

DECEMBER 2019 ■ Volume 221, Number 6

EDITORIAL

539 Vasa previa: time to make a difference

Yinka Oyelese

➤ Related articles, pages 644 and 646

EXPERT REVIEWS

542 To the Point: a prescription for well-being in medical education

Laura Hopkins; Helen Morgan; Samantha D. Buery-Joyner; LaTasha B. Craig; Elise N. Everett; David A. Forstein; Scott C. Graziano; Brittany S. Hampton; Margaret L. McKenzie; Sarah M. Page-Ramsey; Archana Pradhan; Susan Bliss; Undergraduate Medical Education Committee, Association of Professors of Gynecology and Obstetrics

We review the importance of including well-being support and training in the medical curriculum and include resources that help educators incorporate, assess, and customize their own curriculum to enhance learner well-being.

549 The fetal origins of mental illness

Benjamin J. S. al-Haddad; Elizabeth Oler; Blair Armistead; Nada A. Elsayed; Daniel R. Weinberger; Raphael Bernier; Irina Burd; Raj Kapur; Bo Jacobsson; Caihong Wang; Indira Mysorekar; Lakshmi Rajagopal; Kristina M. Adams Waldorf

This review summarizes new evidence for how infections during pregnancy can alter fetal brain development and predispose the child to mental illness decades after birth.

SYSTEMATIC REVIEWS

563 The impact of occupational shift work and working hours during pregnancy on health outcomes: a systematic review and meta-analysis



Chenxi Cai; Ben Vandermeer; Rshmi Khurana; Kara Nerenberg; Robin Featherstone; Meghan Sebastianski; Margie H. Davenport

Pregnant women who work rotating shifts, fixed night shifts, or more than 40 hours per week have an increased risk of adverse pregnancy outcomes.

(continued)

Original research articles, whose abstracts appear in this issue, are posted in full at ajog.org

AJOG's Impact Factor

One measure of the significance of a clinical journal is its effect on research as reflected in citations in subsequent articles. One way to identify that effect is with a journal's Impact Factor, a ratio of the number of citations to articles published in a journal during a given year to citable items published during the 2 preceding years.

The editors and publisher of AJOG proudly report an Impact Factor of 6.120 for 2018 and a 5-year Impact Factor of 5.642.

The latest Impact Factor data appear in the 2019 edition of *Journal Citation Reports* (Clarivate Analytics, Philadelphia), whose metrics are based on citations from 11,877 journals in 81 countries. Impact Factors have been calculated since 1975.

Information about AJOG's Impact Factor dating back to 2014 is posted at <https://journalinsights.elsevier.com/journals/0002-9378>.

Official journal of:



Society for Maternal-Fetal Medicine



Infectious Diseases Society for Obstetrics and Gynecology

The American Journal of Obstetrics & Gynecology (ISSN 0002-9378) is published monthly by Elsevier Inc., 230 Park Avenue, Suite 800, New York, NY 10169. Periodicals postage paid at New York, NY, and additional mailing offices. POSTMASTER: Send address changes to Elsevier, Journal Returns, 1799 Highway 50 East, Linn, MO 65051.



Glossary of Symbols

Editors' Choice



Articles selected by the editors for special notice

SMFM papers



Articles from the Society for Maternal–Fetal Medicine

Fast-Track papers



Research articles from the latest SMFM meeting, sped to press

IDSOG papers



Articles from the Infectious Diseases Society for Obstetrics and Gynecology

Online-only material



Appears only at ajog.org

Supplemental materials



Video clip available at ajog.org



Slides or other supporting didactic information available at ajog.org

Original research articles, whose abstracts appear in this issue, are posted in full at ajog.org

SUBMISSION TO ONLINE PUBLICATION: ~3.5 MONTHS

(continued)

