J Shoulder Elbow Surg (2016) 25, 688-694

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

REVIEW ARTICLE

Utility of features of the patient's history in the diagnosis of atraumatic shoulder pain: a systematic review

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Background: Whereas physical examination tests for shoulder disorders have numeric values that describe the utility of the test and its effect on the probability of having a diagnosis, this information is lacking for elements of the history. The purpose of this study was to conduct a systematic review of the literature to determine numeric data (sensitivity, specificity, predictive values, and likelihood or odds ratios) for elements of the history with regard to diagnoses in patients with chronic atraumatic shoulder pain.
Methods: We performed a systematic review to extract information from the existing literature regarding the numeric utility of different features of the patient history as they pertain to chronic atraumatic shoulder pain. Data sources were MEDLINE through PubMed (1946–January 2012) and EMBASE through Ovid (1980–January 2012).
Results: Twenty-one studies met inclusion criteria. A diagnosis of rotator cuff tear was more likely with a history of hypercholesterolemia, having a relative with rotator cuff disease, excessive lifting, above-shoulder work, hand-held vibration work, or age older than 60 years. Acromioclavicular arthritis was more likely in weightlifters. Glenohumeral arthritis was more likely if the patient has a history of prior dislocation, age >75 years, or a diagnosis of knee osteoarthritis. Adhesive capsulitis was more likely with a history of diabetes or thyroid disorder. Posterior labral tear was more likely in football players.
Conclusions: The numeric values for the utility of these history features will help establish numeric probabilities for diagnoses in patients with shoulder pain.
Level of evidence: Level IV, Systematic Review.

Keywords: Shoulder pain; history; sensitivity; specificity; predictive values; likelihood ratios; probability; diagnosis

Shoulder pain is a common complaint in the practices of both primary care physicians and orthopedic surgeons. Up to 66.7% of the general population will report shoulder pain in their lifetime.[12] Accurate diagnosis can be difficult for the clinician as the shoulder is a complex joint. Physical examination tests have been consistently unreliable in the diagnosis of conditions manifesting with shoulder pain.[11,14] As such, there has been increased reliance on imaging, which may be unnecessary and costly. Bradley et al[5] demonstrated that 41% of patients presenting to a shoulder specialist for chronic, atraumatic shoulder pain had already undergone a magnetic resonance imaging scan.

As a systematic review of the literature, Institutional Review Board approval was not germane.

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1058-2746/$ - see front matter © 2016 Journal of Shoulder and Elbow Surgery Board of Trustees.
http://dx.doi.org/10.1016/j.jse.2015.09.023

This prescreening magnetic resonance imaging had no effect on patient outcome, and the majority of studies did not change the management of the patient.

Many studies have focused on the use and accuracy of different physical examination tests and imaging modalities as tools in diagnosis of shoulder disorders. Very little has been published, however, on the use of the patient history as a tool in the diagnostic process. Historical and demographic information is used to assist in the diagnosis of a patient's shoulder complaint. Codman, in 1934, published a table that empirically rated different elements of the history called ''diagnostic points'' in an effort to guide clinicians in the diagnosis of different shoulder ''clinical entities''.[8] For example, nocturnal pain and crepitus were thought to be ''of positive importance'' in the diagnosis of rotator cuff tears but sensory changes were not. These empirical concepts are helpful, but with enough data, we should be able to assign numeric probabilities to different features of the history with regard to their association with different diagnoses about the shoulder.

The objective of this work was to perform a systematic review of the existing literature in an effort to extract information about the numeric utility of different features of the patient's history and their association (sensitivity, specificity, predictive values, and likelihood ratios [LRs] or odds ratios [ORs]) with regard to 9 anatomic diagnoses in patients with atraumatic shoulder pain. We hypothesized that certain elements of the history will be more helpful than others in distinguishing between different diagnoses that can cause shoulder pain.

