

CURRENT CONCEPT REVIEW**Nonspecific Arm Pain**

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Nonspecific activity-related arm pain is characterized by an absence of objective physical findings and symptoms that do not correspond with objective pathophysiology. Arm pain without strict diagnosis is often related to activity, work-related activity in particular, and is often seen in patients with physically demanding work. Psychological factors such as catastrophic thinking, symptoms of depression, and heightened illness concern determine a substantial percentage of the disability associated with puzzling hand and arm pains. Ergonomic modifications can help to control symptoms, but optimal health may require collaborative management incorporating psychosocial and psychological elements of illness.

Keywords: Arm, Idiopathic arm pain, Nonspecific arm pain, Shoulder

Introduction

The English language has words for benign, nonspecific pains that predate modern medicine: backache, headache, and stomachache. These words indicate good health and puzzlement. To this day, the pathophysiology of these ailments is a mystery. Many hand and arm pains are similarly puzzling. Activity-related arm pain in particular is characterized by vague, diffuse symptoms that are unexpected. There is no objective, measurable pathophysiology.

Patients crave a specific diagnosis. A name and a discrete pathophysiology provide a sense of control and hope for a cure. It is difficult to remember that diagnoses, diagnostic tests, and treatments can all cause harm. Examples include the hysteria related to power lines and cancer risk, silicone breast implants, and other man-made epidemics (1-7).

One useful example is an illness construction invented in Australia in the 1980's: repetitive strain injury (RSI). A well-intentioned effort to protect computer workers inadvertently encouraged and reinforced catastrophic thinking and kinesiophobia in response to physiological pains and created an epidemic. The mere idea that pain with typing might represent injury was enough to disable a large portion of the population. Authorities in the medical community now understand this epidemic as, in part, a sociopolitical phenomenon because it was exacerbated by claims for compensation and greatly eased by a high court ruling that it was no evidence of injury and therefore was no compensable (8-11).

Disease labels that identify specific pathophysiology may be preferable to those that emphasize symptoms and rationale. For instance, carpal tunnel syndrome may be best considered idiopathic median neuropathy at the

carpal tunnel. In the absence of objective pathophysiology, nonspecific descriptive terms might be preferable. For instance, repetitive strain injury is probably better considered as nonspecific activity related pain. Complex regional pain syndrome (reflex sympathetic dystrophy) is more accurately described disproportionate pain and disability. Fibromyalgia implies a pathophysiology of the muscle, and might be more accurately labeled multifocal nonspecific disproportionate pain and disability.

Another important thing to note is that our psychology and psychiatry colleagues can diagnose and effectively manage many of these conditions as somatoform disorders. For instance, pain disorder is the presence of physical symptoms that suggest a general medical condition but that are not fully explained by a general medical condition, by the direct effects of a substance, or by another mental disorder. Hypochondriasis is preoccupation with the fear of having, or the idea that one has, a serious disease based on misinterpretation of bodily symptoms. But the experts of the function of the human mind may be reluctant to apply these diagnoses unless there is an absence of pathophysiology. Given that there is never a complete absence of pathophysiology, none of our machines is in perfect working order, and pain is a normal part of human existence, it may be better to avoid categorical diagnoses and simultaneously treat both heightened illness concern and pathophysiology whether discrete or puzzling. It seems unhelpful to continue inventing illnesses that are accepted as diseases even in the absence of discrete pathophysiology.

Science

Physicians are trained to be scientific (science as applied skepticism) but often seem to value intuition and

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wisdom more than evidence and objective testing. In the modern world, things are often explained or promoted in scientific terms even when there is no scientific basis. Pseudoscience comes in the guise of science but lacks basic elements such as falsifiability/ verifiability, reproducibility, and clear definitions. Many man-made diagnoses are presented side by side with truly scientific concepts even in medical schools. Humans invented science when we realized that human intelligence is exceptionally good at making sense of things (rationalizing), of proving our own theories, that's how the magician fools us. As Nobel laureate Daniel Kahneman's research points out, we are at our best when we are trying to disprove our theories (12). When we expect to err or misinterpret.

