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BACK

Upper extremity

Arthroscopy, Volume 40, Issue 2

Quantifying Threshold Scores for Patient Satisfaction After Massive Rotator Cuff Repair for the Interpretation of Mid-Term Patient-Reported Outcomes

T.S. Hwang, J. Ardebol

DOI: https://doi.org/10.1016/j.arthro.2023.06.031

Purpose: To establish minimal clinically important difference (MCID) and patient acceptable symptomatic state (PASS) values for 4 patient-reported outcomes (PROs) in patients undergoing arthroscopic massive rotator cuff repair (aMRCR): American Shoulder and Elbow Surgeons (ASES) score, Subjective Shoulder Value (SSV), Veterans Rand-12 (VR-12) score, and the visual analog scale (VAS) pain. In addition, our study seeks to determine preoperative factors associated with achieving clinically significant improvement as defined by the MCID and PASS.

Methods: A retrospective review at 2 institutions was performed to identify patients undergoing aMRCR with minimum 4-year follow-up. Data collected at the 1-year, 2-year, and 4-year time points included patient characteristics (age, sex, length of follow-up, tobacco use, and workers' compensation status), radiologic parameters (Goutallier fatty infiltration and modified Collin tear pattern), and 4 PRO measures (collected preoperatively and postoperatively): ASES score, SSV, VR-12 score, and VAS pain. The MCID and PASS for each outcome measure were calculated using the distribution-based method and receiver operating characteristic curve analysis, respectively. Pearson and Spearman coefficient analyses were used to determine correlations between preoperative variables and MCID or PASS thresholds.

Results: A total of 101 patients with a mean follow-up of 64 months were included in the study. The MCID and PASS values at the 4-year follow-up for ASES were 14.5 and 69.4, respectively; for SSV, 13.7 and 81.5; for VR-12, 6.6 and 40.3; and for VAS pain, 1.3 and 1.2. Greater infraspinatus fatty infiltration was associated with failing to reach clinically significant values.

Conclusions: This study defined MCID and PASS values for commonly used outcome measures in patients undergoing aMRCR at the 1-year, 2-year, and 4-year follow-up. At mid-term follow-up, greater preoperative rotator cuff disease severity was associated with failure to achieve clinically significant outcomes.

Level of evidence: Level IV, case series.

BACK

Eighth Cervical Nerve Root Block During Interscalene Brachial Plexus Block Decreases Pain Caused by Posterior Portal Placement but Increases Horner Syndrome in Patients Undergoing Arthroscopic Shoulder Surgery: A Randomized Controlled Trial

E. Kim, C.H. Choi

DOI: https://doi.org/10.1016/j.arthro.2023.06.022

Purpose: To compare the intensity of pain on posterior portal placement between a C5-C7 root block (conventional interscalene brachial plexus block [ISBPB]) and a C5-C8 root block in patients undergoing arthroscopic shoulder surgery.

Methods: In this prospective, single-blinded, parallel-group randomized controlled trial, patients were randomized to receive either a C5-C7 root block (C5-C7 group, n = 37) or a C5-C8 root block (C5-C8 group, n = 36) with 25 mL of 0.75% ropivacaine. The primary outcome was the pain intensity on posterior portal placement, which was graded as 0 (no pain), 1 (mild pain), or 2 (severe pain). The secondary outcomes were the bilateral pupil diameters measured 30 minutes after ISBPB placement; the incidence of Horner syndrome, defined as a difference in pupil diameter (ipsilateral – contralateral) of less than –0.5 mm; the onset of postoperative pain; and the postoperative numerical rating pain score, where 0 and 10 represent no pain and the worst pain imaginable, respectively.

Results: Fewer patients reported mild or severe pain on posterior portal placement in the C5-C8 group than in the C5-C7 group (9 of 36 [25.0%] vs 24 of 37 [64.9%], *P* = .003). Less pain on posterior portal placement was reported in the C5-C8 group than in the C5-C7 group (median [interquartile range], 0 [0-0.75] vs 1 [0-1]; median difference [95% confidence interval], 1 [0-1]; *P* = .001). The incidence of Horner syndrome was higher in the C5-C8 group than in the C5-C7 group (33 of 36 [91.7%] vs 22 of 37 [59.5%], *P* = .001). No significant differences in postoperative numerical rating pain scores and onset of postoperative pain were found between the 2 groups.

Conclusions: A C5-C8 root block during an ISBPB reduces the pain intensity on posterior portal placement. However, it increases the incidence of Horner syndrome with no improvement in postoperative pain compared with the conventional ISBPB (C5-C7 root block).

Level of evidence: Level I, randomized controlled trial.

BACK

Mini-Open Fascia Lata Interposition Graft Results In Superior 2-Year Clinical Outcomes When Compared to Arthroscopic Partial Repair for Irreparable Rotator Cuff Tear: A Single-Blind Randomized Controlled Trial

F.R. Ribeiro, M.P. Nogueira

DOI: https://doi.org/10.1016/j.arthro.2023.06.046

Purpose: To evaluate and compare the results of surgical treatment for irreparable rotator cuff tear (IRCT) by the mini-open interposition procedure using fascia lata autograft against outcomes of the arthroscopic partial repair technique.

Methods: An interventional, prospective, controlled, randomized, single-blinded study involving 2 study groups was conducted. The graft group (n = 20) underwent the mini-open interposition procedure using fascia lata autograft. The control group (n = 22) underwent arthroscopic partial repair. Patients were evaluated using the University of California Los Angeles (UCLA) Shoulder scale, the American Shoulder and Elbow Surgeons (ASES) score, the Constant-Murley (Constant) score, the visual analogue scale (VAS) pain score, active range of motion, frontal flexion strength, retear rates evaluated by magnetic resonance imaging analysis, occurrence of complications, and the minimal clinically important difference (MCID).

Results: The graft group had better UCLA (31.5 vs 28.18, $P = .035$) (100% exceeded the MCID for the graft group and 95% for the control group), ASES (88.62 vs 77.06, $P = .016$) (100% exceeded the MCID for both groups), Constant (78.85 vs 61.68, $P < .001$), and VAS (0.95 vs 2.59, $P = .01$) scores at the 24-month follow-up. For active forward elevation range, both groups showed no statistically significant differences (168.5 vs 164.54, $P = .538$). The results for active external and internal rotation were better in the graft group (60.25 vs 40, and 9.1 vs 6.9, $P < .001$), as was frontal flexion strength (4.24 vs 2.67, $P = .005$). The graft group also had lower retear rates (15% vs 45.5%, $P = .033$). No complications were reported.

Conclusions: Outcomes of surgeries for IRCT by the mini-open interposition procedure using fascia lata autograft and by the arthroscopic partial repair technique showed good results in both groups over time and exceeded the MCID. However, most comparative outcomes between groups showed better results for the interposition procedure.

Level of evidence: Level I, randomized controlled trial.

BACK

An All-Suture Anchor Offers Equivalent Clinical Performance to an Established Solid Suture Anchor in the Arthroscopic Repair of Rotator Cuff Tears: A Prospective, Randomized, Multicenter Trial With 12-Month Follow-Up

H. Yan, L. Zhao

DOI: https://doi.org/10.1016/j.arthro.2023.06.056

Purpose: To evaluate the safety and efficacy of a next-generation, all-suture anchor in patients undergoing arthroscopic repair of rotator cuff tears, compared with that of an established solid suture anchor.

Methods: Between April 2019 and January 2021, a prospective, comparative, randomized controlled noninferiority study conducted on people with Chinese ethnicity at 3 tertiary hospitals enrolled patients (18-75 years) requiring arthroscopic treatment for rotator cuff tears. Patients were randomized into 2 cohorts receiving either all-suture anchor or solid suture anchor and followed for 12 months. The primary outcome was the Constant-Murley score at the 12-month follow-up. Magnetic resonance imaging assessments determined the rate of retear of rotator cuff repair (defined as Sugaya classification 4 and 5). Safety evaluation was performed at all follow-up points to determine the adverse events (AEs).

Results: In total, 120 patients with rotator cuff tears (mean age, 58.3 years; 62.5% female; 60 receiving all-suture anchor) underwent treatment. Five patients were lost to follow-up. Both cohorts showed significant improvement in Constant-Murley scores between baseline and 6 months ($P <$ .001) and between 6 and 12 months ($P <$ .001). There were no significant differences in Constant-Murley scores between the 2 cohorts at 12 months ($P =$ .122) after operation. The retear rate at 12 months was 5.7% and 1.9% in the all-suture and solid suture anchor cohorts, respectively ($P =$ .618). There were 2 cases of intraoperative anchor pullout, both of which were successfully resolved. No cases of postoperative reoperation or other anchor-related AEs were reported.

