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Painless childbirth? Epidural and spinal techniques in obstetric anesthesia

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Appendices

List of abbreviations

Acknowledgements

Curriculum vitae

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List of abbreviations

A

ADP	Accidental Dural Puncture
AICC	Akaike Information Criterion, Corrected
ANS	Autonomic Nervous System
ASA	American Society of Anesthesiologists
AUC	Area Under the Curve

B

BIC	Bayesian Information Criterion
BMI	Body Mass Index
BPI	Brief Pain Inventory

C

CI	Confidence Interval
CGRP	Calcitonin Gene-Related Peptide
CNS	Central Nervous System
CPSP	Chronic Postsurgical Pain
CSE	Combined Spinal-Epidural
CSF	Cerebrospinal Fluid
CT	Computed Tomography
CTG	Cardiotocogram/Cardiotocography
CPZ	College Perinatale Zorg
CVT	Cerebral Venous Thrombosis

E

EBP	Epidural Blood Patch
ECG	Electrocardiography
EDA	Epidural Analgesia
ED95	Effective Dose 95%
EHG	Electrohysterography
EPDS	Edinburgh Postnatal Depression Scale
EPiMAP	European Practices in the Management of Accidental Dural Puncture in Obstetrics
ERB	Ethical Review Board
ESAIC	European Society of Anaesthesiology and Intensive Care

F

FIGO	International Federation of Gynecology and Obstetrics
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G

GONB	Greater Occipital Nerve Block
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H

HADS	Hospital Anxiety and Depression Scale
HR	Heart Rate
HRV	Heart Rate Variability

I

ICB	Intracranial Bleeding
ICHD	International Classification of Headache Disorders
IQR	Interquartile Range
IRC	Institutional Review Committee
IT	Intrathecal
ITC	Intrathecal Catheter
IUPC	Intrauterine Pressure Catheter
IV	Intravenous

L

LA	Local Anesthetic/Anaesthetic
LEA	Labour Epidural Analgesia
LoR	Loss of Resistance

M

MRI	Magnetic Resonance Imaging
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N

NFMS	Nemo Fetal Monitoring System
NRS	Numeric Rating Scale
NSAIDs	Non-Steroidal Anti-Inflammatory Drugs

O

OAA	Obstetric Anaesthetists' Association
OIH	Opioid-Induced Hyperalgesia
ONSD	Optic Nerve Sheath Diameter
OR	Odds Ratio

P

PACU	Post-Anesthesia Care Unit
PCEA	Patient-Controlled Epidural Analgesia
PCS	Pain Catastrophizing Scale
PDPH	Postdural Puncture Headache
POTS	Postural Orthostatic Tachycardia Syndrome
PPD	Postpartum Depression
PRES	Posterior Reversible Encephalopathy Syndrome
PTSD	Post-Traumatic Stress Disorder

R

RCT Randomized Controlled Trial

S

SA Spinal Anesthesia

SAH Subarachnoid Haemorrhage

SBP Systolic Blood Pressure

SD Standard Deviation

SDH Subdural Hematoma

SIH Spontaneous Intracranial Hypotension

SNOSE Sequentially Numbered, Opaque Sealed Envelopes

SPG Sphenopalatine Ganglion

SPGB Sphenopalatine Ganglion Block

STROBE Strengthening the Reporting of Observational Studies in Epidemiology

T

TVS Trigeminovascular System

V

VIF Variance Inflation Factor

Acknowledgements

Obstetrische anesthesiologie (OA) is in Nederland vooralsnog een ondergewaardeerd subspecialisme. In mijn streven om dit te veranderen en de anesthesiologische zorg voor de (zieke) zwangere te verbeteren, ben ik geleidelijk een niet voor de hand liggende academische weg ingeslagen. Ik heb hierdoor het voorrecht gehad om vele interessante mensen te ontmoeten die elk op hun eigen wijze hebben bijgedragen aan mijn reis. Collega's die uitgroeiden tot vrienden, mentoren die nieuwe perspectieven openden, en medereizigers die momenten van twijfel omzetten in doorzetten. De collega's die me ingewijd hebben in obstetrisch anesthesiologisch onderzoek en de vrienden met wie ik nieuwe onderzoeksprojecten opgezet heb zijn geen van allen afkomstig uit de Nederlandse anesthesiologie. Dat er nu toch dit proefschrift ligt heb ik vooral te danken aan mijn hooggeschatte promotor en co-promotoren.