Psychology

We need to read our instruction manual. To understand how our machine works. Humans tend to feel better when they can name their problem. We more readily accept problems that represent a mechanical or physiological malfunction. Many patients are uncomfortable with the hopeful opportunity that they might simply be misinterpreting things. This is particularly true of very intuitive people. People are accustomed to trusting their gut feelings/first impressions. Daniel Kahneman, who distinguishes our automatic thoughts (system 1) from our analytical rethinking of things (system 2), would describe such people as having a "lazy system 2" (12). It seems better for your health to have a healthy, energized system 2 at the ready. We have the impression that psychological distress (symptoms of anxiety or depression) and ineffective coping strategies (catastrophic thinking, health anxiety, kinesiphobia, low self-efficacy) make it more difficult to make good use of system 2.

Other Questionable Illness Concepts

Man-made illnesses (illness constructions) allow patients to have physical disorder and seem to ignore the normal psychosocial aspects of human illness behavior. The fact that these illnesses are contentious and highly debated is obvious in the degree of emotional response that is generating by questioning their scientific basis and their value. In addition to repetitive strain injury, reflex sympathetic dystrophy, and fibromyalgia, considers chronic fatigue syndrome, electrodiagnostic negative carpal and cubital tunnel syndrome, radial tunnel syndrome, pronator syndrome, thoracic outlet syndrome, etc (13-17). Perhaps less contentious illness constructions are historical examples such as whiplash and hysteria (18).

The problem with surgical illness constructions is that they lead to surgery. Surgery that can only do harm if there no pathophysiology for which intervention has more benefits than risks. Consider Atypical Carpal Tunnel Syndrome (ACTS), which is characterized by less discrete sensory changes and diffuse upper limb pain. The scientific rationale for this diagnosis is elevated levels of serum neuropeptide (substance P and calcitonin gene-related peptide) which normalize after the median nerve is decompressed, but studies of illnesses that are entirely or mostly subjective can only prove therapeutic efficacy by comparison with an adequate placebo control such as sham carpal tunnel release (19-21).

Features and Factors

Arm ache, non-specific arm pain, and Idiopathic Arm

Pain are terms that can be applied to painful upper limb disorders characterized by symptoms (pain with or without parenthesis) with no objective pathophysiology on examination or diagnostic testing.

Nonspecific arm pain is often activity related (work-related in particular) and has often been ascribed to repetitive motion, static posturing and "poor ergonomics" (9, 10, 22, 23). The nonspecific term Work-Related Upper Limb Disorder (WRULD) indicates conditions with uncertain definition, etiology, pathology and treatment with nonspecific diagnosis and was intended to replace more stigmatizing illness labels such as repetitive strain injury. Unfortunately, this term does seem to imply injury from work activity. Completely nonspecific descriptive terms such as nonspecific, activity-related arm pain seem preferable (4, 23-25).

Characteristics of nonspecific arm pain include symptoms that are vague, diffuse, and difficult to put into words. Patients with nonspecific arm pain have substantial pain and disability with no identifiable objective pathophysiology. They have disproportionate pain and disability. Idiopathic Arm Pain and nonspecific Work-Related Upper Limb Disorders (WRULDs) appears to be one subject but described from two different points of view as an idiopathic illness or an occupational disorder (4, 19, 23-26). Unfortunately, changes in the work environment (i.e. "ergonomics") have done little to reduce illness (4, 27, 28).

Nonspecific arm pain correlates with heightening illness concern and may represent a somatic presentation of psychological distress (a somatoform disorder) (29). Vranceanu and colleagues found a notable relationship between heightened illness concern and arm-specific disability measured by DASH score in patients with nonspecific pain without discrete pathophysiological processes (30). Ineffective coping strategies such as catastrophic thinking are strongly associated with symptom intensity and magnitude of disability for both discrete and nonspecific arm illnesses (21, 31, 32). Somatoform disorder (34% versus 7.5%), posttraumatic stress disorder (24% versus 7.5%), and panic disorder (12.2% versus 5%) were more prevalent in patients with non-specific arm pain compare to with specific arm pain. The presence of anxiety and somatoform disorders predicted pain type (nonspecific versus specific) among them somatoform disorder was stronger (30).

