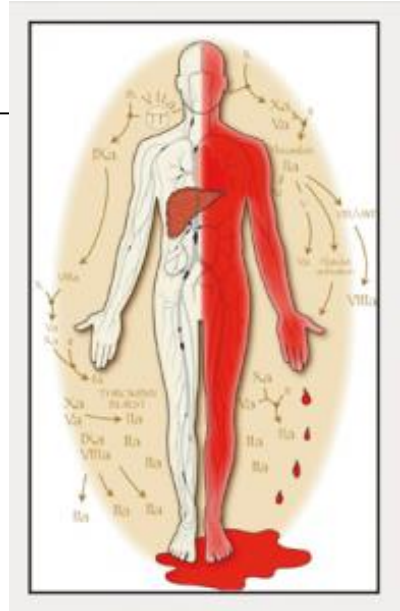
Neuraxial anesthesia in parturient with ***Suspected*** *coagulopathy*



Prof. Alexander Ioscovich

Chair of the Department of Obstetric and Ambulatory Anesthesia,

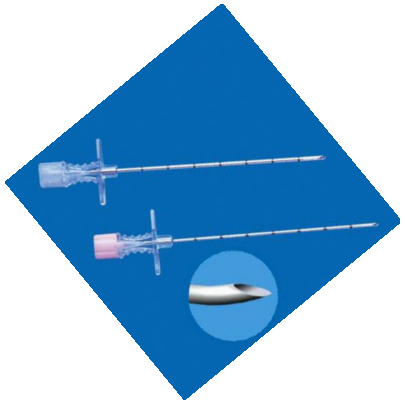
Shaare Zedek Medical Center, Hebrew University, Jerusalem

Past Chairman, Israel Association of Obstetric Anesthesia

The Hebrew University of Jerusalem • האוניברסיטה העברית בירושלים

Est. 1925

Shaare Zedek Medical Center , Jerusalem

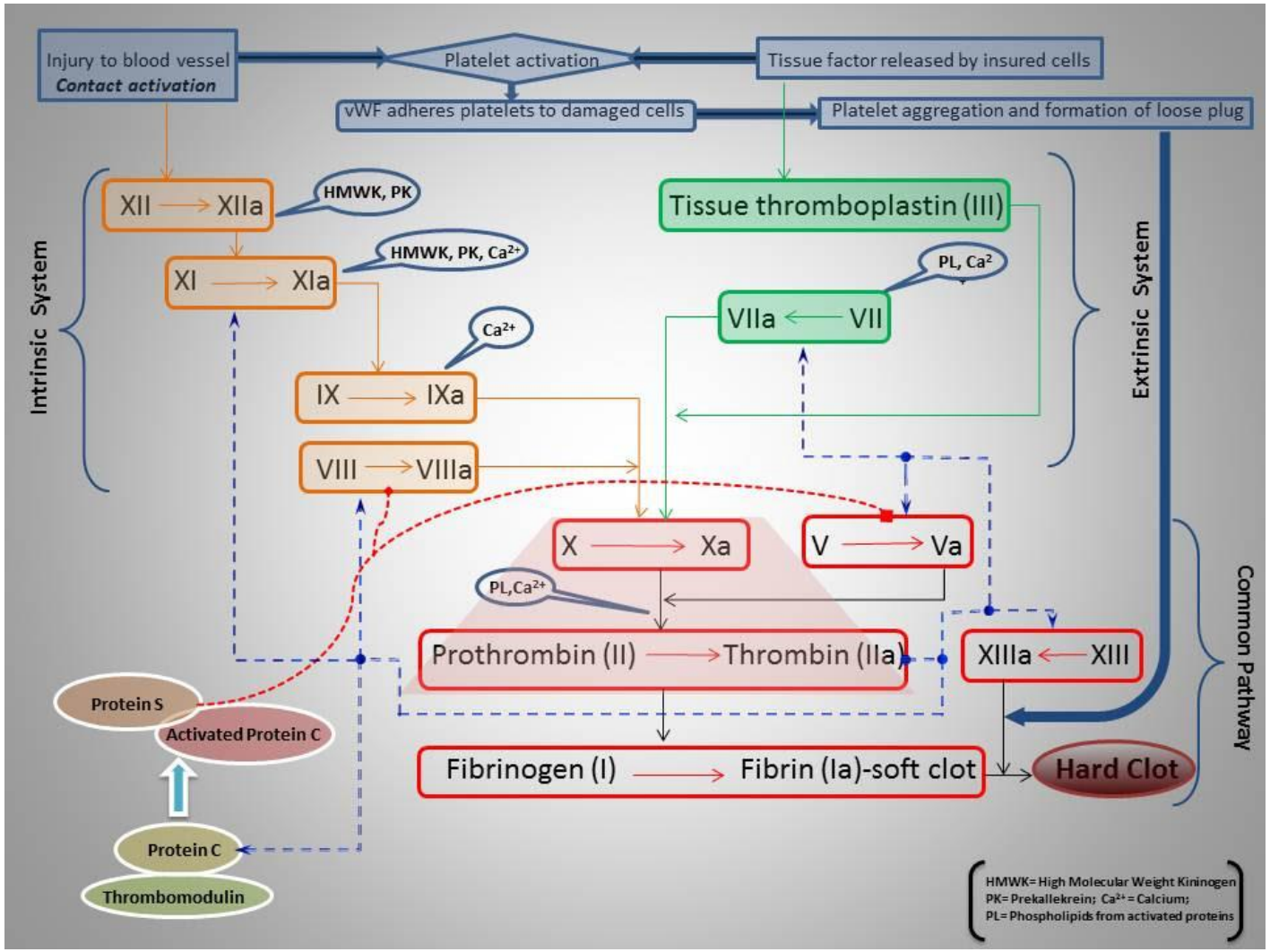


Shaare Zedek Medical Center, Jerusalem

16.000 + 6.000
labors annually
53-56% epidural analgesia
12% of caesarean sections
~15.500 cases of
“OB-anesthesia activity”

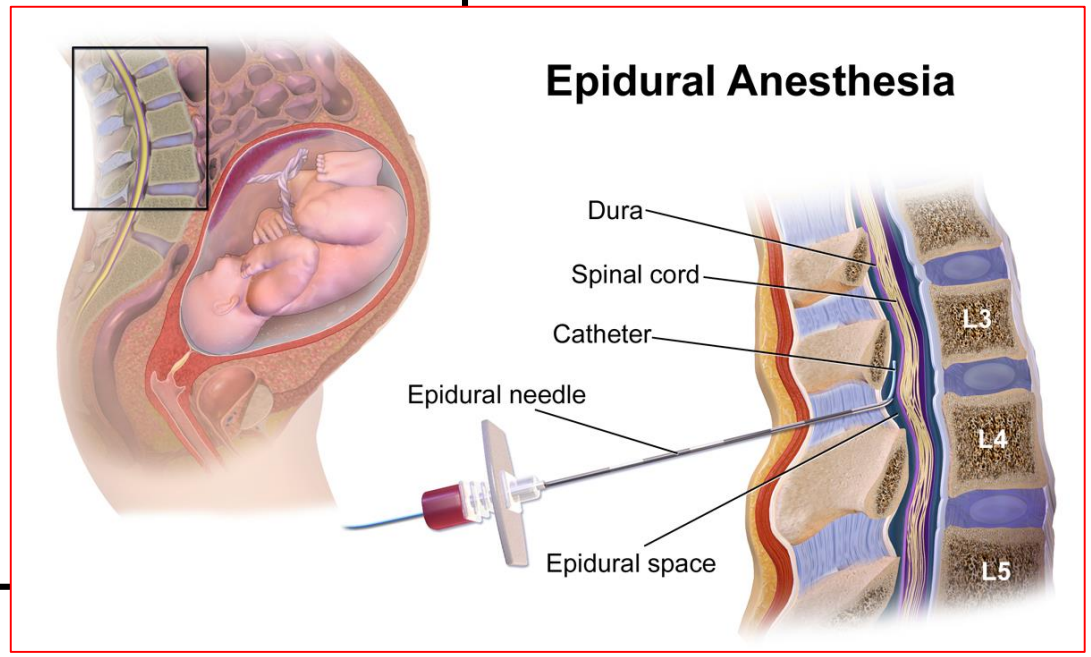
"Simple scheme"

