Can trauma provoke multiple sclerosis?

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Colin Mumford's article was timely (Mumford 2002). However, he errs in advising 'more weight should be placed on the best epidemiological data', as this comes from really only one prospective study. In this, Sibley and colleagues studied the effects of non-specific physical trauma – rather than CNS-specific trauma – such as suturing of lacerations, removal of skin lesions, uterine dilatation, endoscopic procedures, fractures, sprains, burns, head injuries and abrasions (Sibley *et al.* 1991). It is hardly surprising that removing a thorn had no effect on the course of MS! Whiplash injury did not feature in this study. The method by which controls were selected was not described, there was a high drop-out rate, and the study lasted only 5.2 years and not 8 years as reported. All patients with MS had established disability, where exacerbations caused by specific focal trauma might

have been difficult to assess. With at least eight comparisons among 170 patients, the statistical power was low for each group. In the retrospective analysis from the Mayo Clinic, there were multiple statistical errors and inadequate power to reach the conclusion (Siva *et al.* 1993), as accepted by the AAN subcommittee (Goodin *et al.* 1999). As Laurer has pointed out, 'the design of both investigations violates a basic principle of cohort studies, i.e. independence of both cohorts' (Laurer 1994). We have recently reported an association between cervical hyperextension-hyperflexion injuries – the most frequent traumatic trigger to MS – and symptomatic MS (Chaudhuri & Behan 2001). We would welcome an appropriately designed study to test this clinical observation.

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MEDICO-LEGAL

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INTRODUCTION
These neurologists who perform medico-legal work are unlikely to have overlooked the intense debate that has raged in recent years in legal circles regarding the possible association between multiple sclerosis and trauma. Some high profile legal cases have taken place and reports on these have found their way into the popular press. It might be assumed that the decision made in law courts in the various parts of the British Isles would be able to draw on a wealth of previous cases that have addressed this issue. Sadly, surprisingly there is relatively little of established legal data addressing this issue and the same few cases crop up frequently in discussion. Neurologists might be interested to hear a little of the nature of the cases that provide the background for current legal judgements.

THE ISSUES

I would probably agree with our colleagues in the legal profession that it is inadequate simply to pose the question: 'does trauma cause multiple sclerosis?' Whilst this question would be an interesting point at which to start a discussion, it is clear that for more complex set of questions needs to be considered, both by lawyers and by the expert witnesses who advise them.

The question can readily be expanded to ask: 'are any type of trauma cause multiple sclerosis in any individual?' or is it just the case that 'any type of trauma may cause multiple sclerosis in a person who has some pre-existing tendency to

the development of the disease?' In recent legal judgements, the concept of an individual with some pre-existing tendency to multiple sclerosis has been expanded and such individuals are referred to as 'potential demyelination'.

Lawyers will consider these questions in far, far, almost certainly wider to pose some different questions: 'it is difficult to find that different trauma to study cannot previous to multiple sclerosis, then is it possible instead that trauma directly to the central nervous system may cause multiple sclerosis?' 'if it should be considered that no sort of trauma can initiate multiple sclerosis as a new entity, then is it possible that an established diagnosis of multiple sclerosis, or can it accelerate the progress of MS in given individuals?' More other subsequent arise in particular, simple questions such as, 'how severe should the trauma be and how soon after the experience of trauma would it be expected that an individual develop multiple sclerosis if the trauma were itself the cause?' None of these questions being to answer, such questions might be answered more readily if we better understood the cause of multiple sclerosis. But in the absence of a comprehensive understanding of the pathological sequence of events that give rise to multiple sclerosis in a sufferer, then it becomes extraordinarily difficult to provide legal colleagues with unambiguous answers to their questions. Even when we are reminded by members of the legal profession that, in their eyes, 'beyond all doubt' – at least in actual case – it is likely that not on the balance of probability (i.e. if it can be agreed that something is 51% likely then that may be deemed to be 'proof', none of us would all feel that we lack adequate data to answer these questions satisfactorily.