the pregnant patient with symptomatic gallbladder disease.

The authors also identified a higher risk of preterm delivery in the third trimester group and emphasized the potential associated neonatal morbidity. The authors surmised that the prepartum cholecystectomy group had significantly worse cerebral, cardiac, and pulmonary complications. They also assumed an increase in fetal demise. There are no data presented in this report to support these conclusions. Furthermore, the authors did not evaluate the timing of preterm delivery. Spontaneous abortions, which could be induced by delay in treatment of a severe disease process such as severe cholecystitis and biliary pancreatitis, were not recorded. Other confounding factors include that the prepartum subset was slightly older and had a higher Charlson Comorbidity Index than their postpartum counterparts.

In summary, we would like to thank Fong and colleagues for bringing attention to this important topic. The limitations of the existing literature on laparoscopy in pregnancy have been clearly referenced in the SAGES guidelines and indicate the need for high quality studies that will enable guideline developers to provide meaningful advice to surgeons treating pregnant patients.

The SAGES Guidelines committee will continue critically analyzing and grading the published literature using the most robust methodology. Our committee has a task force dedicated to reviewing recent literature and assessing whether our published guidelines require amending or modification. Our detailed review of this article and its limitations do not support a change in our recommendations at this point. Surgeons should continue exercising caution when dealing with surgical diseases in the pregnant patient, but proceed safely with surgery when it is in the best interest of their patient.

REFERENCES

1. Fong ZV, Pitt HA, Strasberg SM, et al. Cholecystectomy during the third trimester of pregnancy: proceed or delay? J Am Coll Surg 2019;228:494–502.e1.
2. Pearl JP, Price RR, Tonkin AE, et al. SAGES guidelines for the use of laparoscopy during pregnancy. Surg Endosc 2017;31:3767–3782.
3. Guyatt GH, Oxman AD, Vist GE, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. BMJ 2008;336:924–926.

Disclosure Information: Nothing to disclose.

Guideline Recommendations for Cholecystectomy in Pregnancy: Need for Emphasis on Neonatal Outcomes

In reply to Pearl et al

Zhi Ven Fong, MD, MPH, PhD,
David C Chang, PhD, MPH, MBA
Boston, MA

Henry A Pitt, MD, FACS
Philadelphia, PA

We thank Pearl and colleagues[1] for their interest in our article titled, "Cholecystectomy during the third trimester of pregnancy: proceed or delay?" First, we would like to acknowledge and thank the authors for their role in the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) Guidelines Committee. These efforts are time consuming and costly, and these surgeons should be commended for taking on the necessary task of providing practitioners with guidelines to assist with everyday patient management. When their most recent guideline for surgery in pregnancy was updated,[2] existing data were not robust, especially with respect to neonatal outcomes.

As the authors point out, inherent biases exist in using administrative databases to address clinical questions, and this issue was acknowledged within our manuscript. Due to possible upcoding practices in patients with biliary colic, our study group deemed that using diagnostic ICD-9 codes would be unreliable, making the indication for cholecystectomy difficult to ascertain. That said, we accounted for disease severity by adjusting for setting (outpatient vs inpatient), urgency (scheduled vs unscheduled), and cholecystectomy approach (open vs laparoscopic). Additionally, we leveraged the longitudinal nature of the database to better define a more homogenous cohort by including only pregnant women who did not have any previous biliary-related hospital episodes before delivery. This subanalysis excluded potential failure of medical management in both third trimester and postpartum women. Analyses after adjustment for disease severity and previous admission both confirmed that preterm delivery was twice as common when operation was performed in the third trimester.

The only maternal issues that we uncovered were related to length of stay, readmissions, and cost. However, the importance of optimizing neonatal outcomes needs to be emphasized. Literature assessing the association of preterm delivery with bronchopulmonary dysplasia, retinopathy of prematurity, learning disabilities, and mortality is abundant[3-5] and should not be ignored. Our group is working to obtain California's neonatal dataset that will be linked to maternal identification numbers to more directly analyze the neonatal outcomes. Although this further analysis is necessary, our findings with respect to preterm delivery are very important, are the best data currently available, and should inform the next guideline update. Pearl and colleagues[1] mention that spontaneous abortions were not recorded in our analysis, but this issue relates to first and second trimester women. Preterm delivery is the third trimester concern, which has the potential for lifelong disability for the child.

