Najważniejsze aktualizacje w praktyce anestezji położniczej

Paweł Krawczyk

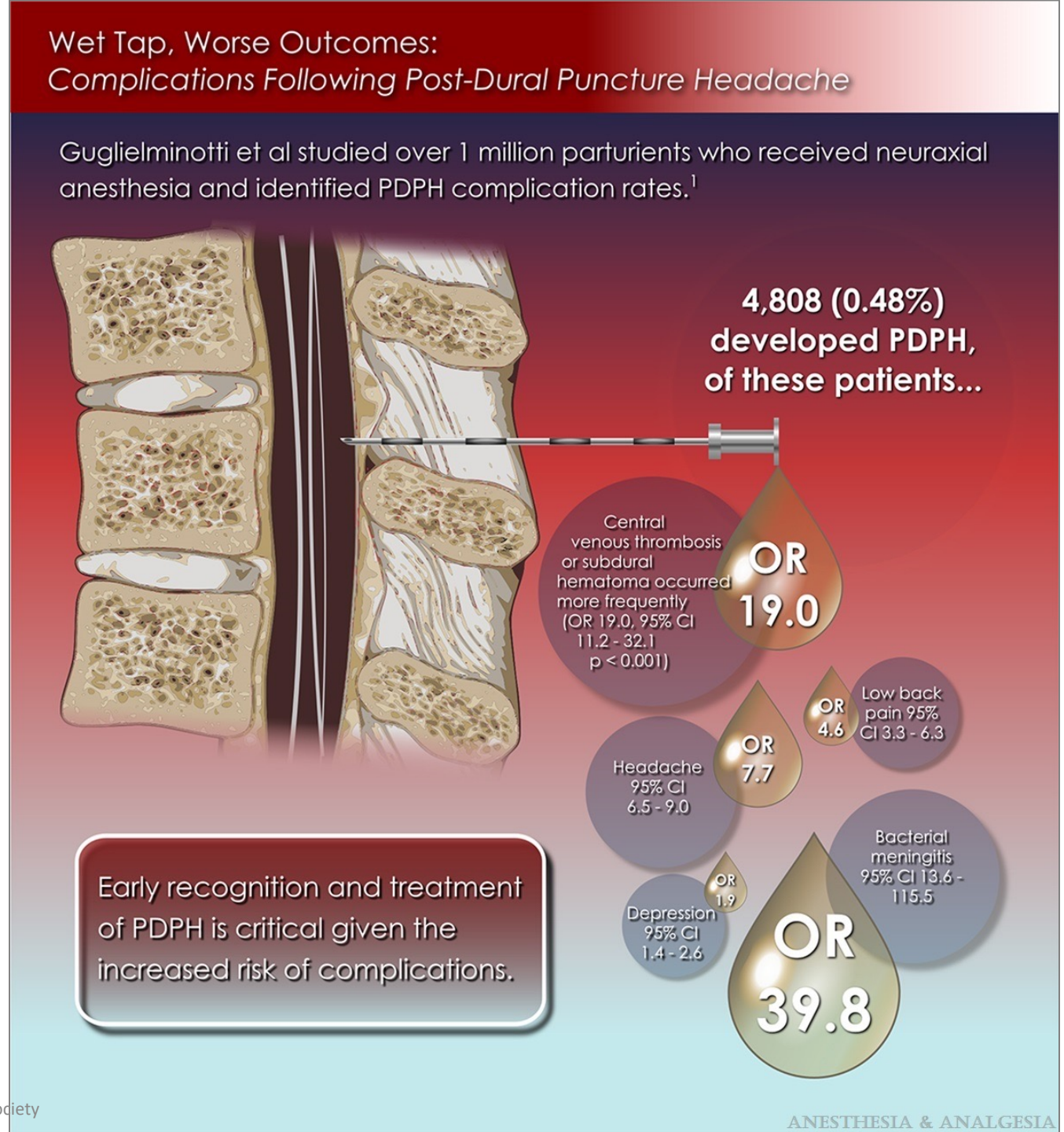
Katedra Anestezjologii i Intensywnej Terapii
Uniwersytet Jagielloński Collegium Medicum

Szpital Uniwersytecki w Krakowie
O/K Położnictwa i Perinatologii

- Ponad 3000 porodów rocznie
- 5 sal porodowych
- 65 łóżek położniczych

Agenda

- PDPH/EBP
- Znieczulenie ogólne do cięcia cesarskiego
- Znieczulenie a laktacja
- Podaż leków obkurczających macicę - *international consensus statement*
- CEI vs PIEB+PCEA vs PCEA
- TXA w położnictwie
- ERAC - SOAP
- PROSPECT - planowe CC
- Morfina Spinal w blokadach centralnych - SOAP
- Trombocytopenia a blokady centralne w położnictwie – SOAP
- MaCriCare.org – OPEN ACCESS



Wet Tap, Worse Outcomes: Complications Following Post-Dural Puncture Headache Wanderer, Jonathan P.; Nathan, Naveen Anesthesia & Analgesia129(5):1192, November 2019. doi: 10.1213/ANE.0000000000004460

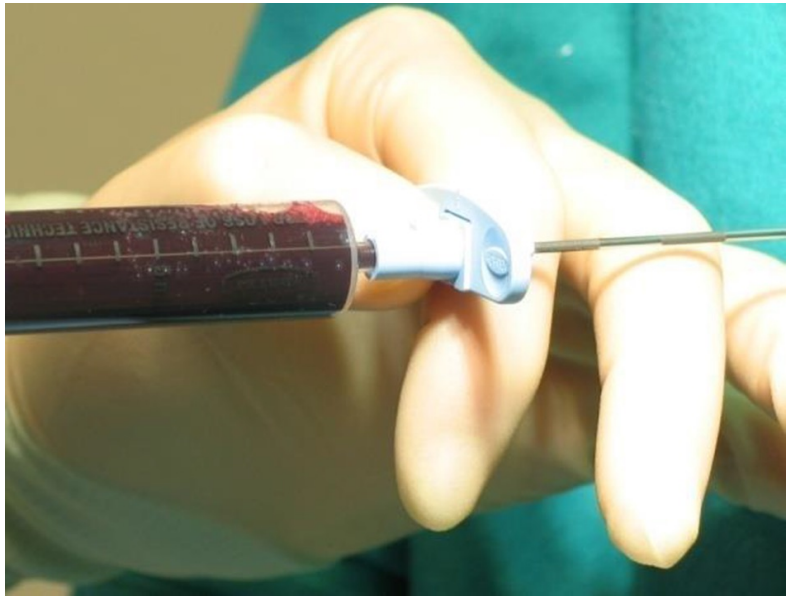
Guglielminotti J, Landau R, Li G. Major Neurologic Complications Associated With Postdural Puncture Headache in Obstetrics: A Retrospective Cohort Study. Anesth Analg. 2019 Nov;129(5):1328-1336. doi: 10.1213/ANE.0000000000004336. PMID: 31335402.

