Can trauma provoke multiple sclerosis?

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Practical Neurology, 2002, **2**, 240–241

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FEBRUARY 2002 | 37

MEDICO-LEGAL

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INTRODUCTION

Those neurologists who perform medicolegal 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, from time to time, found their way into the national UK press. It might be assumed that the decisions 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. Rather surprisingly, there is relatively limited 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 a far 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: 'can 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 demyelinators'.

Lawyers will consider these questions yet further, almost certainly wishing to pose some follow-on questions: 'if it should be found that diffuse trauma to a body cannot give rise 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 instead that trauma may cause the aggravation of an established diagnosis of multiple sclerosis, or can it accelerate the progress of MS in a given individual?' Many other subquestions arise: in particular, simple queries 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 is easy 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 gives rise to multiple sclerosis in a sufferer, then it becomes extraordinarily difficult to provide legal colleagues with unequivocal answers to their questions. Even when we are reminded by members of the legal profession that, in their eyes, to establish 'proof' – at least in a civil case – it is only necessary to show that something is 'more likely than not on the balance of probability', i.e. if it can be agreed that something is 51% likely then that may be determined to be 'proof', many of us would still feel that we lack adequate data to answer these questions robustly.

Multiple sclerosis?

Colin Mumford debates whether trauma to the central nervous system (CNS) may cause multiple sclerosis (MS), or aggravate or accelerate the progress of MS in an established case (Mumford 2002). Trauma may result in breach of the blood–brain barrier. This allows the immune system access to the CNS, and therefore provides a mechanism for trauma to be relevant to the exacerbation of MS. Mumford appropriately asks, ‘how severe should the trauma be?’ but omits to give the answer, ‘severe enough to damage the blood–brain barrier’. Clearly, this must be trauma to the CNS itself, and not to some other part of the body.

Attention is drawn to the case of O’Leary in which the Appeal court had the advantage, in Mumford’s view, of Sibley’s data (Sibley *et al.* 1991). This was tested in court in the case of Nixon, to which Mumford also refers. In this case, the court heard expert statistical evidence, for both the claimant and the defendant, not only on Sibley’s data, but also on those of Siva (Siva *et al.* 1993). Neither study had found any association between trauma and MS. However, in the Sibley study, fewer than 10% of the traumatic episodes might have affected the CNS. In the Siva study, the large majority of trauma was similarly non-neural, with only four cases of spinal injury and no cases of head trauma among 39 people with MS. It is unsurprising therefore that the judge in the Nixon case noted that these studies had not addressed cervical spine or ‘whiplash’ injury and ‘therefore did not exclude a possible causal connection between such injury and MS ... Neither study is authority for the proposition that trauma cannot trigger or exacerbate MS’.

That deterioration of MS following trauma might be related to ‘physical and psychological

effects of trauma rather than any direct neuropathological link’, as Mumford suggests, cannot be disputed. But this does not mean that trauma is irrelevant to deterioration of disability in a person with MS. Furthermore, it is inappropriate to suggest that the argument against a relationship between MS and trauma is strengthened by Goodin’s paper because this offers no new data, but relies on the legally discredited data of Sibley and of Siva (Goodin *et al.* 1999).

Multiple sclerosis is usually neither caused nor exacerbated by trauma. Nor, for example, is it usually associated with the puerperium, or with having an identical twin with MS, although these are undoubtedly risk factors in a minority of cases. Similarly, it is reasonable to believe that CNS trauma exacerbates MS in a minority of people, despite any such cases being present in small population-based studies. Each individual case must be assessed on its merits. To suggest that MS is *never* exacerbated by CNS trauma, is a disservice to our patients with MS, whose ability to struggle on at work despite MS, sometimes becomes impossible after CNS trauma.

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