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Curriculum Vitae

Name: Alexandra Marie-Jeanne Victoria Schyns-van den Berg (Xandra)

Place of birth: Valkenburg-Houthem, The Netherlands

Education

1970-1971: Edron Academy, Mexico D.F., Mexico

1971-1972: John F. Kennedyschool, Queretaro, Mexico

1973-1978: Coriovallum College, Heerlen, the Netherlands

1978-1979: Propedeuse Dutch Language and Literature, Utrecht University (NL)

1979-1987: University of Utrecht, Medical School, 1987 MD

2016-2017: Global Clinical Scholar Research Training (GCSRT), Harvard Medical School

Professional Appointments

1987-1989: Internship Cardiology, Leyenburg Hospital, Den Haag (NL)

1989-1995: Internship/Residency Anaesthesiology, University Medical Centre Utrecht (NL)

1995-1996: Chef de Clinique Anesthesiology, Hospital de Baronie, Breda (NL)

1996-2024: Consultant Anaesthesiologist, Albert Schweitzer Hospital, Dordrecht (NL)

2025-present: Locum Anesthesiologist, currently at Admiraal de Ruyter Hospital, Goes (NL)

Professional Activities

2007-2017: Board member and chair subcommittee Dutch Obstetric Anesthesiology (NVA)

2010-Present: Refresher Course Obstetric Anaesthesia (BE-NL) Organizer and co-director

2016-2018: 25th Anniversary Congress of Dutch Obstetric Anaesthesia, May 2, 2018 during the International Forum on Quality and Safety in Healthcare (IFQSH) "Facilitating Collaboration, Improving Care: Anaesthesia's Role in Safe Obstetrics" Amsterdam (NL), chair of organizing committee

2017-2024: Obstetrische Anesthesie Foundation, chair of board

2022: Organisation and provision of an online course on Obstetric Anaesthesia, with assistance of many international experts, aimed at residents of Myanmar and neighbouring countries who lack formal training

Editorial Activities

2017: Co-editor Anesthesie en de normale zwangerschap (ACCO)

2024: Co-editor Anesthesiologie en Zwangerschap (ACCO)

2023-2025: Contributor to e-learning: Obesitas & Zwangerschap

Research Activities

2014-Present: EPiMAP (Epidural Practices in the Management of Accidental Dural Puncture in Obstetrics, ESA Clinical Trial Network), member of the Steering Committee. (Chief Investigator Dr. Anil Gupta, Karolinska Institute, Stockholm, Sweden)

2017-2021: Co-investigator IT morphine: Effect of IT Morphine on Chronic pain after elective CS. (Chief Investigator Dr. Asish Subedi, Koirala Institute, Dharan, Nepal)

2022-present: Co-investigator: Effect of altitude on postdural puncture headache after Caesarean Section (Chief Investigator Dr. Asish Subedi, Koirala Institute Dharan, Nepal)

2019-2022: Co-investigator Survey Obstetric Anesthesia in the Netherlands

2017-2025: Steering Committee member MaCriCare (Maternal Critical Care in Europe)

2020-2024: Co-investigator Neuraxial analgesia: interaction with progression of labour
Maxima Medical Centre, Veldhoven

2025-present: PreMaCare: Prospective studies in Maternal Care, Cracow (Poland)

2024-present: Preparing a registry of Neuraxial procedures & patient follow-up, Stockholm (SE)

PUBLICATIONS

(* included in this thesis)

A&I, 2010 Pijnbestrijding gedurende de partus M. Coppens, *A.M.J.V. Schyns-van den Berg*

Medisch Contact, 16 Dec. 2010 Partus en pijn hoeven nergens hand in hand *A.M.J.V. Schyns-van den Berg*, N.M.A.A. Engel, M.A.E. Marcus, I.C.M. Beenackers

Current Opinion in Anaesthesiology 28 (3): 267-74 (2015) Postcaesarean section analgesia: are opioids still required? *Schyns-van den Berg AM*, Huisjes A, Stolker RJ

European Journal of Anaesthesiology, 35: 553-555 (2018) Anaesthesiology and ethics: Autonomy in childbirth *Alexandra M.J.V. Schyns-van den Berg*, Frederique Claudot, Antoine Baumann

European Journal of Anaesthesiology 36 (12): 973-976 (2019) Skin-to-skin contact during caesarean delivery: an intriguing interaction between the mother and her child Nicolas Brogly, Leonie Slegers, *Alexandra Schyns-van den Berg*, Emilia Guasch

***British Journal of Anaesthesia, 125 (6): 1045-1055 (2020)** Management practices for postdural puncture headache in obstetrics: a prospective, international, cohort study Anil Gupta, Christian von Heymann, Anders Magnuson, Seppo Alahuhta, Roshan Fernando, Marc Van de Velde, Frederic J. Mercier, *Alexandra M. J. V. Schyns-van den Berg*