PDPH - postępowanie

- Nawodnienie
- Paracetamol, NLPZ
- Opioidy, leki p/wymiotne
- Dogodna pozycja
- Wsparcie psychiczne
- Kofeina
  - dawka: 300– 500mg PO lub IV
  - Filiżanka kawy zawiera 50-100mg
  - Przy dawkach terapeutycznych możliwe drgawki, migotanie przedsionków

Oxford Specialist Handbooks in Anaesthesia Obstetric Anaesthesia
SECOND EDITION edited by Collis, Harries, Theron

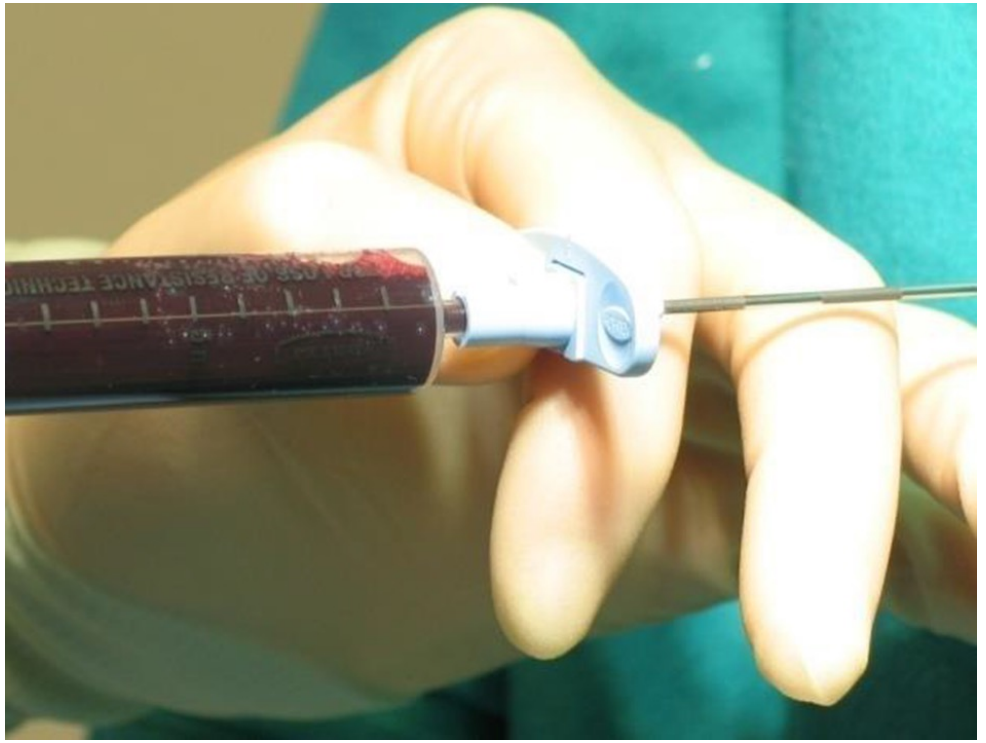
EBP technika wykonania



- Ta sama przestrzeń lub jedna poniżej, odległość do ZO
- **2 operatorów, pełna aseptyka**
- Pozycja na boku lub siedząca
- Pobrać aseptycznie 2×20ml krwi
- Podać do 30ml krwi do ZO, wolno przed kilka minut;
  STOP w razie dolegliwości bólowych; **20ml optymalna objętość**
- Wysłać **resztę krwi na posiew**
- Leżenie w łóżku przez 1h, potem uruchamianie
- Możliwe zaburzenia hemodynamiczne

Oxford Specialist Handbooks in Anaesthesia Obstetric Anaesthesia
SECOND EDITION edited by Collis, Harries, Theron

EBP



Przeciwwskazania:

- Brak zgody
- Gorączka z leukocytozą
- Zaburzenia krzepnięcia
- Infekcja skóry w miejscu podania
- Możliwe bezpieczna procedura w HIV (+)

Oxford Specialist Handbooks in Anaesthesia Obstetric Anaesthesia SECOND EDITION edited by Collis, Harries, Theron

Znieczulenie ogólne do cięcia cesarskiego **Propofol vs Tiopental**

- Wzrost stosowania Propofolu 3% → 46% (UK 2013-2018)
- Porównywalne wartości dla:
  - SBP
  - Apgar
  - Gazometrii krwi pępowinowej
- Mniejsze ryzyko *awareness*
- Mniej epizodów trudnych intubacji
- Znajomość preparatu
- Bez negatywnych efektów na noworodka

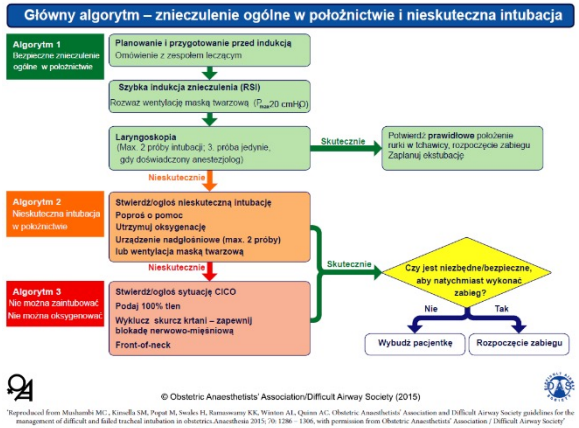
Houthoff Khemlani J Clin Anesth. 2018 Aug;48:73-80; NAP3; Odor Anaesthesia. 2021 Jun;76(6):759-776;
Park Sci Rep. 2020 Apr 10;10(1):6192; Bonnet BJA Anaesth. 2020 Jul;125(1):e81-e87; Mitchell 2020 Nov;75(11):1482-1493

Znieczulenie ogólne do cięcia cesarskiego **Remifentanyl vs Alfentanil vs Fentanyl**

- Remifentanil 0.5–1 µg/kg lub 2–3 µg/kg/h
- Alfentanil 7.5–10 µg/kg
- Fentanyl 0.5–1 µg/kg
- **Bez różnic - 1 min Apgar**
- **Remifentanil i alfentanil bez różnic w potrzebie wentylacji noworodka (P <0.05)**
- **Fentanyl znamiennie niższe Apgar w 5 min** (P=0.002)

White LD et al. Int J Obstet Anesth. 2019 Nov;40:4-13.

Znieczulenie ogólne do cięcia cesarskiego **SCh vs Rocuronium**



- UK 9:1 (DREAMY)
- Porównywalne warunki intubacji po 70s (SCh>Roc)
- Rocuronium: **dawka do RSI 1,2mg/kg** (blok: 60 minut)
  Odwrócenie bloku: sugammadex **< 3 min** (opcja w TDO?)
- **Krótszy czas** od nacięcia skóry **do wydobycia** po rocuronium
- **Anafilaksja 11,1 vs 5,8** / 100 000
  (ale cięższe reakcje po rocuronium; sugammadex?)
- **Rocuronium** przechodzi **przez łożysko**: **niższy Apgar w 1 min**
  (study design?)
- Wideolaryngoskop?

Tran Cochrane Database Syst Rev. 2015 Oct 29;2015(10):CD002788.; DREAMY, Bláha Int J Obstet Anesth. 2020 Feb;41:14-21; NAP6; Kosinova Int J Obstet Anesth. 2017 Nov;32:4-10.

Neonatal and early childhood outcomes following maternal anesthesia for cesarean section

- 140 866 (GA 3.2% elective and 9.8% emergency cases)
- Elective GA vs SA
  - neonatal resuscitation 16.2% vs 1.9%
  - Apgar <7 at 5 min 4.6% vs 0.4%
  - neonatal admission 8.6% vs 4.9%
- Emergency GA vs SA
  - neonatal resuscitation 32.2% vs 12.3%
  - Apgar <7 at 5 min 12.6% vs 2.8%
  - neonatal admission 31.6% vs 19.9%
- GA for CS is associated with **neonatal resuscitation, low Apgar, and neonatal unit admission**
- Associations were **strongest in non-urgent cases and at term**

Kearns et al. Regional Anesthesia & Pain Medicine 2021

Karmienie piersią po znieczuleniu

1. Powinno zachęcać się kobiety do **normalnego karmienia piersią po zabiegach operacyjnych**
2. **Nie ma potrzeby odciągania i wylewania mleka** matki po znieczuleniu
3. **Anestetyki i nie-opioidowe leki p/bólowe** przechodzą do mleka jedynie w **bardzo małej ilości**. Znakomita większość z nich nie wpływa na karmione dziecko
4. **Opioidy i benzodiazepiny** powinny być stosowane **ostrożnie**, zwłaszcza przy powtarzanych dawkach i karmieniu dzieci **do 6 tygodnia życia** (korekta do wieku ciążowego). W takich sytuacjach zaleca się obserwację dzieci pod kątem senności i depresji oddechowej, zwłaszcza gdy takie objawy występują u matki
5. **Kodeina nie powinna być stosowana** u karmiących z powodu różnic w jej metaboliźmie u niemowląt, co może powodować nadmierną sedację

