Psychological factors predict unexpected diagnoses

Ana-Maria Vranceanu · David Ring

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Abstract

Background Unexpected diagnoses and treatment recommendations can be awkward for both hand specialist and patient. We tested the hypothesis that psychological factors predict an unexpected hand specialist diagnosis after referral from a primary care provider (PCP) for management of an atraumatic hand condition.

Methods One hundred and thirty patients referred to a hand surgeon by their PCP were asked to complete measures of symptoms of depression, catastrophic thinking, hypochondriacal attitudes and beliefs, and disability prior to the visit. Patients indicated their impression of the diagnosis and treatment recommendations. The hand specialist recorded a diagnosis and treatment recommendations after the visit.

Results Patients receiving unexpected diagnoses had more psychological symptoms than patients receiving expected diagnoses. In logistic regression analysis, symptoms of depression were the sole predictor of an unexpected diagnosis. Patients receiving unexpected treatment recommendations

had greater catastrophic thinking and hypochondriacal attitudes and beliefs than patients receiving expected treatment recommendations. In logistic regression analysis, catastrophic thinking was the sole predictor of unexpected treatment recommendations.

Conclusions Given that unexpected hand diagnoses or treatment recommendations are both inherently awkward and associated with greater symptoms of depression, catastrophic thinking, and hypochondriacal beliefs, a practiced, thoughtful, and empathetic communication strategy may improve patient satisfaction and health outcomes.

Keywords Unexpected diagnosis · Depression · Catastrophic thinking · Hand illness

Level of evidence: level III, diagnostic

A.-M. Vranceanu · D. Ring
Harvard Medical School,
Boston, MA, USA
e-mail: avranceanu@partners.org

A.-M. Vranceanu
Benson Henry Institute for Mind Body Medicine,
Behavioral Medicine Service, Massachusetts General Hospital,
One Bowdoin Square,
Boston, MA 02114, USA

D. Ring (✉)
Orthopaedic Hand and Upper Extremity Service, Department of
Orthopedic Surgery, Massachusetts General Hospital,
55 Fruit Street,
Boston, MA 02114, USA
e-mail: dring@partners.org

Introduction

Unexpected diagnoses and treatment recommendations can be awkward for both hand surgeon and patient. Both patient and provider tend to evaluate symptoms from the traditional biomedical model of disease, which attempts to explain symptoms entirely on the basis of pathophysiology. Given that a specific pathophysiology is often either elusive or debated, there is increasing advocacy for an evidence-based biopsychosocial perspective because a patient's thoughts, emotions, and circumstances are important sources of symptom intensity and disability [11]. One consistent finding is that the less specific the illness is, the greater the influence of psychological factors [1–3, 7, 8, 10].

In our center, the primary care providers (PCP) are familiar with common hand diagnoses and tend to have a working knowledge of initial treatment recommendations. The awkwardness of an unexpected hand specialist diagnosis after seeing a PCP raises several considerations. First,

randomness and uncertainty can be disconcerting for patients and providers and is often resisted, with the result that a specific diagnosis is offered where a nonspecific diagnosis is more appropriate. Second, the predominance of a somatic complaint may distract attention from comorbid depressive symptoms, catastrophic thinking, and heightened illness concerns—all of which are important opportunities for increasing health and wellbeing. It means that the patient is referred for a hand problem alone, when they might also benefit professional help with mood and coping strategies. Third, some of the thoughts and emotions related to the symptoms may transfer to the provider (so-called stress contagion), which may lead to unhelpful tests and interventions. Finally, the stark separation between mental and physical in our culture, and the stigmatization associated with the mental aspects of illness, may make it more difficult for medical professionals to discuss these issues with patients and easier to focus on the pain symptoms.

Our aims were to better understand the awkwardness of an unexpected hand specialist diagnosis on referral from a PCP and to identify opportunities to improve the patient experience. We tested the hypothesis that psychological factors predict an unexpected hand specialist diagnosis after referral from a PCP for management of an atraumatic hand condition.

Patients and Methods

This was a cross-sectional study. Consecutive adult, English-speaking patients referred by a PCP to the practice of one of three orthopedic hand surgeons or two hand specialist physiatrists for an initial evaluation were invited to enroll under a protocol approved by our Human Research Committee. The study was described in detail and the treating physician/study staff obtained informed consent. No eligible patient declined enrollment.

One hundred and thirty patients were enrolled in the study: 78 (60 %) women and 52 (40 %) men. Sixty-one (47 %) participants were employed full time, 19 (15 %) were employed part time, 23 (18 %) were retired, 9 (7 %) were unemployed, 6 (5 %) were homemakers, and 12 (9 %) did not answer. Sixty-eight (52 %) participants were married or living with a partner, 38 (30 %) were single, 12 (9 %) were divorced or separated, and 12 (9 %) did not answer the question.