Catastrophic thinking is a maladaptive coping strategy characterized by cognitive error in response to pain. A cognitive error is a negatively distorted belief about a situation. Catastrophic thinking is described as the tendency to magnify and ruminate about painful stimuli and focus excessively on the negative aspects of pain. Patients can be overwhelmed when pain makes them feel protective and prepare for the worst (33, 34). Patients with greater catastrophic thinking experience greater pain intensity and a greater magnitude of disability (32, 35).

The effective coping mechanism of self-efficacy (the sense that one can accomplish one's goals in spite of symptoms or physical impairment) also correlates strongly with decreased symptoms and disability. Self-efficacy can be learned and practiced. There is strong evidence that cognitive behavioral therapy (coaching and training in accurate interpretation of symptoms and effective coping strategies) can decrease symptoms and disability (19, 31, 34, 36, 37).

Psychosocial factors influence pain in the workplace (25,

Table 1. Comparing specific arm pain with nonspecific arm pain

Factor	Specific diagnosis	Nonspecific diagnosis
Age	48	41
Female	52%	64%
Body mass index	25.1	24.5
High educational level	27%	32%
Paid work	78%	80%
Recurrent complaints	21%	36%
Multiple-region complaint	25%	45%
Region		
<i>Neck, upper back, shoulder, upper arm</i>	62%	91%
<i>Elbow, forearm</i>	33%	13%
<i>Wrist, hand</i>	21%	14%
Sports participation	48%	46%
Full-time work	62%	58%
Working less than 5y in current job	28%	42%
Sick leave related to arm/neck/shoulder complaints in past 6mo	16%	33%

27, 37-41). For instance, nonspecific pain is associated with dissatisfaction with support from colleagues or supervisors (37). Work organization and interpersonal relationships are important factors in occurrence of nonspecific pain (36). Working situations characterized by high psychological demands, low decision latitude and low social support, play an important role in perception of upper limb pain, especially in women (25, 27, 38, 41, 42). There seems to be a synergetic relationship between mechanical exposure and psychological stress on the job (27).

Work related nonspecific pain is related to three factors: physically demanding work, psychological factors such as ineffective stress management, and social factors such as lack of social support and poor relationships with coworkers and superiors (22, 27, 28, 37, 42).

Keijsers and colleagues compared patients with discrete non-traumatic upper extremity pathophysiology (e.g. rotator cuff tendinopathy, enthesopathy of the extensor carpi radialis brevis origin, CTS, etc) to patients with nonspecific arm pain (Table 1) (31).

Psychological factors such as somatization, distress, catastrophizing, and kinesiophobia were more prevalent in patients with nonspecific arm pain than in patients with discrete pathophysiology. Social support was equal in both groups (Table 1) (31).

In a study of computer workers with nonspecific arm pain, older age, women, lower educational achievement and poorer self-reported physical fitness were associated with greater disability (28).

Prevalence

Nonspecific arm pains are very prevalent. A survey from The Netherlands reported a prevalence of neck, shoulder, and elbow and wrist pain during a 12-month period in the general population equal to 31%, 30%, 11%, and 17% respectively. Only 30-40% brought these symptoms to the attention of a doctor (43).

Another survey in The Netherlands showed that non-traumatic arm, neck, or shoulder pains result in 97 consultations per 1,000 patient per year; which means around three consultations a week for an average-sized general medical practice with 2,350 patients (44).

In a 16-year study in Sweden, the prevalence of self-reported neck-shoulder-arm pain rose gradually, from 23% to 25% in women and from 13% to 15% in men (22). The prevalence of neck-shoulder-arm pain with concurrent low back pain and psychological distress also rose slightly in both sexes (22).

