



A STUDY ON VALIDITY AND RELIABILITY OF SPEED AND YERGASON TEST AMONG PATIENTS WITH CHRONIC PAINFUL RESTRICTED SHOULDER IN NORTHERN DISTRICTS OF WEST BENGAL

Community Medicine

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ABSTRACT

Introduction: High resolution Ultrasonography (HRUSG) is increasingly useful for the assessment of shoulder pain clinically diagnosed to be bicipital tendinitis because of the fact that various clinical tests often do not offer an exact diagnosis on type of structural damage. Only to validate the exact type and severity of damage to peri-articular and intra-articular soft tissue pathology along with the clinical findings HRUSG is a low cost, safe and easily accessible tool available to physiatrists in clinical practice.

Objective: The aim of this study was to identify, compare and validate the findings of clinical examination with high resolution Ultrasonography (HRUSG) in the selected patients presenting with chronic painful shoulder disorders of various duration and severity in the Out Patient Department (OPD) based clinical Practice.

Methods: Non-interventional observational study of adult patients suffering from unilateral shoulder pain clinically diagnosed as bicipital tendinitis at OPD. The clinicians at PMR OPD performs the clinical shoulder examinations after recruitments of the patients from various clinics including orthopedics, General Clinic as well as PMR OPD and after that sono imaging were done to them by senior sonologist specially experienced in musculoskeletal and soft tissue sonography with the support from radiology department. Later on results as available from clinical and sonographic examination were blinded to each other being provided to another investigator for analysis and corroboration.

Results: Total 99 patients has been selected out of them 57 were males and 42 females, of whom the mean age was 42.7 ± 09.51 years (range 23-57 years). In clinical examination it was revealed that the Speed and Yergason test showing respectively sensitivity of 71.3% & 57.7%, specificity of 75.9% & 95.2%, positive predictive values of 67.5% & 85.3% and that of Negative predictive value 77.5% & 71.9%, positive likelihood ratio 3.93 & 7.13, negative likelihood ratio 0.41 & 0.55, Cohen's κ coefficient 0.521 & 0.439.

Conclusion: Clinical tests are of not conclusive in detecting bicipital tendinitis.

KEYWORDS

Speed and Yergason Test, Validity, Reliability, Bicipital Tendinitis, Chronic Painful Restricted Shoulder

INTRODUCTION:

There is increase use of high resolution ultra-sonography (HRUSG) in diagnosing musculoskeletal conditions in the clinical practice. Patients' suffering from shoulder problems forms a substantial burden in the community, particularly for the manual workers of lower socio-economical community. The problem caused huge man day loss for them resulting further economical burden. HRUSG forms a cost effective, quick and objective way of diagnosing condition and thereby offering appropriate care to the clinical condition thereafter. This is particularly of help in delineating multiple etiologies which masquerades under unfortunate clinical terms like frozen shoulder and painful arc syndrome and so on so forth. Such often-used terminologies are being randomly used to describe painful restricted shoulder been the chief complains and has limitations in structurally defining the condition.

An array of clinical test batteries with reasonable sensitivity and specificity are available. They are used mostly to predict singular structural faults. It is still uncertain how accurate they are and it becomes more difficult when multiple structures are involved to contribute in to the condition. Studies correlating imaging diagnosis with clinical finding are therefore needed to corroborate the exact pathology in each and every clinical condition. However very few literatures are available which considered correlating clinical test with sono-imaging defining these multiple structure diagnoses in an objective anatomic manner in chronic shoulder conditions in clinical practice in the OPD set up. Therefore an attempt was made only to find the validity of the two mostly used test which are most often applied in clinical practice to diagnose bicipital tendinitis in any patient with shoulder problem.