Protocolos asistenciales de la sección de anestesia obstétrica de la SEDAR (2021) Chapter 9: Recomendaciones anestésicas en los partos de bajo riesgo *Alexandra Schyns-van den Berg*

***British Journal of Anaesthesia 128 (4): 700-707 (2022)** Intrathecal morphine does not prevent chronic postsurgical pain after elective Caesarean delivery: a randomised controlled trial Asish Subedi, *Alexandra M. J. V. Schyns-van den Berg*, Parineeta Thapa, Prakash M. Limbu, Yojan Trikhatri, Anjali Poudel, Yogesh Dhakal and Sabin Bhandari

***British Journal of Anaesthesia, 129 (5): 758-766 (2022)** Factors associated with failed epidural blood patch after accidental dural puncture in obstetrics: a prospective, multicentre, international cohort study Anil Gupta, Marc Van de Velde, Anders Magnuson, Christian von Heymann, Emilia Guasch, Seppo Alahuhta, Frederic J. Mercier, *Alexandra M. J. V. Schyns-van den Berg*

***Best Practice & Research Clinical Anaesthesiology, Volume 37, Issue 2, June 2023, 171-187** Postdural puncture headache revisited *Schyns-van den Berg AMJV*, Gupta A

***Journal of Anesthesia 2023 Dec; 37(6): 905-913** Effect of height versus height/weight-based spinal bupivacaine on maternal hemodynamics for elective cesarean in short stature patients: a randomized clinical trial Asish Subedi, Parineeta Thapa, Rajesh Prajapati, Alexandra M.J.V. Schyns-van den Berg

Ultrasound in Obstetrics and Gynecology, 62(5), 753-754. 2023 Can national registry data be used to assess effects of epidural analgesia during labor? Papazova, D. A., Schyns-van den Berg, A. M. J. V., Beenackers, I. C. M., & van den Bosch, O. F. C.

Ultrasound in Obstetrics and Gynecology, 62(5), 755-757 2023 Epidural analgesia and emergency delivery: exploring causal misconceptions. van den Bosch, O. F. C., Beenackers, I. C. M., Boonstra, L., Papazova, D. A., & Schyns-van den Berg, A. M. J. V.

Anaesthesia Critical Care & Pain Medicine, Volume 43, Issue 3, 2024 Preparedness for severe maternal morbidity in European hospitals: The MaCriCare study. Krawczyk, P., Dabrowska, D., Guasch, E., Jörnvall, H., Lucas, N., Mercier, F. J., Schyns-van den Berg, A.M.J.V., Weiniger, C. F., Balcerzak, Ł., & Cantellow, S.

Anaesthesia Critical Care & Pain Medicine, Volume 43, Issue 4, 2024 Obstetric units' preparedness to manage critically ill women. The second report from the MaCriCare study. Krawczyk, P., Dabrowska, D., Guasch, E., Jörnvall, H., Lucas, N., Mercier, F. J., Schyns-van den Berg, A.M.J.V., Weiniger, C. F., Balcerzak, Ł., & Cantellow, S.

***Best Practice & Research Clinical Anesthesiology, Volume 38, Issue 2, June 2024, 267-277** Postdural puncture headache: Beyond the evidence A.M.J.V. Schyns-van den Berg, D.N. Lucas, L. R. Leffert

***International Journal of Obstetric Anesthesia, 2025 May; 62: 104296** Uterine contraction frequency after initiation of labour epidural analgesia using electrohysterography monitoring: a prospective pilot study Frenken MWE, Schyns-van den Berg AMJV, Oei SG, Regis M, Meijer P, Houthoff-Khemlani K, van Laar JOEH, van der Woude DAA

***Biopsychosocial Science and Medicine, 87(5):349-352, June 2025** Preoperative higher depression scores are associated with risk of hypotension following spinal anesthesia for caesarean delivery Subedi, Asish; Thapa, Parineeta; Schyns-van den Berg, Alexandra M.J.V.