Mitchell 2020 Nov;75(11):1482-1493

Karmienie piersią po znieczuleniu

6. Każda kobieta z niemowlęciem < 2 r.ż. powinna być **rutynowo zapytana czy karmi** piersią w trakcie wizyty przedoperacyjnej

7. U karmiących matek **preferowane są techniki oszczędzające opioidy**. Anestezja regionalna pozwala na ich zastosowanie i ma niewielki tylko wpływ na możliwość opieki nad dzieckiem

8. Jeżeli możliwe **preferowany jest pobyt jednodniowy** aby uniknąć zakłócenia normalnych czynności karmiącej. Przez pierwsze 24h powinna być pod opieką odpowiedzialnej osoby dorosłej. Kobieta powinna mieć świadomość obniżonej możliwości reakcji w trakcie snu z dzieckiem i karmienia

9. **Wsparcie położnej laktacyjnej** powinno być dostępne podczas opieki nad karmiącą wymagającą zabiegu operacyjnego lub innych procedur medycznych

10. **Dedykowana informacja** dotycząca stosowania anestetyków i leków p/bólowych w trakcie laktacji powinna być **dostępna dla pacjentek** w formie ulotki i dodatkowych źródeł informacji. Informacje te powinny uwzględniać wytyczne dotyczące wsparcia laktacji w okresie okołooperacyjnym

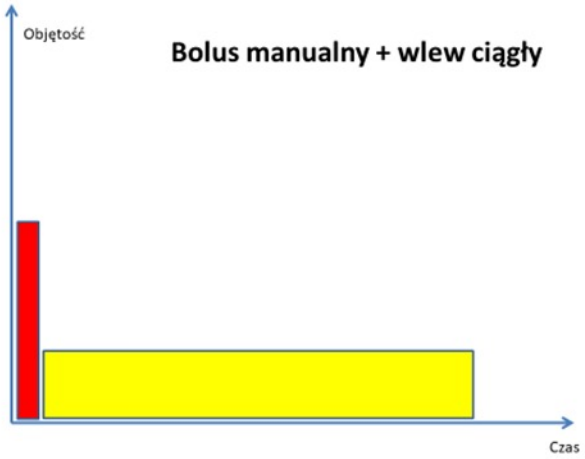
Mitchell 2020 Nov;75(11):1482-1493

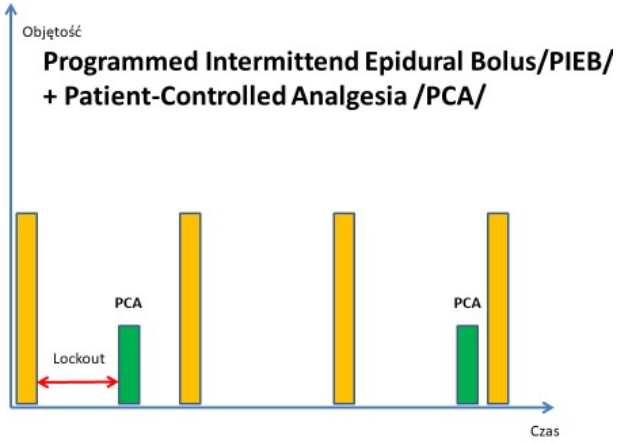
Leki w ciąży i laktacji

- **UK Teratology Information Service**: http://www.uktis.org/
- **BUMPS - Best Use of Medicines in Pregnancy** https://www.medicinesinpregnancy.org/
- **Drugs and Lactation Database (LactMed)** https://www.ncbi.nlm.nih.gov/books/NBK500585/
- **E-lactancia** http://e-lactancia.org/
- https://www.drugs.com/pregnancy-categories.html

CEI vs PIEB+PCEA

- Ropivacaine 0.2% with fentanyl 2mg/ml (5-15 ml/h) CEI
- Ropivacaine 0.1% with fentanyl 2 mg/ml PIEB 5-10ml/h + PCEA 5 ml bolus with a 10 min lockout
- PIEB+PCEA:
  - **fewer** patients with **motor block**
  - **shorter second stage of labour** for primiparous women
  - received **less ropivacaine**
- No significant difference in mode of delivery, fentanyl dose, or maternal satisfaction

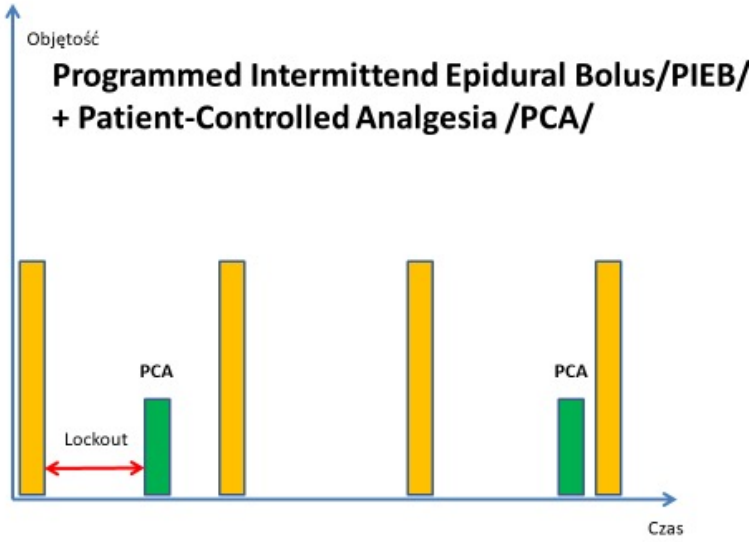


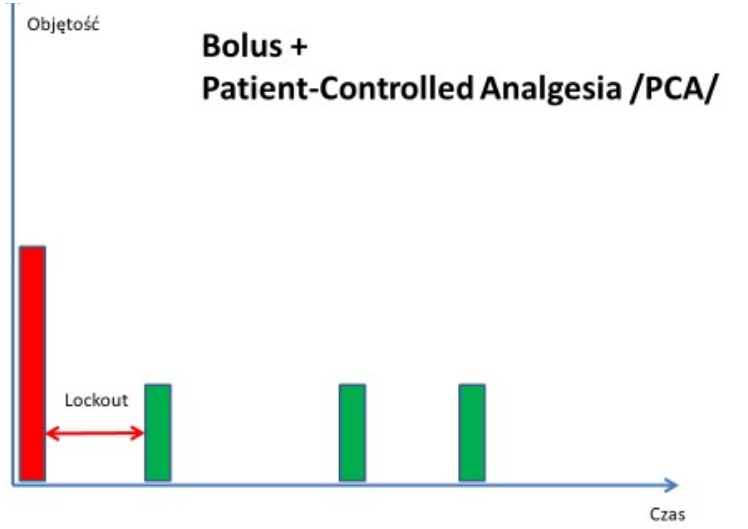


Bullingham et al. Br J Anaesth. 2018 Aug;121(2):432-437

PIEB vs PCEA

- Korzyści CEI vs PIEB+PCEA
- Brak jednoznacznych wyników PIEB vs PCEA
- Postęp technik znieczulenia rodzącej
  - nowoczesne cewniki
  - CSE
  - dural puncture epidural
- Korzyści z technik ciągłych vs manualny bolus
- Dalsze wyniki oczekiwane





Riley&Carvalho. Turk J Anaesthesiol Reanim. 2017; Carvalho&Riley Turk J Anaesthesiol Reanim 2017;
Heesen et al. Int J Obstet Anesth. 2019; Chau et al. Anesthesia & Analgesia: 2017

Leki obkurczające macicę

First-line drugs

Oxytocin

Elective caesarean section	Intrapartum caesarean section
Bolus 1 IU oxytocin; start oxytocin infusion at 2.5–7.5 $IU.h^{-1}$ (0.04–0.125 $IU.min^{-1}$).	3 IU oxytocin over ≥ 30 s; start oxytocin infusion at 7.5–15 $IU.h^{-1}$ (0.125–0.25 $IU.min^{-1}$).
If required after 2 min, give a further dose of 3 IU over ≥ 30 s.	
Consider second-line agent early in the event of failure of this regimen to produce sustained uterine tone.	
Review the patient's clinical condition before discontinuing the infusion; this will usually be between 2 h and 4 h after commencement.	