Conclusions: The all-suture anchor offered equivalent clinical performance to an established solid suture anchor at the 12-month follow-up in patients undergoing arthroscopic repair of rotator cuff tears. The retear rate was not statistically significantly different between the 2 cohorts.

Level of evidence: Level I, randomized controlled trial.

BACK

Preoperative Corticosteroid Injections Within 4 Weeks of Arthroscopic Shoulder Procedures Are Associated With Increased Postoperative Infection Rates

E. Remily, J. Dubin

DOI: https://doi.org/10.1016/j.arthro.2023.08.073

Purpose: To refine the understanding of the effect of timing of corticosteroid injections (CSIs) and shoulder arthroscopy on postoperative infection.

Methods: An insurance database was used to determine all patients who underwent shoulder arthroscopy for a 5-year period with an associated preoperative ipsilateral corticosteroid injection. Patients were stratified into cohorts based on timing of preoperative CSI: (1) 0-<2 weeks, (2) 2-<4 weeks, (3) 4-<6 weeks, and (4) 6-<8 weeks. Patients were pooled to include all patients who had a CSI less than 4 weeks and those longer than 4 weeks. A cohort of patients who never had a corticosteroid injection before undergoing arthroscopy were used as a control. All patients had a follow-up of 2 years. Multivariable regression analyses were performed using R Studio with significance defined as $P < .05$.

Results: Multivariate logistic regression showed a greater odds ratio (OR) for postoperative infection in patients who received CSI 0-<2 weeks before shoulder arthroscopy at 90 days (3.10, 95% confidence interval [CI] 1.62-5.57, $P < .001$), 1 year (2.51, 95% CI 1.46-4.12, $P < .001$), and 2 years (2.08, 95% CI 1.27-3.28, $P = .002$) compared with the control group. Patients who received CSI 2-<4 weeks before shoulder arthroscopy had greater OR for infection at 90 days (2.26, 95% CI 1.28-3.83, $P = .03$), 1 year (1.82, 95% CI 1.13-2,82, $P = .01$), and 2 years (1.62, 95% CI 1.10-2.47, $P = .012$). Patients who received CSI after 4 weeks had similar ORs of infection at 90 days (OR 1.15, 95% CI 0.78-1.69, $P = .48$) 1 year (OR 1.18, 95% CI 0.85-1.63 $P = .33$), and 2 years (OR 1.09, 95% CI 0.83-1.42, $P = .54$), compared with the control cohort.

Conclusions: The present study shows the postoperative infection risk is greatest when CSIs are given within 2 weeks of shoulder arthroscopy, whereas CSIs given within 2-<4 weeks also portend increased risk, albeit to a lesser degree. The risk of postoperative infection is not significantly increased when CSIs are given more than 1 month before surgery.

Level of evidence: Level III, retrospective comparative, prognosis study.

BACK

Greater Socioeconomic Disadvantage as Measured by the Area Deprivation Index Is Associated With Failure of Healing Following Arthroscopic Repair of Massive Rotator Cuff Tears but Not With Clinical Outcomes

J. Ardebol, A.İ. Kiliç

DOI: https://doi.org/10.1016/j.arthro.2023.08.074

Purpose: To analyze the relationship between Area Deprivation Index (ADI) and preoperative status and short-term postoperative clinical outcomes among patients who underwent arthroscopic rotator cuff repair (ARCR) of massive rotator cuff tears (MRCTs).

Methods: A retrospective review was conducted on prospectively maintained data on patients who underwent ARCR of MRCTs defined as tear size ≥5 cm or complete tear of at least 2 tendons, with a minimum 2-year follow-up and a valid home address between January 2015 and December 2018. Each patient's home address was mapped to the ADI to determine neighborhood disadvantage. This composite index is composed of 17 census-based indicators, including income, education, employment, and housing quality to quantify the level of socioeconomic deprivation. Ratings were recorded and categorized based on the sample's percentile. Patients were then divided into 2 groups: upper quartile (ie, most disadvantaged [≥75th percentile]) and lower 3 quartiles (ie, least disadvantaged [<75th percentile]). Bivariate analysis was performed to associate ADI with patient-reported outcomes (PROs) and range of motion pre- and postoperatively, as well as complications, healing rate, satisfaction, and return to work. Patients reaching or exceeding the minimal clinically important difference for visual analog scale (VAS), American Shoulder and Elbow Surgeons, Veterans Rand 12-Item questionnaire, and subjective shoulder value were recorded for both cohorts.

Results: Ninety-nine patients were eligible for study analysis. Preoperative PROs and range of motion were similar, except for a greater VAS for pain (6.3 vs 4.3; $P < .01$) and lower American Shoulder and Elbow Surgeons score (32.2 vs 45.1; $P = .01$) in the most disadvantaged group. Both groups showed similar postoperative PROs scores, but greater VAS improvement was seen in the upper quartile group (Δ 4.2 vs Δ 3.0; $P = .04$). In contrast, only the least-disadvantaged group significantly improved in internal rotation ($P = .01$) and forward flexion (18°; $P< .01$) from baseline. Although satisfaction, complications, and return to work were comparable ($P > .05$), failure of healing occurred more frequently in the most disadvantaged group (21% vs 6%; $P = .03$).

Conclusions: Patients with MRCTs residing in the most disadvantaged neighborhoods as measured by the ADI have more pain and functional limitations before undergoing ARCR but demonstrate similar postoperative functional improvements to patients from other socioeconomic backgrounds. Failure of healing of MRCTs may be more common in disadvantaged groups. Furthermore, both groups reported similar rates of clinically important functional improvement.

Level of evidence: Level III, retrospective cohort comparison.

BACK

No Difference In Clinical Outcomes Following Repair of Large Retracted Anterior Rotator Cuff Tears Using Patch Augmentation With Human Dermal Allograft Versus Anterior Cable Reconstruction With Biceps Tendon Autograft

S.H. Kim, S.-J. Shin

DOI: https://doi.org/10.1016/j.arthro.2023.08.077

Purpose: To compare the clinical outcomes and tendon integrity after rotator cuff repair combined with anterior cable reconstruction (ACR) using the proximal biceps tendon and patch augmentation (PA) using a human dermal allograft (HDA) in a large retracted anterior rotator cuff tear.

Methods: Patients who underwent arthroscopic rotator cuff repair with 2 different augmentation procedures between January 2017 and December 2020 were enrolled. The inclusion criteria were patients who were treated by arthroscopic rotator cuff repair with ACR using the proximal biceps tendon (ACR group) or patch augmentation using a an HDA (PA group) and follow-up for at least 2 years. Clinical outcomes were assessed using American Shoulder and Elbow Surgeons (ASES) score, Constant score, and the number of patients who achieved minimal clinically important differences (MCID). Magnetic resonance imaging was performed to evaluate tendon integrity after surgery.

Results: A total of 92 patients were enrolled (ACR group = 55 patients and PA group = 37 patients). The mean ASES and Constant scores significantly improved in the ACR group (68.8 ± 15.3 and 58.4 ± 16.9 before surgery vs 91.4 ± 6.3 and 87.8 ± 6.0 after surgery, $P < .001$) and in the PA group (63.7 ± 16.7 and 57.9 ± 15.4 before surgery vs 93.1 ± 6.3 and 88.3 ± 6.2 after surgery, $P < .001$). Overall, 78 patients (84.8%) achieved the MCID with 81.8% in the ACR group and 89.2% in the PA group, with no significant differences between the 2 groups ($P = .638$). Ten patients (18.2%) had retear in the ACR group, and three patients (8.1%) had retear in the PA group ($P = .174$).

Conclusions: In large retracted anterior rotator cuff tears, both augmentation techniques using biceps tendon autograft and HDA provided satisfactory clinical outcomes that achieved the MCID in 84.8%, range of motion restoration, and lower retear rates with no significant differences between the two groups.

Level of evidence: Level III, retrospective case-control study.

BACK

Adjuvant Arthroscopy Does Not Improve the Functional Outcome of Volar Locking Plate for Distal Radius Fractures: A Randomized Clinical Trial

M.J. Pérez-Úbeda, P. Arribas

DOI: https://doi.org/10.1016/j.arthro.2023.06.036

Purpose: To evaluate the outcomes of adding arthroscopy to osteosynthesis of distal radius fractures (DRF) with volar locking plate (VLP), by Patient-Rated Wrist Evaluation (PRWE) 1 year after surgery.

