International Journal of Obstetric Anesthesia (2019) **40**, 1–3
0959-289X/$ - see front matter © 2019 Elsevier Ltd. All rights reserved.
https://doi.org/10.1016/j.ijoa.2019.08.008

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EDITORIAL

Combatting myths and misinformation about obstetric anesthesia

Myths and misinformation about obstetric anesthesia have long plagued our subspecialty. Flawed or misleading research can contribute towards these myths and misinformation. As an example, we review a recently published study that reported an association between general anesthesia for cesarean delivery and autism. We discuss why this study's findings were misleading, the responsibilities of non-anesthesia journal editors who accept such manuscripts, and the role of the media in publicizing findings from these studies.

In May 2019, several news media outlets ran stories[1–4] highlighting the findings of a study of children with autism-spectrum disorder (ASD) published in the Journal of Autism and Developmental Disorders.[5] In this study by Huberman et al.,[5] general anesthesia for cesarean delivery was purported to increase the risk of ASD. News stories reported that this was a 'groundbreaking discovery'[1] and that 'exposure to general anesthesia during a cesarean section is apparently the fundamental factor that connects C-sections to autism'.[4]

The research in question was a nested retrospective case-control study examining data from 347 children with ASD, 117 children with developmental delay and 2226 matched controls, all born between 2009 and 2016 at a single obstetric center in Israel. Outcomes data (ASD or developmental delay) were sourced from a hospital autism database. Maternal and delivery data were abstracted from a perinatal database. Although the main study aim was to examine the link between cesarean delivery and ASD, the authors' principal finding was that babies born to mothers receiving general anesthesia had a 1.6-fold increased risk of ASD compared with mothers undergoing vaginal delivery. After reviewing the paper, we identified a number of critical design flaws. These likely resulted in biased estimates of the autism risk associated with general anesthesia reported in the study. First, in the logistic regression analyses, the selected reference group was vaginal deliveries. However, without a comparison group of women undergoing neuraxial anesthesia for cesarean delivery, the risk of general anesthesia relative to neuraxial anesthesia cannot be accurately determined. Second, only 67 children with ASD were born by cesarean delivery under general anesthesia. No event rate for ASD was provided for cesarean deliveries under neuraxial anesthesia. Given the small number of ASD cases and the large number of regression models used to examine the anesthesia-autism associations, type-1 error is a major concern. Third, residual confounding is a major limitation, yet key familial factors and relevant intra-uterine, peri-operative and postnatal exposures were not reported. Specific details pertaining to the indication and the degree of urgency for the cesarean delivery were not provided. In addition, no details about specific anesthetic agents or about duration of exposure were described. Fourth, ascertainment bias is a concern because controls were not screened for ASD. Fifth, the authors did not reference an observational study by Sprung et al. who examined the association between anesthetic exposure during cesarean delivery and learning disabilities among 5320 children born in Olmsted County, Minnesota, USA.[6] In this study, the likelihood of a learning disability was not significantly different between children exposed to general or regional anesthesia compared with mothers delivered vaginally. We acknowledge that other epidemiological research has reported an association between general anesthesia and ASD. In a large cohort study examining 536 673 children born in Taiwan between 2004 and 2007, children born to mothers who received general anesthesia for cesarean delivery had a 1.67-fold increased risk of autism compared to mothers who received regional anesthesia.[7] However, as with the Huberman et al. study,[5] residual confounding is a concern with, notably, no information about the urgency of each cesarean delivery. These conflicting findings highlight the need for high-quality prospective data.

Misinformation and the news media

The media's response to the study by Huberman et al. typifies how news stories amplify the impact of poor-quality research, generating false hopes or unfounded fears among readers. Because general anesthesia is typically considered for true obstetric emergencies (e.g. cord prolapse or fetal bradycardia),[8] the study's clinical ramifications are concerning because these news stories may scare women into refusing general anesthesia when there is an acute clinical indication. In light of these concerns, a rebuttal from the Israeli Society of Anesthesiologists

(ISA) was published in Yedioth Achronoth, an Israeli national newspaper.[9] In the rebuttal, the ISA highlighted the weaknesses of the Huberman et al. study and emphasized that general anesthesia is not causally linked to ASD. In addition, the ISA have submitted a Letter to the Editor for publication to highlight these concerns.