International Journal of Obstetric Anesthesia, accepted July 16, 2025 Maternal experience in the intensive care unit and Post-discharge care: the third report from the MaCriCare study S. Cantellow, Ł. Balcerzak, A.Schyns-van den Berg, D. Dabrowska, E. Guasch, H. Jörnvall, N. Lucas, F.J. Mercier, C.F. Weiniger, P. Krawczyk, the MaCriCare Study Group

***Canadian Journal of Anesthesia, published online July 22, 2025** Association between postpartum depression and chronic postsurgical pain after Cesarean delivery: a secondary analysis of a randomized trial Asish Subedi, Sharon Orbach-Zinger, *Alexandra M.J.V. Schyns-van den Berg*

Regional Anesthesia & Pain Medicine, accepted August 2025 Voluntary Registry-Based Analysis of Risk Factors for Accidental Dural Puncture in Epidural Anesthesia Jörnvall, Henrik; Orbach-Zinger, Sharon; Schyns-van den Berg, Alexandra

LECTURES & ORAL PRESENTATIONS

2021

- Royal Society of Medicine (23-07-2021): Dutch Obstetric Care, the best of 2 worlds?
- ESRA Virtual Conference (09-09-2021): PDPH: New strategies for an old problem
- DARA-ESRA Radboud MC: What's new in obstetric anesthesia
- AIOS-dag (06-11-2021): Problem-based learning discussion: Obesitas & COVID-2019
- RCOA (15-11-2021): Sepsis in de zwangerschap en het kraambed

2022

- Myanmar Residents Virtual Lectures (January-March 2022): 7 sessions of 2 hours each
- International Congress on Ambulatory Surgery, Bruges (31-05-2022): Caesarean section in day surgery?
- Euroanaesthesia Milano:
 - o (04-06-2022) The obese patient in the labour ward, intrapartum analgesia
 - o (06-06-2022) Primum non nocere, so why do postdural puncture headaches occur frequently in labouring women?
- ESRA Thessaloniki:
 - o The Obstetric patient with pre-existing neurologic disease, can she have an epidural?
 - o How to manage pain during anesthesia for c-section?
- OAA 3-day course, London (09-11-2022): PDPH, new perspectives
- New York PGA (12-12-2022): Clinical Trial Network of the ESAIC: the concept works, EPiMAP

2023

- ESRA/OAA online (20-01-2023): Neuraxial anesthesia for Caesarean Section
- Wintersymposium Leuven (10-02-2023): The placenta and uteroplacental perfusion: the essentials!
- RCoA Anaesthetic Updates, virtual (28-03-2023): Managing patients requiring emergency C-section
- 2nd Summer School of OA, Banja Luka, virtual (10-06-2023): EPiMAP study results
- ESRA World Congress on Regional Anesthesia, Paris (08-09-2023): Managing PDPH in obstetric neuraxial anesthesia
- Monothematic Meeting Obstetric Anesthesia, Algarve:
 - o (02-10-2023) A history of obstetric Anesthesia
 - o (05-10-2023) Anesthetic management of neurologic disease in pregnancy
 - o (06-10-2023) PDPH
 - o Avoiding medicolegal problems in obstetric anesthesia
- Association of Obstetric Anesthesiologists of Ukraine, Kyiv, Virtual:

- o Anesthetic management of neurologic disease in pregnancy
 - o Postdural puncture headache, current insights, improved management
- OAA London (22-11-2023): PDPH: Managing complications or preventing them?
- Slovenian Society of Obstetric Anesthesiology, Ljubljana (18-11-2023): PDPH, prevention and treatment
- RCOA Leuven (04-12-2023): PDPH, een update

2024

- ESRA webinar (April 2024): PDPH
- SOAP Denver, USA (05-05-2024): PDPH, beyond the guidelines
- 3rd Summer School of Obstetric Anesthesia, Banja Luka (08-06-2024): Catching waves, studying the effect of neuraxial labour analgesia on labor and delivery
- Israeli Society of OA, Jerusalem (14-06-2024): Interesting hot topics in obstetric anesthesia: PDPH
- SSAI Oulo, Finland (20-06-2024): PDPH and its long-term consequences
- ESRA Prague:
 - o Cardiac arrest in pregnancy
 - o Defining the walking epidural
- Philippine Society of Anesthesiology Annual Convention, Manila (27-11-2024):
 - o Catching Waves: Electrohysterography to Study the Effects of Neuraxial Analgesia on Progress of Labour
 - o Neurologic disease in pregnancy
- Slovenian Society of Obstetric Anesthesiology, Ljubljana (30-11-2024): The walking Epidural

2025

- World Day Regional Anesthesia, Veenendaal (25-01-2025): Obstetric RA: Evidence-based practice
- POIDA, Rotterdam (19-04-2025): Spinaal, epiduraal, CSE - wat te doen bij complicaties
- 4th Summer School of Obstetric Anesthesia, Banja Luka (06-06-2025): Epidural analgesia: the good, the bad, the ugly?
- Amsterdam Spontaneous Intracranial Hypotension Symposium (SIH) (29-06-2025): The basis of PDPH