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Papers

Case-control study of the effect of mechanical trauma on the risk of herpes zoster

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Herpes zoster results from reactivation of latent varicella zoster virus infection. Risk of zoster increases with age and with depressed cell mediated immunity, but relatively little is known about other factors.[1–3] Case reports and case series have indicated that mechanical trauma may be a risk factor.[4] But these studies had no control group, and physical mishaps and surgical trauma are common in older people. We investigated whether trauma is associated with increased risk of zoster using a case-control design.

Methods and results

This investigation was part of a study based in general practice in London of the determinants of zoster in adults without underlying immunosuppression. Elsewhere, we describe recruitment and definitions of cases (patients with incident zoster) and controls (patients with no previous zoster, individually matched to cases by age, sex, and general practice) elsewhere.[5] Participants gave informed consent.

We hypothesised that trauma increases the risk of zoster at the trauma site within one month of the trauma, as indicated by a previous case series.[4] We asked participants about all physical trauma severe enough to cause bruising (without prompting as to the site of trauma) and about surgical procedures in the six months before interview. We compared occurrence of trauma among cases and their matched controls in the month before the case developed zoster, evaluating both trauma at the site of the case's rash and trauma occurring elsewhere. We used matched comparisons of the timing and site of trauma because the risk of trauma varies seasonally, and trauma occurs at certain body sites more often. We used multivariable conditional logistic regression to determine the independent effects of trauma on risk of zoster.

We got information on trauma for 243/244 cases (median age 57.2 years; range 16.5-91.2 years) and 483 matched controls. In the six months before interview, cases and controls had a similar frequency of trauma at body sites other than the site of the cases' zoster. But cases more often reported prior trauma at the site of their rash—this was associated with an eightfold increased risk of zoster as determined by multivariable analysis (table). Fourteen of the 22 participants who experienced trauma to the same site as subsequent zoster (mostly the trunk or head) did so in the month before the rash started (see table A on bmj.com). This recent trauma was associated with an adjusted 12-fold increased risk of zoster (table). Again, cases and controls had similar frequency of trauma to other body sites.

Comment

In this study, mechanical trauma was associated with a significantly increased risk of zoster the next month. The results indicate that trauma increases the risk of zoster at the trauma site, but not elsewhere. This suggests that traumatic stimulation of the nerve may trigger viral reactivation in the dorsal root ganglion of that nerve. The findings could be affected by recall bias—cases may have remembered more clearly that minor trauma occurred immediately before their zoster. Many of the 11 cases included in these analyses, however, reported memorable traumatic events—for example, undergoing cardioversion or being assaulted—and controls are unlikely to have forgotten such events.

Our sample size enabled us to show significant association with recent trauma, but only 14 participants had recent trauma at the site of the cases' zoster, resulting in wide 95% confidence intervals. Most trauma experienced by cases was not followed by zoster at the trauma site, perhaps because zoster occurs most often within thoracic, lumbar, or trigeminal (ophthalmic) dermatomes, whereas physical injuries are more common elsewhere (such as the limbs). Traumatic stimulation of nerves in parts of the body predisposed to reactivation of varicella zoster virus may be relatively uncommon in older people, and so only a modest proportion of zoster cases are likely to result directly from trauma.

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Contributors: AJH conceived the study, and all authors contributed to the design. SLT ran the study, did the interviews, managed the data, and did the statistical analyses with input from AJH and JGW. All authors interpreted the findings and wrote the manuscript. SLT is guarantor.

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Table A on bmj.com gives details of 14 people who had recent trauma at the site of subsequent rash in the case

Effect of physical trauma on the risk of zoster

Physical trauma	No of cases (%)	No of controls (%)	Univariable odds ratio (95% CI; P value)	Adjusted odds ratio*(95% CI; P value)
Past six months				
At any site:				
No	182 (74.9)	370 (76.6)	1.00	1.00
Yes	61 (25.1)	113 (23.4)	1.10 (0.77 to 1.58; P=0.598)	1.08 (0.72 to 1.61; P=0.716)
At different site to rash:				
No	198 (81.5)	373 (77.2)	1.00	1.00
Yes	45 (18.5)	110 (22.8)	0.77 (0.52 to 1.14; P=0.182)	0.75 (0.49 to 1.16; P=0.191)
At same site as rash:				
No	226 (93)	478 (99.0)	1.00	1.00
Yes	17 (7.0)	5 (1.0)	10.38 (3.02 to 35.62; P<0.0001)	8.02 (2.24 to 28.69; P=0.0002)
Month before rash onset†				
At any site:				
No	217 (89.7)	457 (94.6)	1.00	1.00
Yes	26 (10.7)	26 (5.4)	2.28 (1.25 to 4.18; P=0.007)	2.61 (1.31 to 5.19; P=0.006)
At different site to rash:				
No	228 (93.8)	459 (95.0)	1.00	1.00
Yes	15 (6.2)	24 (5.0)	1.28 (0.65 to 2.55; P=0.478)	1.59 (0.74 to 3.45; P=0.242)
At same site as rash:				
No	232 (95.5)	480 (99.4)	1.00	1.00
Yes	11 (4.5)	3 (0.6)	19.08 (2.44 to 149.10; P=0.0001)	12.07 (1.49 to 97.63; P=0.002)

*Adjusted for social and occupational child contacts, varicella contacts, major stress events in the two months before rash onset, and current illness.
†Trauma occurring to cases or to their matched controls in the month before the case developed rash.

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