This is not the first time, and is unlikely to be the last, that media have highlighted misleading findings from studies of obstetric anesthesia practices and interventions. In other studies, investigators have previously claimed that neuraxial labor analgesia was linked to an increased risk of cesarean delivery and long-term back pain.[10,11] Assuaging these claims has taken considerable time and effort by anesthesia researchers.[12–15] In contrast, the news media is less interested in research reporting favorable perinatal outcomes linked to contemporary obstetric anesthesia practices, notably from modern neuraxial labor analgesia regimens.[12,16,17]

Obstetric anesthesia research, journals, and the media: is there room for improvement?

Clinicians, researchers and the media perceive peer-reviewed journals as trustworthy sources of credible medical information.[18] During the process of peer review, decisions of journal editors and peer reviewers are critical in determining whether the scientific findings of research papers are legitimate. Furthermore, to meet minimum standards of peer review, authors are expected to adhere to publishing guidelines such as the "Uniform Requirements" of The International Committee of Medical Journal Editors (ICJME)[19] and reporting guidelines endorsed by the EQUATOR Network.[20] Whether all authors and journals rigidly follow these guidelines is unclear.[21–23] Peer reviewers may be susceptible to numerous biases when assessing manuscripts, including: ad hominem bias (bias for or against a person based on personal jealousy, friendship, or sympathy for the author's situation); affiliation bias (bias related to the whether the author's institution is prestigious or not); and ideologic bias (bias for or against the author's position).[24] To address these biases, new peer-review strategies have attracted journals' interest, including double-blind peer review in which authors and their affiliations are concealed from reviewers, open peer review which reveals the full identities of authors and reviewers, and an 'independent' discussion section in which an independent expert who is not an author writes a second discussion.[24,25] These strategies may help to limit poor-quality research entering the public domain. In addition, we strongly recommend that journal editors of non-anesthesia journals obtain peer review from at least one expert obstetric anesthesiologist.

Once a paper is published, journalists may struggle to find or understand key medical information, including the potential harms of interventions and the study limitations.[18,26] To mitigate these concerns, high-quality press releases issued by medical journals can improve the quality of information presented to journalists.[27] There are also lessons to learn from the fallout of the well-publicized vaccine-autism crisis. Strategies for correcting vaccine misinformation such as contrasting myths with facts, or presenting images of non-vaccinated sick children, are ineffective and can back-fire, leading to reinforcement of deep-seated beliefs and increased resistance to vaccination.[28] More recently, to remove damaging online misinformation, cyber techniques have been proposed.[29] However, it is unclear whether correcting misinformation about obstetric anesthesia alters patients' or providers' entrenched beliefs.

Other strategies may also help the obstetric anesthesia community respond to poor-quality research. One approach is to improve how women obtain information about obstetric anesthetic and labor analgesic practices. Data from a survey of 2400 mothers in the United States indicated that the most trustworthy sources of information about pregnancy and childbirth (in descending order) were maternity care providers, childbirth education classes, and pregnancy and childbirth websites.[30] However, the survey did not assess how mothers received antenatal information about labor analgesia or cesarean anesthesia. We know that Google searches for the word 'epidural' have increased in recent years, with 726 000 searches performed in 2015,[31] and more patient information about obstetric anesthesia is appearing online. This includes patient education materials published by obstetric anesthesia societies,[32,33] and op-eds with interviews from leading obstetric anesthesia experts.[34] To determine what information about our practice is of most interest to mothers, and whether conventional print media or e-media is the most effective means of distributing this information, we need large-scale population-specific survey data. For mothers who prefer to receive information online, engaging influencers with a strong online and social media presence can assist us in meeting these goals.[35]

In conclusion, we believe that better quality peer review and news reporting may reduce the myths and misinformation about obstetric anesthesia. Only then will we see whether the message is getting through.

Financial disclosures

This editorial was not funded.

A.J. Butwick
Department of Anesthesiology, Perioperative, and Pain Medicine, Stanford University School of Medicine, Stanford, CA, USA

C.F. Weiniger
Division of Anesthesia, Critical Care and Pain, Tel Aviv Sourasky Medical Center, Israel
E-mail address: carolynw@tlvmc.gov.il

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