Subjects were asked the diagnosis they recall receiving from their PCP according to the following five broad categories: tendon problem, joint problem (arthritis), nerve problem, overuse problem, and doctor was puzzled/nonspecific pain/uncertain. The subjects were also asked about their understanding of their PCP's treatment recommendations according to the following five categories: nonspecific

treatments (e.g., non-narcotic analgesics, anti-inflammatory medication, ice, or heat) and avoid activities that cause pain, injection, surgery, and others. After the appointment, the hand specialist was asked to categorize the diagnosis and treatment according to the same categories. The hand specialist was not blinded to the PCP's diagnosis and treatment recommendations in order to replicate the usual circumstances and avoid interfering with the patient–doctor relationship. An unexpected diagnosis was defined as a difference in the diagnostic category on the patient and specialist questionnaire. Unexpected treatment recommendations were similarly defined.

Subjects completed the following questionnaires: the Pain Catastrophizing Scale (PCS [9]), the Center for Epidemiologic Study of Depression (CES-D [6]) scale, the Whitley Index [5], and the disabilities of the arm, shoulder, and hand (DASH [4]). The three psychological questionnaires were selected based on prior work showing that catastrophic thinking (PCS), symptoms of depression (CES-D), and heightened illness concern (Whitley Index) are strong correlates of disability in subsets of patients with hand illness [11].

Measures

The PCS [9] is a reliable and valid measure of negative pain-related cognitions. It has 13 items answered on a four-point Likert scale from “not at all” (0) to “all of the time” (3). Items are grouped into three subscales: rumination (tendency to spend a lot of time dwelling on the pain), helplessness (feeling hopeless and helpless when in pain), and magnification (thinking of the worse when in pain). A total catastrophizing score is computed by adding all items.

The CES-D [6] scale is a reliable and valid measure of depression. It has 20 items answered on a four-point Likert scale from 0 to 3. A total score is obtained by summing up all the items, of which four are reversed, scored. Patients with scores higher than 16 are considered fit to the criteria for the diagnosis of a depressive disorder.

The Whitley Index [5] was used to measure hypochondriacal attitudes and beliefs (heightened illness concern). This is a reliable and valid 14-item measure answered on a five-point Likert scale, from 1=not at all to 5=extremely.

The DASH [4] is a 30-item questionnaire that addresses arm-specific symptoms and disability during the preceding week. Twenty-one items address specific tasks, five items address symptom severity (pain, activity-related pain, tingling, weakness, and stiffness), and four items address social activities, work, sleep, and self-image. Items are answered on a five-point Likert scale. The overall score is scaled from 0 (no disability) to 100 (most severe disability). Scores were rounded to the nearest whole number.

Table 1 Frequency of unexpected and expected diagnosis

Diagnosis	Unexpected diagnoses [<i>N</i> (%)] ^a	Expected diagnoses [<i>N</i> (%)] ^b	Total
Tendonitis	17 (50)	17 (50)	34
Arthritis	11 (33)	22 (67)	33
Nerve problem	14 (37)	24 (64)	38
Puzzling condition	18 (72)	7 (28)	25
Total	60 (46)	70 (54)	130

^aNumber of patients diagnosed with condition only by the hand surgeon

^bNumber of patients diagnosed with condition by both hand surgeon and PCP

Statistical Analyses

Power analyses indicated that a sample of 120 patients total would provide 85 % statistical power, with $\alpha=0.05$, for a medium effect size f -squared=0.15 for logistic regression with five main predictors (pain catastrophizing, anxiety sensitivity, health anxiety and depression, and one demographic variable).

Unexpected diagnosis and treatment recommendations were the dependent variables. Means and standard deviations were calculated for continuous variables. Frequencies were calculated for categorical demographic variables. In bivariate analysis, the differences between patients with unexpected and expected diagnoses or treatment recommendations were evaluated using Student's *t* test for continuous variables and chi-square tests for categorical variables.

Two binary multivariable logistic regressions were performed for each of the two concordance questions using the variables with $p>0.10$ in bivariate analysis as explanatory variables. Fitness of the logistic models was assessed with the Hosmer and Lemeshow test. The Wald test was used as coefficient assessed for significance.

Results

There were no significant differences ($p>0.1$) by demographics in any of the main study variables (depression, catastrophic thinking, heightened illness concern, and disability). There was no significant correlation between age and these main study variables ($p>0.1$).

The diagnosis was expected in 70 of the 130 subjects (54 %), and the treatment recommendations were expected in 78 of the 130 subjects (60 %). If the hand surgeon's diagnosis is considered definitive for the purposes of this experiment, 17 patients (50 %) with tendonitis, 11 (33 %) arthritis, 14 (37 %) a nerve problem, and 18 (72 %) a nonspecific or puzzling condition had a different expectation upon referral from the PCP (Table 1). There was an unexpected treatment recommendation in 5 (22 %) patients who received nonspecific treatment from the surgeon, in 8 (22 %) patients who received an injection, 28 (74 %) patients who received surgery, and 11 (33 %) patients who received other treatments, including referral for cognitive behavioral therapy (Table 2).