CLINICAL OPINION

- 577 Fetal electrocardiography ST-segment analysis for intrapartum monitoring: a critical appraisal of conflicting evidence and a way forward**
 Isis Amer-Wählin; Austin Ugwumadu; Branka M. Yli; Anneke Kwee; Susanna Timonen; Vanessa Cole; Diogo Ayres-de-Campos; Georges-Emmanuel Roth; Christiane Schwarz; Luca A. Ramenghi; Tullia Todros; Virginie Ehlinger; Christophe Vayssiere; On behalf of the Study Group of Intrapartum Fetal Monitoring (European Association of Perinatal Medicine)

This narrative review critically appraises the evidence for the use of ST analysis for intrapartum fetal monitoring and concludes that compared to CTG alone, the use of CTG plus ST analysis in high-risk women by well-trained staff results in a significant one-third reduction of metabolic acidosis without increasing operative deliveries.

- 602 Opioids affect the fetal brain: reframing the detoxification debate**

Steve N. Caritis; Ashok Panigrahy

The effect of opioids on the fetal brain must be considered in determining management options for pregnant women with an opioid-use disorder.

CALL TO ACTION

- 609 Changing the conversation: applying a health equity framework to maternal mortality reviews**

Michael R. Kramer; Andrea E. Strahan; Jessica Preslar; Julie Zaharatos; Amy St Pierre; Jacqueline E. Grant; Nicole L. Davis; David A. Goodman; William M. Callaghan

Incorporating measures of women's sociospatial context within a health equity framework can help maternal mortality review committees better address disparities.

ORIGINAL RESEARCH

Articles abstracted in this issue appear in full at ajog.org

GYNECOLOGY

- 617 The combined impact of maternal age and body mass index on cumulative live birth following in vitro fertilization**



Randi H. Goldman; Leslie V. Farland; Ann Muir Thomas; Chloe A. Zera; Elizabeth S. Ginsburg

Delaying conception to achieve a lower body mass index before in vitro fertilization may be detrimental to the cumulative live birth rate for older women with obesity.

- 619 Impact of surgical approach on oncologic outcomes in women undergoing radical hysterectomy for cervical cancer**

Maria C. Cusimano; Nancy N. Baxter; Lilian T. Gien; Rahim Moineddin; Ning Liu; Fahima Dossa; Karla Willows; Sarah E. Ferguson

Minimally invasive radical hysterectomy is associated with increased death and recurrence compared to open radical hysterectomy in stage IB cervical cancer patients even after controlling for surgeon volume.

The online issue is FREE with your print subscription. Register at ajog.org/onlineaccess/.

ORIGINAL RESEARCH *(continued)***621 Patient perceptions of same-day discharge after minimally invasive gynecologic and pelvic reconstructive surgery**

Sarah Evans; Erinn M. Myers; Smitha Vilasagar

Most patients perceive same-day discharge favorably following minimally invasive gynecological and pelvic reconstructive surgery.

623 Disparities in healthcare services in women with endometriosis with public vs private health insurance

Jessica Fourquet; Diego E. Zavala; Stacey Missmer; Nabal Bracero; Josefina Romaguera; Idhaliz Flores

We report significant differences in utilization trends of endometriosis-related healthcare services and drug prescriptions based on socioeconomic parameters, indicative of health disparities in this population.

625 Outcomes of secondary cytoreductive surgery for patients with platinum-sensitive recurrent ovarian cancer

Allison Gockley; Alexander Melamed; Angel Cronin; Michael A. Bookman; Robert A. Burger; Mihaela C. Cristae; Jennifer J. Griggs; Gina Mantia-Smaldone; Ursula A. Matulonis; Larissa A. Meyer; Joyce Niland; David M. O'Malley; Alexi A. Wright

Secondary cytoreductive surgery is associated with improved overall survival among select patients with platinum-sensitive recurrent ovarian cancer in a multi-institutional retrospective cohort.