Extrinsic, Intrinsic system and Common pathway of coagulation



Congenital or chronic or iatrogenic coagulopathy problems and neuraxial anesthesia

- ***Thrombocytopenia/Thrombocytostenia***
- ***Common factor deficiency disorders***
- ***Rarer factor deficiency disorders***
- ***Anticoagulants***



Thrombocytopenia

7-10% with PLT < 150.000 or 3-5% with PLT < 100.000

Gestation thrombocytopenia ~ 80% of all cases with peripartum thrombocytopenia (PLT > $70x10^9$)

- No history of previous thrombocytopenia
- Normal platelet count in early pregnancy
- **No evidence of pre-eclampsia**
- **Exclusion of other disorders**

These patients are not at increased risk of hemorrhage, and there is no contraindication to neuraxial anesthesia.

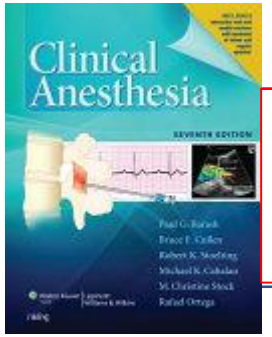
Beilin Y. Anesth Analg 1997 *Sainio S. Acta OG Scand 2000*

Gestation Thrombocytopenia

A Canadian survey reported that **16.2%** **of university-based anaesthetists** would place an epidural if the **platelet count**

was >50.000 another wise healthy parturient.

Obstetric anesthesia practice in Canada. Can J Anaesth ***2000***



7th ed
Barash
2013

Regional anesthesia is safe with PLT >50.000

In Israel > 80.000 or >70.000 is a "safe level" of PLT for neuraxial anesthesia.

??? **The risk of epidural hematoma in patients with PLT 50-70-80.000**

Spinal cord injury in 1990-2000 UK

73 claims related to Spinal Cord injury

The risk of spinal haematoma following neuraxial anaesthesia or lumbar puncture in thrombocytopenic individuals

Joost J. van Veen,[1] Timothy J. Nokes[2] and Mike Makris[1,3]

[1]Sheffield Haemophilia and Thrombosis Centre, Royal Hallamshire Hospital, Sheffield, [2]Plymouth Hospitals NHS Trust, Plymouth, and [3]Department of Cardiovascular Science, University of Sheffield, Sheffield, UK

50 were related to RA

2 ?

9 Direct Spinal cord injury

4 Thoracic Epidural

35 Lumbar epidural

16 as a result of Hematoma

14 for chronic pain

13 In present of systemic anticoagulation

No obstetric patients

■ PAIN AND REGIONAL ANESTHESIA

Anesthesiology 2004; 101:950–9

Severe Neurological Complications after Central Neuraxial Blockades in Sweden 1990–1999

Vibeke Moen, M.D., Nils Dahlgren, M.D., Ph.D.,† Lars Irestedt, M.D., Ph.D.‡*

Table 1. Cases and Sources of Information

Type of Complications	Number of Cases First Survey	Number of Cases in Present Study: Second Survey	Number of Cases in Present Study: Administrative Files	Number of Cases in Present Study: Total Number of Complications
Spinal hematoma	32	25	8	33
Cauda equina syndrome	22	5	27	32
Purulent meningitis	28	18	11	29
Epidural abscess	25	7	6	13
Miscellaneous	10	9	11	20
Total	117	64	63	

33 cases of spinal hematoma

Total 127 cases

2 Obstetric patients with HELLP s-m and Epidural analgesia

Estimated risk of spinal/epidural hematoma 1:200.000

- 119 patients with HELLP s-m PLT 19-143.000
- 58 Epidural and 4 Spinal
- There were no neurologic complications or bleeding in the epidural space.

Anesthesia in pregnant women with HELLP syndrome. Int J Gynaecol Obstet. .

Vigil-De Gracia P[1], Silva S, Montufar C, Carrol I, De Los Rios S.

"The drop in trends of platelet count predisposes them at the risk epidural hematoma with neuraxial anesthetic technique."

No evidence!!!

The anesthetic technique may be decided at the discretion of anesthesiologist, urgency of CS delivery in parturients with the platelet count between 60,000* and 90,000/mm^3.

Khellaf M Thrombocytopenia and pregnancy. Rev Med Interne. 2012;33:446–52.

Table I. Case series of regional anaesthesia in thrombocytopenic patients.

Reference and study design	Patient group	Platelet count and number of patients	Complications (%)	Comments on risk factors	Conclusion
(Rasmus *et al*, 1989) Retrospective review of 2929 parturients with epidural anaesthesia	Adult delivery	14 epidurals Platelet count 15–99 × 10^9/l	0	2 patients with severe pre-eclampsia, 1 with amnionitis and 1 with streptococcal sepsis	Regional anaesthesia at platelet counts <100 × 10^9/l may be safe but individual risk benefit assessment should made
(Beilin *et al*, 1997) Retrospective review of: a) epidurals during delivery b) patients becoming thrombocytopenic after epidural	Adult delivery	a) 30 epidurals with platelet count 69–98 × 10^9/l b) 22 epidurals with subsequent platelet count 58–99 × 10^9/l	0	Excluded patients with falling platelet counts and bleeding	Regional anaesthesia should not necessarily be withheld when the platelet count is <100 × 10^9/l
(Rolbin *et al*, 1988) Retrospective review 2204 healthy random selected parturients. 104 thrombocytopenic, 61 with epidural, 3 with platelet count <100 × 10^9/l	Adult delivery	61 epidurals with a platelet count <150 × 10^9/l, 2 with a platelet count 50–74 × 10^9/l and 1 with a count 75–99 × 10^9/l	0	Excluded patients with conditions associated with thrombocytopenia	Epidural anaesthesia is safe if the platelet count exceeds 100 × 10^9/l in otherwise healthy women and the platelet counts is not falling and there are no associated coagulopathies or platelet dysfunction
(Sharma *et al*, 1999) Prospective study of the use of TEG during labour: a) 52 healthy women b) 254 with preeclampsia, 38 with platelets <100 × 10^9/l	Adult delivery	27 epidurals in patients with preeclampsia and platelet count <100 × 10^9/l	0	Patients with abnormal TEG were excluded from epidural	TEG may be used to assess haemostasis in pre-edamptic women
(Frenk *et al*, 2005) Retrospective chart review of 177 patients with platelet count <100 × 10^9/l 170 received regional anaesthesia Included patients with gestational thrombocytopenia, preedampsia and ITP	Adult delivery	153 regional anaesthesia with platelet count 70–100 × 10^9/l 11 regional anaesthesia with platelet count 60–70 × 10^9/l 6 regional anaesthesia with platelet count 50–60 × 10^9/l Patients with a platelet count >60 × 10^9/l had predominantly epidural anaesthesia	0	Patients with a platelet count >60 × 10^9/l had predominantly epidural anaesthesia Upper limit of 95% CI for complications 1·8%	Need to evaluate the risk-benefit ratio on a case-by-case basis before administering regional anaesthesia to parturients
(Webert *et al*, 2003) Retrospective review of 119 deliveries in patients with ITP, 42 with epidural	Adult delivery	8 epidurals with platelet count >150 × 10^9/l 8 epidurals with platelet count 101–150 × 10^9/l 19 epidurals with platelet count 76–100 × 10^9/l 6 epidurals with platelet count 50–75 × 10^9/l 1 epidural with platelet count <50 × 10^9/l	0	Not discussed	No specific comments related to regional anaesthesia

