterozygous)

Medical conditions
- Systemic Lupus erythematosus
- Heart disease
- Sickle cell disease

Blood transfusion
Postpartum infection
Minor risk factors (two needed for prophylaxis)
BMI >30 kg/m^2
Multiple pregnancy
Emergency caesarean
Smoking >10 cigarettes/day
Fetal growth restriction
Thrombophilia
- Protein C deficiency
- Protein S deficiency

Pre-eclampsia

RCOG
Risk factors (LMWH recommended for any of the following risk factors)
Previous VTE
Antenatal anticoagulation
Caesarean in labour
Asymptomatic thrombophilia
Prolonged admission
Major medical co-morbidities (e.g. heart or lung disease, systemic Lupus erythematosus, cancer, inflammatory conditions, nephrotic syndrome, sickle cell disease, intravenous drug user
Age >35
BMI >30 kg/m^2
Parity ≥3
Smoker
Any surgical procedure
Gross varicose veins

Under RCOG guidelines, 85.0% of patients would receive post-caesarean pharmacologic prophylaxis (95% CI 80.5–88.6%). In comparison, 1.0% of patients would receive pharmacologic prophylaxis under ACOG guidelines (95% CI 0.3–3.0%) and 34.8% of patients would receive prophylaxis under Chest guidelines (95% CI 29.6–40.4%).

Heparin use according to different GL

Risk factors according to different GL

The most common risk factors for prophylaxis using RCOG criteria were caesarean during labour, maternal age ≥35, and obesity. Other risk factors included pre-eclampsia, infection, and high parity. Leading indications for prophylaxis based on Chest guidelines included emergency caesarean, pre-eclampsia, obesity, multiple gestation, and postpartum haemorrhage. Prophylaxis based on ACOG recommendations resulted in three women receiving prophylaxis, all on the basis of having a prior event.

Palmerola KL et al, BJOG 2015

Table 3. Other international guidelines for post-caesarean pharmacologic prophylaxis

Queensland, Australia	Swedish guidelines

and prolonged repair

Conclusion

Our findings highlight a major concern regarding strategies to reduce obstetric thromboembolism: what is the optimal management for postpartum patients at increased risk for an event? Current recommendations diverge significantly, with the ACOG recommending pharmacologic prophylaxis for a small minority of patients, and the RCOG recommending treatment for a large majority of patients. Research on obstetric VTE is challenging because of relatively low incidence, but VTE is one of the leading causes of maternal morbidity and severe morbidity, and there is an urgent clinical need to clarify optimal prophylaxis regimens.

Palmerola KL et al, BJOG 2015

Table 1:

Risk factor	Venous thromboembolism	Score
Personal history of VTE	History of VTE related to pregnancy (occurred during the antepartum), or cerebral vein thrombosis or massive PE or VTE in childhood (<16 y.o.)	6
	Spontaneous or estrogen-induced PE or proximal DVT	3
	Transient risk factor-induced PE or proximal DVT	2
	Spontaneous or estrogen-induced distal calf DVT	2
	Transient risk factor induced distal calf DVT	1
If there is a personal history of VTE	Recurrent VTE history	3
	Residual venous thrombi with clinical signs of post-thrombotic syndrome	3
	Recent VTE history < 2 years	2
Thrombophilia	Homozygous mutations, combined thrombophilia risk factors	3
	Protein C deficiency, protein S deficiency, heterozygous F5 G1691A mutation, heterozygous F2 G20210A mutation	1
	If no hypercoagulability detected, family history of severe or recurrent VTE	1
Other risk factors	Bedrest, immobilisation	2
	Twin pregnancy	1
	Age > 35 years	1
	Body mass index > 30 kg/m^2	1
Total score =		
No. antenatal prophylaxis if score < 3. Early heparin prophylaxis in patients with a score ≥ 6. LMWH was prescribed only in the third trimester to patients with a score between 3 and 5.		
VTE, venous thromboembolism; CVT, Cerebral venous thrombosis; PE, pulmonary embolism; DVT, deep vein thrombosis.		

Dargaud Y, JTH 2017

Lyon–VTE score based strategy for LMWH prophylaxis	Score < 3: No LMWH ante-partum; LMWH postpartum	Score 3–5: LMWH during 3rd trimester; LMWH postpartum	Score ≥ 6: Early LMWH during antepartum; LMWH postpartum
Number of patients, n = 445 Number of pregnancies, n = 542	158	153	134
Personal history of VTE	36 (22.7%)	141 (92%)	134 (100%)
Thrombophilia	125 (79.1%)	102 (66.7%)	55 (41%)
Prophylaxis with LMWH by score	139 (=158 -19)	172 (=153 +19)	134
VTE occurred during antepartum	1	0	1
VTE occurred during postpartum	0	3	1
Bleeding complications	2	0	0

Strategy to reduce risk of VTE in pregnancy

- **Identifying & modifying risk factors in women planning to embark on pregnancy –**
- To reduce BMI below 30kg/m2
- Stop smoking
- History of VTE
- Optimizing chronic medical illnesses
- **Improve awareness: e.g. Making patient information leaflets/brochures available**

“Risk scoring of antenatal and postnatal women for VTE is probably the most effective way of identifying who is at significant risk and needed intervention or treatment with thromboprophylaxis”

An Expert is someone who made all possible mistakes in a very narrow field

Niels Bohr