627 Mediterranean diet and outcomes of assisted reproduction: an Italian cohort study

Elena Ricci; Francesca Bravi; Stefania Noli; Edgardo Somigliana; Sonia Cipriani; Marta Castiglioni; Francesca Chiaffarino; Michele Vignali; Benedetta Gallotti; Fabio Parazzini

In an Italian population of women undergoing assisted reproduction techniques, no clear association was observed between adherence to a Mediterranean diet and successful in vitro fertilization.

629 Risks of preoperative anemia in women undergoing elective hysterectomy and myomectomy

Ally Murji; Melody Lam; Britney Allen; Lucie Richard; Salimah Z. Shariff; Peter C. Austin; Jeannie Callum; Lorraine Lipscombe

In women undergoing elective hysterectomy or myomectomy for benign indications, preoperative anemia (hemoglobin <12 g/dL) was an independent risk factor for 30 day postoperative adverse outcomes.

631 Multiparity is associated with poorer cardiovascular health among women from the Multi-Ethnic Study of Atherosclerosis

Oluseye Ogunmoroti; Olatokunbo Osibogun; Olamide B. Kolade; Wendy Ying; Garima Sharma; Dhananjay Vaidya; Erin D. Michos

Multiparity is associated with poorer cardiovascular health among women in middle or late adulthood.

*(continued)***Editors-in-Chief**Catherine Bradley, MD, MSCE
GynecologyRoberto Romero, MD, DMedSci
Obstetrics**Deputy Editors**Jeffrey F. Peipert, MD, PhD
Gynecology

George A. Macones, MD

Anthony M. Vintzileos, MD
Obstetrics**Associate Editors**

Valerie Baker, MD

Vincenzo Berghella, MD

Aaron B. Caughey, MD, PhD

Larry J. Copeland, MD

William A. Grobman, MD, MBA

Wanda Nicholson, MD, MPH, MBA

Mary E. Norton, MD

Samuel Parry, MD

Luis Sanchez-Ramos, MD

Anthony C. Sciscione, DO

Editor for China

Huixia Yang, MD, PhD

INTERNATIONAL AFFAIRS

Yves Ville, MD

Media Editor

Christopher J. Robinson, MD, MSCR

Editors Emeriti

Thomas J. Garite, MD

Moon H. Kim, MD

Ingrid E. Nygaard, MD, MS

E. J. Quilligan, MD

Social Media Committee

Pietro Bortoletto, MD

Frederick R. Bossert, MD, AMT

Martin R. Chavez, MD

Joshua D. Dahlke MD

Linda R. Duska, MD

Andrea L. Greiner, MD

Vanita D. Jain, MD

Elisa M. Jorgensen, MD

Kimberly K. Ma, MD

Emily S. Reiff, MD

Amber Samuel, MD

Mark F. Sewell MD

J. Ryan Stewart, DO

Mallory A. Stuparich, MD, FACOG

Melissa S. Wong, MD

Pensee Wu, MRCOG, MD(Res), MBChB

(continued)

Statistical Consultants

Paul S. Albert, PhD
Cande Ananth, PhD, MPH
Anita Das, PhD
Mary D. Sammel, ScD

Managing Editors

Sandra Perrine
Donna L. Stroud

Editorial Consultant

Marcia Ringel

Advisory Board**Subspecialty Areas**

Ray O. Bahado-Singh, MD
Obstetric ultrasound

Judith L. Balk, MD
Nutrition

Sarah L. Berga, MD
Neuroendocrinology and
reproductive neurobiology

Michael J. Birrer, MD, PhD
Biology of gynecologic cancers

Wendy R. Brewster, MD, PhD
Gynecologic epidemiology

William Camann, MD
Obstetric anesthesiology

Frank A. Chervenak, MD
Ethics

Reese Clark, MD
Neonatology

Arnold W. Cohen, MD
Managed care

Michal A. Elovitz, MD
Translational science in obstetrics

Murray Freedman, MD
Psychosexual issues

Robert E. Garfield, PhD
Uterine physiology

Ronald S. Gibbs, MD
Infectious diseases

Linda C. Giudice, MD, PhD
Reproductive cellular biology

(continued)

ORIGINAL RESEARCH (continued)**OBSTETRICS****633 Maternal cardiac parameters can help in differentiating the clinical profile of preeclampsia and in predicting progression from mild to severe forms**

Elvira Di Pasquo; Tullio Ghi; Andrea Dall'Asta; Laura Angeli; Stefania Fieni; Giuseppe Pedrazzi; Tiziana Frusca

Cardiac output, systemic vascular resistance and pulsatility index of uterine arteries in women with mild preeclampsia predict the evolution toward severe forms.

