A Predictive Instrument for Cesarean Delivery After Labor Induction

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In *JAMA Network Open*, Hamm et al observed a reduction in cesarean delivery and maternal morbidity after clinical implementation of a calculator to predict the risk of cesarean delivery after labor induction. The prognostic knowledge gained from the prediction calculator to guide the obstetrician in medical practice is most evident in the group with a predicted cesarean delivery risk of 40.0% to 59.9% in the study. Among women in this predicted risk group, there were 19 fewer cesarean deliveries per 100 women after clinical implementation of the calculator (ie, the obstetrician had knowledge of the predicted cesarean delivery risk) than there were before clinical implementation of the calculator (ie, the obstetrician did not have knowledge of the predicted cesarean delivery risk). Presumably, it is this group of women for whom the likelihood of cesarean delivery after labor induction is most uncertain for the obstetrician; even the calculator predicted that neither vaginal nor cesarean delivery was considerably more likely. Knowledge of a predicted risk of 40.0% to 59.9% appears to have prevented some cesarean deliveries in this group of women and to have decreased the morbidity associated with cesarean delivery.

In the women with the highest predicted cesarean risk—those with a risk of 60.0% or greater—there was no statistically significant difference in the proportion who underwent cesarean delivery after clinical implementation of the calculator compared with before calculator implementation (52.6% vs 61.1%, respectively; *P* = .30). Obstetricians can perhaps better assess the need for cesarean section after labor induction in this high-risk group. There was, however, an observed decrease of more than 5 hours in the time to cesarean delivery in this group of women after clinical implementation of the calculator. This finding suggests that, with the confirmation (or knowledge) of a high-risk probability of cesarean delivery after labor induction from the calculator, obstetricians tended to perform cesarean delivery sooner. Furthermore, as noted by Hamm et al,1 maternal morbidity from a prolonged and failed induction can be avoided for some women in this high-risk group with implementation of the calculator.

Finally, after clinical implementation of the calculator, a 6% absolute reduction in cesarean delivery in the group with lowest (<20.0%) predicted risk for cesarean delivery was observed, with suggestion of a similar reduction in the group with a predicted risk of 20.0% to 39.9%. It appears that the calculator-predicted cesarean delivery risk informed the practice of medicine even in this low-risk group, although observed differences in maternal outcomes were less pronounced than those observed in groups at higher risk for cesarean delivery.

Two decades ago in an advanced epidemiology course, my classmates and I reviewed a 1984 publication on the use of a handheld calculator to assist the emergency department physician in the diagnostic probability of acute ischemic heart disease for patient admission to a coronary care unit.2 A fellow doctoral student said, incredulously, “Really, physicians are walking around holding a calculator to estimate the diagnostic probability of acute ischemic heart disease in their patient?” The idea did seem strange. Such a comment would not be made in today’s smartphone era: use of a prediction calculator to assist in physician knowledge and the practice of medicine is increasingly common.3

Miettinen4(p441)—the professor of the aforementioned epidemiology class—wrote in his eminent series on the modern scientific physician that the practice of medicine is an art: “Like Plato originally, and just before him, Aristotle distinguished science from the arts—the latter meaning ‘productive’ arts (techne), medicine among these. The essential difference between science and the arts was in the nature of the product: knowledge (episteme) vs artifacts or actions.” Miettinen holds

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that, regardless of whatever predicates, the practice of medicine is art and not science, in the Aristotelian and still appropriate meanings of art and science.4

The rationale for Hamm et al in developing5 and implementing1 the prediction calculator for the risk of cesarean delivery after labor induction was precisely to improve the obstetrician’s practice of medicine through appropriate action. Approximately one-third of labor inductions result in cesarean delivery, yet an obstetrician's ability to predict which women can have successful induction resulting in a vaginal birth is limited.1,5-7 The initial observations by Hamm et al1 among women at a university labor unit suggest that their predictive instrument refined the obstetrician's art in performing cesarean delivery after labor induction. Implementation of a predictive calculator at other obstetrical centers—either the same calculator or an adapted version, depending on differences in induction prevalence and clinical and patient characteristics—may further reduce the number of cesarean deliveries and maternal morbidity after labor induction.

ARTICLE INFORMATION
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REFERENCES