TEG may be used to assess hemostasis in thrombocytopenic woman

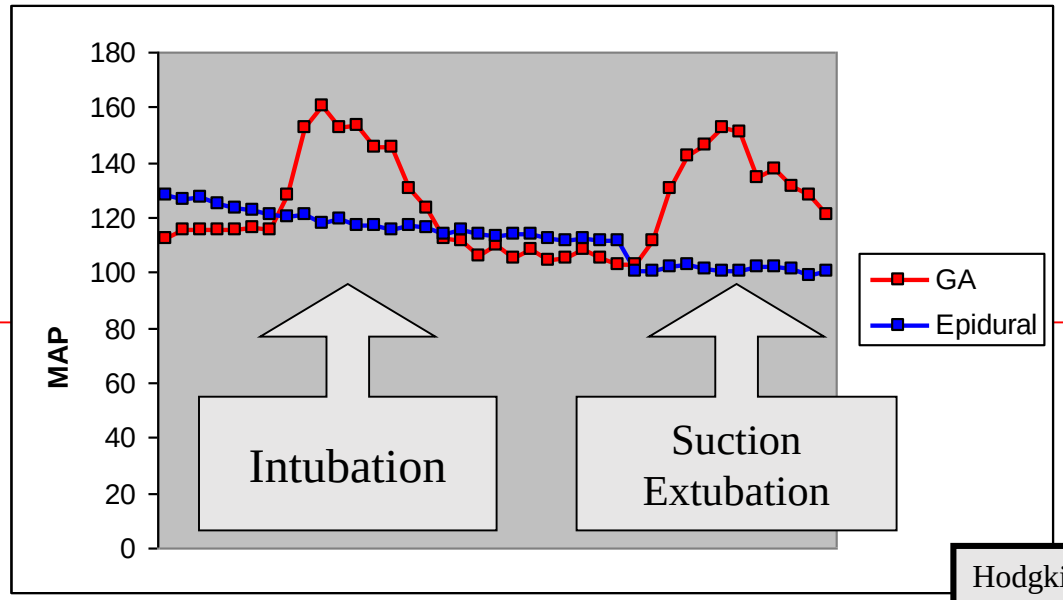
Need to evaluate the risk-benefit ratio on a case-by-case basis before administration regional anesthesia for patient with significant thrombocytopenia

Regional anesthesia in patients with preeclampsia with preeclampsia and low PLT

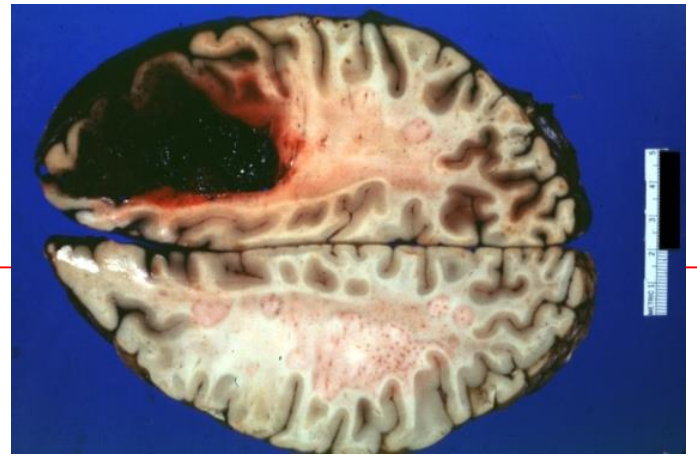
- ***GA*** may cause exaggerated cardiovascular response to intubation leading to
  - Cerebral hemorrhage and edema
  - Cardiovascular decompensation and pulmonary edema

Lawes EG Br J Anaesth. Loughran PG Br J Obstet Gynaecol.

- The administration of ***RA*** not only avoids the maternal complications with GA like difficult intubation, vasopressor response to intubation, but also improves uteroplacental blood flow and neonatal outcome.

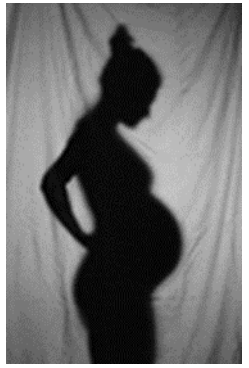


Hodgkinson et al: Can J of Anesthesia

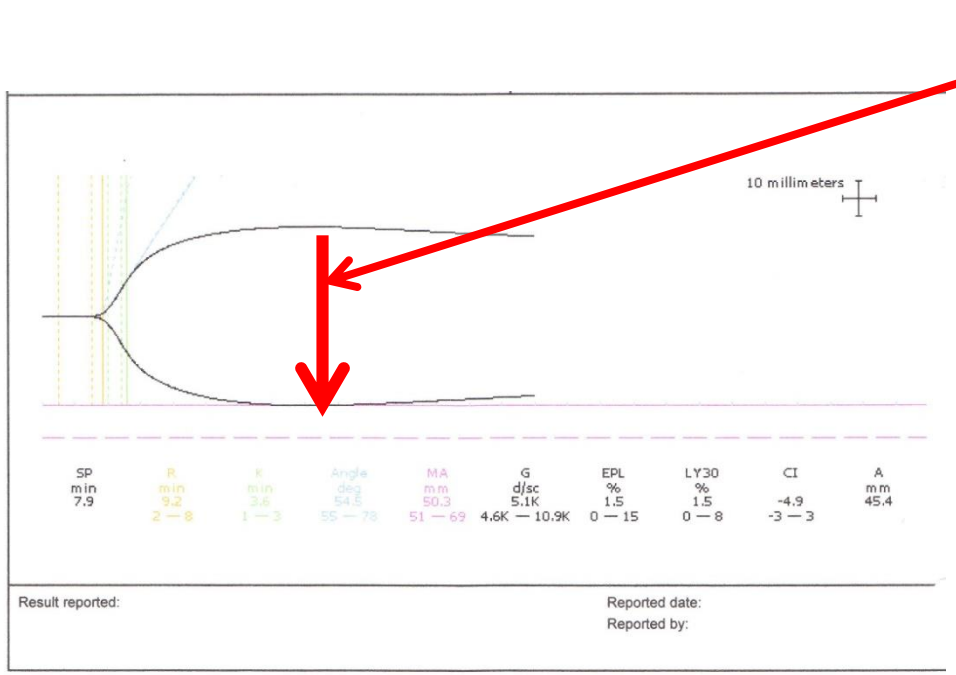


Patient with preeclampsia and very low PLT number for CS 20-30-40.000/mL

- This patient needs PLT transfusion for surgical hemostasis
- This patient is in a risk group for intracranial hemorrhage at the time of intubation and extubation
- Give 6-10uPLT immediately before operation
- Perform one shot spinal with atraumatic tiny needle 26-27G immediately after PLT transfusion
- No case reports about spinal or epidural hematoma after the use of this atraumatic tiny needle



➢**Tromboelastography** (TEG) **Maximal Amplitude (MA) for PLT function**



Sample data:		Units:		Normal values:
SP:	7.9	min		
R:	9.2	min	<high>	(2 — 8)
K:	3.6	min	<high>	(1 — 3)
Angle:	54.5	deg	<low>	(55 — 78)
MA:	50.3	mm	<low>	(51 — 69)
G:	5.1K	d/sc		(4.6K — 10.9K)
EPL:	1.5	%		(0 — 15)
LY30:	1.5	%		(0 — 8)
CI:	-4.9		<low>	(-3 — 3)
A:	45.4	mm		

TEG for parturients with thrombocytopenia

Neuraxial techniques in parturients can be performed with PLT >56.000 and a normal TEG results

Utility of Thromboelastography During Neuraxial Blockade in the Parturient With Thrombocytopenia

Jeffrey Huang, MD
Nicholas McKenna, BA
Noah Babins, MD

2014

AANA Journal ▪ April 2014 ▪ Vol. 82, No. 2

TEG may be a better tool to evaluate coagulation in the parturient with thrombocytopenia.

