Dysautonomia after pediatric brain injury

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Dysautonomia is an under-recognized and often misdiagnosed condition following acquired brain injury. The condition is largely a diagnosis of exclusion,1 given that the cardinal signs of the disorder (hyperthermia, hypertension, tachycardia, tachypnoea, diaphoresis associated with muscle overactivity) are relatively non-specific and have multiple differential diagnoses. This has resulted in many clinicians not recognizing the condition, instead diagnosing it as opiate withdrawal or infection (organism not identified). This is not to say that patients with dysautonomia do not get infections, only that not all temperatures are bacterial in origin.

Part of the difficulty with the diagnosis of dysautonomia has been a lack of adequate diagnostic criteria.1 While the use of diagnostic criteria has become more common in recent research, Kirk et al.2 go one step further than these observational systems by applying a statistical model to determining ‘caseness’. Their predictive model, incorporating hypertension, sweating, and dystonia, provides another means of thinking about the diagnosis of dysautonomia. It is unlikely that this trial will be as useful in an adult rehabilitation population, where data shows that hypertension rarely persists more than 4 weeks post injury.3 Alternatively, recent research has suggested that over-reactivity to normally non-noxious stimuli is pathognomonic of the condition.4 Determining diagnostic criteria remains an area of ongoing research.

Although under-diagnosed, dysautonomia is a surprisingly common condition. Estimates of the incidence consistently fall around 10% of the sample across adult and paediatric samples, irrespective of whether the research is undertaken in the intensive care unit or in the rehabilitation setting. This high incidence is accompanied by a poorer prognosis across multiple studies, as measured by longer length of stay, poorer rehabilitation outcomes, greater likelihood of requiring long-term institutional care, and higher health care costs.3,5

While clinicians often assume that dysautonomia and worse outcome are epiphenomena related to the severity of the patient’s injury (and hence unavoidable), this has yet to be shown in empirical research. Perhaps, controversially, there are multiple reasons to believe that dysautonomia might produce secondary brain damage.3,5 As such, it is surprising that the condition has been completely ignored in prospective multicentre/international traumatic brain injury outcome studies. Furthermore, there is a sufficiently large body of research to suggest that it is inappropriate to ignore treatment of this condition on the basis that dysautonomia ‘burns out’ over time.6

In a well-designed study of consecutive admissions to a rehabilitation centre, Kirk et al.2 provide further confirmatory evidence of the importance of the condition. The paper extends the limited paediatric literature on the condition, and in doing so highlights the overlap between the condition in children and that reported in the more extensive adult data set. Furthermore, their data confirms previous suggestions that the incidence of the condition is higher following severe hypoxic brain injury. Thus, while an estimated 80% of dysautonomia cases in world literature result from traumatic brain injury,1 their work confirms that dysautonomia is three times more common following cardiac arrest; it is only that severe hypoxic brain injury is a less common clinical scenario.

While the majority of published research has used the term dysautonomia, this appears to have been for accidental and historical reasons. By definition, the term dysautonomia refers to any abnormality of autonomic function. Unfortunately, the use of such a generic label for a specific syndrome has caused additional confusion for a condition that many clinicians fail to recognize. For this reason, an international expert consensus group that I am chairing is promoting the use of the term paroxysmal sympathetic hyperactivity to identify the key clinical features of the condition.

REFERENCES