Alternative – carbetocin

Elective caesarean section	Intrapartum caesarean section
100 µg over ≥ 30 s.	100 µg over ≥ 30 s.
Smaller doses (as low as 20 µg) may be sufficient; in this case, doses can be repeated if required, up to 100 µg.	Do not exceed 100 µg – if required move to second-line drug.
Do not exceed 100 µg – if required move to second-line drug.	

Heesen M, et al. Anaesthesia 2019

Leki obkurczające macicę

Second-line drugs

These drugs should be considered for both prophylaxis and treatment of postpartum haemorrhage.

Consider early use in the event of failure of first-line drugs to produce sustained uterine tone.

Depending on local availability, the following drugs can be used:

1. Ergometrine (ergonovine) 200–500 μg/methylergometrine (methylergonovine) 200 μg: i.m., or slow i.v. in exceptional circumstances; may be repeated after 2 h.
2. Misoprostol 400–600 μg: sublingual, rectal, vaginal, oral; repeat after 15 min if required, maximum dose 800 μg.
3. Carboprost 250 μg: i.m. or intramyometrial (contraindicated i.v.); up to every 15 min if required, maximum eight doses.
4. Sulprostone 500 μg: i.v. at 100 $\mu g.h^{-1}$; maximum dose 1500 μg.

Heesen M, et al. Anaesthesia 2019

History of Tranexamic acid

The Okamoto Legacy[1]

Left: Shosuke Okamoto, Right: Utako Okamoto

1940s

1945: Drs. Utako and Shosuke Okamoto, wife and husband team, were medical doctors and researchers at Kobe and Keio Medical School in Japan. After World War II, they directed their research towards hemostasis due to scare resources

"If there was not enough [resources], we could simply use our own [blood]"

1960s

1960s: Post-partum hemorrhage (PPH) was identified as the major cause of maternal death in Japan. Utako and Shosuke Okamoto began to develop new compounds that could reduce the risk of PPH

1960s: Studied anti-fibrinolytic ***epsilon-amino-caproic acid*** **(EACA)** → Determined that a more potent agent was required

After 1962: Utako and Shosuke Okamoto were unable to persuade obstetricians to conduct research studies on the use of TXA for PPH

1962: Discovered ***1-(aminomethyl)-cyclohexane-4-carboxylic acid*** **(AMCHA)[2]**, a chemical relative of EACA that is 27x more powerful. AMCHA was later renamed **tranexamic acid (TXA)**

2004

November 1, 2004: Shosuke Okamoto died

2010

2010: CRASH-2 trial showed TXA safely reduced the risk of death in bleeding trauma patients[3]

2011

2011: TXA added to WHO list of essential medicines[4]

2014

2014: Principle investigator of **WOMAN Trial** investigating TXA for PPH visits Utako in Japan. Utako said: "It is going to be effective"

2016

April 14, 2016: WOMAN Trial reached recruitment target of 20,000 patients

April 21, 2016: Utako Okamoto died in Kobe, Japan at 98 years of age

Did you know?

Earlier in her career, Utako worked long hours in the lab while also caring for her daughter. She was once asked to leave a conference because "events were not for women and children". Unfortunately, sexism in academia and in medicine remains prevalent today[6]

#SHERO

2017

2017: WOMAN Trial showed that TXA safely decreased the risk of hemorrhagic death in women with PPH[5]

Results of the **WOMAN Trial** shown below!

TXA Indications

The Grading of Recommendations, Assessment, Development and Evaluations (GRADE) system was used to classify quality of evidence as *high*, *moderate*, or *low*[13]

Green = High quality evidence
Yellow = Moderate quality evidence
Orange = Low quality evidence

Indication	TXA Regimen
Postpartum hemorrhage (PPH)[5,14] **WOMAN TRIAL**	1g IV over 10 min. If bleeding continues after 30 min or restarts within 24h a 2nd dose of 1g IV can be given
Trauma-associated hemorrhage[3] **CRASH-2 TRIAL**	1g IV over 10 min then 1g over the next 8 hours as a continuous infusion
Reducing transfusion in cardiac surgery[15]	50mg/kg IV over 30 min during the OR
Traumatic brain injury with GCS > 9[16] **CRASH-3 TRIAL**	1g IV over 10 min then 1g over the next 8 hours as a continuous infusion
Heavy Menstrual Bleeding[17,18,19]	1300mg PO 3 times daily (3900mg/day) for up to 5 days during each monthly menstruation
Intracerebral Hemorrhage (ICH)[20] **TICH-2 TRIAL**	1g IV over 10 min then 1g over the next 8 hours as a continuous infusion
Hemoptysis[21,22]	500-1000mg nebulized in 5-10mL 0.9% normal saline
Reducing transfusion during orthopedic surgery[23,24]	10mg/kg IV loading dose during the OR followed by 1mg/kg/hour maintenance infusion
Von Willebrand Disease (VWD) related bleeding[25,26]	Oral: TXA 20mg/kg PO TID Mouthwash: TXA 5% 10mL QID prn – Swish and spit
Topical surgical field blood loss reduction[27]	Variable doses; most commonly 1g TXA in 50 mL administered intraarticularly
Epistaxis[28,29]	Topical: Cotton gauze soaked with injectable form of TXA (500mg in 5mL)
Hereditary Hemorrhagic Telangiectasia related bleeding[30]	1g PO TID
Prophylaxis in Acute Myeloid Leukemia related bleeding[31]	1g IV q6h when platelet count <20 or falling trend <50, until platelets >20 on two counts
Prophylaxis in Acute Promyelocytic Leukemia related bleeding[31]	2g IV q8h for 6 days
Melasma[33]	250mg PO BID or 4mg/mL injected intradermal to melasma lesions
Hereditary angioedema[34]	Long-term prophylaxis: 0.5-1g PO BID-TID Short-term prophylaxis: 1g PO QID x48 before and after procedure

Did you know?

The **TRAAP study** showed that in women with **vaginal delivery** who received prophylactic oxytocin, **TXA did NOT result in significantly lower rates of measured PPH** compared to placebo[35]

Research In Progress

Does prophylactic TXA in women with **cesarean delivery** reduce the risk of PPH?
TRAAP2 study[36]: NCT03431805
MFMU Study: NCT03364491

WOMAN-2 → Does TXA prevent PPH in women with **vaginal delivery** and **moderate or severe anemia**?[37] NCT03475342

Research In Progress

Relke et al. Res Pract Thromb Haemost. 2021;5:e12546.