Methods: In total, 186 functionally independent adult patients who met the inclusion criteria (DRF and a clinical decision for surgery with a VLP) were randomized to arthroscopic assistance or not. Primary outcome was PRWE questionnaire results 1 year after surgery. For the main variable, PRWE, we obtained the minimal clinically important difference based on a distribution-based method. Secondary outcomes included Disabilities of the Arm, Shoulder and Hand and 12-Item Short Form Health Survey questionnaires, range of motion, strength, radiographic measures, and presence of joint step-offs by computed tomography. Data were collected preoperatively and at +1 and +4 weeks, +3 and +6 months, and +1 year after surgery. Complications were recorded throughout the study.

Results: In total, 180 patients (mean age: 59.0 ± 14.9 years; 76% women) were analyzed by modified intention to treat. A total of 82% of the fractures were intra-articular (AO type C). No significant difference between arthroscopic (AG) and control (CG) groups in median PRWE was found at +1 year (median AG: 5.0, median CG: 7.5, difference in medians 2.5; 95% confidence interval [CI] –2.0, 7.0, $P = .328$). The proportion of patients who exceeded the minimal clinically important difference of 12.81 points in the AG and CG was 86.4% vs 85.1%, $P = .819$, respectively. Percentage of associated injuries and step-offs reduction maneuvers was greater with arthroscopy (mean differences: 17.1 95% CI –0.1, 26.1, $P < .001$) and 17.4 (95% CI 5.0, 29.7, $P = .007$). The difference in percentage of residual joint step-offs at the postsurgical computed tomography in radioulnar, radioscaphoid, and radiolunate joints was not significant ($P = .990$, $P = .538$, and $P = .063$). Complications were similar between groups (16.9% vs 20.9%, $P = .842$).

Conclusions: Adjuvant arthroscopy did not significantly improve PRWE score +1 year after surgery for DRF with VLP, although the statistical power of the study is below the initially estimated to detect the expected difference.

Level of evidence: Level I, randomized controlled trial.

BACK

Majority of Studies Show Similar Rates of Return to Play After Arthroscopic Bankart Repair or Latarjet Procedure: A Systematic Review

E.T. Hurley, R.M. Danilkowicz

DOI: https://doi.org/10.1016/j.arthro.2023.04.017

Purpose: To systematically review the current evidence in the literature to compare return to play following arthroscopic Bankart repair versus open Latarjet procedure for the treatment of anterior shoulder instability.

Methods: A literature search was performed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Comparative studies reporting return to play following arthroscopic Bankart repair versus open Latarjet procedure were included. Return to play was compared, with all statistical analysis performed using Review Manager, Version 5.3.

Results: Nine studies with 1,242 patients (mean age: 15-30 years) were included. The rate of return to play was 61% to 94.1% among those undergoing arthroscopic Bankart repair and 72% to 96.8% in those undergoing an open Latarjet procedure. Two studies (Bessiere et al. and Zimmerman et al.) found a significant difference in favor of the Latarjet procedure ($P < .05$ for both, $I^2 = 37\%$). The rate of return to play at preinjury level was 9% to 83.8% among those undergoing arthroscopic Bankart repair and 19.4% to 80.6% in those undergoing an open Latarjet procedure, with no study finding a significant difference ($P > .05$ for all, $I^2 = 0\%$). The mean time of return to play was 5.4 to 7.3 months among those undergoing arthroscopic Bankart repair and 5.5 to 6.2 months in those undergoing an open Latarjet procedure, with no study finding a significant difference ($P > .05$ for all, $I^2 = 39\%$).

Conclusions: Overall, the majority of studies showed no significant difference in rates of return to play or timing following arthroscopic Bankart repair or open Latarjet procedure. Furthermore, no study has found a significant difference in rate of return to play at pre-injury level, or rate of return to play among collision athletes.

Level of evidence: Level III, systematic review of Level I-III studies.

BACK

Results After Arthroscopic Bankart Repair in Contact Athletes Should Not Be Reported Globally Because of the High Variability in Recurrences Among the Different Contact or Collision Sports: A Systematic Review

I. Pasqualini, L.A. Rossi

DOI: https://doi.org/10.1016/j.arthro.2023.06.037

Purpose: To describe and compare the recurrence rates in contact or collision (CC) sports after arthroscopic Bankart repair (ABR) and to compare the recurrence rates in CC versus non-collision athletes after ABR.

Methods: We followed a prespecified protocol registered with PROSPERO (registration No. CRD42022299853). In January 2022, a literature search was performed using the electronic databases MEDLINE, Embase, and CENTRAL (Cochrane Central Register of Controlled Trials), as well as clinical trials records. Clinical studies (Level I-IV evidence) that evaluated recurrence after ABR in CC athletes with a minimum follow-up period of 2 years postoperatively were included. We assessed the quality of the studies using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) tool, and we described the range of effects using synthesis without meta-analysis and described the certainty of the evidence using GRADE (Grading of Recommendations, Assessment, Development, and Evaluations).

Results: We identified 35 studies, which included 2,591 athletes. The studies had heterogeneous definitions of recurrence and classifications of sports. The recurrence rates after ABR varied significantly among studies between 3% and 51% (I^2 = 84.9%, 35 studies and 2,591 participants). The range was at the higher end for participants younger than 20 years (range, 11%-51%; I^2 = 81.7%) compared with older participants (range, 3%-30%; I^2 = 54.7%). The recurrence rates also varied by recurrence definition (I^2 = 83.3%) and within and across categories of CC sports (I^2 = 83.8%). CC athletes had higher recurrence rates than did non-collision athletes (7%-29% vs 0%-14%; I^2 = 29.2%; 12 studies with 612 participants). Overall, the risk of bias of all the included studies was determined to be moderate. The certainty of the evidence was low owing to study design (Level III-IV evidence), study limitations, and inconsistency.

Conclusions: There was high variability in the recurrence rates reported after ABR according to the different types of CC sports, ranging from 3% to 51%. Moreover, variations in recurrence among CC sports were observed, with ice hockey players being in the upper range but field hockey players being in the lower range. Finally, CC athletes showed higher recurrence rates when compared with non-collision athletes.

Level of evidence: Level IV, systematic review of Level II, III, and IV studies.

BACK

Intravenous Tranexamic Acid Significantly Improved Visualization and Shortened the Operation Time in Arthroscopic Rotator Cuff Repair: A Systematic Review and Meta-analysis of Level I and II Studies

J. Zhao, G. Liang

DOI: https://doi.org/10.1016/j.arthro.2023.06.055

Purpose: To further clarify the role of tranexamic acid (TXA) in arthroscopic rotator cuff repair (ARCR), especially visual field clarity and operation time.

Methods: We searched the PubMed, Cochrane Library, and Embase databases to find prospective randomized controlled clinical trials (RCTs) examining the use of TXA in ARCR. All included RCTs were evaluated for methodological quality using the Cochrane Collaboration's risk of bias tool. We used Review Manager 5.3 for meta-analysis and calculated the weighted mean difference (WMD) and 95% confidence interval (CI) of the related outcome indicators. The GRADE system was used to evaluate the strength of the clinical evidence provided by the included studies.

Results: Six RCTs (3 Level I, 3 Level II) from four countries or regions were included in this study: 2 studies used intra-articular (IA) TXA, and 4 studies used intravenous TXA. A total of 451 patients underwent ARCR, including 227 patients in the TXA group and 224 patients in the non-TXA group. In 2 RCTs evaluating good visualization, intravenous TXA achieved a better surgical field of view in ARCR compared to the control group (P =.036; P = .045). Meta-analysis showed that compared with non-TXA, intravenous TXA shortened the operation time (WMD = −12.87 min, 95% CI: −18.81 to −6.93). These two RCTs did not reveal a statistically significant difference in the impact of intravenous TXA and non-TXA on mean arterial pressure (MAP) (P = .306; P = .549). Compared with epinephrine (EPN), IA TXA had no significant effects on improving the visual field clarity under arthroscopy, shortening the operation time or reducing the total amount of irrigation fluid (P > .05). Compared with saline irrigation, IA TXA improved the surgical field of vision and shortened the operation time (P < .001). No adverse events were reported for either intravenous TXA or IA TXA.

Conclusions: Intravenous TXA can shorten the operation time of ARCR, and the conclusions of existing RCTs suggest that intravenous TXA can improve visual field clarity during ARCR, thus supporting the application of intravenous TXA in ARCR. Compared with EPN, IA TXA was not better at improving the visual field clarity under arthroscopy and shortening the operation time, but it was better than saline irrigation.