Evaluation of the platelet function analyzer (PFA-100®) vs. the thromboelastogram (TEG) in the parturient

Y. Beilin, I. Arnold, S. Hossain

International Journal of Obstetric Anesthesia (2006) 15, 7–12

2006

TEG cannot be recommended in this specific setting

Should a normal thromboelastogram allow us to perform a neuraxial block? A strong word of warning

Charles Marc Samama MD PhD

2003

- **Prospective study (3-y period)**
- **Patients with PLT count <100.000**
- **TEG before a neuraxial anesthesia/analgesia**

This case series suggests that neuraxial techniques in parturients can be performed with a platelet count greater than 56,000 mm³ and a normal TEG result.

Utility of thromboelastography during neuraxial blockade in the parturient with thrombocytopenia. AANA J. **2014** Apr;82(2):127-30.

TEG may be used as an additional index whilst making a decision regarding the performance of regional anesthesia in obstetrics. The safety of regional anesthesia does not differ in patients with a number of thrombocytes above 60,000 and normal TEG, fibrinogen and PT results, regardless of the etiology of thrombocytopenia.

(Ioscovich @ Einav TEG for 105 thrombocytopenic parturients. Unpublished data)

SZMC

ITP - Idiopathic thrombocytopenic purpura

- *Patient with a **history of ITP***
- ***First presentation** in pregnancy as a most common reason for isolated thrombocytopenia **in the first trimester***
- ***Autoimmune disorder** - production of **anti-platelet immunoglobulin (IgG)**, **is not always present (recognized)**, making the diagnosis problematic*
- *Despite low platelet numbers, **hemostasis is often normal***
- ***PLT ~ 50-75.000 (?) → TEG***

Thornton P. Coagulation in pregnancy

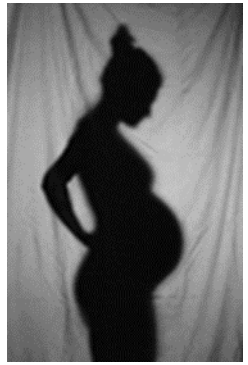
Best Practice & Research Clinical Obstetrics and Gynaecology 2010

ITP - Idiopathic thrombocytopenic purpira

- ***Administered corticosteroids prednisone 1 gm/kg/d or intravenous gammaglobulin (IVIgg), over 2-3 days, will raise the platelet count in approximately 75%-100% of ITP patients and the platelet count will remain elevated for 3–6 weeks***
  - *There are no trials comparing IVIg to corticosteroids for effect*

- ***Administration of IVIg and/or corticosteroids usually will raise the platelet count to enable neuraxial anesthesia***

Coagulation in pregnancy Thornton P. Best Practice & Research Clinical Obstetrics and Gynaecology 2010

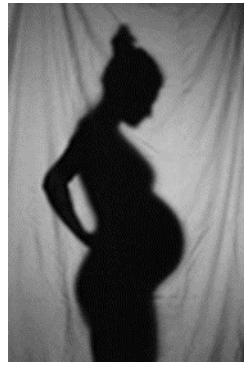


The British Committee for Standards in Haematology guidelines recommend a platelet count of $80x10^9$ for epidural anaesthesia.

80.000 → **50.000**

"However, many anaesthetists would do a neuraxial block (especially spinal anaesthesia) in asymptomatic ITP patients with platelet counts > $50x10^9$ "

Guidelines for the investigation and management of idiopathic thrombocytopenic purpura in adults, children and in pregnancy. Br J Haematol 2003



Neuraxial Anesthesia in Parturients with Thrombocytopenia: A Multisite Retrospective Cohort Study

Christopher G. Goodier, MD,* Jeffrey T. Lu, MD,† Latha Hebbar, MD, FRCA,‡ B. Scott Segal, MD, MHCM,§ and Laura Goetzl, MD, MPH‖

www.anesthesia-analgesia.org

October 2015 • Volume 121 • Number 4

RESULTS: No cases of spinal hematoma were observed in 102 thrombocytopenic parturients receiving epidural analgesia or 71 receiving spinal anesthesia. Including data from the previous published series (total *n* = 499), the exact binomial 95% confidence interval for the risk of spinal-epidural hematoma was 0% to 0.6%. Given the small number of patients at each specific platelet count, the theoretical risks at individual platelet count strata are presented.

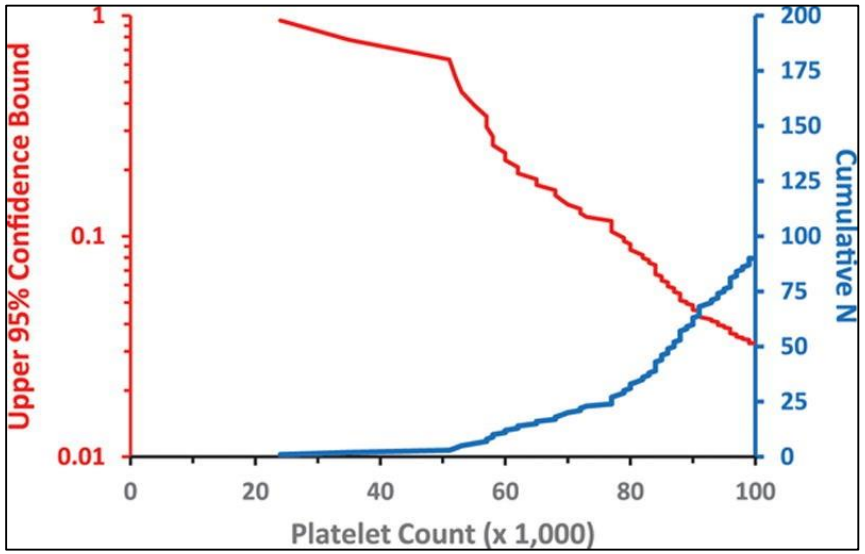


Figure 1. Estimated risk of neuraxial hematoma with spinal anesthesia.

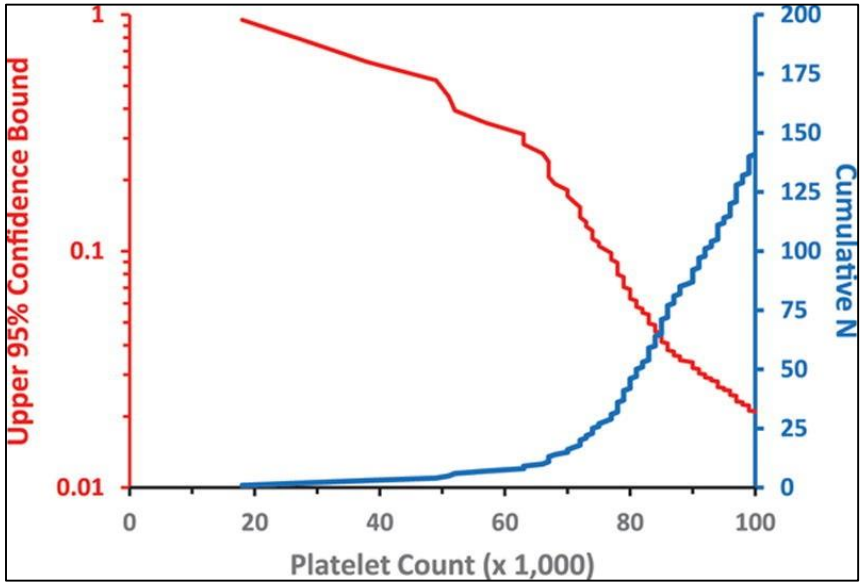


Figure 2. Estimated risk of neuraxial hematoma with epidural (including combined spinal-epidural) anesthesia.