TRANEXAMIC ACID

A drug that stops bleeding

woman
World Maternal Antifibrinolytic Trial

20,000 WOMEN
21 COUNTRIES
193 HOSPITALS

Results from the WOMAN trial

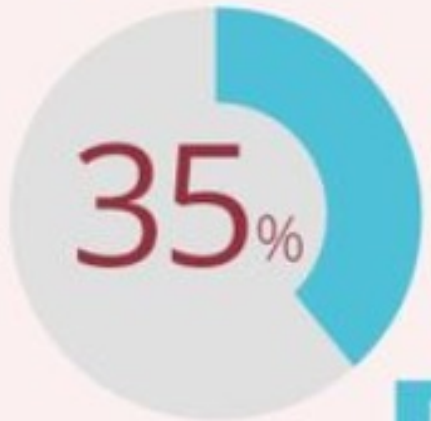
The drug could save

1/3

women who would otherwise bleed to death after childbirth

An estimated **100,000** women die from severe bleeding after giving birth every year

The drug reduced the number of women bleeding to death after childbirth by more than 30%



The drug reduced the need for urgent surgery to control bleeding by more than 35%

£2 ($2.5)

The cost of tranexamic acid in most countries

Find out more at **womantrial.lshtm.ac.uk**

Source: The WOMAN trial (2017)
Credit: Rebeccah Robinson/LSHTM

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Tranexamic Acid for the Prevention of Blood Loss after Cesarean Delivery

L. Sentilhes, M.V. Sénat, M. Le Lous, N. Winer, P. Rozenberg, G. Kayem, E. Verspyck, F. Fuchs, E. Azria, D. Gallot, D. Korb, R. Desbrière, C. Le Ray, C. Chauleur, F. de Marcillac, F. Perrotin, O. Parant, L.J. Salomon, E. Gauchotte, F. Bretelle, N. Sananès, C. Bohec, N. Mottet, G. Legendre, V. Letouzey, B. Haddad, D. Vardon, H. Madar, A. Mattuizzi, V. Daniel, S. Regueme, C. Roussillon, A. Benard, A. Georget, A. Darsonval, and C. Deneux-Tharaux, for the Groupe de Recherche en Obstétrique et Gynécologie*

CONCLUSIONS

Among women who underwent cesarean delivery and received prophylactic uterotonic agents, tranexamic acid treatment resulted in a **significantly lower incidence of calculated estimated blood loss greater than 1000 ml or red-cell transfusion by day 2** than placebo

Relative risk reduction 16%; Absolute risk reduction 5%; NNT-20

N Engl J Med 2021;384:1623-34.

Research In Progress

WOMAN-2 → Does TXA prevent PPH in women with **vaginal delivery** and **moderate or severe anemia**?[37] NCT03475342

PROSPECT guideline for elective caesarean section

prospect
procedure specific postoperative pain management

Implement strategies to minimise systemic opioid utilisation and develop individualised or stratified post-discharge opioid prescribing practices to reduce unnecessary opioid analgesic consumption after elective caesarean section.

Add intrathecal morphine 50–100 µg or diamorphine 300 µg to spinal anaesthesia. Epidural morphine 2–3 mg or diamorphine 2–3 mg may be used as an alternative, for example, when an epidural catheter is used as part of a combined spinal-epidural technique.

Roofthooft E, Joshi GP, Rawal N et al. PROSPECT guideline for elective caesarean section. *Anaesthesia* 2020 Epub 28 Dec https://onlinelibrary.wiley.com/doi/full/10.1111/anae.15339

@Anaes_Journal
TheAnaesthesia.Blog

Prescribe paracetamol and a NSAID administered after delivery and continued regularly postoperatively.

Administer a single dose of i.v. dexamethasone after delivery in the absence of contra-indications.

Consider a single injection of local anaesthetic infiltration, continuous wound local anaesthetic infusion and/or fascial plane blocks, if intrathecal morphine is not used.

Use a surgical technique that includes the Joel-Cohen incision, non-closure of the peritoneum and abdominal binders.

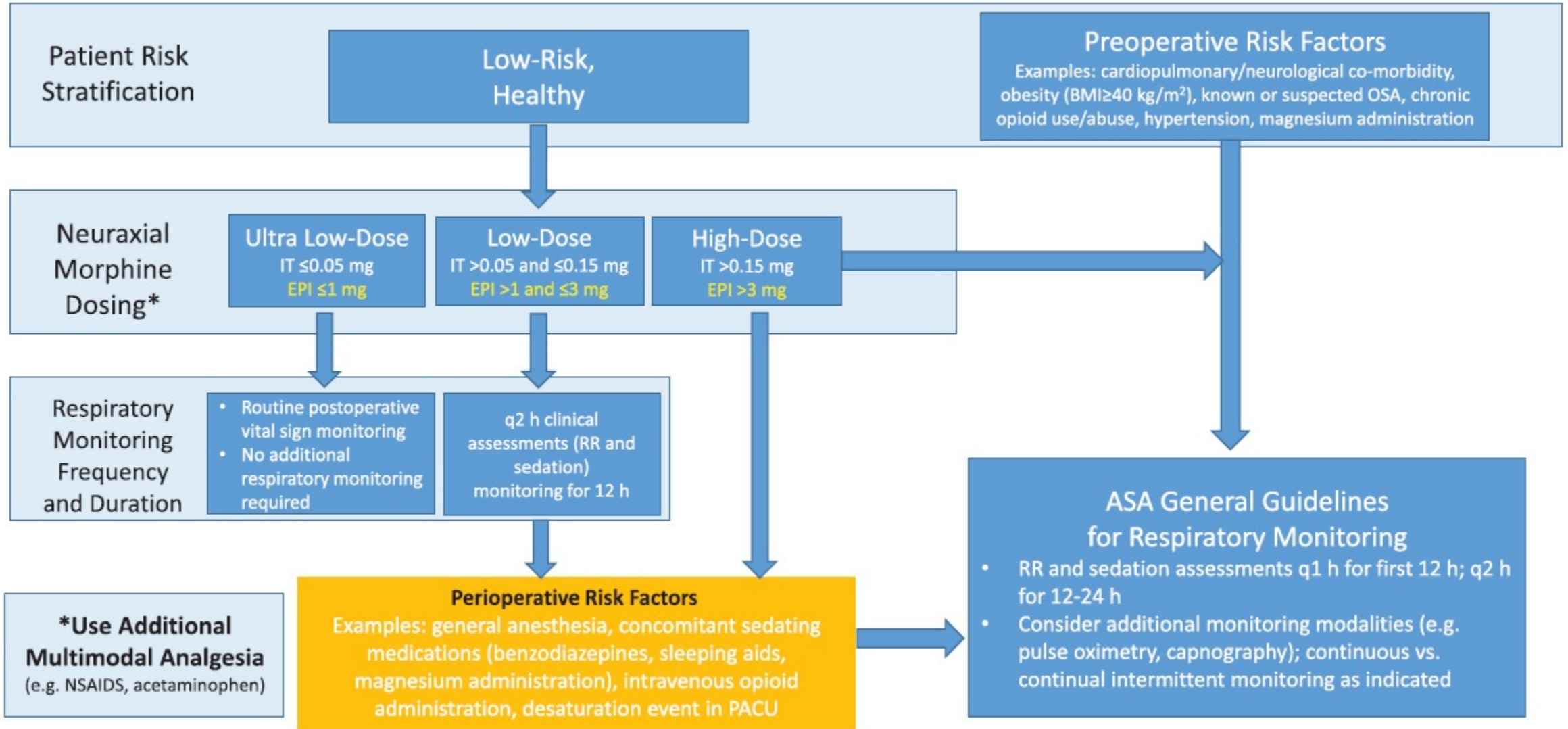
Consider the use of transcutaneous electrical nerve stimulation as an analgesic adjunct.

