

The role of physical examination in the diagnosis of work-related upper limb musculoskeletal disorders

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KEY WORDS

Diagnostic criteria; musculoskeletal diseases; occupational disease; physical examination

SUMMARY

Background: *This paper argues that diagnostic criteria for upper limb disorders should be assessed according to their practical utility in distinguishing categories of illness that differ in their risk factors or in their prognosis and response to treatment. Methods:* *The starting point for defining disorders could be current clinical practice or empirical demonstration that certain symptoms and physical signs tend to cluster abnormally within individuals. Either way, it is necessary to test the performance of proposed diagnostic criteria in discriminating illness with distinctive risk factors or clinical outcomes. It is also important that diagnoses be repeatable within and between observers, at least in the short term. Thus, methods for eliciting physical signs should as far as possible be standardised. To facilitate comparison between studies, it would help if consensus could be reached on the definitions and methods for eliciting relevant physical signs. Conclusion:* *Currently, a wide range of upper limb disorders are distinguished by clinicians, but opinions differ on the entities that should make up diagnostic classifications, and on the criteria by which each entity should be defined. This paper considers the approaches by which epidemiologists should define and evaluate possible diagnostic systems, focusing in particular on the contribution to case definition from physical examination.*

RIASSUNTO

«Ruolo dell'esame obiettivo nella diagnosi delle patologie muscolo-scheletriche dell'arto superiore correlate al lavoro». *I criteri diagnostici per le patologie muscolo-scheletriche degli arti superiori dovrebbero essere stabiliti tenendo conto della loro utilità pratica nel classificare tali patologie in categorie secondo gli specifici fattori di rischio, la prognosi o la risposta al trattamento. La classificazione potrebbe essere formulata sulla base dell'obiettività clinica, oppure considerando, come dimostrato empiricamente, che alcuni segni e sintomi si presentano frequentemente associati. D'altra parte è necessario stabilire la validità dei criteri diagnostici proposti anche nel distinguere le malattie caratterizzate da diversi fattori di rischio o con un diverso quadro clinico. È inoltre importante che la diagnosi sia ripetibile tra i diversi osservatori, almeno a breve termine; pertanto il metodo per rilevare i segni fisici dovrebbe essere il più possibile standardizzato. Per facilitare il confronto tra i diversi studi, sarebbe utile raggiungere un parere unanime sulla definizione e sul metodo di indagine e raccolta dei segni fisici significativi. Attualmente la maggior parte delle patologie muscolo-scheletriche degli arti superiori viene definita secondo criteri clinici, ma emergono discrepanze sia riguardo ai parametri, i quali dovrebbero costituire la classificazione diagnostica, sia riguardo ai criteri in base ai quali tali parametri dovrebbero essere definiti. Questo articolo valuta i criteri con cui gli epidemiologi potrebbero definire un metodo diagnostico per le patologie muscolo-scheletriche degli arti superiori, concentrandosi, in particolare, sul ruolo dell'esame obiettivo.*

Pervenuto il 6.12.2006 - Accettato il 3.1.2007

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WHAT IS DIAGNOSIS?

Diagnosis is often conceived as an attempt to identify the disease process that underlies a patient's complaints. For example, when a patient presents with chest pain, possible causes include myocardial infarction, angina, dissection of the thoracic aorta, oesophagitis and pleurisy. Information is collected about the characteristics of the pain and other associated symptoms, and also from physical examination and clinical investigations, with the aim of establishing which, if any, of these disorders is responsible for the patient's illness. Implicit is the assumption that there is a "true" diagnosis, which through appropriate clinical assessment, can normally be reached.

This way of thinking works well for disorders that result from a well-characterised underlying pathological process, and for which there is a widely accepted "gold standard" against which other diagnostic criteria can be evaluated. For example, the gold standard for acute appendicitis might be histological demonstration of acute inflammation in the appendix. The accuracy of diagnostic criteria such as the location of abdominal pain and tenderness can be assessed against this standard in those patients who subsequently undergo appendectomy.

The approach is less satisfactory, however, where there is no agreed gold standard for diagnosis, and particularly where the pathogenesis of illnesses is unclear. This applies, for example, to many psychiatric illnesses, and also to most upper limb complaints.

The difficulty can be overcome if instead of being viewed as a search for the truth, diagnosis is considered simply as a useful way of classifying people so that illnesses can be managed or prevented more effectively (1). Thus, for example, in patients with sensory symptoms in the hands, it may be useful to distinguish a subset who are likely to benefit from surgical decompression of the carpal tunnel from others in who this treatment was unlikely to be effective.

Thinking of diagnosis in this way does not detract from the value of diagnostic classifications and criteria that are based on an understanding of

underlying pathology. If a group of patients have symptoms that arise from the same pathological process, then it is more likely that their illnesses will share similar causes, have a similar prognosis, or respond to the same treatment. However, it gives us more insight in situations where pathogenesis is unknown. In particular, it implies that the value of a diagnostic classification can be assessed in terms of its ability usefully to discriminate people with illnesses that share the same causes or a similar prognosis and response to treatment.

DEFINING POSSIBLE DIAGNOSTIC CRITERIA FOR UPPER LIMB DISORDERS

Potentially, a large number of physical findings could be relevant to the classification of patients with upper limb complaints (table 1). Similarly, many different patterns of symptoms can be distinguished, and various clinical investigations might be helpful. To optimise diagnostic classification, it is necessary first to define potentially useful case definitions, using combinations of symptoms, signs and findings on special investigations, and then to evaluate their practical utility in discriminating illnesses with different causes or clinical outcomes. The initial choice of case definitions may be made in several ways.