Peripartum Thrombocytopenia in Shaare Zedek Medical Center

- ***10,369 obstetric cases 166 cases of thrombocytopenic patient***

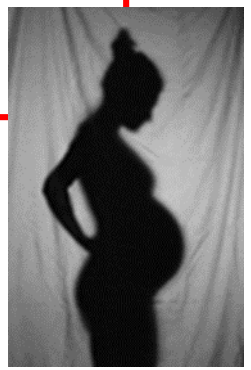
  Bernstein K @ Ioscovich A ***Retrospective audit*** *of outcome of regional anesthesia for delivery in women with thrombocytopenia.* J Perinat Med 2008

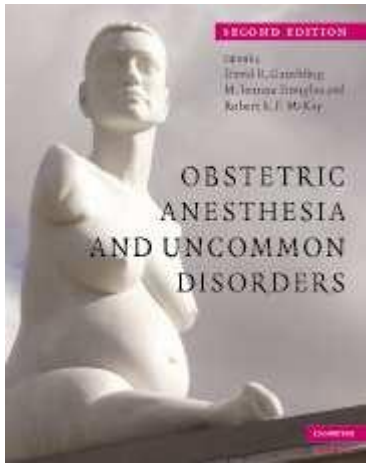
- ***168 patient with PLT < 80.000 with 2 control age/parity matched group 80-150.000 and >150.000***

  Dikman D @ Ioscovich A. Effect of thrombocytopenia on mode of analgesia/anesthesia and maternal and neonatal outcomes. J Matern Fetal Neonatal Med 2014

No peripartum anesthetic complication even in parturients with severe gestation thrombocytopenia or ITP.

TromboElastoGram in this situation !!!





Thrombocytostenia or Abnormal platelet's aggregation

- **Normal/low PLT** number with **abnormal PLT *function **
- **Up to 22% of patients with glycogen storage diseases had abnormal platelet aggregation. (Gaucher diseases, Fabry diseases or other)**

Am J Hematol. 1999 Jun;61(2):103-6.
Platelet function abnormalities in Gaucher disease patients.
Gillis S, Hyam E, Abrahamov A, Elstein D, Zimran A.

Anesthesia for obstetric patients with Gaucher disease: survey and review
A. Ioscovich, S. Halpern, D. Elstein

Thromboelastography as a Surrogate Marker of Perisurgical Hemostasis in Gaucher Disease
Ioscovich A et al Clin Appl Thromb Hemost. 2016

Neuraxial anaesthesia for parturient with coagulation factor deficiency

- *36y old 36w gestation*
- *Factor XI deficiency 4%*
- *4 previous VD with 2 PPH*
- *Letter from haematological consultant:*

  "Give 2 FFP and perform epidural!"

Haematological consultation

No!

?

Letter from USA

Dear Friends,

I have a clinical question, because, perhaps you have more experience with this than we do.

FXI deficiency is more common in Ashkenazi Jews, therefore I wonder if you see it more frequently.

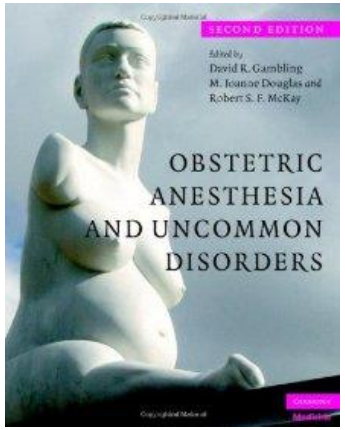
In any case, we have patient,…her factor level was 21%. Her hematologist told her we could give her a couple of units of FFP, check the factor level, and then proceed with an epidural (for routine labor analgesia). We all refused…

……

Professor and Vice Chair

Department of Anesthesiology

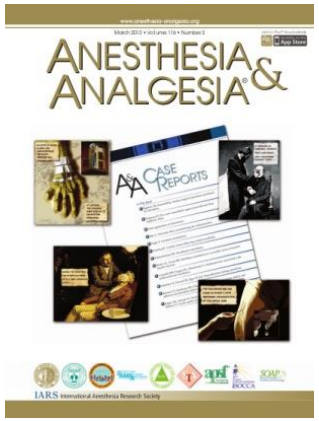
David R. Gambling
M. Joanne Douglas



Neuraxial anesthesia is contraindicated in women with FXI deficiency unless factor XI concentrate has been given with an adequate response.

Factor XI level normally decrease during pregnancy. At term FXI level is 62% of nonpregnant level.

Factor XI deficiency



Brief Report

(Anesth Analg 2009;108:1882–5)

Factor XI Deficiency and Obstetrical Anesthesia

Our series of 13 patients with FXI deficiency suggests that it may be safe to administer neuraxial anesthesia to this patient population, especially if factor replacement is performed. Diagnosis of FXI

Table 1. Anesthetic and Coagulation Data

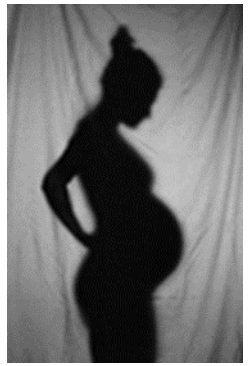
Patient	Jewish	Details of diagnosis	Gravity/ parity	Factor XI level (%)[a]	aPTT(s)[b]	FFP (units)	aPTT(s)[c]	Anesthesia	Delivery	Complication
1	Unknown	Bleeding during surgery	G1P0	47	30.1	1	Not done	Epidural	NVD	None
2	No	Dental extraction bleed	G1P0	30	38.7	1	32.4	Epidural	NVD	None
3	Unknown	Family history	G4P0	19	29.4	None	Not done	Epidural	NVD	None
4	Yes	Family history	G1P0	49	36.7	2	34	Spinal	Cesarean, twins	PPH: retained products
5	Yes	Slight bleed with rhinoplasty	G1P0	30	36	2	32.8	Epidural	NVD	None
6	Yes	Easy bruising	G3P0	56	32	None	Not done	GA	Cesarean	None
7	Yes	Tonsillectomy bleed	G2P0	1	56	4	33.8	GA	Cesarean	Hives and wheezing with FFP
8	Yes	Family history	G2P1	49	Not done	None	32.2	CSE	NVD	None
9	Yes	Post ovarian cystectomy bleed	G1P0	1	57.7	1	34.3	Pudendal	NVD	None
10	Yes	Family history	G2P1	38	33.2	None	29.4	Epidural	NVD	Vulvar artery bleed, postpartum day 1
11	Yes	Routine screen as participant in a research study	G1P0	5	46.2	3	Not done	Epidural	NVD	None
12	Yes	Family history	G1P0	38	25.7	None	Not done	Epidural	NVD	None
13	Yes	Family history	G3P1	4	50.9	4	35.8	GA	Cesarean	None

aPTT = activated partial thromboplastin time; FFP = fresh frozen plasma; NVD = normal vaginal delivery; GA = general anesthesia; PPH = postpartum hemorrhage; CSE = combined spinal-epidural.

[a] Normal reference range is 50%–150% activity, all factor levels were determined in the 3rd trimester of pregnancy.

[b] aPTT before transfusion of FFP.

[c] aPTT after FFP transfusion, if done; normal reference range for PTT: 23–36 s.



91 pregnancy in 74 women with Factor XI deficiency

J Perinat Med. 2014 May;42(3):295-300. doi: 10.1515/jpm-2013-0144.

Peripartum anesthetic management of patients with Factor XI deficiency.

Reuveni A, Orbach-Zinger S, Eidelman LA, Ginosar Y, Ioscovich A.

