Letters

RESEARCH LETTER

Incidence of Sports-Related Sudden Death in France by Specific Sports and Sex

Although screening programs prior to participation in sports have been used for many years for young competitive athletes,[1] it has been suggested that screening programs might also be worthwhile in the general population.[2] Description of the incidence of sports-related sudden death by specific sports as well as by sex and age may help inform the debate.

Methods | The study design and population have been described previously.[3] Briefly, this prospective study was performed in France between 2005 and 2010, and was approved under the auspices of the French National Institute of Health and Medical Research as well as the French Ministry of Sports and Health with oral informed consent obtained from survivors. However, consent was not required for nonsurvivors (84.3% of cases). Overall, 60 of 96 administrative districts participated voluntarily, and included a population of approximately 35 million inhabitants. Sports-related sudden death was reported by local emergency medical services and defined as death occurring during or within 1 hour of cessation of sports activity, whether the resuscitation was successful or not.[3]

To maximize case detection, we also used systematic web-based monitoring, which was performed continuously by a specific working group. Data were then obtained from medical records. Only patients between the ages of 15 and 75 years were included in this analysis. In addition, because there is no evidence supporting a triggering effect of light exertion, calculation of incidence of sports-related sudden death only included cases during moderate and vigorous exertion, and was assessed by sex, age range, as well as by the 3 most frequent sports among women in France (cycling, jogging, and swimming).[4]

Level of exercise at the time of sports-related sudden death was assessed by responding emergency medical technicians using a prospectively defined scale[3] (light, <4 metabolic equivalents [METs]; moderate, 4-8 METs; and vigorous, >8 METs). The denominator included overall sports participants and those of specific sports based on the 2000 National French Survey of Sports Practices, a random sample of 6526 people aged 15 to 75 years, with a 68% response rate.[4]

All tests were 2-tailed and a *P* value of less than .05 was considered statistically significant. All data were analyzed using Stata software version 11.0 (StataCorp).

Results | There were 775 sports-related sudden death cases during moderate to vigorous exertion over 5 years. Of these cases, 51% were first reported by emergency medical services and 49% by press report with further confirmation by emergency medical services in the majority of cases (<2% were finally confirmed by web-based monitoring); 42 (5%) were women. The mean (SD) age of sudden death in women was 44 (17) years vs 46 (15) years in men ($P = .33$). The overall mean incidence rate in women was estimated to be 0.51 (95% CI, 0.34-0.68) per million female sports participants vs 10.1 (95% CI, 9.3-10.8) in men ($P<.001$) (**Table**).

The incidence rate of sports-related sudden death significantly increased with age among men (5.23 for 15-34 years to 14.19 for 55-75 years; $P<.001$), but not among women (0.43 for 15-34 years to 0.65 for 55-75 years; $P = .47$) (Table). The overall incidence of sudden death differed by sport for men but not women (**Figure**). No significant differences were observed among the 60 participating districts regarding the proportion of sports-related deaths among women ($P = .88$).

Discussion | Compared with men, we found a lower incidence of sports-related sudden death in women and differences by age and sport. The observed sex differences may be a result of variation in the rate of sports participation between men and women. However, because we provided incidence per million participants, this is unlikely to explain such differences. The duration or level of exertion during each session could differ between men and women. An intrinsic risk related to sex could play a role because the age-specific prevalence of coronary heart disease is known to be lower in young and middle-aged women with sudden death.[5] Differ-

Table. Estimated Incidence Rates of Sports-Related Sudden Death According to Sex and Age

	No. of Participants	Overall Incidence/ Million Sport Participants/Year (95% CI)	No. of Participants	Incidence/ Million Female Participants/Year (95% CI)	No. of Participants	Incidence/ Million Male Participants/Year (95% CI)	*P* Value[a]
Age groups, y							
15-34	160	2.96 (2.50-3.42)	11	0.43 (0.18-0.69)	149	5.23 (4.39-6.07)	<.001
35-54	357	6.63 (5.94-7.31)	13	0.49 (0.23-0.76)	344	12.47 (11.15-13.79)	<.001
55-75	258	7.51 (6.60-8.43)	11	0.65 (0.27-1.03)	247	14.19 (12.42-15.96)	<.001
Overall	775	5.45 (5.07-5.83)	35	0.51 (0.34-0.68)	740	10.07 (9.34-10.80)	<.001

[a] Statistical tests used were categorical comparisons and tests for trends.

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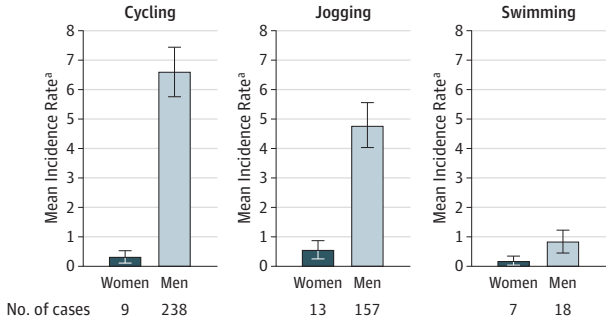
Figure. Mean Incidence Rates of Sports-Related Sudden Death According to Sex Among the 3 Most Practiced Sports Among Women



All incidence rate comparisons between women and men by sport yielded *P* values of less than .001. The overall comparison among the 3 sports yielded a *P* value of less than .001; for men, the comparison yielded a *P* value of less than .001; and for women, the comparison yielded a *P* value of .30. The error bars indicate 95% confidence intervals.

[a] Rates are per million sports participants per year.

ent sports activities differ in terms of static vs dynamic components. Thus, the differences in sudden death incidence according to sport may not be surprising, although not previously documented. The extent to which observed differences between sports are related only to specificities of sports activities, or also to characteristics of participants, needs further study.

Strategies for community screening prior to participation in recreational sports activities should consider both the types of sports to be undertaken and the sex of participants. The incidence of sports-related sudden death is probably underestimated in this study. However, we have observed a similar sex ratio of sudden death among districts, making differential reporting unlikely.

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COMMENT & RESPONSE

Efficacy of Sublingual Immunotherapy

To the Editor The primary objective of the systematic review by Dr Lin and colleagues[1] was "to review the clinical efficacy and safety of sublingual immunotherapy delivered as an aqueous

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