Serious eye injuries caused by bottles containing carbonated drinks

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SCIENTIFIC REPORT

Aim: To analyse serious eye injuries caused by bottles containing pressurised drinks.

Methods: Retrospective review of the databases of US, Hungarian, and Mexican eye injury registries.

Results: In the combined database (12,889 injuries), 90 cases (0.7%) were caused by bottle tops or glass splinters. The incidence varied widely: 0.3% (United States), 3.1% (Hungary), and 0.9% (Mexico), as did the agent. Champagne bottle corks were responsible in 20% (United States), 71% (Hungary; p<0.0001), and 0% (Mexico). Most eyes improved, but 26% remained legally blind.

Conclusions: The presence of warning labels on champagne bottles appears to reduce cork related eye injuries, as does using plastic bottles and caps.

Bottles containing pressurised fluid are potentially hazardous, even under normal circumstances. We present data on 90 such injuries from standardised surveillance systems in three countries—United States, Hungary, and Mexico.

Patients and Methods

We retrospectively reviewed the databases of the US eye injury registry (USEIR), surveillance arm of the American Society of Ocular Trauma, and two of its international affiliates, the Hungarian (HEIR) and the Mexican eye injury registries (MEIR). In the USEIR model, initial and 6 month follow up information on both outpatients and inpatients is collected electronically (useironline.org and weironline.org) on all types of serious trauma using the Birmingham Eye Trauma Terminology (BETT) system. Only unintentional injuries occurring under ‘normal circumstances’ were included in this study. Fisher’s two sided exact test was used for statistical analysis.

Results

Results are presented in table 1.

Discussion

The first report on unintentional eye injuries from bottles containing pressurised drinks was followed by many from several countries from Sri Lanka to the United States, but no population based study is available. One review from India found that 15% of inpatient trauma cases were the result of bottle explosion. In a hospital based study 2.2% had such an aetiology in Kuwait, while a 2% rate was found in a 19 hospital survey in Israel. In our databases, 0.23% (USEIR) to 0.9% (HEIR) to 0.5% (MEIR) of cases had such an aetiology. The true incidence is thought to be much higher.

The material used for packaging pressurised fluids determines the injury risk. Glass is breakable, especially after wall thinning, and is responsible for the most severe cases. In our study, 38% of injuries, and almost all open globe trauma, were caused by glass splinters. Conversely, plastic and metal cans pose little danger: we found no related injury among the 12,889 cases. Use of plastic bottles and screwcaps helps reduce the incidence of bottle related injuries: their annual number and rate gradually decreased in the USEIR from seven (0.9%) in 1991 to one (0.2%) in 1997, and we noticed similar trends in Hungary and Mexico. The US Consumer Product Safety Commission (CPSC) estimated that 32,000 people were treated in emergency rooms for bottle related trauma in 1974; a recent search conducted at our request on the CPSC database found only 12 such injuries in 1990 and five in 2000. A similar search of the National Electronic Injury Surveillance System database identified 22 cases in 1990 and seven in 2000.

The pressurised liquid is ejected at a high velocity and can crush the eye, as well as impair the visual system. The threat is increased by the use of carbonated drinks, which deliver higher velocities and greater energy to the eye. Such injuries occur in children, who are often playing with the bottle, and in adults, especially in bars.

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In conclusion, bottles containing carbonated drinks can cause severe ocular trauma. Among patients with adequate follow up in the combined USEIR/HEIR/MEIR database, 26% of eyes remained legally blind. Injuries occur even if the bottle is handled properly, but the risk markedly increases if the bottle is not chilled or is improperly handled. The risk of ocular trauma is not restricted to the person handling the bottle: more than one fourth of patients in our combined database were bystanders. Trauma caused by the broken glass typically results in more severe damage, requires more surgical interventions, and has worse prognosis than that caused by flying bottle tops. Open globe injury can also result from broken prescription glasses.

There are several ways to reduce the injury risk. School campaigns should be waged since children are the most susceptible. The use of plastic bottles, metal cans, and plastic screws, rather than glass and pressed metal caps, is crucial. Conspicuous warning labels should be placed on all champagne bottles. Based on this study, we plan to approach manufacturers—or legislators if need be—in Hungary and request label placement, which serves the interest of the industry as well by reducing liability. The use of specialised opening tools (such as the PerfectPop, www.perfectpop.com) should also be encouraged since these also decrease the risk.

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REFERENCES


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