635 Fetal growth patterns in pregnancy-associated hypertensive disorders: NICHD Fetal Growth Studies

Julio Mateus; Roger B. Newman; Cuilin Zhang; Sarah J. Pugh; Jagdishwar Grewal; Sungduk Kim; William A. Grobman; John Owen; Anthony C. Sciscione; Ronald J. Wapner; Daniel Skupski; Edward Chien; Deborah A. Wing; Angela C. Ranzini; Michael P. Nageotte; Nicole Gerlanc; Paul S. Albert; Katherine L. Grantz

Fetal growth in pregnancy-associated hypertensive disorders is abnormal only in severe preeclampsia and is characterized by asymmetric growth reduction identifiable as early as midgestation.

638 Randomized comparison of a reduced-visit prenatal care model enhanced with remote monitoring

Yvonne S. Butler Tobah; Annie LeBlanc; Megan E. Branda; Jonathan W. Inselman; Megan A. Morris; Jennifer L. Ridgeway; Dawn M. Finnie; Regan Theiler; Vanessa E. Torbenson; Ellen M. Brodrick; Marnie Meylor de Mooij; Bobbie Gostout; Abimbola Famuyide

A reduced-visit prenatal care model supplemented with remote monitoring results in higher patient satisfaction and lower prenatal stress, while maintaining care standards for pregnant women.

640 First stage of labor progression in women with large-for-gestational age infants

Stephanie A. Blankenship; Candice L. Woolfolk; Nandini Raghuraman; Molly J. Stout; George A. Macones; Alison G. Cahill

Women with large-for-gestational age infants, particularly obese and nulliparous women, progress more slowly through active labor than women with appropriate-for-gestational age infants.

642 Prediction of spontaneous vaginal delivery in nulliparous women with a prolonged second stage of labor: the value of intrapartum ultrasound

Andrea Dall'Asta; Laura Angeli; Bianca Masturzo; Nicola Volpe; Giovanni Battista Luca Schera; Elvira Di Pasquo; Flavia Girlando; Rossella Attini; Guido Menato; Tiziana Frusca; Tullio Ghi

The midline angle and the head-symphysis distance can predict the likelihood of spontaneous vaginal delivery in nulliparous women with prolonged second stage of labor.

(continued on page 6A)

Advisory Board (continued)

Robert L. Goldenberg, MD
Obstetric epidemiology

Steven R. Goldstein, MD
Gynecologic ultrasound

Seth M. Guller, PhD
Translational science in obstetrics

Susan L. Hendrix, DO
Reproductive physiology

Robert J. Kurman, MD
Gynecologic pathology

Laurence B. McCullough, MD
Ethics

Jennifer L. Melville, MD, MPH
Behavioral medicine

Thomas J. Musci, MD
Fetal physiology

Leslie Myatt, PhD
Vascular biology

Anita L. Nelson, MD
Family planning

Jennifer R. Niebyl, MD
Drugs in pregnancy

Errol R. Norwitz, MD, PhD
Translational science in obstetrics

Pasquale Patrizio, MD, MBE
Andrology

Susan D. Reed, MD, MPH
Menopause

Joseph S. Sanfilippo, MD, MBA
Adolescent gynecology

Nanette Santoro, MD
Menopause

Robert M. Silver, MD
Immunology

Stephen Vermillion, MD
Peer review

Kenneth Ward, MD
Molecular genetics

Katharine D. Wenstrom, MD
Genetics and teratology

Sharon Wilczynski, MD, PhD
Cytology and pathology

(continued)