Level of evidence: Level II, systematic review and meta-analysis of Level I and II studies.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 33, issue 2

Elevated HbA1c is not associated with reoperation following arthroscopic rotator cuff repair in patients with diabetes mellitus

A.Z. Khan, A. Vaughan

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Background: Hyperglycemia is a known risk factor for tendon degeneration due to oxidative stresses from production of advanced glycosylation end products. In patients with diabetes mellitus (DM), analysis of glycated hemoglobin (HbA1c) provides a 3-month window into a patient's glucose control. No guidelines exist for ideal preoperative HbA1c and glucose control prior to arthroscopic rotator cuff repair. This study evaluated if a critical HbA1c level is associated with reoperation following arthroscopic rotator cuff repair.

Methods: We retrospectively evaluated patients with DM who underwent primary arthroscopic rotator cuff repair from January 2014 to December 2018 at a single institution. Patients required a preoperative HbA1c within 3 months of surgery. Medical records were queried to evaluate for reoperation and identify the subsequent procedures performed. Univariate statistical analysis was performed to assess factors associated with reoperation ($P < .05$ considered significant). Threshold, area under the curve (AUC), analysis was performed to assess if a critical HbA1c value was associated with reoperation.

Results: A total of 402 patients met inclusion criteria. Patients had an average age of 65.5 years (range 40-89) at time of surgery; 244 (60.6%) patients were male; and average body mass index was 32.96 ± 5.81. Mean HbA1c was 7.36 (range 5.2-12). Thirty-three patients (8.2%) underwent subsequent reoperation. Six patients (1.5%) underwent capsular release and lysis of adhesions, 20 patients (5.0%) underwent a revision rotator cuff surgery, combination revision rotator cuff repair and lysis of adhesions, graft-augmented revision repair, or superior capsular reconstruction, and 7 patients (1.7%) underwent revision to reverse shoulder arthroplasty (1.7%). There were no cases of reoperation for infection. On AUC analysis, no critical HbA1c value was identified to predispose to reoperation. Interestingly, elevated preoperative American Society of Anesthesiologists (ASA) physical status classification score (2.8 vs. 2.28, $P = .001$) was associated with a higher reoperation rate.

Discussion: In patients with DM, preoperative HbA1c is not a predictive factor for surgical failure requiring reoperation. Stable glycemic control is important to a patient's overall health and may play a role in minimizing postoperative medical complications, but an elevated preoperative HbA1c should not be a strict surgical contraindication for arthroscopic rotator cuff repair. In patients with DM, an elevated ASA score is associated with an increased rate of subsequent reoperation; diabetic patients should be counseled accordingly.

Level of evidence: Level III, Retrospective Case Control Design, Prognosis Study.

BACK

Massive and irreparable rotator cuff tear treatment by arthroscopic partial repair with long head of the biceps tendon augmentation provides better healing and functional results than partial repair only

H. Laprus, R. Brzóska

DOI: https://doi.org/10.1016/j.jse.2023.06.022

Background: The aim of this study was to compare the clinical and radiologic outcomes of 2 treatment methods for massive and irreparable rotator cuff tears (RCTs): partial repair (PR) and PR with long head of the biceps tendon (LHBT) augmentation. Biceps tendon augmentation is believed to promote better healing at the bone-tendon junction, leading to improved clinical and radiologic outcomes.

Methods: This retrospective comparative study included patients with chronic, massive and irreparable RCTs involving both the supraspinatus (SSP) and infraspinatus muscles. Only patients with failure of nonoperative treatment and at least 1 year of follow-up between 2013 and 2018 were analyzed. The patients were divided into 2 groups based on the chosen treatment method. Irreparability was defined intraoperatively as the inability to achieve sustainable repair of the SSP after complete release, typically corresponding to a Goutallier classification of stage ≥ 3 and Patte classification of stage 3. The clinical assessment protocol involved measurements of range of motion and shoulder strength, as well as the Constant-Murley score (CMS) and Simple Shoulder Test score. Radiologic assessment comprised measurements of the acromiohumeral distance, Hamada classification, Sugaya classification, and Goutallier classification of both the SSP and infraspinatus.

Results: The study included data from 60 patients (30 in each group) with a mean age of 62.5 years and a mean follow-up period of 34.5 months. The retear rate was 43.3% for PR with LHBT augmentation and 73.3% for PR alone (P = .036). During the final examination, statistically significant differences in favor of PR with LHBT augmentation were observed for the CMS (76.2 ± 10.9 vs. 70.9 ± 11.5, P = .034), Sugaya classification (3.5 ± 1.1 vs. 4.1 ± 0.9, P = .035), and acromiohumeral distance (5.8 ± 2 mm vs. 4.7 ± 1.3 mm, P = .021). There were no significant differences between the groups in range of motion, shoulder strength, Hamada classification, Simple Shoulder Test score, and postoperative Goutallier stage.

Conclusion: PR with LHBT augmentation for patients with irreparable, massive RCTs provides a lower retear rate and better humeral head centralization, as well as improved results measured by the CMS, compared with PR alone.

Level of evidence: Level III, Retrospective Cohort Comparison, Treatment Study.

BACK

When and how much does the muscle strength recover after arthroscopic superior capsular reconstruction?

N. Yamamoto, A. Arino

DOI: https://doi.org/10.1016/j.jse.2023.06.010

Background: Recently, arthroscopic superior capsular reconstruction (SCR) has been performed for irreparable large to massive rotator cuff tears and excellent clinical results have been reported. Although the muscle strength is reported to recover, it has not yet been clarified when and how much it recovers. The purpose of this study was to determine the recovery pattern of muscle strength after SCR.

Methods: We retrospectively reviewed 35 patients (mean age, 65 years) who met the following inclusion criteria: (1) patients with large to massive irreparable tears of the rotator cuff including the supraspinatus and infraspinatus tendons; (2) those with severe muscle atrophy and fatty change; (3) those who underwent assessment of muscle quality and strength by magnetic resonance imaging and dynamometry at 6 months, 1 year, and 2 years; (4) those with a minimum follow-up period of 2 years; and (5) those without severe osteoarthritis. The isometric muscle strength of scaption (ie, scapular-plane elevation), internal rotation, and external rotation in adduction was measured twice for each motion by a dynamometer.

Results: Relative to the muscle strength on the uninvolved side, the involved side showed 61% ± 21% in scaption, 63% ± 20% in external rotation, and 103% ± 29% in internal rotation at 2 years after surgery. Whereas no significant differences were observed between the 1-year and 2-year follow-up assessments, a significant difference in muscle strength of scaption was found between 6 months and 1 year ($P = .0174$). Graft retear was seen in 5 cases (14%). There was a trend that the muscle strength of scaption and external rotation in the no-retear group was greater than that in the retear group despite no significant difference ($P = .0717$ and $P = .0824$, respectively).

Conclusion: The recovery of the muscle strength after SCR was observed until 1 year after surgery, and the muscle strength of scaption and external rotation returned to 60% of that on the uninvolved side at 2 years.

Level of evidence: Level IV, Case Series, Treatment Study.

BACK

Complications following arthroscopic Bankart repair: a systematic review

K. Rodriguez, E.T. Hurley

DOI: https://doi.org/10.1016/j.jse.2023.08.013

Background: Complications are rare after arthroscopic Bankart repair, and as a result, there is a lack of guidance over rates of complications that can be used to consent patients. The purpose of this study is to systematically review the literature to assess the complications after arthroscopic Bankart repair, other than recurrent instability.

Methods: A literature search of MEDLINE, Embase, and the Cochrane Library was performed based on the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines. Clinical studies reporting on the complications after arthroscopic Bankart repair were included.

Results: A total of 194 studies were included in the analysis, with 13,979 patients and 14,019 shoulders undergoing arthroscopic Bankart repair. The overall complication rate was 0.67%, with frozen shoulder being the most common complication occurring in 0.32%. Persistent pain occurred in 0.17%. The rates of nerve, hardware, and wound complications were 0.07%, 0.05%, and 0.03%, respectively.

Conclusion: The arthroscopic Bankart repair has a very low rate of complications. Frozen shoulder and persistent pain are the most frequently encountered complications.

Level of evidence: Level IV, Systematic Review.

