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SHORT REPORTS

Effect of seat belt legislation on the incidence of sternal fractures seen in the accident department

In the United Kingdom legislation on the compulsory wearing of seat belts was introduced on 1 February 1983. Subsequently the number of front seat occupants of vehicles wearing seat belts increased dramatically. There is no doubt that seat belts correctly worn greatly reduce the incidence of serious and fatal injuries in automobile accidents,^{1 2} and in Cambridge a reduction of 20-25% has been seen since legislation.

Seat belts may, however, be associated with certain injuries³—for example, fractured sternums—and since legislation we might expect to see an increased incidence of these.^{4 5} At Addenbrooke's Hospital, Cambridge, I noticed that a comparatively large proportion of front seat car occupants hurt in automobile accidents were presenting with anterior chest pain and were found to have sternal fractures. The aim of this study was therefore to determine whether the incidence of patients presenting to the casualty department with a sternal fracture had increased as a result of seat belt legislation.

Method and results

The data were collected from the casualty records of Addenbrooke's Hospital (which sees about 40 000 casualties a year). All patients seen in the casualty department for injuries received in automobile accidents are documented as such. During 1 February 1981 to 31 January 1983 and 1 February 1983 to 31 January 1985—that is, the two years before and after legislation—all patients sustaining injuries as front seat occupants in automobile accidents were identified. Those who received chest injuries and also those who received multiple injuries where a chest injury was not specifically recorded had their records drawn. From these it was determined which patients had sustained a sternal fracture and whether or not they had been wearing a seat belt at the time of their accident.

Also included were patients brought into hospital dead as a result of an automobile accident and those admitted but who subsequently died of their injuries. From necropsy reports it was determined if any had sustained a sternal fracture (table).

Comparison of the two study periods showed a highly significant increase in the number of patients presenting with sternal fractures since legislation ($\chi^2=13.14$; $p<0.001$). About 90% of these fractures occurred in patients claiming to have been wearing a seat belt at the time of their accident. By contrast, there was no significant change in the overall incidence of all chest injuries in the two periods ($\chi^2=0.21$; $p>0.5$). This last finding agrees with other studies.⁵

Numerical data on front seat occupants of vehicles admitted to casualty department after road traffic accidents during two years before and two years after introduction of compulsory wearing of seat belts (1 February 1983)

	February 1981 to January 1983	February 1983 to January 1985
No of patients seen in casualty department after automobile accidents	1970	1620
No with chest injuries	226	178
Fractured sternums:		
Total	7	24
Belted	3	21
Unbelted	3	2
Unknown	1	1
Driver	6	16
Passenger	1	8
Mean age (range)	39 (18-61)	58 (34-84)
Male: female ratio	5:2	2:1

Comment

Before wearing seat belts became compulsory most sternal fractures were caused by the steering wheel or dashboard in unrestrained front seat occupants. Some people sustained fatal, multiple injuries and never reached the casualty department, having been certified dead at the accident site. These deaths accounted for about 5-10% of all deaths among front seat occupants (the latter totalling about 35 a year before legislation) and the proportion was similar in the period after legislation. Although the number of deaths before legislation was greater by about 20%, probably the number of sternal fractures in these people was not greatly different between the two periods. Lack of information on this relatively small group would not alter the significance of the increase in sternal fractures seen since seat belt legislation.

My study shows a threefold increase in the incidence of sternal fractures since legislation, coupled with an increase in the number of people surviving high speed automobile accidents and also a pronounced increase in the number of people wearing seat belts. Most patients sustaining a sternal fracture while wearing a seat belt received no other serious injury and the fracture was uncomplicated.

Evidence to date confirms the great benefit of correctly worn seat belts in automobile accidents. It therefore seems reasonable to conclude that an uncomplicated fracture of the sternum, albeit painful, is an acceptable price for the compulsory wearing of seat belts in exchange for more serious multiple injuries or even death.

I thank the casualty department of Addenbrooke's Hospital for help in facilitating this study.

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Cyanide toxicity after immersion and the hazards of dicobalt edetate

We report on a patient with cyanide toxicity who developed severe oedema after treatment with dicobalt edetate.

Case report

A 43 year old industrial chemist was admitted to casualty 15 minutes after total immersion for three minutes in a vat containing 1000 gallons (4546 litres) of hot cupric cyanide. On arrival he was deeply unconscious, cyanosed, and breathing irregularly. Oxygen 100% was administered by mask and intravenous infusion begun. His contaminated clothing was removed and the "cyanide box" in casualty opened. Arterial blood was obtained for measurement of gas tensions; cyanide, urea, electrolyte, and glucose concentrations; and full blood count. In accordance with the instructions he was given 300