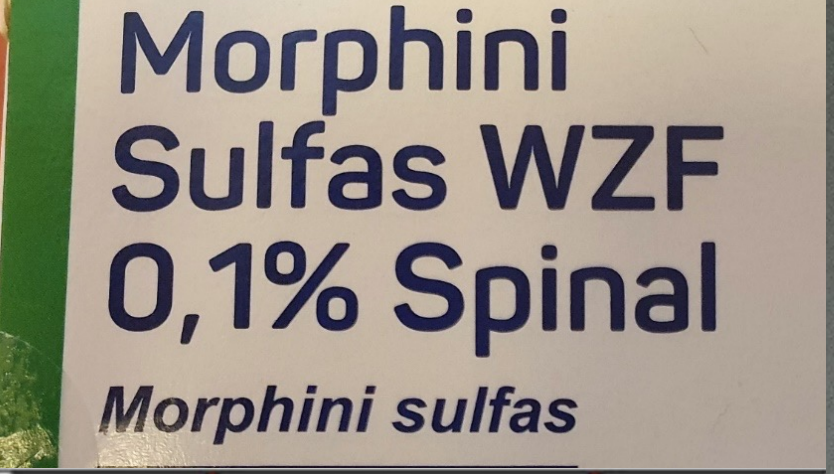
Roofthooft E, Joshi GP, Rawal N et al. PROSPECT guideline for elective caesarean section. *Anaesthesia* 2020 Epub 28 Dec
https://onlinelibrary.wiley.com/doi/full/10.1111/anae.15339

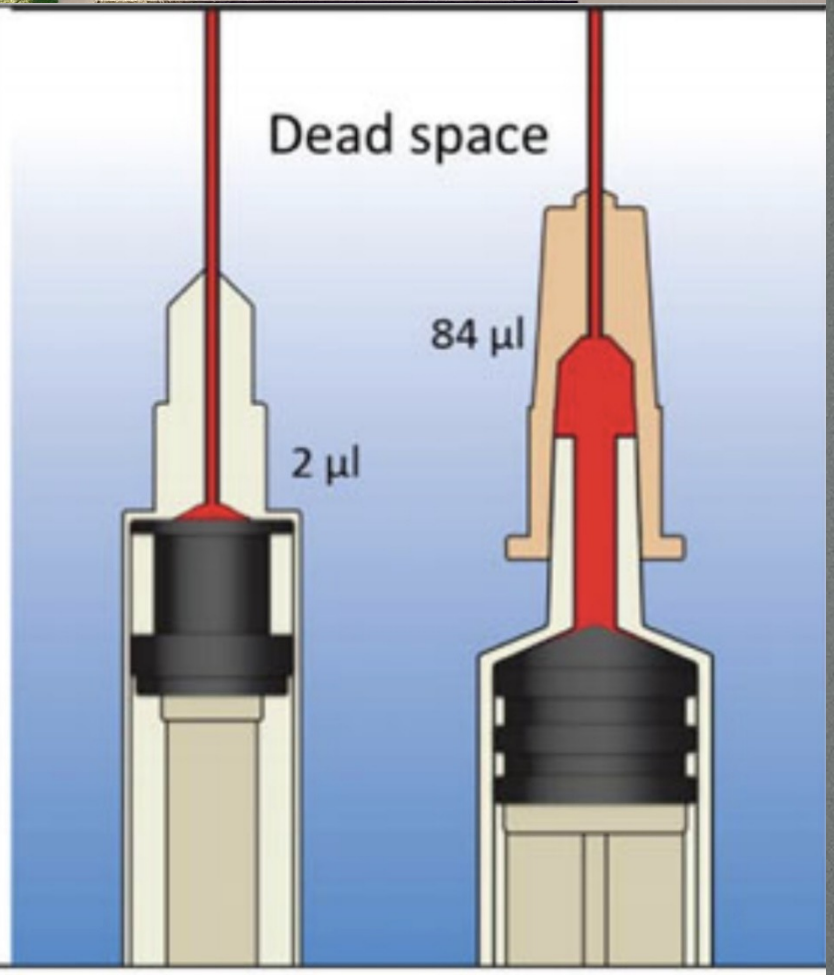
Society for Obstetric Anesthesia and Perinatology Consensus Statement: Monitoring Recommendations for Prevention and Detection of Respiratory Depression Associated With Administration of Neuraxial Morphine for Cesarean Delivery Analgesia

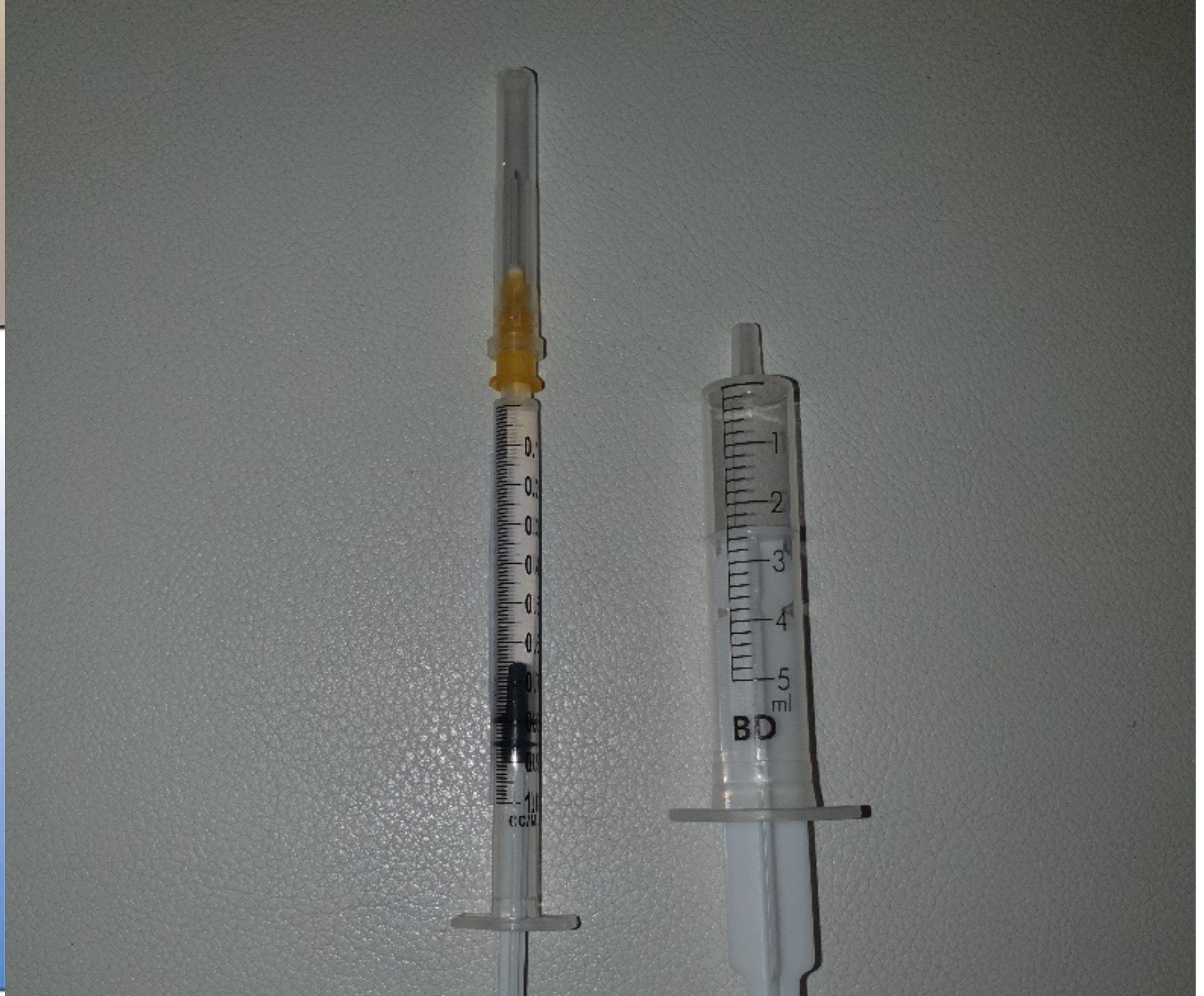
Jeanette R. Bauchat, MD, MS,* Carolyn F. Weiniger, MBChB,†
Pervez Sultan, MBChB, FRCA, MD,‡ Ashraf S. Habib, MBBCh, MSc, MHSc, FRCA,§
Kazuo Ando, MD, PhD,‖ John J. Kowalczyk, MD,¶ Rie Kato, MD, DPhil,#
Ronald B. George, MD, FRCPC,** Craig M. Palmer, MD,†† and Brendan Carvalho, MBBCh, FRCA‡‡