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 32, Issue 2

Arthroscopic Bankart with remplissage results in lower rates of recurrent instability with similar range of motion compared to isolated arthroscopic Bankart for anterior glenohumeral instability: A systematic review and meta-analysis

J.B. Villareal-Espinosa, J. Kay

DOI: https://doi.org/10.1002/ksa.12054

Purpose: The addition of the remplissage procedure to an arthroscopic Bankart procedure has been shown to improve clinical outcomes, yet at the expense of potentially decreasing shoulder range of motion. The purpose of this study was to assess recurrent instability, range of motion, functional outcomes and rates of return to sport outcomes in patients undergoing an isolated arthroscopic Bankart repair compared to those undergoing arthroscopic Bankart repair in addition to the remplissage procedure.

Methods: According to the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines, a search was conducted using three databases (MEDLINE/OVID, EMBASE and PubMed). Retrieved studies were screened based on predefined inclusion and exclusion criteria for comparative studies. Data were extracted and meta-analysis performed using a random-effects model.

Results: A total of 16 studies (13 level III studies, 2 level II studies and 1 level I) were included with a total of 507 and 704 patients in the Bankart plus remplissage and isolated Bankart repair groups, respectively. No studies reported glenoid bone loss of >20% with the least percentage of glenoid bone loss reported among studies being <1%. There was a significantly increased rate of recurrent dislocations (odds ratio [OR] = 4.22, 95% confidence interval [CI]: 2.380–7.48, $p < 0.00001$) and revision procedures (OR = 3.36, 95% CI: 1.52–7.41, $p = 0.003$) in the isolated Bankart repair group compared to the Bankart plus remplissage group. Additionally, there were no significant differences between groups in terms of external rotation at side (n.s.), in abduction (n.s.) or at forward flexion (n.s.) at final follow-up. Furthermore, return to preinjury level of sport favoured the Bankart plus remplissage group (OR = 0.54, 95% CI: 0.35–0.85, $p = 0.007$).

Conclusion: Patients undergoing arthroscopic Bankart plus remplissage for anterior shoulder instability have lower rates of recurrent instability, higher rates of return to sport, and no significant difference in range of motion at final follow-up when compared to an isolated arthroscopic Bankart repair. Further large, prospective studies are needed to further determine which patients and degree of bone loss would benefit most from augmentation with the remplissage procedure.

Level of Evidence: Level III.

BACK

American Journal of Sports Medicine (AJSM), Volume 52, Issue 2

Functional and Radiologic Outcomes of Degenerative Versus Traumatic Full-Thickness Rotator Cuff Tears Involving the Supraspinatus Tendon

C. Baum, L. Audigé

DOI: https://doi.org/10.1177/03635465231219253

Background: Arthroscopic rotator cuff repair (ARCR) is among the most commonly performed orthopaedic procedures. Several factors—including age, sex, and tear severity—have been identified as predictors for outcome after repair. The influence of the tear etiology on functional and structural outcome remains controversial.

Purpose: To investigate the influence of tear etiology (degenerative vs traumatic) on functional and structural outcomes in patients with supraspinatus tendon tears.

Study Design: Cohort study; Level of evidence, 2.

Methods: Patients undergoing ARCR from 19 centers were prospectively enrolled between June 2020 and November 2021. Full-thickness, nonmassive tears involving the supraspinatus tendon were included. Tears were classified as degenerative (chronic shoulder pain, no history of trauma) or traumatic (acute, traumatic onset, no previous shoulder pain). Range of motion, strength, the Subjective Shoulder Value, the Oxford Shoulder Score (OSS), and the Constant-Murley Score (CMS) were assessed before (baseline) and 6 and 12 months after ARCR. The Subjective Shoulder Value and the OSS were also determined at the 24-month follow-up. Repair integrity after 12 months was documented, as well as additional surgeries up to the 24-month follow-up. Tear groups were compared using mixed models adjusted for potential confounding effects.

Results: From a cohort of 973 consecutive patients, 421 patients (degenerative tear, n = 230; traumatic tear, n = 191) met the inclusion criteria. The traumatic tear group had lower mean baseline OSS and CMS scores but significantly greater score changes 12 months after ARCR (OSS, 18 [SD, 8]; CMS, 34 [SD,18] vs degenerative: OSS, 15 [SD, 8]; CMS, 22 [SD, 15]) ($P < .001$) and significantly higher 12-month overall scores (OSS, 44 [SD, 5]; CMS, 79 [SD, 9] vs degenerative: OSS, 42 [SD, 7]; CMS, 76 [SD, 12]) ($P \leq .006$). At the 24-month follow-up, neither the OSS (degenerative, 44 [SD, 6]; traumatic, 45 [SD, 6]; $P = .346$) nor the rates of repair failure (degenerative, 14 [6.1%]; traumatic 12 [6.3%]; $P = .934$) and additional surgeries (7 [3%]; 7 [3.7%]; $P = .723$) differed between groups.

Conclusion: Patients with degenerative and traumatic full-thickness supraspinatus tendon tears who had ARCR show satisfactory short-term functional results. Although patients with traumatic tears have lower baseline functional scores, they rehabilitate over time and show comparable clinical results 1 year after ARCR. Similarly, degenerative and traumatic rotator cuff tears show comparable structural outcomes, which suggests that degenerated tendons retain healing potential.

BACK

Arthroscopic Surgery Versus Nonoperative Treatment for Calcific Tendinitis of the Shoulder: A Retrospective Cohort Study

F. Chen, Z. Deng

DOI: https://doi.org/10.1177/03635465231217733

Background: Treatment options for calcific tendinitis (CT) of the shoulder remain controversial. A consensus for an operative indication for this condition is lacking.

Purpose: To compare nonoperative versus operative treatment for shoulder CT and analyze factors affecting the prognosis after treatment.

Study Design: Cohort study; Level of evidence, 3.

Methods: A total of 180 patients diagnosed with symptomatic CT between January 2017 and September 2021 were evaluated in this retrospective cohort study. There were 103 patients treated nonoperatively at our institution, which included the use of nonsteroidal anti-inflammatory drugs, acupuncture, steroid injections, extracorporeal shock wave therapy, and ultrasound-guided needle aspiration/percutaneous irrigation. However, 77 patients were treated with arthroscopic surgery after 6 months of failed nonoperative treatment. The visual analog scale (VAS) for pain, the Constant-Murley score, and imaging were used to assess and evaluate outcomes. Descriptive data, functional outcomes, and imaging findings were compared between the operative and nonoperative groups before and after propensity score matching. Additionally, prognostic factors including calcium deposit size, tendon infiltration by calcium deposits, involvement of single or multiple tendons, and occurrence of rotator cuff tears were analyzed by comparing the groups to determine their effect on treatment options and recovery.

Results: Magnetic resonance imaging showed that the supraspinatus tendon (66.7%) was most commonly involved, followed by the infraspinatus (42.8%) and subscapularis (21.1%) tendons. Tendon infiltration by calcium deposits was observed in 84.4% of the patients, and rotator cuff tears occurred in 30.0% of the patients. After propensity score matching, there was no significant difference in changes in the Constant-Murley score (48.1 ± 25.4 vs 49.0 ± 22.8, respectively; P = .950) and VAS score (4.9 ± 2.3 vs 4.5 ± 1.9, respectively; P = .860) between the operative and nonoperative groups at the final follow-up. However, for patients with shoulder CT and without rotator cuff tears, there was a significant difference in changes in the Constant-Murley score (52.93 ± 25.18 vs 42.13 ± 22.35, respectively; P = .012) and VAS score (5.21 ± 2.06 vs 3.81 ± 1.98, respectively; P < .001) between the operative and nonoperative groups, but the recovery time in the operative group was longer than that in the nonoperative group (86.92 ± 138.56 vs 30.42 ± 54.97 days, respectively; P = .016). The results also showed that calcium deposit size, involvement of multiple tendons, and tendon infiltration by calcium deposits did not affect the recovery time after treatment. The survival analysis showed that rotator cuff tears affected the complete recovery of shoulder function.

Conclusion: This study demonstrated no significant difference between nonoperative and operative treatment for patients with shoulder CT, on the whole. However, for patients with shoulder CT and without rotator cuff tears, the effect of operative treatment was better than that of nonoperative treatment; yet, operative treatment was shown to prolong the recovery time. Calcium deposit size, tendon infiltration by calcium deposits, and involvement of multiple tendons did not correlate with recovery time or the recovery of function. A rotator cuff tear was the only factor affecting the complete recovery of shoulder function.

BACK

Immobilization in External Rotation Versus Arthroscopic Stabilization After Primary Anterior Shoulder Dislocation: A Systematic Review of Level 1 and 2 Studies

A.G. Potyk, J.W. Belk

DOI: https://doi.org/10.1177/03635465231155199

Background: Arthroscopic stabilization has been established as a superior treatment option for primary glenohumeral instability when compared with immobilization in internal rotation. However, immobilization in external rotation (ER) has recently gained interest as a viable nonoperative treatment option for patients with shoulder instability.