Abstract

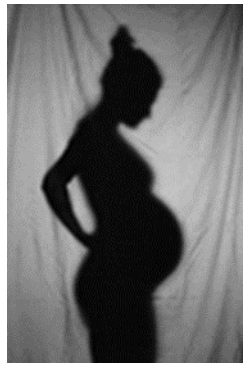
INTRODUCTION: Factor XI deficiency is predominantly found in the Ashkenazi Jewish population with a prevalence of 9%, but also seen in other ethnicities. Little information is available on obstetric anesthesia management in women with Factor XI deficiency. Therefore, we undertook a study to evaluate obstetric, anesthetic and perinatal outcomes in parturients with Factor XI deficiency.

METHODS: A retrospective study was conducted with chart reviews from 1996 to 2011 resulted in 74 women with Factor XI level deficiency. We compared anesthetic and obstetric management in parturients with low (≤30%) level of Factor XI to those with higher levels.

RESULTS: Ninety-one pregnancy outcomes were reviewed in these 74 women with Factor XI deficiency. Forty-three women had levels ≤30% in 46 labors while 31 women had levels >30% in 45 labors. Women with low levels of Factor XI were significantly more likely to receive FFP and less likely to receive neuroaxial anesthesia. There were no anesthetic complications and no difference in mode of delivery or neonatal outcomes.

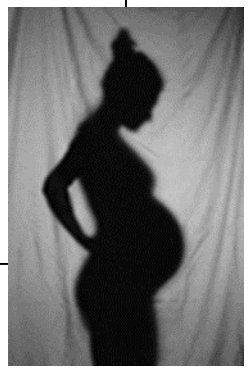
DISCUSSION: This study is the first step in building a national database for anesthetic cases and outcomes of parturients with Factor XI deficiency. Further efforts must be made to provide safe analgesia for these women.

	74 women with 91 labors (100%)	43 women Fact 11 ≤ 30% 46 labors (50.5%)	31 women Factor 11 > 30% 45 labors (45.5%)	P value
Age at time of labor	29.5±5.2 (19-46)	29 ±5.3 (19-46)	30±4.2 (23-40)	0.39
Gravity	3.4±2.6 (1-14)			0.38
History of PPH	14 (15.3%)	9 (19.5%)	5 (11.1%)	0.27
Level of Factor 11 (the last one before labor)	29±20 (1-86)%	12±10 (1-30) %	47±20 (30-86) %	<0.00001
PT (INR)	0.99±0.12 (0.79-1.35)	0.99±0.14 (0.82-1.35)	1.02±0.05 (0.79-1.24)	0.74
PTT (sec)	1.02±0.05 (0.83-1.24)	45±11 (27-79)	34.2±4.8 (28-48)	0.01
PLT (X1000)	213±52 (96-418)	204±50 (105-300)	227±56 (96-418)	0.1
Regional Anesthesia for CS	6 (6.5%)	0	6 (13.3%) (4 Spinal 2 Epidural)	0.012
Regional anesthesia for labor	23 (25.3%)	6 (13%)	17 (37.8%)	0.012
PPH	6 (6.5%)	3 (6.5%)	3 (6.5%)	0.98
FFP before labor or CS	13(14.2%)	9 (19.5%)(total 20U)	4(8.8%) (total 8U)	<0.0001
FFP after labor or CS	14(15.4%)	12 (26%) (total 42U)	2 (4.4%) (total 4U)	0.01
Treated with FFP throughout labor	27 (29.6%)	21 (45.5%)	6 (13.2%)	<0.0001



Our recommendation

- ***Recognized level of FXI close to labor***
- ***Don't use FFP routinely for patient with FXI deficiency***
- ***Regional anesthesia for patient with mild FXI deficiency (> 30 %) may be performed according to***
  - ***Case by case multidisciplinary discussion***
  - ***Benefit/ risk index***



Von Willebrand disease (VWD)

- 43-y old new emigrant from Chili
- G13P8 38w 4NVD and 3CS
- BMI 55 (162cm ; 145kg)
- Type 1 vWf def **36 IU/dl** *(at her 30y)*

'' For elective CS **with general anesthesia**, secondary to vWf deficiency''

In preoperative high risk obstetric anesthesia clinic

- Repeated blood test – vWf- **78 IU/dl**

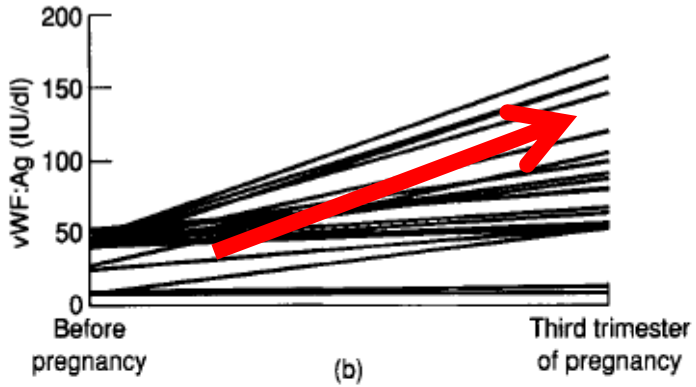
Uneventful One shot Spinal anesthesia with 27G PP long needle

British Journal of Obstetrics and Gynaecology
March 1998, Vol. 105, pp. 314–321

Pregnancy in women with von Willebrand's disease or factor XI deficiency

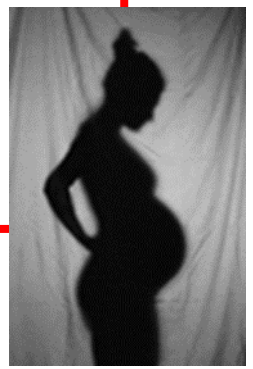
***Rezan A. Kadir** *Clinical Research Fellow*, **†Christine A. Lee** *Consultant (Haematology)*,
‡Caroline A. Sabin *Lecturer (Medical Statistics and Epidemiology)*, **†Debra Pollard** *Haematology Sister*,
***Demetrios L. Economides** *Senior Consultant (Obstetrics and Gynaecology)*

**University Department of Obstetrics and Gynaecology, †Haemophilia Centre and Haemostasis Unit, and ‡Department of Primary Care and Population Sciences, The Royal Free Hospital, London*



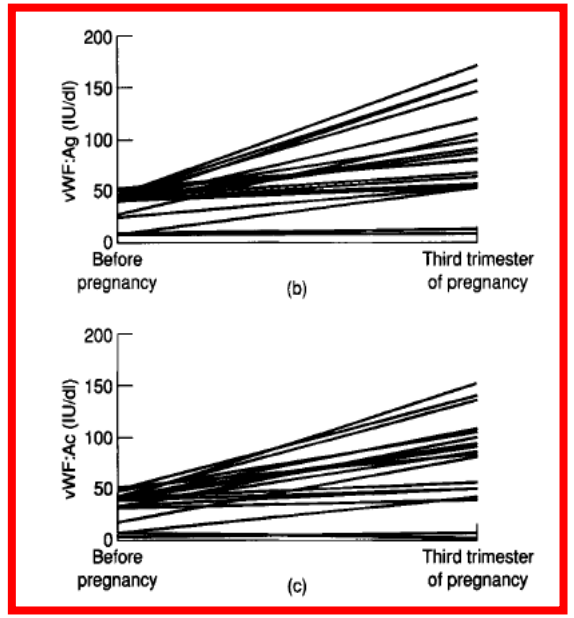
Most of the women with von Willebrand's disease showed a significant (up to 300%) increase in factor antigen (P=0.0001)
and in vWf activity (p=0.0001) levels during pregnancy.