AIMS & OBJECTIVES:

- Correlation between clinical and sono finding in the stated clinical condition
- Determine inter-observer agreeability of clinician and sonologist
- Determine reliability of the tests

MATERIALS & METHODS:

Study period was from month of August 2017 to January 2019. Essential ethical clearance and patient consent was taken. Study

enrolled 99 consecutive adult patients with unilateral shoulder pain of greater than 6 weeks visiting Physical Medicine & Rehabilitation Dept of North Bengal Medical College, Kolkata, India either directly or being referred from Orthopedic OPD or General OPD for rehabilitation management. Exclusion criteria were shoulder pain less than 6 weeks, Post operative Shoulder Pain & Stiffness, Fractures and suspected labral lesions, Neurological Conditions associated Shoulder Problems, prior shoulder joint surgery and prior shoulder injection (local anesthetics or steroids) in the past 4 week. All patients were recruited from Physical Medicine and Rehabilitation Outpatient department by chief investigator as shown in **Fig. (1)**. He sent the patient to a sonographer or another Physiatrist in random order after preliminary clinical assessment for further review both clinically as well as sonographically. Thereby each patient went through a process of through and routine clinical and sonographical examination as was being performed by two different investigators who were blinded to each other. The study was performed according to good clinical practice and carried out in compliance with the Helsinki Declaration. For HRUSG examination we adhered to credible books journals and guidelines^(1,2,3). The HRUSG examination was performed by senior faculty at the radiology Department with an extensive experience of musculo skeletal sonography. All these clinical and radiological data was finally collected by the chief investigator. Sono examinations were performed with Edan DUS 3 Digital Ultrasonic Diagnostic Imaging System using a linear 7.5 MHz central frequency transducer L741 probe. After test was completed independently the researcher communicated finding to the patient and compiled the data generated. The tests included in the clinical examination were:

- Speed test;
- Yergason test

Each test had the option of being either positive or negative for being generated into dichotomous (0/1) data for analysis.

RESULTS:

For statistical purpose SPSSv20 and Microsoft Office Excel 2007 was used. In our study sensitivity and specificity of selected clinical tests for the assessment of chronic painful restricted shoulder are determined using HRUS as the gold standard. Empirical Pearson's correlation coefficient was used as an indicator of linear dependence

between the two variables (clinical examination test results and HRUSG examination findings respectively). In order to measure the correlation in terms of inter-rater agreement, the Cohen's κ coefficient was used.

There were 99 patients, 57 males and 42 females (Fig.2) with the mean ages of 42.7 ± 09.51 years (range 23-57 years). Of them 53 patient had Bicipital tendinitis affection. Of them 30 were male and 23 female.

Speed test (Table 1) showed sensitivity of 71.3%, specificity of 75.9%, positive predictive values of 67.5%, negative predictive value 77.5%, positive likelihood ratio 3.93, negative likelihood ratio 0.41, Cohen's κ coefficient 0.421.

Yergason Test (Table 2) showed sensitivity of 57.7%, specificity of 95.2%, positive predictive values of 85.3%, negative predictive value 71.9%, positive likelihood ratio 7.13, negative likelihood ratio 0.55, Cohen's κ coefficient 0.439.

Pearson Correlation of Test with USG findings for 99 patients is 0.781. It is a statistically significant linear relationship ($p < .001$). The direction of the relationship is positive and magnitude of strength is strong ($.5 < |r|$). Pearson Correlation of Speed test with USG findings for 99 patients is 0.421. It is a statistically significant linear relationship ($p < .001$). The direction of the relationship is positive and magnitude of strength is moderate ($.3 < |r| < .5$). Pearson Correlation of Yergason test with USG findings for 99 patients is 0.439. It is a statistically significant linear relationship ($p < .001$). The direction of the relationship is positive and magnitude of strength is moderate ($.3 < |r| < .5$).

DISCUSSION:

There is a moderate agreement between the clinical evaluators and sonologist for both Speed test and Yergason test whereby we confirm agreement is robust and not by chance. Under such agreement if we consider sono-finding to be definite diagnosis of the condition then Speed test is found to be more valid in detecting truly positive cases considering the sensitivity of Yergason Test is taken as measure of validity. However positive predictive values validate exact opposite for the two tests. Whereas in detecting true negative cases Yergason test showed superior validity if specificity data are observed. But negative predictive value shows good validity for both in detecting true negative cases. Overall the validity of both the test to detect positive or negative can be consider quite good. However the question that is paramount is whether these test are reliable for screening purpose. To find out this issue we have represented two Fagan's nomogram from previous meta-analysis which gave a pretest probability of 39% for Speed test and 50% for Yergason test⁽⁴⁾.

