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The supine apprehension test helps predict the risk of recurrent instability after a first-time anterior shoulder dislocation

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Background: We previously identified the positive result of the supine apprehension test after completion of rehabilitation following a first dislocation as a possible predictor of high risk for redislocation. We extend the follow-up of a previous cohort of patients with first-time shoulder dislocations to better assess this test.

Methods: Fifty-three men aged 17 to 27 years who sustained a first traumatic shoulder dislocation were treated by shoulder immobilization for 4 weeks and then rehabilitated with a standard physical therapy protocol. At 6-week follow-up, a supine anterior apprehension test was performed to assess the risk of redislocation. The patients were observed prospectively for a minimum of 75 months.

Results: Of the 53 participants, 52 (mean age, 20.2 years) completed the study follow-up. Of the 52 subjects, 41 (79%) were combat soldiers. Follow-up was between 75 and 112 months. Of the 52 subjects, 31 (60%) redislocated at a range of 3 to 70 months after the initial dislocation. Eleven of 14 subjects (79%; confidence interval, 52%-92%) with a positive anterior apprehension test result redislocated, compared with 20 of 38 patients (53%; confidence interval, 37%-68%) with a negative test result. Patients with a positive test result redislocated more and earlier ($P = .02$, PROC LIFETEST, SAS).

Conclusions: The results of the supine apprehension test after a first shoulder dislocation and rehabilitation can help predict risk for recurrent instability. It potentially may be included as a variable in decision analysis models.

Level of evidence: Level I, Diagnostic Study.

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Keywords: Shoulder dislocation; anterior apprehension test; recurrent dislocation; risk; soldiers

IRB approval: Israeli Defense Forces Medical Corps (274-2004) and Hadassah University Hospital.

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Personalized medicine is the tailoring of medical treatment to the individual characteristics, needs, and preferences of each patient. This principle can be applied to the young patient who sustains a first-time traumatic anterior shoulder dislocation. The first element of the treatment is unequivocal. The shoulder dislocation must be reduced. The goal of the subsequent treatment is to prevent recurrent dislocations. How to achieve this is the dilemma. The shoulder is traditionally immobilized to prevent immediate redislocation, even though this treatment has not been proved to be effective in reducing recurrent dislocation.[4] Initial reports that immobilization in external rotation may be more effective in reducing recurrent dislocation have not been supported by subsequent level I studies.[2,8]

Mather et al introduced a Markov decision model for patients with first-time anterior shoulder dislocations.[9] They constructed the decision model with outcome probabilities and effectiveness based on the literature and expert opinion.[5-7,10] Their original model includes only 2 risk factors, gender and age. Sachs et al identified contact or collision sports in the young patient and overhead occupational activities as risk factors for recurrent dislocation after a primary shoulder dislocation.[11] These variables are not in the Mather model. Their model is constructed in such a way that additional variables, once identified and validated, can be incorporated into the model.

We previously reported on the use of the supine apprehension test as a tool for identifying patients with a high risk for recurrent shoulder dislocation after a first-time anterior shoulder dislocation.[12] Our first report was short term. Because the test could potentially be added to the Markov decision model, we now report the results with a minimum 75 months of follow-up. The longer term follow-up further documents the use of the supine anterior apprehension test in predicting the risk for recurrent dislocation after a first-time anterior shoulder dislocation.

Methods

As part of a prospective study that began in January 2004, 53 consecutive male patients in the age group of 17 to 27 years who sustained documented first traumatic shoulder dislocation were observed to evaluate the predictive value of the supine apprehension test in determining risk for redislocation. The initial results of the 24- to 48-month follow-up of the group have previously been reported.[12] This report extends the follow-up to a minimum of 75 months. Institutional Review Board approval from the Israeli Defense Forces Medical Corps (274-2004) and Hadassah University Hospital was received for this study. The goals and study methods were explained to participants both in a written information sheet and orally before the study. Informed written consent was obtained from all participants.

After being treated in a shoulder immobilizer for 4 weeks, the patients were treated according to a standard physical therapy protocol. Six weeks after the dislocation, participants underwent a supine apprehension test. Before the test, a detailed explanation of how it would be performed was given, but participants were not told what might be their reaction to avoid bias. The test was presented to them as one of the tools used by the medical staff to assess the stability of their shoulder. The test was performed bilaterally, first on the nonaffected arm and then on the affected arm. The test was done with the patient lying supine, with the affected arm brought to 90° of abduction and the elbow flexed to 90°. The examiner supported the elbow with one hand, grasped the distal forearm with the other hand, and quickly rotated the arm externally from neutral rotation toward 90° of external rotation. The examination was done twice. The apprehension test result was defined as positive on the basis of the presence on both repetitions of at least 1 of 2 criteria: resistance or apprehension during the maneuver. The participant was considered to be apprehensive according to his facial expression or if he stated that he felt his shoulder was about to ''come out of place.'' Patients considered to have clinically stable shoulders on the basis of a negative supine apprehension test result were allowed to return to full activity 3 months after their dislocation. Patients with positive supine apprehension test results returned to activity levels determined by their level of confidence. Two participants were unable to return to normal activity. The follow-up at 1 year and at yearly intervals afterward was done by a single dependent observer (C.M.) either by telephone interview or at a clinic visit. Patients were asked if they (1) participated in sports, (2) were still protective of their shoulder, (3) had sustained a new dislocation, (4) had sustained a new subluxation, (5) had undergone surgery and inquired of the results, or (6) were contemplating having surgery.

The Fisher exact test was used to assess whether there was a statistically significant difference between shoulder dislocation recurrence of subjects with and without a positive anterior apprehension test result. Confidence intervals were calculated comparing probabilities of redislocation occurrence between patients with positive or negative apprehension test results. Survival analysis was performed with the LIFETEST procedure (SAS 9.2, Cary, NC, USA) to assess whether there was a statistically significant difference in shoulder dislocation recurrence of participants with and without a positive anterior apprehension test result. The relationship between the patient's age and the presence or absence of recurrent dislocation was assessed by the *t* test.

Results

Of the 53 study participants, 52 (98%) were available for the long-term review. All 52 subjects completed every

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