Purpose: To compare the rates of recurrent instability and subsequent surgery in patients undergoing treatment for primary anterior shoulder dislocation with arthroscopic stabilization versus immobilization in ER.

Study Design: Systematic review; Level of evidence, 2.

Methods: A systematic review was performed by searching PubMed, the Cochrane Library, and Embase to identify studies that'evaluated patients being treated for primary anterior glenohumeral dislocation with either arthroscopic stabilization or immobilization in ER. The search phrase used various combinations of the keywords/phrases "primary closed reduction,""anterior shoulder dislocation,""traumatic,""primary,""treatment,""management,""immobilization,""external rotation,""surgical,""operative,""nonoperative," and "conservative." Inclusion criteria included patients undergoing treatment for primary anterior glenohumeral joint dislocation with either immobilization in ER or arthroscopic stabilization. Rates of recurrent instability, subsequent stabilization surgery, return to sports, positive postintervention apprehension tests, and patient-reported outcomes were evaluated.

Results: The 30 studies that met inclusion criteria included 760 patients undergoing arthroscopic stabilization (mean age, 23.1 years; mean follow-up time, 55.1 months) and 409 patients undergoing immobilization in ER (mean age, 29.8 years; mean follow-up time, 28.8 months). Overall, 8.8% of operative patients experienced recurrent instability at latest follow-up compared with 21.3% of patients who had undergone ER immobilization ($P < .0001$). Similarly, 5.7% of operative patients had undergone a subsequent stabilization procedure at latest follow-up compared with 11.3% of patients who had undergone ER immobilization ($P = .0015$). A higher rate of return to sports was found in the operative group ($P < .05$), but no other differences were found between groups.

Conclusion: Patients undergoing arthroscopic treatment for primary anterior glenohumeral dislocation with arthroscopic stabilization can be expected to experience significantly lower rates of recurrent instability and subsequent stabilization procedures compared with patients undergoing ER immobilization.

BACK

Journal of Bone and Joint Surgery (JBJS), Volume 107, Issue 1+2

No Upper Extremity Abstracts

BACK

Clinical Orthopaedics and Related Research (CORR), Volume 482, Issue 2

No Upper Extremity Abstracts

BACK

Bone and Joint Journal (BJJ), Volume 106-B, issue 2

No Upper Extremity Abstracts

BACK

Lower Extremity

Arthroscopy, Volume 40, Issue 2

Magnetic Resonance Imaging Approximates Labral Width at the 9-, 12-, and 3-O'Clock Positions in the Setting of Revision Hip Arthroscopy

J.J. Ruzbarsky, S.M. Comfort

DOI: https://doi.org/10.1016/j.arthro.2023.05.030

Purpose: To compare preoperative magnetic resonance imaging (MRI) and intraoperative measurements of labral width and determine whether MRI can reliably predict labral width in the setting of revision surgery.

Methods: Patients who underwent revision hip arthroscopy with labral repair performed by a single surgeon from January 2008 to December 2015 were identified retrospectively from a prospectively collected database. The width of the labrum was measured intraoperatively at the time of surgery. Two orthopaedic surgeons performed labral width measurements on MRI scans at 3 standardized locations using the clock-face method. Interobserver and intraobserver reliabilities were calculated, and comparisons between intraoperatively measured labral widths and MRI measurements were performed.

Results: Fifty-eight patients who underwent revision hip arthroscopy were enrolled in the study. The average labral width measurements at the 3-, 12-, and 9-o'clock positions were 7.4 mm (standard deviation [SD], 1.2 mm), 7.5 mm (SD, 1.4 mm), and 6.6 mm (SD, 1.2 mm), respectively, on MRI compared with 6.7 mm (SD, 2.1 mm), 6.5 mm (SD, 2.5 mm), and 7.0 mm (SD, 1.9 mm), respectively, when measured intraoperatively. The average intraoperative measurements were smaller than the MRI measurements at the 3-o'clock (P = .03) and 12-o'clock (P = .01) positions. The inter-rater intraclass correlation coefficients between the 2 surgeons exhibited good agreement (0.612) at the 3-o'clock position, fair agreement (0.498) at the 12-o'clock position, and poor agreement (0.171) at the 9-o'clock position. The positive predictive values of the MRI measurements were 72% at the 3-o'clock position, 68% at the 12-o'clock position, and 88% at the 9-o'clock position for identifying a labral width of 6 mm or greater.

Conclusions: The results of this study show that MRI-measured labral width and actual labral width measured at the time of revision arthroscopy are usually within 1 mm of each other.

Level of evidence: Level II, diagnostic study investigating diagnostic test.

BACK

Improved Functional Outcomes of Combined Hip Arthroscopy and Periacetabular Osteotomy at Minimum 2-Year Follow-Up

J.J. Ruzbarsky, S.M. Comfort

DOI: https://doi.org/10.1016/j.arthro.2023.06.034

Purpose: To evaluate patient-reported outcomes (PROs) and survivorship at minimum 2-year follow-up after combined hip arthroscopy and periacetabular osteotomy (PAO) performed in the setting of a single anesthetic event.

Methods: Patients who underwent combined hip arthroscopy (M.J.P.) and PAO (J.M.M.) between January 2017 and June 2020 were identified. Preoperative and minimum 2-year postoperative PROs including Hip Outcome Score–Activities of Daily Living (HOS-ADL), HOS-Sport, modified Harris Hip Score (mHHS), Western Ontario and McMaster Universities Osteoarthritis Index, 12-Item Short Form Survey Mental Component Scores (SF-12 MCS), and 12-Item Short Form Survey Physical Component Score were collected and compared in addition to revision rate, conversion to total hip arthroplasty (THA), and patient satisfaction.

Results: Twenty-four of 29 patients (83%) eligible for the study were available for 2-year minimum follow-up with a median follow-up time of 2.5 years (range, 2.0-5.0). There were 19 females and 5 males with mean age of 31 ± 12 years. Mean preoperative lateral center edge angle was 20° ± 5° and alpha angle was 71° ± 11°. One patient underwent reoperation for removal of a symptomatic iliac crest screw at 11.7 months after operation. Two patients, a 33-year-old woman and a 37-year-old man, were converted to THA at 2.6 and 1.3 years, respectively, following the combined procedure. Both patients had a Tönnis grade of 1 on radiographs, as well as bipolar Outerbridge grade III/IV defects requiring microfracture of the acetabulum. For patients who did not convert to THA (n = 22), there was significant improvement from before to after surgery for all scores ($P < .05$) except SF-12 MCS. The minimal clinically significant difference and patient-acceptable symptom state rates for HOS-ADL, HOS-Sport, and mHHS were 72%, 82%, 86%, and 95%, 91%, and 95%, respectively. Median patient satisfaction was 10 (range, 4 to 10).

Conclusions: Single-stage combined hip arthroscopy with periacetabular osteotomy for patients with symptomatic hip dysplasia results in improvement in PROs and arthroplasty free survivorship of 92% at median 2.5 year follow-up.

Level of evidence: Level IV, case series.

BACK

Pericapsular Nerve Group Block Leads to Small but Consistent Reductions in Pain Between 18 and 24 Hours Postoperatively in Hip Arthroscopy for Femoroacetabular Impingement Surgery: A Prospective, Randomized Controlled Clinical Trial

B. Eppel, M.M. Schneider

DOI: https://doi.org/10.1016/j.arthro.2023.06.016

Purpose: To investigate whether the use of a pericapsular nerve group (PENG) block would reduce perioperative pain after arthroscopic therapy for femoroacetabular impingement syndrome (FAIS) and to examine opioid requirements and occurrence of postoperative nausea and vomiting (PONV).

Methods: Between May 2022 and October 2022, patients (N = 68) undergoing arthroscopic surgery for FAIS were randomly allocated into 2 groups. The first group received an ultrasound-guided PENG preoperatively with 20 mL of 0.375% ropivacaine and standardized postoperative oral medication. The second group received a sham block preoperatively with 20 mL of 0.9% saline and standardized postoperative oral medication. The primary end point was pain scores (visual analog score [VAS], 0-10) during the first 24 hours postoperatively. To quantify clinical significance of outcome achievement for the VAS pain score, the minimal clinically important difference (MCID) was calculated using the half standard deviation method. The incidence of PONV as well as opioid usage (converted to morphine equivalent) within the first 24 hours were secondary outcomes.