Though we find both Speed & Yergason Clinical Examination Tests are not a good tool for screening of bicipital tendinitis. The ambiguity regarding validity in diagnosing true positive or true negative cases can be answered by the constructed nomogram which shows Speed test has poor probability of detecting both true positive and true negative cases where as Yergason test has significant probability of detecting true positive cases but has poor probability of detecting true negative cases. Finally one can assume clinical test of not much use in detecting bicipital tendinitis, therefore we are suggesting using of HRUSG evaluation for those cases to directly visualize and then to establish such cases of shoulder pathology as bicipital tendinitis to offer appropriate therapeutic protocol from rehabilitation point of view without relying on clinical tests for screening.

CONCLUSION:

It is assumed that clinical test commonly used in clinical practice in the OPD setting may not be considered comprehensive tools in detecting bicipital tendinitis. Therefore due to inappropriate detection of pathology there is high probability that the patients attending OPD with shoulder problems in the OPD of Physical Medicine and Rehabilitation for the purpose of Shoulder Rehabilitation either directly from community or may referred from other departments like Orthopedic or General OPD may as being clinically diagnosed case of Bicipital Tendinitis by these clinical tests may receive inappropriate rehabilitation protocol causing them to suffer more with prolongation of their morbidity. Thereby they will have further loss of their working man days causing additional financial loss to them along with loss of money to procure cost of Medicare. And as the most of these patients were representative of low socioeconomic section of the community the working man day loss to them is much costly for their livelihood both for them as well as to their dependents and family members.

Therefore it will be our suggestions to use the HRUSG for direct visualization of pathology to establish actual diagnosis of such cases without relying on clinical tests for screening.

Fig (1): Flow diagram depicting study design

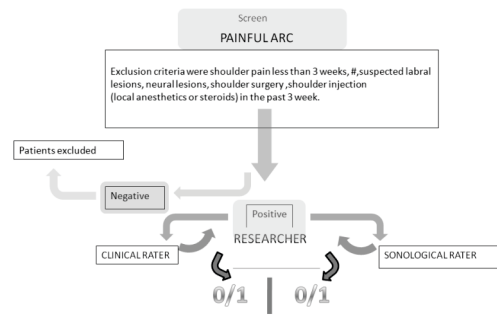


Fig 2: A pie-chart showing male female distribution

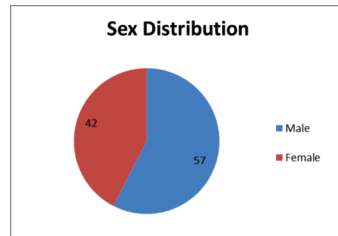


Fig 3: Chart showing Fagan's Nomogram of Speed Test and Yergason Test for reliability. The study result shows these two test are not reliable to the test for screening purposes.

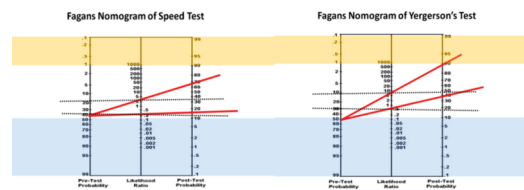


Table 1 – Speed test

SENSITIVITY	71.3%
SPECIFICITY	75.9%
POSITIVE PREDICTIVE VALUE	67.5%
NEGATIVE PREDICTIVE VALUE	77.5%
POSITIVE LIKELIHOOD RATIO	3.93
NEGATIVE LIKELIHOOD RATIO	0.41
COHEN'S KAPPA INDEX	0.421

Table 2 – Yergason Test

SENSITIVITY	57.7%
SPECIFICITY	95.2%
POSITIVE PREDICTIVE VALUE	85.3%
NEGATIVE PREDICTIVE VALUE	71.9%
POSITIVE LIKELIHOOD RATIO	7.13
NEGATIVE LIKELIHOOD RATIO	0.55
COHEN'S KAPPA INDEX	0.439

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