One starting point is the approaches to diagnosis that are currently applied in clinical practice. Thus, several groups have attempted to define diagnostic criteria for upper limb disorders through

Table 1 - *Physical findings potentially relevant to the diagnosis of upper limb disorders*

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- Visible signs – deformity, wasting of muscles, inflammation
 - Palpable signs – deformity, inflammation
 - Range of movement – active and passive
 - Assessment of muscle strength
 - Sensory testing
 - Tenderness – localised or generalised
 - Challenge tests – e.g. Tinel's test, Phalen's test, pain on resisted movement
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consensus of clinical opinion (2, 3, 5). The rationale for this approach is that the diagnostic criteria applied by clinicians are perceived to be useful, even if their performance has not been formally tested. In some cases, the diagnoses distinguished by clinicians will reflect beliefs about pathogenesis (e.g. carpal tunnel syndrome, tenosynovitis).

Another approach is to collect information about a range of symptoms and signs, and then to look mathematically for patterns of clustering within individuals. Here, the rationale is that if a collection of symptoms and signs occur together more frequently than would be expected by chance, this may indicate that they share a common origin. One attempt to pursue this method revealed clusters of symptoms and signs in the elbow that corresponded closely to consensus criteria from clinicians for lateral and medial epicondylitis (Classification of musculoskeletal disorders of the neck and upper limb: a population study. PhD thesis. University of Southampton, 2003). On the other hand, patterns of clustering at the shoulder did not correspond to diagnostic entities commonly distinguished in clinical practice.

TESTING POSSIBLE DIAGNOSTIC CRITERIA FOR UPPER LIMB DISORDERS

Once a possible diagnostic classification has been defined, it is necessary to test its performance. In the absence of a diagnostic gold standard, there are three main components to this assessment.

Repeatability within and between observers

One test of a case definition is its repeatability within and between observers. The demonstration of repeatability does not necessarily imply that a diagnosis is useful. However, a lack of repeatability, at least in the short-term, detracts from its value. Poor repeatability may reflect temporal biological variability in the patient, as happens, for example, with blood pressure. Often, however, it occurs because the techniques for eliciting symptoms and signs are difficult to standardise. It is therefore important that diagnostic criteria, and especially

methods for eliciting physical signs, be specified as precisely as possible. For example, in the assessment of tenderness, the method of applying pressure and the level of pressure (e.g. just sufficient to cause blanching beneath the nail of the examining finger) might be prescribed, as well as the exact anatomical location at which to conduct the test.

Associations with risk factors

A case definition may be useful in distinguishing a group of people with a disorder that has distinctive risk factors, perhaps offering opportunities for preventive intervention. Thus, one test of the utility of a diagnostic system is its ability to discriminate categories of illness or disability that differ in their risk factors.

This can be tested empirically. For example, as part of a large cross-sectional survey of the general population, the associations of risk factors with different anatomical patterns of sensory disturbance in the hand were compared (6). The findings indicated a distinction between numbness and tingling that affected most of the sensory distribution of the median nerve but no other areas, as compared with symptoms that extended to other regions of the hand, or affected only a small part of the median nerve distribution. The former showed a stronger association with repetitive movement of the wrist and hand, and a weaker association with psychological risk factors. This observation suggested that it could be useful to classify subjects in epidemiological studies according to the anatomical pattern of their sensory symptoms, using extensive involvement of the median nerve distribution as one grouping.

In another study, the value of sub-classifying people with neck pain according to their range of active neck movements was explored (7). In this case, the information on neck movements appeared to have little impact on associations with risk factors, and the investigation therefore gave no support to the inclusion of range of neck movement as a diagnostic criterion.

When comparing associations with risk factors for different possible case definitions, care is needed if one diagnosis occurs with a much higher

prevalence than another. By definition, the prevalence ratio associated with an exposure cannot be higher than the inverse of the disorder's prevalence in unexposed people (otherwise exposed people would have a prevalence greater than one). Therefore, odds ratios may provide a fairer comparison than prevalence ratios.

Associations with clinical outcome and response to treatment

A third justification for a diagnostic system is that it distinguishes groups of patients who differ importantly in their clinical outcome or response to treatment. This again can be explored empirically. For example, the value of a diagnostic algorithm to distinguish specific upper limb disorders such as tenosynovitis and epicondylitis from non-specific arm pain (in which there was no evidence of underlying local pathology) was tested in a systematic follow-up of patients presenting to primary care or physiotherapy services with upper limb complaints (4). There was some indication that pain associated with specific disorders of the wrist and hand was more likely still to be present after 12 months than non-specific pain of the wrist and hand. However, at the elbow, no such distinction was apparent.

FUTURE DIRECTIONS FOR RESEARCH

A number of alternative classification systems for upper limb disorders have been published in recent years, some more closely inter-related than others. Currently, however, relatively little information is available on the performance of these different systems in terms of their repeatability and their ability to distinguish usefully between patients.

There is an urgent need to generate this information so that appropriate choices can be made. In addition, to facilitate comparison of findings, it would help if definitions of the individual signs that contribute to diagnostic criteria could be standardised as far as possible between investigators.

NO POTENTIAL CONFLICT OF INTEREST RELEVANT TO THIS ARTICLE WAS REPORTED

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