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REVIEW ARTICLE

Complications associated with open coracoid transfer procedures for shoulder instability

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Background: Interest has been maintained in the use of coracoid transfer procedures for recurrent shoulder instability despite the significant potential for serious complications. A comprehensive systematic review of the literature was performed to quantify and characterize the complication rate associated with these procedures to better inform practicing surgeons and their patients.

Materials and methods: Medline, Excerpta Medica Database (EMBASE), and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases were searched for therapeutic studies published between 1985 and 2011. Data regarding complications was extracted from selected articles in a standardized manner. Complication rates were determined and expressed as percentages with 95% confidence intervals.

Results: Included were 30 studies describing the results of 1658 coracoid transfer procedures. Repeat surgery was documented in 4.9% ± 1.0% of cases. Recurrent instability occurred in 6.0% ± 1.2%. Hardware complications occurred in 6.5% ± 1.3%. Collectively, the rate of graft nonunion, fibrous union, or postoperative graft migration was 10.1% ± 1.6%; graft osteolysis occurred in 1.6% ± 0.7%. There was a 1.2% ± 0.8% rate of nerve palsy. Surgical site infection occurred in 1.5% ± 0.7%. Intraoperative fractures occurred in 1.1 ± 0.6%.

Conclusion: Coracoid transfers for shoulder instability can improve shoulder stability with acceptable recurrence rates. They are challenging procedures associated with a broad range and significant incidence of complications. A detailed appreciation of anatomy and meticulous attention to technical detail, particularly graft placement, is key to reducing complications. These procedures may be best indicated in the setting of glenoid or humeral bony deficiency, although efficacy over open capsular procedures remains equivocal.

Level of evidence: Review Article.

Keywords: Shoulder instability; shoulder dislocation; Latarjet; Bristow-Latarjet; Bristow; coracoid transfer

Transfer of the coracoid along with its attached tendons to the anterior glenoid is a widely used procedure in the treatment of anterior shoulder instability. In 1958, Helfet[20] described the Bristow procedure, which was named after his mentor who taught him the procedure. Helfet's original article details the surgical technique in which the terminal half-inch of the coracoid process is transferred just medial to the anteroinferior glenoid rim through a vertical slit in the subscapularis. The graft is held adjacent to the decorticated donor site by incorporating the conjoined tendon in the

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subscapularis closure. In this way, once healed, the bone and its attached short head of the biceps and coracobrachialis provide a sling-like buttress that is amplified when the arm is abducted and externally rotated.

Latarjet[27] had earlier (1954) reported a similar procedure, although in his description, the coracoid was delivered with its attached conjoined tendon through a horizontal split in subscapularis, laid flat and fixed against the prepared site on the scapular neck.[54] McMurray[34] described a procedure that he had used for more than 20 years, whereby the coracoid tip, along with the conjoined tendon and pectoralis minor, were transferred to the rim of the glenoid and secured by screw fixation. Since these early descriptions of coracoid transfer procedures for shoulder instability, significant interest has been maintained, with numerous modifications to the approach (including arthroscopic techniques) and method of fixation described, although the basic concept has remained the same.[5,7,8,9,12,13,16,22,24,26,39]

Understanding the complications associated with these procedures can minimize their occurrence and is important for surgical training and in providing informed consent for patients in whom the operation is planned. The purpose of this study was to conduct a systematic review of the complications of open coracoid transfer procedures to characterize the safety profile for this method of the treatment of anterior shoulder instability.

Materials and methods

Literature search

A search was initiated for articles published in English between 1985 and 2011 (week 18) about human participants using Medline, the Excerpta Medica Database (EMBASE), and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). Keywords used were ''shoulder instability,'' ''Latarjet,'' ''Bristow-Latarjet,'' ''Bristow,'' and ''coracoid transfer.'' The title or abstract, or both, of each article was reviewed. Full-text articles were reviewed where inclusion was anticipated, where no abstract was available for a potentially relevant article, or where a decision to include or exclude could not be made from the abstract. The citations of all selected articles and reviews were also reviewed to ensure a comprehensive list of pertinent articles was considered.

Study selection

Full-text articles were retrieved for all preselected studies. All open coracoid transfer procedures that involved transfer and fixation of the coracoid, along with the conjoined tendon (variations of those described by Bristow and Latarjet), were considered. Articles involving series detailing multiple procedures were considered but only included if the complications for coracoid transfer procedures could clearly be separated from complications for other procedures. Arthroscopic series, case reports, abstract-only publications, and review articles not presenting original data were excluded.

Data extraction

Data were abstracted from the examined studies using standardized criteria. This included study design and level of evidence in addition to number of patients and cases, patient demographics, duration, and type of follow-up. Complications requiring additional treatment and any complication where there was potential for long-term morbidity or mortality risk were included for analysis. Specifically, these were intraoperative fracture of the coracoid or glenoid; hardware issues, such as joint penetration, impingement, migration, loosening or failure; graft osteolysis, fibrous, or nonunion; superficial and deep infection; hematoma; nerve injury; and recurrent subluxation or dislocation. Although graft and hardware complications may occur together in the same patient and be mutually causal, they may lead to distinct sequelae and indeed may occur independently. For this reason, they are presented independently in the Results.

Data analysis

Type-specific complication rates were determined by the number of occurrences divided by the number of relevant study subjects and expressed as percentages with 95% confidence intervals.

Results

The combined database search revealed 2202 articles (839 Medline, 992 EMBASE, 371 CINAHL). After a careful examination of the lists, full texts were retrieved for 42 articles. We subsequently excluded 14 for not meeting the inclusion criteria or because the same data had been used in an article already included. A search of the reference lists of selected articles identified a further 2 relevant articles, leaving a total of 30 articles[1,4-6,9,12,13,15-17,19,22,24,29,31-33,36,39,42-47,49-53] for final inclusion and analysis (Fig. 1). Study details including patient demographics, follow-up characteristics and details of previous surgery are presented in Table I.

These 30 studies described the results of 1658 open coracoid transfer procedures for shoulder instability. Three percent of cases (20 of 636) from 14 studies[1,5,6,9,13,15-17,19,22,24,32,41,45] were revision procedures. Sixteen studies[4,12,29,31,33,36,39,43-45,47,49-53] (1058 cases) made no comment regarding whether the procedures were primary or revision cases. Metallic screw fixation was used in 29 studies,[1,4-6,9,12,13,15-17,19,22,24,29,31-33,36,42-47,49-53] and bioabsorbable screws and plugs were used in 1 study.[39]

Repeat surgery was documented in 81 cases (4.9 $\pm$ 1.0%), including for hardware problems in 50 and recurrent instability in 20. Other reasons included infection in 5, hematoma in 3, graft migration into the joint in 1, aseptic graft necrosis with a cutaneous fistula in 1, and a permanent axillary nerve palsy treated with a sural nerve graft in 1. Table II presents a breakdown of reported complications by study.