

Systematic Review

Does Study Design Affect Redislocation Rates After Primary Shoulder Dislocations? A Systematic Review Comparing Prospective and Retrospective Studies

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Purpose: To compare recurrence rates between prospectively collected and retrospectively collected data on primary anterior shoulder dislocations, as this could influence the timing of surgical decision making. **Methods:** A comprehensive literature search of Medline, Embase, CINAHL, and hand searches was performed. Recurrence rates of anterior shoulder dislocations were collected from relevant articles, along with follow-up length, age, and gender. An independent sample *t* test was conducted to evaluate our hypothesis. A multiple linear regression model was used to examine the variance in recurrence rates while controlling for covariates. **Results:** A total of 1,379 articles were identified, of which 25 were relevant to our study—16 prospective and 9 retrospective. The average rate of recurrence of anterior shoulder dislocations in retrospective studies (mean [M] = 45.2, standard deviation [SD] = 31.67) was not significantly different from that in prospective studies (M = 56.7, SD = 22.55). The 95% confidence interval for the difference of the means ranged from -34.05 to 10.91. After controlling for covariates with the multiple linear regression, only 1.9% of the variance in recurrence rates was due to study type and was not significant ($P = .42$). The *t* test performed to evaluate our hypothesis was also not significant ($t(23) = -1.07, P = .298$). **Conclusions:** When comparing prospective and retrospective studies, there was no significant difference in recurrence rates of primary anterior shoulder dislocations treated nonoperatively. The average redislocation rate was 56.7% in prospective studies and 45.2% in retrospective studies. Furthermore, the majority of this difference was accounted for by varying rates between age groups. Further research is needed to determine the risk of redislocation in specific age groups, to guide treatment decisions based on varying risk. **Level of Evidence:** Systematic review of Level II and III studies.

The shoulder is the most commonly dislocated joint in the human body due to its delicate balance between stability and a large functional range of motion. This tendency for instability is exacerbated following a primary anterior shoulder dislocation, which can lead to high recurrence rates. In fact, a retrospective study by Wheeler et al. reported rates as high as 92% to 100% in younger populations.¹ Reports of exceedingly high

recurrence rates suggest that operative management of dislocations may be more appropriate than the previous regime of immobilization and rehabilitation. Postacchini et al. reported recurrent dislocation rates of 86% following primary anterior shoulder dislocation when treated nonoperatively, and suggests prophylactic operative treatment at the time of primary dislocation for younger patients.² Kralinger et al. similarly recommended primary surgical repair, particularly for patients involved in sports who have experienced traumatic anterior shoulder dislocations, based on increased recurrence rates in patients who received nonoperative management.³ The majority of the reported recurrent dislocation rates, including those from the aforementioned studies, are drawn from retrospectively collected data. This finding is particularly significant because it is used as the basis to promote early stabilization surgery. However, more recent literature published on this topic uses prospectively collected data from randomized controlled trials (RCTs)

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and states that recurrence rates may be more in the range of 35% to 40%.⁴ Similarly, the high recurrence rates cited in previous literature seemed overinflated relative to the clinical experience of the senior authors of this paper. If recurrence rates were in fact overstated, then treatment decisions based on these rates would not be merited. The purpose of this study was to compare recurrence rates between prospectively collected and retrospectively collected data on primary anterior shoulder dislocations, as this could influence the timing of surgical decision making. We hypothesized that recurrence rates of primary anterior shoulder dislocations treated nonoperatively would consistently be reported as lower in prospective studies than in large retrospective studies.

Methods

Literature Search

We gathered both prospective and retrospective studies that looked at recurrence rates for anterior shoulder dislocations. This was done through a systematic literature search of the electronic databases Medline, Embase, and CINAHL from inception to January 20, 2014. We also performed hand-searches of PubMed and Google Scholar. Our search strategy can be found in the appendix. Studies were excluded if they did not study primary shoulder dislocation, if they did not have at least one nonoperative arm for which recurrence rates were cited, and if they did not cite follow-up length. All of the studies are written in English and published in peer-reviewed journals. The search produced a total of 1,379 articles. Article titles and abstracts were reviewed independently by 2 of the authors to determine if they were applicable to our study. Discrepancies were discussed and clarified with a senior author. Of those articles, 1,222 were excluded based on title and abstract screening. The remaining 157 titles appeared relevant and were reviewed by 2 independent reviewers (C.G., J.R.). After full article review, 25 articles were found to be relevant to this study—16 prospective studies and 9 retrospective studies (Fig 1).

Methodologic Quality Assessment

Prospective and retrospective cohort studies were assessed for their quality using the Newcastle Ottawa Scale (NOS). The NOS uses a star system (0-9) to evaluate 3 components of nonrandomized studies: selection, comparability and outcome/exposure.⁵ Higher scores on the NOS represent higher study quality.

RCTs were assessed using the checklist to evaluate a report of a nonpharmacologic trial (CLEAR-NPT). The CLEAR-NPT is a validated checklist used to evaluate the adequacy of 10 key elements of an RCT.⁶ These elements are included in Table A1 in the supplemental content.

Data Extraction

All data were abstracted into a standardized collection form using Microsoft Excel 2013 (Microsoft, Redmond, WA) independently by 2 independent reviewers (C.G., J.R.). A kappa statistic was calculated to determine the concordance of reviewers. We chose an a priori criterion of kappa = 0.65 or greater for adequate agreement.⁷ The data we collected from these articles includes general study information (author, year of publication, study design), demographic data (age and gender), follow-up length, and recurrence rates of anterior shoulder dislocations following nonoperative management.

Statistical Analysis

The statistical analysis of the collected data included a descriptive analysis of data grouped by study type. The mean, standard deviation, and range were calculated for age, follow-up, gender (%male), and recurrence rates (%) for pooled data from all prospective studies compared to pooled data from all retrospective studies. An independent sample *t* test was conducted to evaluate the hypothesis that the rate of anterior shoulder redislocation reported in a prospectively conducted study is lower than the redislocation rate reported in a retrospectively conducted study. A multiple linear regression model was also completed to adjust for covariates in the analysis. The independent variable was study type (prospective vs retrospective), the dependent variable was recurrence rate, and the covariates adjusted for in the analysis were age, follow-up length, and percentage of male patients.

Results

General Study Characteristics

The search resulted in 16 prospective studies and 9 retrospective studies that were relevant to our study. Agreement between authors was substantial with respect to eligibility of the studies (kappa = 0.79). All except 1 study had majority male patients with average recurrence rates ranging from as low as 4% to as high as 94.5% (Table 1). The mean age for patients in all of the prospective studies combined was 26.2 years (SD = 8.6, 95% CI 21.4-30.9) and for all retrospective studies combined was 38.8 years (SD = 22.4, 95% CI 18.1-59.5) (Table 2). The mean follow-up for prospective studies was found to be 34.2 months (SD = 21, 95% CI 22.6-45.8). Retrospective studies had a longer mean follow-up period of 55.6 months (SD = 21.7, 95% CI 35.6-75.7). The majority of studies included were male dominant, with a mean percentage of male patients of 85.9% (SD = 14.5, 95% CI 77.9-94) in prospective studies and 70.7% (SD = 25.1, 95% CI 47.5-94) in retrospective studies. Agreement between authors was substantial with regard to data extraction (kappa = 0.82).

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