

Decreased Incidence of Rib Fractures in Pregnant Patients After Motor Vehicle Collisions

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INTRODUCTION

- The hormonal changes associated with pregnancy decrease the stiffness and increase the laxity of cartilage and tendons
- The effect of these changes on injury mechanics is not completely understood
- Objective: To compare the incidences of chest wall injury following blunt thoracic trauma between pregnant and nonpregnant women

METHODS

- Retrospective evaluation of all female patients age 18 – 45 years old entered into the trauma registry at an ACS-COT level 1 Trauma Center from 2009-2017
- Mechanism of Injury was MVC
- Injury severity, protective devices, imaging modality, patient characteristics, length of stay, mortality, and injuries were abstracted
- Incidence of rib fractures was evaluated for pregnant and non-pregnant patients
- Statistics were performed with SPSS v24
- Presented as Mean +/- St. Deviation or Median (IQR) for normally and non-normally distributed data

RESULTS

Table 1. Patient Characteristics

Characteristic	Pregnant	Nonpregnant	All patients	P
Age, mean (SD), y	25.9 (5.4)	28.7 (7.8)	28.5 (7.7)	<.001
Injury Severity Score, median (IQR)	1 (0-6)	5 (1-12)	5 (1-12)	.003
Score on Glasgow Coma Scale, median (IQR)	15 (15-15)	15 (15-15)	15 (15-15)	.34
Mortality, %	0.0	1.8	1.8 (28)	.41
Hospital length of stay, median (IQR), d	1 (0-3)	1 (0-4)	1 (0-4)	.98
Intensive care unit length of stay, median (IQR), d	0 (0-0)	0 (0-0)	0 (0-0)	.12
Days of mechanical ventilation, median (IQR)	0 (0-0)	0 (0-0)	0 (0-0)	.14

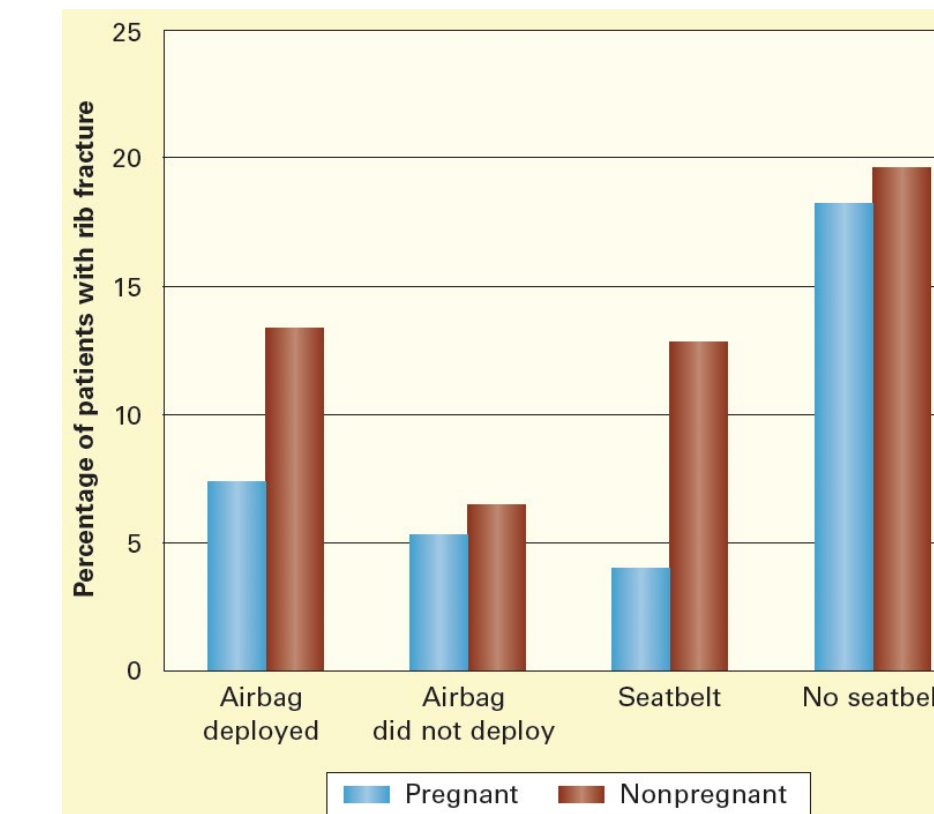
Abbreviation: IQR, interquartile range.

Table 2. Chest injuries in female trauma patients after MVC

Chest injury	Percentage of group		P
	Pregnant	Nonpregnant	
Rib fracture	7.9	15.2	.047
Pulmonary contusion	4.0	5.3	.56
Hemopneumothorax	7.9	10.4	.42

- No significant differences in GCS scores, mortality, length of hospital stay, length of stay in ICU, or days of mechanical ventilation between the groups
- Significantly lower incidence of rib fracture in the pregnant group ($P = .047$)
- No significant difference in incidence of pulmonary contusion and hemopneumothorax
- Pregnant patients without fractures had significantly lower ISS values ($P < 0.001$)

Figure 1. Comparison of rib fracture incidence and type of automotive safety restraint in female trauma patients



- No significant difference between groups in restraint type used
- Lower incidence of rib fracture in pregnant patients wearing seatbelt ($P = 0.04$)

CONCLUSIONS

- Pregnant patients have a lower rate of rib fracture after MVC
- Intrathoracic injury without rib fracture should raise concerns about injury severity in the pregnant patient
- The difference in injury mechanics in the pregnant patient may be due to hormonal changes resulting in increased elasticity and resistance to bony injury
- Limitations
 - Single-center study with low number of pregnant trauma patients
 - Significant difference in mean age between the groups
 - Unable to adequately power the study to perform a regression analysis accounting for the age and ISS differences
- A multicenter evaluation of these findings is warranted to evaluate the clinical implications if our current findings can be replicated in a larger group of pregnant patients

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