

Maternal-fetal Protection in Automobile Accidents and Reliability in the use of Existing Safety Belts

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Abstract— This study aimed to understand the mechanisms of lesions that occur in pregnant women involved in automobile accidents, their outcomes, and to evaluate the effectiveness and reliability in the use of existing seatbelts. A systematic review was conducted based on PubMed, Scielo, and Lilacs. Descriptors: Pregnancy, traffic accidents, pregnancy complications, seatbelts, protective devices. Criteria of inclusion: Articles published in the period from 2006 to 2017, in the English, Portuguese, or Spanish languages. Eight studies were selected that comprised the sample in this research. The findings indicate that the main mechanisms of lesions that occur in pregnancy due to an automobile accident are related to direct trauma on the abdomen, given that at the moment of an accident the objects located within the vehicle continue moving forward, causing the pregnant woman to project the torso forward, strongly compromising the uterus, even with the use of the sub-abdominal seatbelt; despite this, the majority of the authors relate that the non-use of the seatbelts could lead to even graver traumatizations, including adverse fetal consequences.

Keywords— Seat belt; Pregnancy; Auto Accident.

I. INTRODUCTION

In the last decades, there has been a great change in the incidence of causes of maternal death. At the beginning of the century, the main causes were obstetric ones, determined by the lack of prenatal care and inadequate delivery assistance. Currently, with the improvement of medical services, hospitalization of births and decrease of parity, maternal mortality was significantly reduced. The same was not observed in relation to the fetal mortality rate, since non-obstetric pregnancies became more important (Corsi et al., 1998).

Pregnant women were rarely victims of trauma, but today it has become an increasingly common problem that has been increasing morbidity and mortality statistics, especially in large urban centers, and the most common are auto accidents and firearms. These types of accidents leading to maternal and perinatal deaths could be avoided, as they depend on the primary prevention attitudes of the people, the vehicle manufacturers, and secondarily on a better training of the health team that deals with emergencies and pregnant women victims of trauma (COSTA, RAMOS and SERRANO, 2005).

Automobile injuries may entail serious consequences (Weiss and Strotmeyer, 2002), such as premature labor or even fetal loss (El-Kady et al., 2004; Pearlman et al., 1990). Gestational age may be an important factor that affects the risk of fetal loss, since in the first two months of pregnancy there is a higher risk of fetal loss in the case of an automobile accident (El-Kady et al., 2004).

Many injuries and deaths resulting from auto accidents can be prevented with the proper use of safety equipment, in which the safety belt occupies a prominent place, since the correct use of such a device reduces both the mortality and the severity of the resulting injuries of traffic accidents (Adura et al, 2003).

Despite the great importance of the use of safety belts, some pregnant women do not use them either because of lack of habit or because they feel that they can be detrimental to the pregnancy or even the discomfort that they cause to them and this decision can entail risks and irreparable damages to the mother-fetus binomial (Adura et al, 2004).

The traumatized pregnant woman is a singular patient, because two people are victimized simultaneously. In

addition, the physiological adaptations of the maternal organism during pregnancy alter the normal pattern of response to the different variables involved in the trauma. These alterations of the organic structure and function may influence the evaluation of the pregnant woman traumatized by the alteration of the signs and symptoms of the lesions, alter the approach and response to volume resuscitation, as well as the result of the diagnostic tests. Gestation may also affect the pattern and severity of the lesions (Pereira junior et al, 1999)

However, no accessory seems to have specific function for the protection of the abdominal area of a pregnant woman. An experimental series of vehicle collisions evaluated the effect of force transmitted to the uterus and concluded that the three-point seat belt provides superior protection for the mother and fetus when compared to the subabdominal. Following the abrupt deceleration, the trunk projected forward strongly compresses the uterus (550 mmHg increase) and the three-point belt can eliminate this pressure increase in the gravid uterus by the action of the diagonal strap that will prevent the body's the pelvis. In experimental studies, the diagonal strap increased fetal survival from 50% to 92% (ADURA et al, 2003).

II. METHODOLOGY

A systematic review was performed on PubMed, Scielo and Lilacs databases. Descriptors: pregnancy, accidents traffic, pregnancy complications, seat belts, protective devices. Inclusion criteria: articles published in the period 2006 to 2017, languages English, Portuguese or Spanish.

III. RESULTS

We selected 08 papers that composed the sample of this research. The results indicate that the main mechanisms of injuries that occur in pregnancy in the event of an automobile accident are related to the direct trauma on the abdomen, since at the moment of an accident the objects housed inside the vehicle continue moving forward, leading to pregnant woman to project the trunk onwards by severely compressing the uterus, even with the use of sub abdominal belts, despite this, most authors report that non-use of these could lead to more severe trauma including adverse fetal consequences. They also report that the lack of prenatal orientation for the importance of wearing a seat belt is a factor that often contributes to discouraging the pregnant woman from not having as a habit to wear them. As a result, most authors point out that the main ones are: placental abruption, uterine rupture, severe bleeding, prematurity and fetal and

maternal death. Regarding the effectiveness of seat belts, the authors generally state that the three-point seat belt would provide greater efficacy for the pregnant occupant by reducing the risks compared to the belts currently used.

IV. CONCLUSION

Based on this systematic review we observed the need to propose the creation of a model to be developed that has the function of providing the correct positioning of the vehicular safety belt in pregnant women, including an accessory for storage of memory device, pen drive type, which will provide access in emergency / emergency situations to the medical history of the pregnant woman.

ACKNOWLEDGEMENTS

Special attention to the Institute of Technology and Education Galileo of the Amazon and the Federal University of Pará.

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