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Editorial

How common is complex regional pain syndrome-Type I?

Despite the regularity with which CRPS-I is seen in pain clinics, epidemiological data on its occurrence in the general population have been sparse. In part due to historical disagreements regarding mechanisms and diagnosis of CRPS-I, clinical beliefs regarding its incidence and prevalence range widely. While some argue that CRPS-I does not even exist as a neuropathic pain disorder (Ochoa, 2006), clinicians receiving many CRPS referrals assume a much higher rate of occurrence. The more rare CRPS is believed to be, the less likely it is to be considered a relevant diagnostic rule-out, particularly among physicians not specializing in pain. Patient outcomes may suffer if appropriate treatment is delayed (Stanton-Hicks et al., 2002).

Sandroni et al. (2003) published the first population study of CRPS-I. Responses from both researchers (e.g., Bennett and Harden, 2003) and the CRPS patient community indicate that conclusions of this study were somewhat controversial. Statements that CRPS-I is rare (5.46 new cases per 100,000 annually) and associated with frequent "spontaneous resolution" provoked strong reactions. As noted by Bennett and Harden (2003), conclusions that "spontaneous resolution" of CRPS-I is common were unjustified because over 90% of the sample received physical therapy, and nearly half received sympathetic blocks and pharmacological intervention. Until now, however, no other epidemiological data were available to support or refute the reported low incidence of CRPS.

The article by de Mos et al., 2007 (this issue) is only the second published epidemiological study regarding CRPS incidence in the general population. When based on clinical diagnoses confirmed by the original treating physicians, the incidence was 26.2 new cases per 100,000 annually, a figure 4.2 times higher than the Sandroni et al. study. Even when restricted to those cases in which detailed specialist evaluation data were available to make independent diagnoses using IASP diagnostic criteria, de Mos et al. report an incidence of 16.8 new cases per 100,000 annually, nearly 3 times higher than Sandroni et al.

These significant discrepancies in CRPS incidence demonstrate the importance of continued epidemiological investigations. Although both studies are valuable, we believe that certain features of the de Mos study may have produced relatively more accurate incidence estimates. Compared to Sandroni et al. strengths of this new study include a study population more than twice as large (217,653 versus 106,470) and the fact that the study period began after publication of the 1994 IASP diagnostic criteria so was less likely to be influenced by changes in diagnostic criteria. Differences between the studies in clinical data available to make independent IASP diagnoses of CRPS are also apparent. In de Mos et al. detailed data on CRPS signs and symptoms were available from pain specialist evaluations in 95 patients, and the most conservative incidence figure reported is based on these well-documented cases. In contrast, Sandroni et al. relied upon sign and symptom data recorded in routine electronic medical records (including specialist and non-specialist evaluations) to identify 74 patients in whom IASP CRPS diagnoses could be made retrospectively. Given that non-specialists may not routinely evaluate for allodynia, hyperalgesia, and vasomotor and sudomotor signs necessary to make a CRPS diagnosis, the likelihood of false negative diagnoses is higher in the latter study.

Despite difference in CRPS incidence across these studies, there were also important similarities. Both confirmed that fractures and sprains were the most common precipitating events, that CRPS more commonly affects the upper extremities, that it is significantly more common in females, and that incidence of CRPS was highest in the 50–70 age range.

In addition to better characterizing the epidemiology of CRPS, the de Mos study also highlights important diagnostic issues. A formal revision of the IASP diagnostic criteria for CRPS has been proposed ("Budapest Criteria"; Harden and Bruehl, 2005), and the Budapest *research* criteria are quite similar to the "Bruehl Criteria" examined in de Mos et al. It is notable that these proposed research criteria displayed higher inter-rater diag-

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nostic agreement than did the current IASP criteria. CRPS diagnosis rates were also nearly 50% lower when using the proposed research criteria compared to the IASP clinical criteria, suggesting that they achieved the aim of improved diagnostic specificity, although at the expense of reduced diagnostic sensitivity. The Budapest *clinical* diagnostic criteria address this sensitivity issue by altering decision rules so that the diagnosis is made if 2 of 4 sign clusters are positive and only 3 of 4 symptom clusters are positive (rather than 4 of 4 as in the Budapest research criteria and the "Bruehl criteria" tested by de Mos). This change is expected to increase diagnostic sensitivity in clinical settings but retain significantly improved specificity over current IASP criteria. Given that CRPS incidence is dependent on how it is diagnosed, formal changes in diagnostic criteria will necessitate re-evaluation of the incidence of CRPS.

In conclusion, applying the most conservative incidence figures reported by de Mos et al. to current U.S. census bureau population estimates (299,665,000), one would expect over 50,000 new cases of CRPS-I annually. The lower incidence estimate of Sandroni et al. translates to more than 16,000 new CRPS-I cases annually. While neither study suggests that CRPS is common in the general population on a percentage basis, clearly a substantial number of patients will develop CRPS every year, with significant quality of life consequences for those affected. For physicians making pain diagnoses, incidence of CRPS in relevant at-risk populations (e.g., post-fracture) is even more clinically relevant. Large scale well-designed studies of this issue are lacking, although smaller prospective studies suggest that CRPS-Type I may develop in 11–18% of patients following fracture or total knee arthroplasty (Gradl et al., 2003; Harden et al., 2003; Puchalski and Zyluk, 2005).

Clinically, the epidemiological findings above suggest that particularly after fractures and in females over age 50, CRPS should be considered an important rule-out diagnosis in cases of otherwise unexplained pain symptoms. Although pragmatically challenging, improved education of non-pain physicians regarding criterion-based CRPS diagnosis might facilitate earlier identification and treatment of the disorder, and would likely translate to improved patient outcomes.

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