(31 patient with 84 pregnancy)



Anesthetic implication of vWD

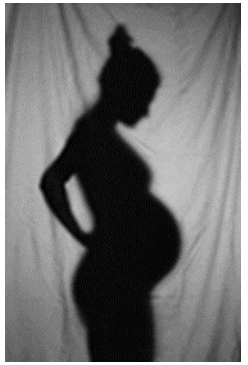
- ***Neuraxial anesthesia is safe in type 1 vWD parturients with vWf ≥ 50 IU/dL***
- ***An epidural catheter should be removed early or not be removed if coagulation is abnormal.***
- Levels of vWf **begin decrease in 6h postpartum**, returning to pre-pregnancy levels by 7–20 days.
- ***Neuraxial block contraindicated in types 2 and 3 vWD***



Coagulation in pregnancy

Patrick Thornton, BMSc, MBBCh, FCARCSI, Clinical Research Fellow, Joanne Douglas, MD, FRCPC, Clinical Professor*

Department of Anesthesia, University of British Columbia, BC Women's Hospital, Vancouv



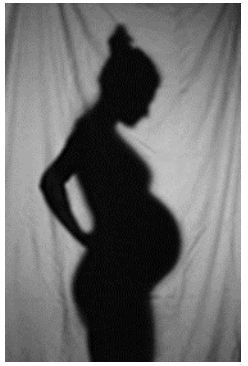
Cata JP, Hanna A, Tetzlaff JE et al. Spinal anesthesia for a cesarean delivery in a woman with type-2M von Willebrand disease: case report and mini-review. *Int J Obstet Anesth* 2009; **18:** 276–279.
Varughese J & Cohen AJ. Experience with epidural anaesthesia in pregnant women with von Willebrand disease. *Haemophilia* 2007; **13:** 730–733.

Factor VIII and IX deficiency Haemophilia A and B

- Haemophilia A and B – X-linked recessive condition
- Haemophilia (as a disease) is diagnosed when FVIII or FIX activity is ≤ 35%

- **FVIII levels usually normalise during pregnancy**
- **FIX levels may decreases during pregnancy**

- Known carriers of haemophilia - check factor's level

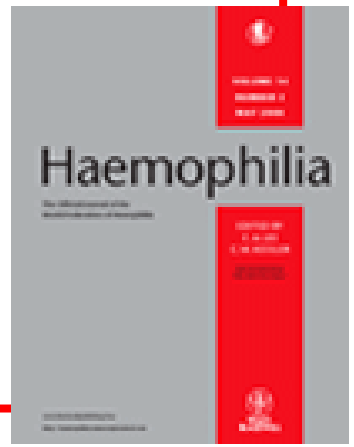


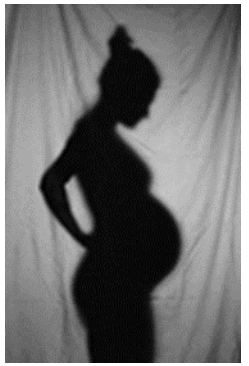
Chi C, Lee CA, Shiltagh N et al. Pregnancy in carriers of haemophilia. *Haemophilia* 2008; **14:** 56–64

Anaesthetic implications of haemophilia carriers

Neuraxial anaesthesia is not contraindicated

- **Factors level is ≥ 50 IU/dL in the end of pregnancy**
  - **92-96% for haemophilia A carriers**
  - **50% for haemophilia B carriers**
- **PT and PTT are normal**
- **No evidence of bleeding or bruising**
- **TEG ***

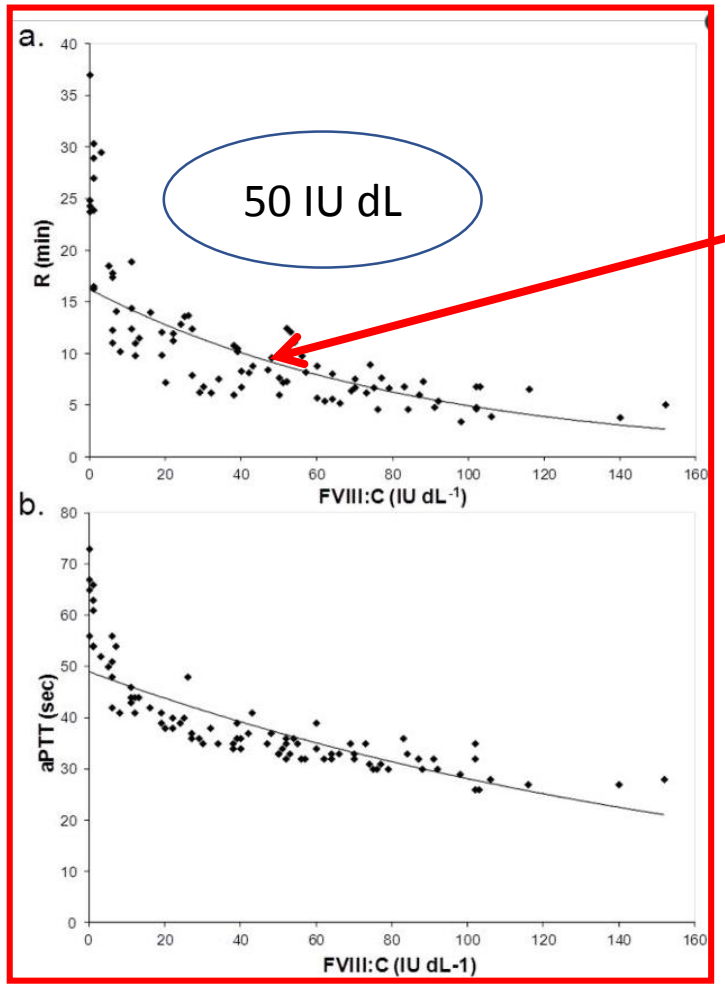


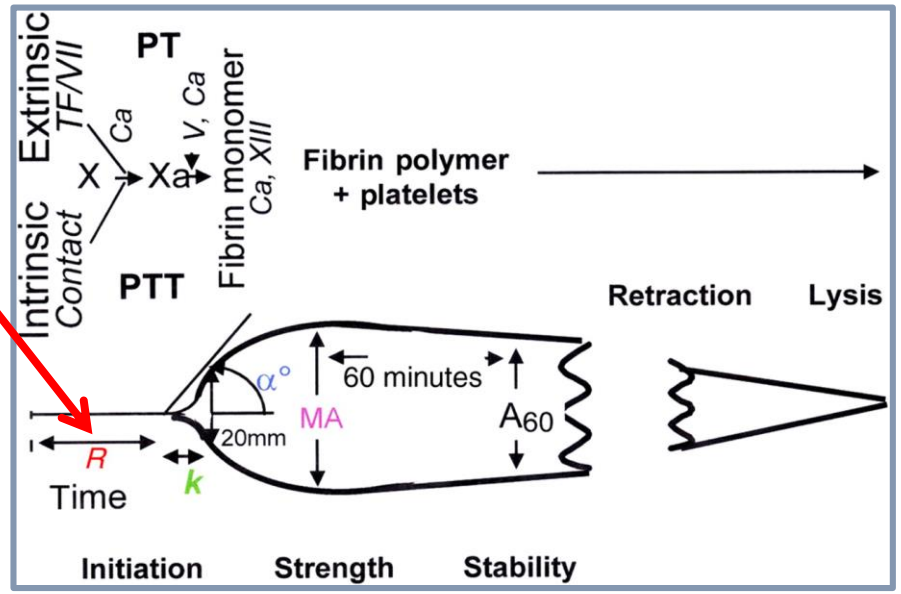


Chi C, Lee CA, Shiltagh N et al. Pregnancy in carriers of haemophilia. *Haemophilia* 2008; **14:** 56–64.

Dhar P, Abramovitz S, DiMichele D et al. Management of pregnancy in a patient with severe haemophilia A. *Br J Anaesth* 2003; **91:** 432–435.