Materials and methods

Search strategies

An electronic search was performed of the databases MEDLINE (1946–January 2012) through PubMed and EMBASE (1980–January 2012) through OVID. Search strategies were generated with the help of a medical librarian for these 2 databases and are included in Table I. In addition to the database, reference lists from included articles were reviewed for relevant articles.

Table I Search strategies

MEDLINE through PubMed search strategy
("Shoulder"[Mesh] OR "Shoulder Pain"[Mesh] OR "Shoulder Joint"[Mesh] OR "Bursitis"[Mesh] OR "Shoulder Impingement Syndrome"[Mesh] OR "Rotator Cuff"[Mesh] OR "shoulder injury" OR "adhesive capsulitis" OR "glenohumeral arthritis") AND ("Medical History Taking"[Mesh] OR "Physical Examination"[Mesh] OR history OR "Diagnostic Imaging"[Mesh]) AND ("Probability"[Mesh] OR "Predictive Value of Tests"[Mesh] OR "sensitivity and specificity"[MeSH Terms] OR risk OR prevalence OR incidence OR sensitivity OR specificity) NOT review
EMBASE through OVID search strategy
("shoulder pain" and (history or risk or comorbid$ or demographic$)).mp. [mp = title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword)

Selection of manuscripts

Titles from all 1421 MEDLINE articles and all 1482 EMBASE articles were reviewed. By use of the inclusion and exclusion criteria outlined later, 1772 of these articles were excluded on the basis of the title alone. All abstracts of the remaining 1131 articles were reviewed; 818 articles were excluded on the basis of the material in the abstracts, and the full texts of the remaining 313 articles were reviewed. Reasons for exclusion are outlined in the flow sheet in Figure 1.

Articles were eligible for inclusion if they were primary research, were related to some element of the patient history or had data related to some element of the patient history, included a control or comparison group, were written in English or were able to be translated into English, provided (or allowed the calculation of) an LR or OR related to the specific risk factor, and provided an actual diagnosis. It was predetermined that the diagnosis would have to be one of the following 9 diagnoses related to the shoulder: rotator cuff tear, rotator cuff tendinitis, bicipital tendinitis, acromioclavicular arthritis, labral tears, glenohumeral arthritis, adhesive capsulitis/frozen shoulder, subacromial bursitis, or calcific tendinitis.

Articles were excluded if they were unrelated to the shoulder, were unrelated to the patient history, were animal studies, were unable to be translated into English, were review articles, included only patients who had undergone treatment, did not have a control or comparison group, included patients not generalizable to patients presenting to the clinic with shoulder pain, did not provide a diagnosis, had questionable diagnostic criteria for the diagnosis provided, did not provide enough data to be able to calculate an LR, or were related to recent trauma or high-energy trauma. In addition, studies purely related to shoulder instability were excluded as these patients typically present with signs of instability as opposed to chronic shoulder pain. Finally, purely radiologic studies were excluded. Many of these radiology studies had information related to the history and provided diagnoses, but most of them did not describe the reason the radiologic study was ordered in the first place. As such, these patients were not thought to be generalizable to the patient presenting to the clinic.

The 313 pulled manuscripts were reviewed. After detailed evaluation of the full texts, 21 studies met all criteria for inclusion in our systematic review. These texts were assessed independently by the 2 authors (M.B.R. and J.E.K.) for inclusion or exclusion, quality, and bias. We then extracted data related to elements of the patient history from the included studies. Any calculations made by the authors in the original texts of a positive LR, negative LR, or OR were included.[3,9,13,22,26,27] In those studies that included raw information related to elements of the patient history without provided LRs or ORs, we made independent calculations.[1,2,4,6,7,9,10,13,15-20,22,24,25,28,29]

We used 2 × 2 contingency tables to make any calculations possible related to elements of the patient history. From the tables, we were able to calculate sensitivity, specificity, positive predictive value, negative predictive value, positive LR, negative LR,