The gold standard to ascertain the best timing for cholecystectomy for pregnant patients with gallbladder disease in their third trimester would be randomized controlled trials. However, the difficulty in recruiting these women makes a trial impractical, or even impossible, to conduct. Therefore, we believe that waiting and hoping for higher quality studies to appear is not in the best interests of these infants. Our study needs to be carefully interpreted, but the current cited evidence in the SAGES guidelines are problematic.[2] The guidelines state that "both laparoscopic cholecystectomy and appendectomy have been successfully performed late in the third trimester without increasing the risk of preterm labor or fetal demise." However, the studies cited were vastly underpowered (leading to type II errors, ie false negative findings). Of note, 1 reference demonstrated that both laparoscopy and laparotomy were associated with increased risks of preterm delivery and underweight infants (<2,500 g).[6]

The immediate next guideline sentence, "importantly, postponing necessary operations until after parturition has been shown in some cases to increase the rates of complications for both mother and fetus" cites studies that assess pregnant females of first, second, and third trimesters. In fact, the final reference used to support that statement actually demonstrated that cholecystectomy during the third trimester did have a higher rate (82%) of preterm labor.[7] Our study exclusively assessed pregnant women in the third trimester, and the stage of pregnancy is a detail that is important to be differentiated when recommending treatment options in pregnant women. The fact that surgeons and obstetricians are not following current guidelines 98% of the time needs to be acknowledged. For the vast majority of third trimester pregnant women requiring a cholecystectomy, delay of a few weeks to enhance neonatal maturity should be recommended.

REFERENCES

1. Fong ZV, Pitt HA, Strasberg SM, et al. Cholecystectomy during the third trimester of pregnancy: Proceed or delay? J Am Coll Surg 2019;228:494–502.e1.
2. Pearl JP, Price RR, Tonkin AE, et al. Guidelines for the use of laparoscopy during pregnancy 2017. Available at: https://www.sages.org/publications/guidelines/guidelines-for-diagnosis-treatment-and-use-of-laparoscopy-for-surgical-problems-during-pregnancy/. Accessed November 13, 2018.
3. Costeloe KL, Hennessy EM, Haider S, et al. Short term outcomes after extreme preterm birth in England: Comparison of two birth cohorts in 1995 and 2006 (the EPICure studies). BMJ 2012;345:e7976.
4. Morley CJ, Davis PG, Doyle LW, et al. Nasal CPAP or intubation at birth for very preterm infants. N Engl J Med 2008;358:700–708.
5. Johnson S, Fawke J, Hennessy E, et al. Neurodevelopmental disability through 11 years of age in children born before 26 weeks of gestation. Pediatrics 2009;124:e249–257.
6. Reedy MB, Kallen B, Kuehl TJ. Laparoscopy during pregnancy: A study of five fetal outcome parameters with use of the Swedish Health Registry. Am J Obstet Gynecol 1997;177:673–679.
7. Visser BC, Glasgow RE, Mulvihill KK, et al. Safety and timing of nonobstetric abdominal surgery in pregnancy. Dig Surg 2001;18:409–417.

Disclosure Information: Nothing to disclose.
Support: Drs Chang and Fong are supported by California Office of Statewide Health Planning and Development, Contract #13-4146.

Case Fatality Rates Do Not Tell the Whole Story

Angela Sauaia, MD, PhD,
Ernest E Moore, MD FACS,
Hunter B Moore, MD, PhD
Denver, CO

Given the paucity of resources and the controversy associated with gun-related research,[1] we commend Sarani and colleagues[2] for their study on potentially preventable deaths and sites of injuries by different types of firearms. The authors presented rigorous methods to assess autopsy results and define potentially preventable deaths. Yet the article's emphasis, now reported in lay media,[3] was on the lethality of handguns vs rifles (reportedly, a case fatality rate of 72% for handguns vs 19% for rifles; $p = 0.10$) and its impact on policy. For this latter purpose, the study design, as well as its sampling strategy, analysis, and results' interpretation, was unsuited. The study suffers from substantial selection