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The Danger of Air Bags for Children in the Front Seat

In this issue of the *American Journal of Neuroradiology*, Marshall et al report the patterns of injury found in children suffering severe or fatal air bag trauma during low-velocity motor vehicle accidents (page 1599). Their results suggest that head trauma is the most important mechanism of injury in infants in rear-facing seats, and that craniofacial and cervical spine injuries are most significant in older children. These results make explicit the widely reported risk of air bag inflation to infants and small children. The authors have provided radiologists with valuable information on the patterns of trauma found in these children. This report will help guide radiologic evaluation and raise awareness of the type of injuries most likely to occur. The workup may be further tailored if details of the accident (eg, velocity of the vehicle, whether the child was restrained or unrestrained) are known.

This article reinforces the warning that children should ride in the back seat, properly restrained. It is striking that the major risk to children who are in the front seat of air bag-equipped cars is to those who are not properly restrained in front-facing car seats or lap-and-shoulder belts. Practical considerations largely limited this study to severe or fatal injuries; thus, it is impossible to know what proportion of low-velocity accidents with air bag inflation is represented by the severe injuries Marshall and colleagues report. Although 128 excess child deaths have been estimated as a result of widespread use of passenger-side air bags, the reliability of this figure is unclear. This report also does not address the potential value of full-power air bags for children who are not properly restrained but riding in the front seat, or whether, considering accidents at all velocities, restrained children in the front seat are safer with a deactivated or an active air bag. It is well known that children are at substantially lower risk for death and injury in automobile accidents than are adults (1).

As is often the case, the authors are chasing a moving target. The coming improvements in auto safety and air-bag design Marshall et al cite most likely will alter the pattern and severity of injuries found in the future. Depowering of air bags may save the lives of children who might otherwise have died as

a result of air-bag injury. However, some of these children may have suffered less severe but still significant brain injury, which would not have been detected had full-power air bags been in use in the passenger seat. In other words, although autopsy records of patients who have died of air-bag injuries may yield some clues, milder head trauma produces few pathologic changes, and those that do occur are detected only as a result of a focused search for these lesions. Therefore, mild brain injury, to the extent that it may have occurred with full-power air bags in patients who died of trauma outside the CNS, may not have been detected to date. Of course, such mild injuries are also more likely with lower-powered air bags.

The nature and relative frequency of injuries, in addition to their severity, may be altered through the replacement of current air bags with depowered versions. Thus, it is possible that the predominance of CNS injuries in severe or fatal air-bag trauma may not persist when depowered or "smart" bags are widely available. The authors may need to repeat this study in a few years to update the radiologic community on the changing distribution of injuries found as air-bag technology evolves.

Side-impact air bags may pose a further risk to children in the front seat. These systems have not been in widespread use long enough to determine whether they contribute to the danger or provide any net protection for these children. Although one would hope that children will rarely ride in the front seat of vehicles equipped with passenger and side-impact air bags, future studies are certain to reveal the pattern of injuries associated with this safety innovation.

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References

1. National Highway Traffic Safety Administration. *Traffic Safety Facts, 1996*. Bethesda, MD: US Government Printing Office; 1996

Eye-Popping Fistulas: What's in a Name?

Graybeards in our ranks may muse reflectively upon the discourse set forth by Komiyama and colleagues in this issue of the *American Journal of Neuroradiology* (page 1641), in which they confirm a well-

known but poorly documented occurrence: that major craniofacial trauma resulting in severe epistaxis causes angiographically demonstrable arteriovenous fistulas of the cavernous sinus. The fact is well known