ORIGINAL RESEARCH (continued from page 4A)

644 Vasa previa: a multicenter retrospective cohort study

Hadi Erfani; Sina Haeri; Scott A. Shinkler; Antonio F. Saad; Rodrigo Ruano; Timothy N. Dunn; Atefeh Rezaei; Soroush Aalipour; Ahmed A. Nassr; Amir A. Shamshirsaz; Micah Vaughn; William Lindsley; Melissa H. Spiel; Sherif A. Shazly; Eniola R. Ibiroga; Steven L. Clark; George R. Saade; Michael A. Belfort; Alireza A. Shamshirsaz

Outcomes in antenatally diagnosed vasa previa are excellent. There is a higher chance of resolution when vasa previa is diagnosed before rather than after 24 weeks of gestation.

➤ Related editorial, page 539

646 Frequency of spontaneous resolution of vasa previa with advancing gestational age

Rebecca Klahr; Nathan S. Fox; Kelly Zafman; Melissa B. Hill; Courtney T. Connolly; Andrei Rebarber

Approximately 39% of vasa previas (39/100) are resolved over the course of pregnancy.

➤ Related editorial, page 539

648 In utero exposure to antibiotics and risk of congenital malformations: a population-based study


Per Damkier; Louise M. S. Brønneiche; Johan F. B. Korch-Frandsen; Anne Broe Merging comprehensive, complete, and validated national registries, we found no excess risk of congenital malformations to be associated with 10 antibiotics commonly prescribed in pregnancy.

650 Prospective evaluation of screening performance of first-trimester prediction models for preterm preeclampsia in an Asian population


Piya Chaemsathong; Ritsuko K. Pooh; Mingming Zheng; Runmei Ma; Noppadol Chaiyasit; Mayumi Tokunaka; Steven W. Shaw; Suresh Seshadri; Mahesh Choolani; Tuangsit Wataganara; George S. H. Yeo; Alan Wright; Wing Cheong Leung; Akihiko Sekizawa; Yali Hu; Katsuhiko Naruse; Shigeru Saito; Daljit Sahota; Tak Yeung Leung; Liona C. Poon

The first-trimester Fetal Medicine Foundation triple test is effective in the prediction of preterm preeclampsia in an Asian population, and it is superior to the approach recommended by the American College of Obstetricians and Gynecologists and the National Institute for Health and Care Excellence.

IMAGES IN GYNECOLOGY
653 Umbilical endometriosis (Villar's nodule)

Pradip Dashraath; Chen Kailun; Ma Li

A 30-year-old nulliparous woman presented with a pelvic mass and an enlarging umbilical nodule over the preceding 6 months, which appeared as a firm, russet-red tumor protruding through her umbilicus.

654 Shedding cells from the fimbriae of fallopian tubes

Yingying He; Zhen Xiao

A 42-year-old woman underwent a total hysterectomy and bilateral salpingectomy because of uterine fibroids.

*(continued)***RESEARCH LETTERS****655** Safety and varicella outcomes after varicella zoster immune globulin administration in pregnancy

Geeta K. Swamy; Sarah K. Dotters-Katz

656 QI Bootcamp: feasibility and acceptability of a novel approach to training residents in process improvement

Ilona T. Goldfarb; Nicole A. Smith

LETTERS TO THE EDITORS**659** Cerebroplacental ratio assessment in low-risk population

Roger A. McMaster-Fay

Reply, page 659

Ranjit Akolekar; Kypros H. Nicolaides

660 Clinical utility of noninvasive prenatal screening for pathogenic copy number variants

Li-Li Xu; Dong-Zhi Li

Reply, page 661

Matthew Hoi Kin Chau; Daljit Singh Sahota; Kwong Wai Choy;