Differential Diagnosis

Moloney et al investigated sensory profiles in individuals with nonspecific arm pain compared with cervical radiculopathy and pain-free controls (45). They concluded, nonspecific arm pain and cervical radiculopathy have different sensory profiles. Non-specific arm pain was characterized as widespread sensitivity to thermal and pressure pain in the absence of thermal hypoesthesia, whereas cervical radiculopathy was characterized by the presence of thermal and vibratory hypoesthesia as well as more localized cold and pressure pain sensitivity. In other words, less specific illnesses are characterized by disproportionate symptoms and disability, and hyperreaction to physical stimuli (45).

In another study Tampin et al, by using quantitative sensory testing (QST) parameters and the pain detect (PD-Q) screening questionnaire, investigate the presence of neuropathic pain in patients with unilateral painful cervical radiculopathy and in patients with unilateral nonspecific neck-arm pain associated with heightened nerve mechanosensitivity (Table 2) (46).

They concluded hyper-reactivity to physical stimuli (sometimes referred to as "neuropathic pain"), is likely to be observed in patients with painful cervical radiculopathy, but not in patients with nonspecific neck-arm pain (46).

It can be concluded from these two recent studies that

Table 2. Comparing painful cervical radiculopathy with nonspecific neck-arm pain using quantitative sensory testing

painful cervical radiculopathy		nonspecific neck-arm pain	
<i>Affected dermatome</i>	<i>Maximal pain area</i>	<i>Affected dermatome</i>	<i>Maximal pain area</i>
Loss of sensory function in mechanical sense	Loss of sensory function in mechanical sense	Loss of warm detection threshold	
Loss of sensory function in vibration sense	Loss of sensory function in vibration sense		
Reduced cold detection			
Reduced pressure pain sensitivity			
<i>Nerve root damage</i>		<i>Neuropathic pain components were unlikely</i>	

nonspecific arm pain is characterized by hyperprotectiveness or an exaggerated negative response to physical stimuli.

Management and therapeutic choices

Whatever the name, our primary responsibility as doctors is to identify objective pathophysiology, rule out dangerous disease, and make sure no opportunities for health have been overlooked. It is important to clarify for the patient that every effort will be made to advance health, but that sometimes that means not ordering a test or treatment. This is difficult to communicate because it is counterintuitive. Inaccurate diagnosis or pathologizing normal variations or ageing can lead to invasive treatment that can only do harm; treatments that can only succeed through the placebo effect (19, 26).

Ergonomic modifications can help to control symptoms, but optimal health may require collaborative treatment incorporating psychosocial and psychological elements of illness (34, 47-49).

Patient reassurance, supportive palliative treatment, and periodic observation (monitoring) may be the best management strategy (19, 26). It may prove optimal to provide collaborative care with surgeons, non-operative providers, hand therapists, and cognitive behavioral therapists (psychologists) working together to help patients be as healthy as possible.

Treatments that improve coping mechanisms in work and away from work are useful (32). Self-efficacy or the belief that one has the ability to succeed in spite of symptoms or impairment is a cognitive factor associated with less pain and disability. Self-efficacy should be taught and practiced (50, 51).

Psychological interventions such as cognitive behavioral therapy and biofeedback appear to be effective (52). Rational emotional therapy (RET) which is a kind of cognitive therapy that helps a patient to replace irrational beliefs with rational assumptions is effective (28).

The traditional biomedical model for illness seems inadequate. A comprehensive biopsychosocial model with

special emphasizes on psychological, social, cultural and biological aspects seem preferable. In the biopsychosocial model, it is recognized that the correlation between nociception (the physiology of actual or potential tissue damage) and pain (an unpleasant sensory and emotional experience in response to nociception) is limited and other determinants as other factors merit consideration.

Treatment of idiopathic arm pain can be very frustrating. Physicians may even aggravate patients' symptoms by an inappropriate reaction that unintentionally encourages maladaptive illness behavior. An honest explanation of the uncertain cause of disease and empathy regarding psychological stressors may help the patient even though at first these are very unexpected from a hand surgeon (19, 26, 34).

Challenge is a part of life. Many people choose the role of patient. We doctors can encourage attention to optimizing coping strategies, adaption, and optimism, along with acceptance of uncertainty, probability, and the limits of modern medicine.

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