Bauchat JR, et al. Anesth Analg 2019;129:458–74




Morphini
Sulfas WZF
0,1% Spinal
Morphini sulfas


Dead space
84 µl
2 µl


BD
1
2
3
4
5
ml

SPECIAL ARTICLE

Society for Obstetric Anesthesia and Perinatology: Consensus Statement and Recommendations for Enhanced Recovery After Cesarean

Laurent Bollag, MD,* Grace Lim, MD, MS,† Pervez Sultan, MBChB, FRCA,‡
Ashraf S. Habib, MBBCh, MSc, MHSc, FRCA,§ Ruth Landau, MD,‖ Mark Zakowski, MD,¶
Mohamed Tiouririne, MD,# Sumita Bhambhani, MD,** and Brendan Carvalho, MBBCh, FRCA‡

Anesth Analg. 2021 May 1;132(5):1362-1377

SOAP
Society for Obstetric Anesthesia and Perinatology

Pre-op

- Limit fasting interval
- Non-particulate liquid carbohydrate loading
- Patient education
- Lactation/breastfeeding preparation and support
- Hemoglobin optimization

Intra-op

- Prevent spinal anesthesia induced hypotension
- Maintain normothermia
- Optimal uterotonic administration
- Antibiotic prophylaxis
- Intra- and Post-operative Nausea and Vomiting (IONV/PONV) prophylaxis
- Initiate multimodal analgesia
- Promote breastfeeding and maternal-neonate bonding
- Intravenous fluid optimization
- Delayed cord clamping

Post-op

- Early oral intake
- Early mobilization
- Promotion of resting periods
- Early urinary catheter removal
- Venous thromboembolism prophylaxis
- Facilitate early discharge
- Anemia remediation
- Breastfeeding support
- Multimodal analgesia
- Glycemic control
- Promotion of return of bowel function

OAP ERAC Elements

SPECIAL ARTICLE

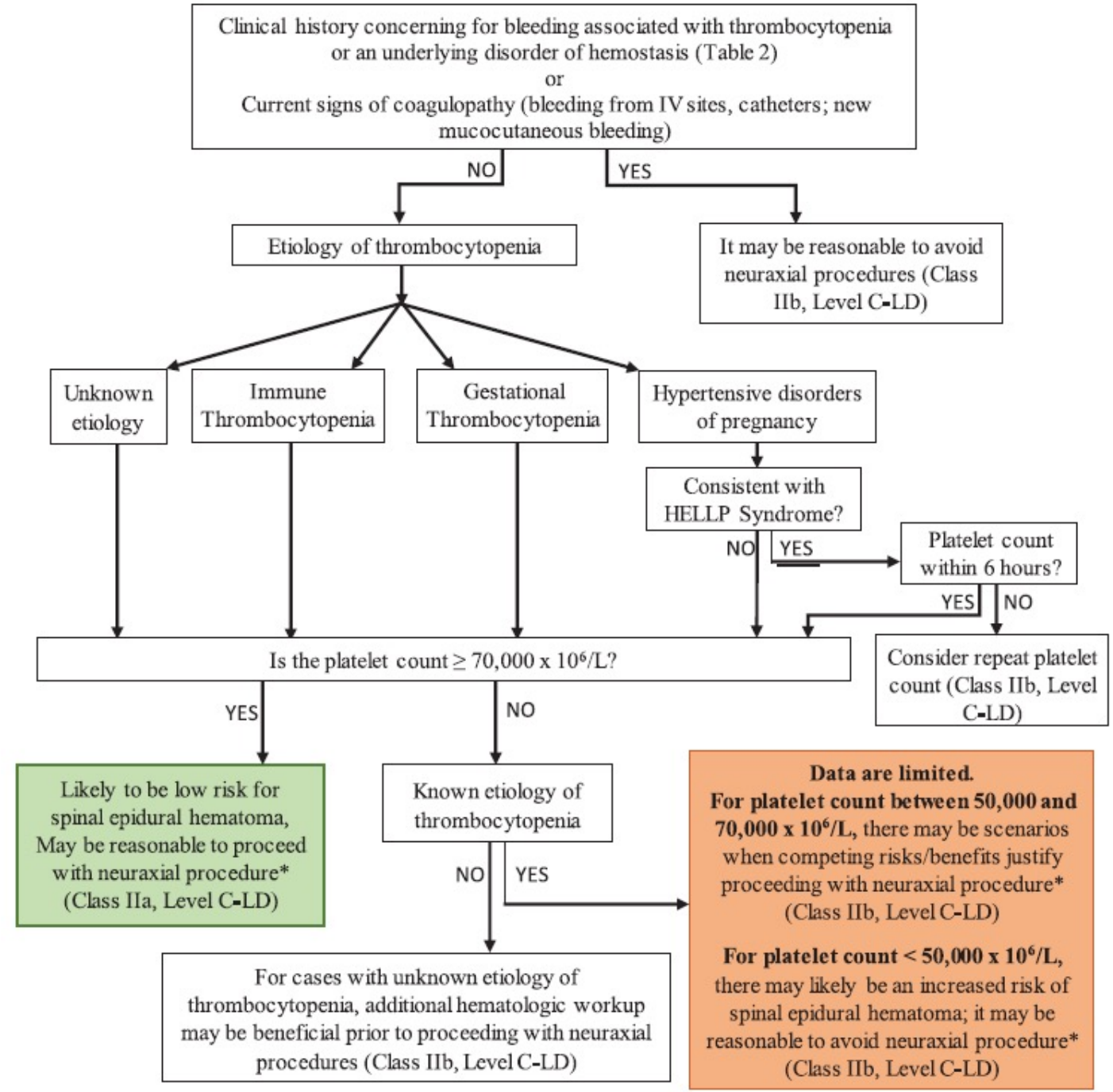
The Society for Obstetric Anesthesia and Perinatology Interdisciplinary Consensus Statement on Neuraxial Procedures in Obstetric Patients With Thrombocytopenia

Melissa E. Bauer, DO,* Katherine Arendt, MD,† Yaakov Beilin, MD,‡ Terry Gernsheimer, MD,§ Juliana Perez Botero, MD,‖ Andra H. James, MD,¶ Edward Yaghmour, MD,# Roulhac D. Toledano, MD, PhD,** Mark Turrentine, MD,†† Timothy Houle, PhD,‡‡ Mark MacEachern, MLIS,§§ Hannah Madden, BS,‡‡ Anita Rajasekhar, MD, MS,‖‖ Scott Segal, MD,¶¶ Christopher Wu, MD,## Jason P. Cooper, MD, PhD,§ Ruth Landau, MD,*** and Lisa Leffert, MD‡‡

Through a systematic review and modified Delphi process, the taskforce concluded that **the best available evidence** indicates the **risk of spinal epidural hematoma** associated with a **platelet count ≥70,000 × 10^6/L** is **likely to be very low in obstetric** patients with thrombocytopenia secondary to gestational thrombocytopenia, immune thrombocytopenia (ITP), and hypertensive disorders of pregnancy **in the absence of other risk factors**.