Results: Randomization and permission were successfully obtained from 68 participants. From the fifteenth postoperative hour, the PENG group reported significantly less postoperative pain than the control group (24th postoperative hour: VAS pain PENG group 1.3 ± 0.9 [0-3]; 95% confidence interval {CI} 0.4-1.2 vs the VAS pain control group 2.4 ± 1.6 [0-5]; 95% CI 1.4-4.7; *P* = .009). The VAS pain score threshold for achieving the MCID at 24 hours postoperative was defined as a decrease of 1.1. 27 patients (79%) in the PENG group and 22 patients (65%) in the control group were able to achieve MCID (*P* = .009). Opioid dosage and postoperative nausea did not differ significantly between groups (*P* = .987 and *P* = .655, respectively). Concomitant complications such as falls, hematomas, or weakened muscles did not occur in either group.

Conclusions: According to this study, a PENG block minimally reduced pain after arthroscopic treatment for FAIS between the 18th and 24th postoperative hours. The PENG group achieved significantly more often the pain VAS MCID. However, there was no proof that the PENG group consumed fewer opioids than the control group. Overall, PONV was found at a low and comparable rate.

Level of evidence: Level I, randomized controlled trial.

BACK

Anterior Cruciate Ligament Reconstruction Plus Lateral Extra-articular Tenodesis Has a Similar Return-to-Sport Rate to Anterior Cruciate Ligament Reconstruction Alone but a Lower Failure Rate

A. Rezansoff, A.D. Firth

DOI: https://doi.org/10.1016/j.arthro.2023.05.019

Purpose: To determine whether the addition of lateral extra-articular tenodesis (LET) to anterior cruciate ligament reconstruction (ACLR) would improve return-to-sport (RTS) rates in young, active patients who play high-risk sports.

Methods: This multicenter randomized controlled trial compared standard hamstring tendon ACLR with combined ACLR and LET using a strip of the iliotibial band (modified Lemaire technique). Patients aged 25 years or younger with an anterior cruciate ligament–deficient knee were included. Patients also had to meet 2 of the following criteria: (1) pivot-shift grade 2 or greater, (2) participation in a high-risk or pivoting sport, and (3) generalized ligamentous laxity. Time to return and level of RTS were determined via administration of a questionnaire at 24 months postoperatively.

Results: We randomized 618 patients in this study, 553 of whom played high-risk sports preoperatively. The proportion of patients who did not RTS was similar between the ACLR (11%) and ACLR-LET (14%) groups; however, the graft rupture rate was significantly different (11.2% in ACLR group vs 4.1% in ACLR-LET group, $P = .004$). The most cited reason for no RTS was lack of confidence and/or fear of reinjury. A stable knee was associated with nearly 2 times greater odds of returning to a high-level high-risk sport postoperatively (odds ratio, 1.92; 95% confidence interval, 1.11-3.35; $P = .02$). There were no significant differences in patient-reported functional outcomes or hop test results between groups ($P > .05$). Patients who returned to high-risk sports had better hamstring symmetry than those who did not RTS ($P = .001$).

Conclusions: At 24 months postoperatively, patients who underwent ACLR plus LET had a similar RTS rate to those who underwent ACLR alone. Although the subgroup analysis did not show a statistically significant increase in RTS with the addition of LET, on returning, the addition of LET kept subjects playing longer by reducing graft failure rates.

Level of evidence: Level I, randomized controlled trial.

BACK

Evidence of Bacterial Metabolism in Synovial Fluid of Patients With Graft Failure After Anterior Cruciate Ligament Reconstruction: A Microbiological Comparison of Primary Anterior Cruciate Ligament and Hamstring Tendon Autograft Ruptures

C. Offerhaus, S. Leutheuser

DOI: https://doi.org/10.1016/j.arthro.2023.06.044

Purpose: To investigate whether the bacterial presence in a primary ruptured native anterior cruciate ligament (ACL) differs from that in a ruptured hamstrings ACL autograft and whether low-grade infections cumulatively can be detected in the case of graft failure.

Methods: In a retrospective case-control study with prospectively collected data, synovial fluid aspirates and tissue samples of failed ACL grafts were examined for evidence of bacterial colonization and compared to samples of the native ACL in primary ACL reconstruction (ACLR) using microbiological culture, 16S rRNA-PCR and histopathological examination. Furthermore, synovial fluid aspiration was investigated for possible future biomarkers for a low-grade infection.

Results: A total of 112 consecutive patients undergoing primary ACLR without history of previous surgeries to the affected knee (n = 59) and revision ACLR after reconstruction with a hamstring tendon autograft (n = 53) were recruited from one center. No patient had a history or showed clinical signs of infection. A total of 389 samples were analyzed by culture. Bacteria were detected in 9.4% of patients with a graft rupture (n = 5/53) compared to 3.4% of patients with a primary ACL rupture (n = 2/59) showing no statistical difference (P = .192). One patient with a “true” low-grade infection was found in our study population, resulting in a prevalence of 1.9% (1/53) in the graft group. The percentage of polymorphonuclear leukocytes (PMN%) as a highly sensitive marker for joint infections was significantly higher in aspirated synovial fluid of graft ruptures (27% ± 3% vs 20% ± 4%; P = .032), as well as glucose levels were significantly lower (83 mg/dL ± 2 mg/dL vs 88 mg/dL ± 2 mg/dL; P = .042).

Conclusions: Synovial fluid obtained before revision ACLR showed a higher percentage of polymorphonuclear leukocytes and lower glucose levels compared with primary ACLR, suggesting bacterial metabolism and demonstrating that the intra-articular milieu changes significantly after ACLR. Tissue samples of ACL grafts revealed a low-grade infection in one case, although overall cultivable bacterial presence did not differ significantly when compared to samples of a native ACL.

Level of evidence: Level III, retrospective case-control study.

BACK

Revision and Primary Meniscal Allograft Transplantations Provide Clinical Benefit at Mid-Term Follow-Up: A Matched-Cohort Analysis of Patient-Reported Outcomes, Reoperations, and Failures

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DOI: https://doi.org/10.1016/j.arthro.2023.06.047

Purpose: To report the mid-term outcomes of patients who underwent revision meniscal allograft transplantation (RMAT) and compare survivorship free from reoperation and failure with a matched cohort of patients who underwent primary meniscal allograft transplantation (PMAT).

Methods: A retrospective review of prospectively collected data identified patients who underwent RMAT and PMAT between 1999 and 2017. A cohort of PMAT patients matched at a ratio of 2:1 with respect to age, body mass index, sex, and concomitant procedures served as the control group. Patient-reported outcome measures (PROMs) at baseline and at a minimum of 5 years postoperatively were collected. PROMs and the achievement of clinically significant outcomes were analyzed within groups. Graft survivorship free from meniscal reoperation and failure (arthroplasty or subsequent RMAT) was compared between cohorts using log-rank testing.

Results: During the study period, 22 RMATs were performed in 22 patients. Of these RMAT patients, 16 met the inclusion criteria (73% follow-up rate). The mean age of RMAT patients was 29.7 ± 9.3 years, and the mean follow-up period was 9.9 ± 4.2 years (range, 5.4-16.8 years). There were no differences between the RMAT cohort and the 32 matched PMAT patients with respect to age (P = .292), body mass index (P = .623), sex (P = .537), concomitant procedures ($P \geq .286$), or baseline PROMs ($P \geq .066$). The patient acceptable symptomatic state was achieved by the RMAT cohort for the subjective International Knee Documentation Committee score (70%), Lysholm score (38%), and Knee Injury and Osteoarthritis Outcome Score subscales (Pain [73%], Symptoms [64%], Sport [45%], Activities of Daily Living [55%], and Quality of Life [36%]). In the RMAT cohort, 5 patients (31%) underwent subsequent reoperation at a mean of 4.7 ± 2.1 years (range, 1.7-6.7 years) and 5 patients met the criteria for failure at a mean of 4.9 ± 2.9 years (range, 1.2-8.4 years). There were no significant differences in survivorship free from reoperation (P = .735) or failure (P = .170) between the RMAT and PMAT cohorts.

Conclusions: At mid-term follow-up, most patients who underwent RMAT achieved the patient acceptable symptomatic state for the subjective International Knee Documentation Committee score and the Knee Injury and Osteoarthritis Outcome Score subscales of Pain, Symptoms, and Activities of Daily Living. Additionally, there were no differences in survival free from meniscal reoperation or failure between the PMAT and RMAT cohorts.