Patients with unexpected diagnoses had more symptoms of depression (average CES-D 17.0 vs. 5.3; $p=0.001$), catastrophic thinking (23.9 vs. 18.4, $p=0.003$), and hypochondriacal attitudes and concerns (26.5 vs. 21.0, $p=0.002$) than patients with expected diagnoses (Table 3). Of note is that the mean score on the depression measure for the unexpected group exceeds the cutoff for the diagnosis of major depressive disorder [9]. Twenty percent (26 of 130) of the patients met the threshold for diagnosis of a depressive disorder according to the CES-D, and 20 of them (76 %) had unexpected diagnoses.

Logistic regression including all three variables produced a model with good fit (chi-square=8.51, $p=0.30$), and depression was the sole significant predictor of unexpected diagnosis (Wald=6.28; $p=0.01$). The odd of an unexpected diagnosis rises by a factor of 1.26 for every unit increase in depressive symptoms on the CES-D. The model explained

Table 2 Frequency of unexpected and expected treatment recommendations

Treatment	Unexpected treatment recommendation [<i>N</i> (%)] ^a	Expected treatment recommendation [<i>N</i> (%)] ^b	Total
Surgery	28 (74)	10 (26)	38
Injection	8 (22)	28 (78)	36
Nonspecific treatment	5 (22)	18 (78)	23
Other treatments	11 (33)	22 (67)	33
Total	52 (40)	78 (60)	130

^aUnexpected treatment recommended by hand surgeon

^bTreatment recommended by both surgeon and PCP

Table 3 Psychological questionnaires in patients with concordant and discordant diagnoses

Questionnaire	Concordant diagnoses <i>M</i> (SD)	Discordant diagnoses <i>M</i> (SD)	<i>p</i> value
Depression (CES-D)	5.3 (4.7)	17 (12.3)	0.001
Pain catastrophizing (PCS)	18.4 (7.4)	23.3 (10.8)	0.003
Hypochondriacal attitudes and concerns (Whitley Index)	21 (6.1)	26.5 (11.5)	0.002

50 % variance in unexpected diagnoses (Cox and Snell pseudo- $R^2=.50$).

Patients with unexpected treatment recommendations had greater catastrophic thinking (23.2 vs.17.5, $p=0.002$) and hypochondriacal attitudes and concerns (24.9 vs. 20.8, $p=0.03$). A logistic regression including both variables had a good fit (chi-square=8.14, $p=0.42$), and PCS was the sole significant predictor of unexpected treatment recommendations (Wald=5.27, $p=0.02$). The odds of an unexpected treatment recommendation increase by a factor of 1.1 for each unit increase in pain catastrophizing. The model explained 14 % variance in treatment disagreement (Cox and Snell pseudo- $R^2=.14$).

Discussion

Our results show that unexpected diagnoses and treatment recommendations occur in approximately one half of all patients referred from a PCP with a primary complaint of atraumatic hand or arm pain. Our data also demonstrate that unexpected diagnosis and treatment are related to psychological factors (depression, catastrophic thinking, and heightened illness concern). In fact, it is notable that symptoms of depression explained half of the variation in unexpected diagnoses. Patients with more depressive symptoms are more likely to receive an unexpected diagnosis. Patients with greater catastrophic thinking are more likely to receive an unexpected treatment recommendation. The converse is worth stating: Patients with better mood and more effective coping strategies are more likely to receive expected diagnoses and treatment recommendations.

These findings are intuitive. The diagnosis of trigger finger, carpal tunnel syndrome, and trapeziometacarpal joint arthrosis is straightforward and familiar to the PCPs in our center. Our PCPs are also familiar with first-line treatment options for these conditions. A patient with a simple hand and arm pain condition who is coping effectively and has good mental health is likely to leave the PCP visit with an accurate understanding of the diagnosis and treatment options.

Vague, diffuse, and disproportionate pain and disability tend to correlate with somatization of psychological distress. Such a presentation can be puzzling and nonspecific. A

patient with a nonspecific condition or a discrete condition but ineffective coping strategies and psychological distress may present in a way that makes health providers more concerned and cautious. Health care providers (both PCPs and specialists) handle the consequent uncertainty and uneasiness variably with some admitting puzzlement, others preferring to make a guess at a discrete diagnosis, and most of us somewhere on a continuum between these two extremes. For example, many patients with nonspecific upper extremity pain are diagnosed with tendonitis or carpal tunnel syndrome (Table 1).

Our results should be viewed in light of several limitations. First, an unknown percentage of the variance in unexpected diagnoses and treatment recommendations may be due to the difference in training emphasis and experience between PCPs and hand specialists. Second, our diagnostic categories and treatment recommendation categories were simplified for practical purposes and therefore do not precisely reflect clinical practice; however, this might be expected to decrease the proportion of unexpected diagnosis and treatment since it would be easier to match when there are fewer groups.

Given that unexpected hand diagnoses or treatment recommendations are both inherently awkward and associated with greater symptoms of depression, catastrophic thinking, and hypochondriacal beliefs, a practiced, thoughtful, and empathetic communication strategy may improve patient satisfaction and health outcomes.

Ethical statement The study was approved by the Institutional Review Board at MGH.

Conflict of interest None of the authors has any conflicts of interest to report.

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