Utility and sensitivity of thromboelastography (TEG) in the diagnosis of the condition and monitoring the response to therapy. 2013





Haemophilia. 2013 May;19(3):409-14. doi: 10.1111/hae.12110. Epub 2013 Mar 19.
Monitoring rFVIII prophylaxis dosing using global haemostasis assays (10 patients).
Al Hawaj MA[1], Martin EJ, Venitz J, Barrett JC, Kuhn JG, Nolte ME, Brophy DF.

Anaesth Intensive Care. 2013 Nov;41(6):799-803.
Utility of thromboelastography in managing acquired Factor VIII inhibitor associated massive haemorrhage.
Fisher C[1], Mo A, Warrillow S, Smith C, Jones D.

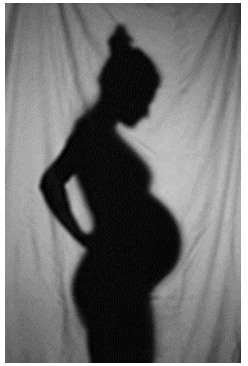
Rarer coagulation disorders include abnormalities in factors II, V, VII, X, XII and XIII

"These disorders usually have a low prevalence in the general population and constitute approximately 3-5% of all coagulation disorders. "

- F II Extremely rare. No reports about anesthetic management. (* hypercoagulation and LMWH treated)
- F V Extremely rare. One case CS – General Anesthesia.
- F XII and FXIII – very rare, miscarriage, bleeding not a problem, anesthetic management- no reports.

Best Practice & Research Clinical Obstetrics and Gynaecology 24 (2010) 339–352

Haemophilia. 2014 James P.
Rare bleeding disorders - bleeding assessment tools, laboratory aspects and phenotype and therapy of FXIdeficiency.



Factor VII deficiency *Hemophilia C*

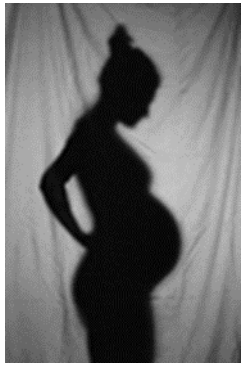
Most common of the “rare” disorders

1 : 100-500.000

- Epidural anesthesia for CS and labor following administration of recombination FVII (rFVIIa) **Novoseven**

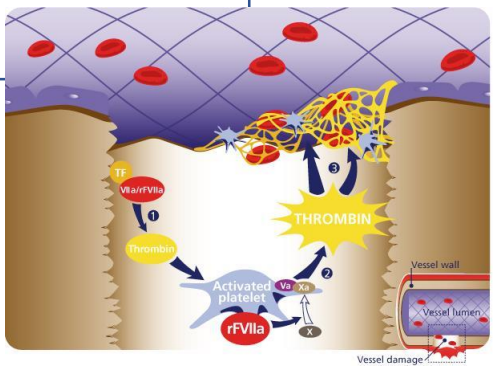
Jiminez-Yuste V, Villar A, Morado M et al. Continuous infusion of recombinant activated factor VII during caesarean section delivery in a patient with congenital factor VII deficiency. *Haemophilia* 2000; **6:** 588–590.

Kulkarni AA, Lee CA & Kadir RA. Pregnancy in women with congenital factor VII deficiency. *Haemophilia* 2006; **12:** 413–416.



Recombination factor VII for peripartum bleeding (rFVIIa) (Novoseven)

FVIIa works via activation of the extrinsic pathway of the coagulation cascade leading to an enhanced generation of thrombin and a **stable fibrin plug at the site of injury.**



Side-effect - Increased risk of thromboembolism.

Thus, the timely use of rFVIIa, hence, can be used to save life and fertility in cases of intractable obstetric bleeding.

Indian J Anaesth. 2012 Jan;56(1):69-71.
Burad J, Bhakta P, Sharma J.
Department of Anaesthesia and Intensive Care, Sultan Qaboos University Hospital, Muscat, Oman.

Pulmonary embolism after administration of recombinant activated Factor VII for major obstetric hemorrhage.

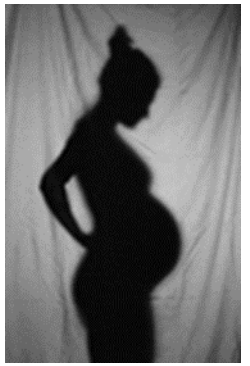
J Clin Anesth. 2012 Sep;24(6):508-9. McCarthy GC, Allen TK, Habib AS.

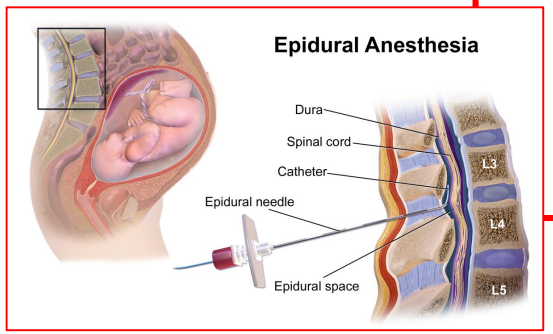
Neuraxial anesthesia and anticoagulants

Neuraxial anaesthesia in patients on anticoagulants.[73,74]

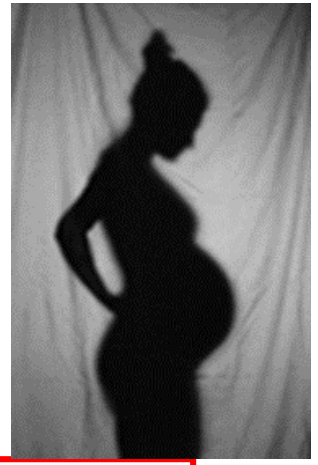
Anticoagulant	Coagulation tests	Time to peak effect	Time to normal coagulation after discontinued	Neuraxial anaesthesia	Epidural catheter removal
IV SH	↑ PT ↑↑↑ APTT	Minutes	4–6 h	Must have normal coagulation (check APTT if <4–6 h after last dose, or if additional concerns). Wait 4–6 h after last SH dose; Wait 1 h after procedure before giving heparin dose	4–6 h after last heparin Wait 1 h to give 1st dose after catheter removal
SC heparin (SH)	↑ PT ↑↑↑ APTT	40–50 min	4–6 h	If on 5000–7500 u q12 h no need to measure APTT if elapsed time 4–6 h post-dose in the absence of specific patient concerns NA not contraindicated ↑ risk if also on anti-platelet drugs	4–6 h after last heparin dose or 1 h prior to next dose
LMWH	Anti-Xa activity not recommended as not predictive of risk of bleeding	2–4 h	12+ h	Wait 10–12 h after low dose Wait 24 h after high dose	Low dose: 10–12 h after last dose; High dose: 24 h after last dose Wait ≥2 h to give 1st dose after catheter removal; If traumatic insertion, wait 24 h to give 1st dose. May be safer to wait 24 h for 1st dose.

Regional Anesthesia in the Patient Receiving Antithrombotic or Thrombolytic Therapy
American Society of Regional Anesthesia and Pain Medicine Evidence-Based Guidelines





Summary



- ***No peripartum anesthetic complication even in parturients with severe gestation thrombocytopenia or ITP.***
- **Recommendation of the hematologist may not always have to be done**
- **Tromboelastogram became important, available and reliable in these situations**
- **Neuroaxial anesthesia is safe and even in the presence of some kinds of coagulopathy may be done on the basis of the benefit/risk index**
- **Team (obstetrician, anesthetist and hematologists) approach is crucial for these patients**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«Теория и практика анестезии и интенсивной терапии в акушерстве и гинекологии»

Первый совместный конгресс по акушерской анестезиологии (ОАА-ОАІА) памяти Джеральдины О'Салливан

III Съезд Ассоциации акушерских анестезиологов-реаниматологов

5–7 СЕНТЯБРЯ 2018

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