Endorsed by the American Society of Regional Anesthesia and Pain Medicine (ASRA), American College of Obstetricians and Gynecologists (ACOG), and the Society for Maternal-Fetal Medicine (SMFM)

Anesth Analg. 2021 Jun 1;132(6):1531-1544


Clinical history concerning for bleeding associated with thrombocytopenia or an underlying disorder of hemostasis (Table 2)
or
Current signs of coagulopathy (bleeding from IV sites, catheters; new mucocutaneous bleeding)
NO
YES
Etiology of thrombocytopenia
It may be reasonable to avoid neuraxial procedures (Class IIb, Level C-LD)
Unknown etiology
Immune Thrombocytopenia
Gestational Thrombocytopenia
Hypertensive disorders of pregnancy
Consistent with HELLP Syndrome?
NO
YES
Platelet count within 6 hours?
YES
NO
Consider repeat platelet count (Class IIb, Level C-LD)
Is the platelet count ≥ 70,000 x 10⁶/L?
YES
NO
Likely to be low risk for spinal epidural hematoma, May be reasonable to proceed with neuraxial procedure* (Class IIa, Level C-LD)
Known etiology of thrombocytopenia
NO
YES
Data are limited.
For platelet count between 50,000 and 70,000 x 10⁶/L, there may be scenarios when competing risks/benefits justify proceeding with neuraxial procedure* (Class IIb, Level C-LD)
For platelet count < 50,000 x 10⁶/L, there may likely be an increased risk of spinal epidural hematoma; it may be reasonable to avoid neuraxial procedure* (Class IIb, Level C-LD)
For cases with unknown etiology of thrombocytopenia, additional hematologic workup may be beneficial prior to proceeding with neuraxial procedures (Class IIb, Level C-LD)

Anaesthesia 2013, 68, 966–972 doi:10.1111/anae.12359

Guidelines

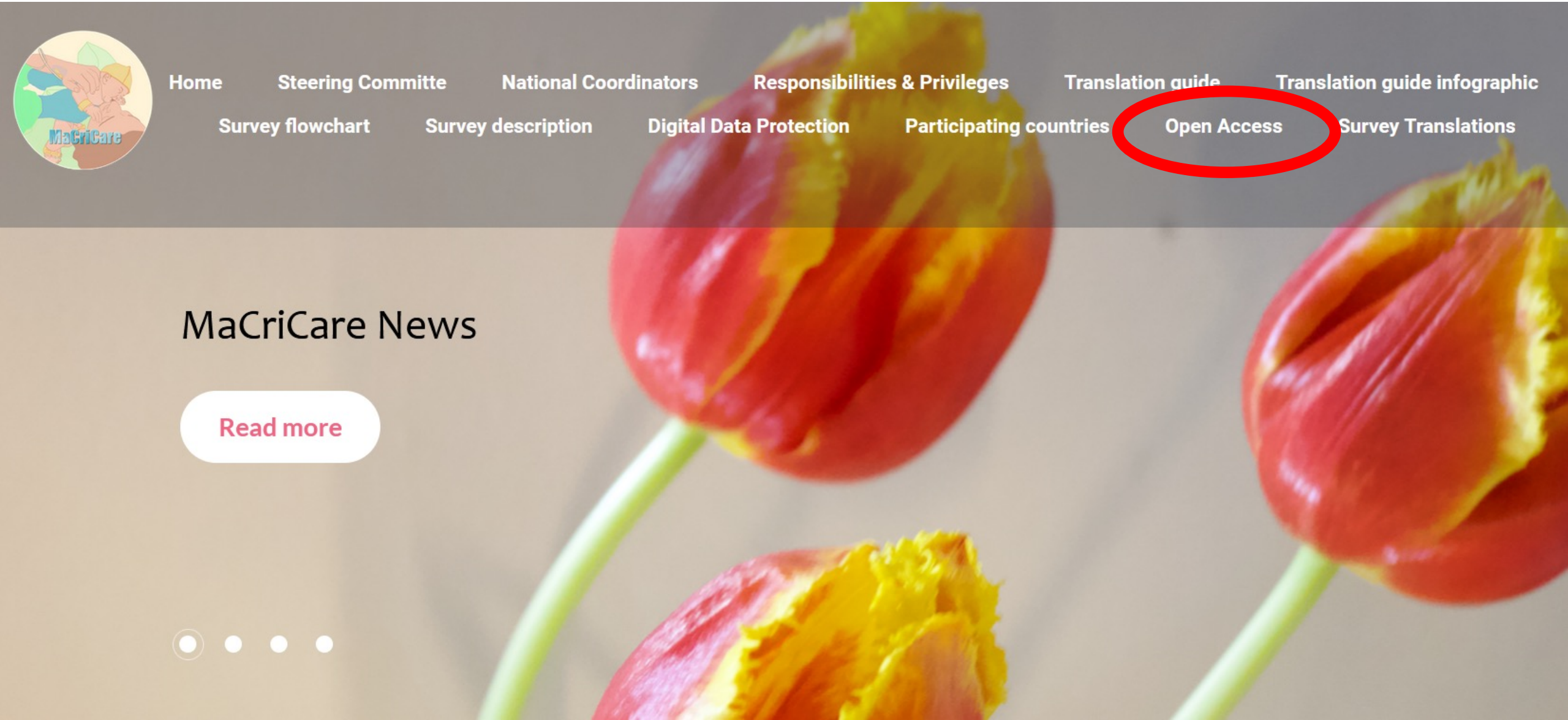
Regional anaesthesia and patients with abnormalities of coagulation

The Association of Anaesthetists of Great Britain & Ireland
The Obstetric Anaesthetists' Association
Regional Anaesthesia UK

Table 3 Relative risks related to neuraxial blocks in obstetric patients with abnormalities of coagulation.

Risk factor	Normal risk	Increased risk	High risk	Very high risk
LMWH – prophylactic dose	> 12 h	6–12 h	< 6 h	< 6 h
LMWH – therapeutic dose	> 24 h	12–24 h	6–12 h	
UFH – infusion	Stopped > 4 h and APTTR ≤ 1.4			APTTR above normal range
UFH – prophylactic bolus dose	Last given > 4 h	Last given < 4 h		
NSAID + aspirin	Without LMWH	With LMWH dose 12–24 h	With LMWH dose < 12 h	
Warfarin	INR ≤ 1.4	INR 1.4–1.7	INR 1.7–2.0	INR > 2.0
General anaesthesia*	Starved, not in labour, antacids given		Full stomach or in labour	
Pre-eclampsia	Platelets > $100 \times 10^9.l^{-1}$ within 6 h of block	Platelets 75–100 $\times 10^9.l^{-1}$ (stable) and normal coagulation tests	Platelets 75–100 $\times 10^9.l^{-1}$ (decreasing) and normal coagulation tests	Platelets < $75 \times 10^9.l^{-1}$ or abnormal coagulation tests with indices ≥ 1.5 or HELLP syndrome
Idiopathic thrombocytopenia	Platelets > $75 \times 10^9.l^{-1}$ within 24 h of block	Platelets 50–75 $\times 10^9.l^{-1}$	Platelets 20–50 $\times 10^9.l^{-1}$	Platelets < $20 \times 10^9.l^{-1}$
Intra-uterine fetal death	FBC and coagulation tests normal within 6 h of block	No clinical problems but no investigation results available		With abruption or overt sepsis
Cholestasis	INR ≤ 1.4 within 24 h	No other clinical problems but no investigation results available		

MaCriCare.org



MaCriCare.org

28 krajów
12 wersji językowych
01.09-30.11.2021
Ankieta online – 15 minut
Protokół na MaCriCare.org

MACRICARE NEEDS YOU

Podsumowanie

- Świadomość powikłań w PDPH
- Optymalne znieczulenie ogólne do cięcia cesarskiego
- TXA – rozszerzone wskazania?
- ERAC – cel do realizacji
- PROSPECT /Morfina Spinal/
- Trombocytopenia (SOAP/AAGBI/OAA): ryzyko vs korzyści

Dziękuję za uwagę !

p.krawczyk@uj.edu.pl