Kwong Wai Choy

662 Unexpected term NICU admissions: a marker of obstetrical care quality?

Jonathan M. Snowden; Suzan L. Carmichael; Mark A. Klebanoff

663 Generalizability from well-designed RCTs underpin their scientific strength

Kristy P. Robledo; Val Gebiski; Pedro Ramirez

Reply, page 663

Farr R. Nezhat; Cande V. Ananth; Anthony M. Vintzileos

664 Cerebroplacental ratio and estimated fetal weight, the 2 different yardsticks

José Morales-Roselló; Gabriela Loscalzo; Silvia Buongiorno;

Alfredo Perales-Marín

IDSOG ABSTRACTS**666** IDSOG Oral Presentations**676** IDSOG Poster Presentations**SOCIETY FOR MATERNAL-FETAL MEDICINE****B2** SMFM Fetal Anomalies Consult Series #2: Extremities

Society for Maternal-Fetal Medicine (SMFM); Jennifer McKinney; Martha W. F. Rac; Manisha Gandhi

International Editorial BoardAris Antsaklis, MD, PhD
GreeceRigmor Austgulen, MD, PhD
NorwayPhillip R. Bennett, MD, PhD
United KingdomDominique Cabrol, MD, PhD
FrancePavel Calda, MD, PhD
Czech RepublicErnesto Castelazo, MD
MexicoZi-Jiang Chen, MD, PhD
ChinaAgustin Conde-Agudelo, MD
ColombiaGian Carlo DiRenzo, MD, PhD
ItalyJoachim Dudenhausen, MD
GermanyWilliam Fraser, MD, MSc, FRCSC
CanadaSharad Gogate, MD
IndiaWolfgang Holzgreve, MD
SwitzerlandJung Gu Kim, MD, PhD
KoreaKarel Marsal, MD, PhD
SwedenEnrique Oyarzun, MD
ChileZoltán Papp, MD, PhD
HungaryGamal I. Serour, MD
EgyptNiels Ulbjerg, MD
DenmarkHerman P. van Geijn, MD, PhD
The NetherlandsLiliana S. Voto, MD
Argentina*(continued)*

Affiliated Societies

American Gynecological
and Obstetrical Society
agsonline.org

Association of Professors
of Gynecology and Obstetrics
apgo.org

Central Association
of Obstetricians and Gynecologists
caog.org

Infectious Diseases Society
for Obstetrics and Gynecology
idsog.org

Pacific Coast Obstetrical
and Gynecological Society
pcogs.org

Society of Gynecologic Surgeons
sgsonline.org

Society for Maternal–Fetal Medicine
smfm.org

South Atlantic Association
of Obstetricians and Gynecologists
saaog.org

SOCIETY FOR MATERNAL-FETAL MEDICINE

(continued)

B19 Obstetric Care Consensus #9: Levels of Maternal Care: (Replaces Obstetric Care Consensus Number 2, February 2015)



The American Association of Birth Centers; the American College of Nurse-Midwives; the Association of Women's Health, Obstetric and Neonatal Nurses; the Commission for the Accreditation of Birth Centers; and the Society for Obstetric Anesthesia and Perinatology endorse this document. The American Academy of Family Physicians supports this document. The American Society of Anesthesiologists has reviewed this document. This document was developed jointly by the American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine in collaboration with Sarah J. Kilpatrick; M. Kathryn Menard; Christopher M. Zahn; and the Centers for Disease Control and Prevention's representative William M. Callaghan, MD, MPH

This Obstetric Care Consensus document provides standardized descriptions of the facility capabilities and personnel at four levels of risk-appropriate maternal care and focuses on the need for development of collaboration between facilities of different care levels to enhance the ability of women to give birth safely in their communities while providing support for circumstances when higher level resources are needed. This document is a revision of the original 2015 Levels of Maternal Care Obstetric Care Consensus that clarifies terminology and includes more recent data based on published literature and feedback from levels of maternal care implementation.

RECRUITMENT & EMPLOYMENT OPPORTUNITIES

13A Classified advertising