Trauma experts study treatment of pregnant trauma patients to improve neonatal outcomes

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Expectant mothers who sustain a traumatic injury and receive care at a hospital with a designated trauma center experience better outcomes than those treated at a non-trauma hospital. They are less likely to experience preterm labor (give birth prematurely), have a low birth weight infant, or have meconium at delivery (a sign of fetal distress), according to new study results published online in the *Journal of the American College of Surgeons* in advance of print publication later this year.

During pregnancy, approximately 8 percent of women sustain traumatic injuries such as fractures, superficial or open wounds. "Previous research has shown that even minor injuries in pregnancy can result in serious maternal and neonatal morbidity," said study coauthor Major John T. Distelhorst, DO, MPH, a U.S. Army Preventive Medicine physician at Fort Bragg, North Carolina. "In cases of injury, pregnant women have had poor neonatal outcomes, so we wanted to know whether the trauma system could better help these women."

Trauma centers are specialized medical facilities that have optimal processes and resources in place to monitor and meet the critical needs of injured patients. Care at trauma designated hospitals has been shown to decrease the risk of death and improve outcomes after injury in non-pregnant populations. Until now, however, there has been very little data on the impact of trauma systems on women who are pregnant. The aim

of this study was to examine the association between the type of hospital (trauma versus non-trauma hospital) at which pregnant women receive care and maternal and neonatal outcomes.

For this analysis, researchers linked two databases—-the Washington State Birth Events Records Database and the Comprehensive Hospital Abstract Recording System. This alignment allowed them to assess the maternal and neonatal outcomes of all injured pregnant women (3,429 patients) who were hospitalized in Washington State between 1995 and 2012.

The researchers adjusted for confounding factors, including injury severity score, maternal age, education status, and prenatal smoking status. The leading causes of injury accounting for hospitalization in both the trauma hospitals and non-trauma hospitals were motor vehicle accidents and falls.

The study findings showed that expectant mothers treated in the trauma system did much better. Treatment at a specialized trauma hospital lowered the odds of preterm labor by 40 percent. Among neonatal complications, treatment at a trauma hospital decreased the odds of premature birth by 26 percent, of low birth weight by 28 percent, and of meconium at delivery by 46 percent.

"This study shows beneficial effects that trauma hospitals can have on injured pregnant women and their neonates," Dr. Distelhorst said. "We hope that the state trauma systems will look at this information to optimize their resources and triage protocols."

The study also suggests that in some cases of injury, women who are pregnant may be under triaged. "Our study showed that about 16 percent of pregnant patients at non-trauma hospitals actually had severe injuries, implying that some of these patients might have been under triaged, as

all of their care occurred at non-trauma hospitals," said study coauthor Vijay Krishnamoorthy, MD, assistant professor of anesthesiology, University of Washington. "It might be explained by the EMS system or the fact that the patients were driven in a private vehicle to a non-trauma hospital. But we would like to learn more about how women are brought to the hospital."

Because trauma systems differ from region to region, the study authors hope that these findings will lead to further studies using different populations in different states. "Our results are for Washington State, a regionalized and inclusive trauma system," Dr. Distelhorst said. "These findings can help our system improve care for injured pregnant women and neonates, and can contribute to helping to improve the trauma systems in other states."

Dr. Krishnamoorthy added, "This is the first step to more studies in other states with different populations of injured pregnant women. And if this association continues to hold it may change triage practice, potentially leading to treating pregnant patients with injuries, even moderate injuries, in trauma hospitals."

More information: John T. Distelhorst et al. Association between Hospital Trauma Designation and Maternal and Neonatal Outcomes after Injury among Pregnant Women in Washington State, *Journal of the American College of Surgeons* (2016). DOI: 10.1016/j.jamcollsurg.2015.12.010

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