Level of evidence: Level III, retrospective comparative cohort.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 33, issue 2

Outcomes after arthroscopically assisted lower trapezius transfer with Achilles tendon allograft

A.Chopra, M.A. Wright

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Background: Lower trapezius tendon transfer is 1 option to improve pain and function with massive irreparable rotator cuff tears. Magnetic resonance imaging (MRI) evaluation of tendon healing with the procedure has not yet been reported. The purpose of this study was to evaluate early tendon transfer healing using postoperative MRI scans and to assess early clinical outcomes in patients after arthroscopically assisted lower trapezius tendon transfer (AALTT) for massive irreparable rotator cuff tears.

Methods: This was a single institution retrospective review of consecutive patients with massive irreparable rotator cuff tears who underwent AALTT with a single surgeon from January 2017 to July 2020 with a minimum 6-month follow-up. Patient information including age, sex, follow-up, prior surgical history, and type of work (sedentary or labor-intensive) was recorded. Preoperative and postoperative range of motion, external rotation strength, presence of a lag sign, and pain visual analog scale data were extracted from medical records. Patient-reported outcomes were extracted from patient charts. Six-month postoperative MRIs were reviewed for tendon transfer healing at both the greater tuberosity and the trapezius-allograft interface.

Results: A total of 19 patients met inclusion criteria with average age 56.7 (range, 29-72 years). Of these patients, 17 (89.5%) were male. The average follow-up was 14.6 (range, 6-45) months. Fifteen (78.9%) patients had unsuccessful previous rotator cuff repair. Six-month MRI demonstrated complete healing of the transferred tendon in 17 of 19 patients (89.5%). There were significant improvements in postoperative pain visual analog scale (5.9 ± 2 vs. 1.8 ± 2), ASES score (44.6 ± 18 vs. 71.2 ± 24), and Patient Reported Outcomes Measurement Information System Physical (46.3 ± 6 vs. 51.3 ± 11) and in external rotation motion (10.5 ± 17° vs. 40.5 ± 13°) and strength (2.8/5 ± 1 vs. 4.7/5 ± 0.5) at final follow-up. All patients with a preoperative external rotation lag sign had reversal of their lag sign at final follow-up (15/15). Of 17 work-eligible patients, 13 (76.4%) were able to return to work.

Conclusion: In this series, AALTT showed a high rate of healing of the transferred tendon on MRI by 6 months postoperatively. The current findings of a high rate of early tendon transfer healing are consistent with the good early and mid-term outcomes that have been observed in AALTT and provide support for surgeon and patient expectations, postoperative rehabilitation, and return to work following AALTT for massive posterior superior rotator cuff tears.

Level of evidence: Level IV, Case Series, Treatment Study.

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 32, Issue 2

Management after acute injury of the anterior cruciate ligament (ACL). Part 3: Recommendation on surgical treatment

M. Häner, T. Stoffels

DOI: https://doi.org/10.1002/ksa.12064

Purpose: The aim of this consensus project was to give recommendations regarding surgical treatment of the anterior cruciate ligament (ACL) injured patient.

Methods: For this consensus process, an expert, steering and rating group was formed. In an initial online meeting, the steering group, together with the expert group, formed various key topic complexes for which multiple questions were formulated. For each key topic, a structured literature search was performed by the steering group. The results of the literature review were sent to the rating group with the option to give anonymous comments until a final consensus voting was performed. Sufficient consensus was defined as 80% agreement.

Results: During this consensus process, 30 topics regarding the surgical management and technique of ACL reconstruction were identified. The literature search for each key question resulted in 30 final statements. Of these 30 final statements, all achieved consensus.

Conclusions: This consensus process has shown that surgical treatment of ACL injury is a complex process. Various surgical factors influence patient outcomes. The proposed treatment algorithm can be used as a decision aid for the surgeon.

Level of Evidence: Level V.

BACK

High rates of return to sport following management of osteochondritis dissecans of the femoral trochlea: A systematic review

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Purpose: To summarize management strategies and associated clinical outcomes in patients with osteochondritis dissecans (OCD) of the femoral trochlea.

Methods: Three databases were searched from inception to 2 October 2023, for studies describing outcomes posttreatment for femoral trochlear OCD. The authors adhered to the preferred reporting items for systematic reviews and meta-analyses and revised assessment of multiple systematic reviews guidelines as well as the Cochrane Handbook for Systematic Reviews of Interventions. Data on demographics, injury characteristics, and operative details were extracted. Outcomes included patient reported outcome measures (PROMs), complications, and revision and return to sport (RTS) rates.

Results: Twenty studies comprising 105 patients (119 knees) were included. Females comprised 10.1% (range: 0%–100%) of patients and the mean age of patients was 14.5 (range: 11–28) years. A total of 89 (74.7%) of knees received operative management, with 28 of 34 (82.4%) known open procedures being open reduction internal fixation (ORIF), and nine of 29 (31%) known arthroscopic procedures receiving arthroscopic reduction internal fixation (ARIF) or drilling. Lysholm and International Knee Documentation Committee scores in 20 patients each ranged from 93.4 to 100 and 74.7 to 96.6, respectively. The revision rate for operative procedures was 9.0%, and the overall RTS rate was 93.3%.

Conclusion: There is very little high quality evidence investigating patients with femoral trochlear OCD lesions. Drilling, ARIF, and ORIF were the most common surgical options for this patient population. Patients treated with either nonoperative or operative management returned to sport at a high rate, and those requiring operative management had a low revision rate.

Level of Evidence: Level V.

BACK

American Journal of Sports Medicine (AJSM), Volume 52, Issue 2

Estimation Failure Risk by 0.5-mm Differences in Autologous Hamstring Graft Diameter in Anterior Cruciate Ligament Reconstruction: A Meta-analysis

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Background: Because grafts are made in 0.5-mm increments clinically for anterior cruciate ligament (ACL) reconstruction, it is important to clarify how the failure rate decreases as the diameter increases. Moreover, it is important to know whether even a slight increase in the graft diameter decreases the risk of failure.

Purpose: The risk of failure decreases significantly with each 0.5-mm increase in hamstring graft diameter.

Study Design: Meta-analysis; Level of evidence, 4.

Methods: The systematic review and meta-analysis have estimated the diameter-specific failure risk for each 0.5-mm increase in ACL reconstruction using autologous hamstring grafts. We searched for studies describing the relationship between graft diameter and failure rate published before December 1, 2021, in leading databases, such as PubMed, EMBASE, Cochrane Library, and Web of Science, according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. We included studies using single-bundle autologous hamstring grafts to investigate the relationship between failure rate and graft diameter of 0.5-mm intervals with >1-year follow-up. Then, we calculated the failure risk caused by 0.5-mm differences in autologous hamstring graft diameter. Assuming Poisson distribution for the statistical model, we employed an extended linear mixed-effects model in the meta-analyses.

Results: Five studies containing 19,333 cases were eligible. The meta-analysis revealed that the estimated value of the coefficient of diameter in the Poisson model was −0.2357 with a 95% CI of −0.2743 to −0.1971 ($P < .0001$). With every 1.0-mm increase in diameter, the failure rate decreased by 0.79 (0.76-0.82) times. In contrast, the failure rate increased by 1.27 (1.22-1.32) times for each 1.0-mm decrease in diameter. The failure rate significantly decreased with each 0.5-mm increase in graft diameter in the range of <7.0 to >9.0 mm from 3.63% to 1.79%

Conclusion: The risk of failure decreased correspondingly with each 0.5-mm increase in graft diameter in the range of <7.0 to >9.0 mm. Failure is multifactorial; however, increasing the graft diameter as much as possible to match each patient's anatomic space without overstuffing is an effective precaution that surgeons can take to reduce failures.

BACK

Journal of Bone and Joint Surgery (JBJS), Volume 107, Issue 1+2

No Lower Extremity Abstracts

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Clinical Orthopaedics and Related Research (CORR), Volume 482, Issue 2

No Lower Extremity Abstracts

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Bone and Joint Journal (BJJ), Volume 106-B, issue 2

No Lower Extremity Abstracts

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Miscellaneous

Arthroscopy, Volume 40, Issue 2

No Miscellaneous Abstracts

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Journal of Shoulder and Elbow Surgery (JSES), Volume 33, issue 2

No Miscellaneous Abstracts

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Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 32, Issue 2

No Miscellaneous Abstracts

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American Journal of Sports Medicine (AJSM), Volume 52, Issue 2

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Journal of Bone and Joint Surgery (JBJS), Volume 107, Issue 1+2

No Miscellaneous Abstracts

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Clinical Orthopaedics and Related Research (CORR), Volume 482, Issue 2

No Miscellaneous Abstracts

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Bone and Joint Journal (BJJ), Volume 106-B, issue 2

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