Distance to Dislocation and Recurrent Shoulder Instability Following Latarjet in a Military Population

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INTRODUCTION: Anterior shoulder instability can result in bipolar osseous defects, which are known risk factors for recurrent instability. The combination of wider and medialized Hill-Sachs lesions (HSL) with increasing amounts of glenoid bone loss (GBL) yields off-track lesions susceptible to instability. Recently, this concept has evolved into a spectrum of distance to dislocation (DTD) of a HSL impacting stability rather than a threshold value. The Latarjet procedure reconstructs large glenoid defects and effectively decreases the DTD and recurrent instability in the setting of off-track lesions in civilian populations. However, there is conflicting evidence which do not show an increased risk of recurrence in those with off- or near-track lesions following surgical stabilization without Latarjet. Therefore, our purpose was to determine the relationship between recurrent shoulder instability and DTD in military patients who have undergone a Latarjet procedure.

METHODS: We retrospectively analyzed Latarjet procedures with two screws for fixation in the Military Health System from 2010-2018. We excluded patients undergoing the Bristow technique or arthroscopic Latarjet, with less than two years clinical follow-up, or for lack of pre- and postoperative computed tomography (CT) scans. Procedures were classified as primary or revision Latarjet, but all were the index bone block augmentation procedure. We recorded demographics and instability history. Preoperative CT was analyzed for the percent GBL measured by the perfect circle technique, Hill-Sachs index to calculate preoperative DTD based on the methods of Li et al, and coracoid thickness to calculate the postoperative glenoid track and DTD. On postoperative CT, we classified coracoid graft resorption using the Zhu classification. The primary outcome was recurrent instability defined as subjective instability with a positive apprehension test, a traumatic subluxation event, or a dislocation with or without manual reduction. We assessed risk factors for recurrent instability through multivariate analysis. A receiver operating characteristic (ROC) curve determined the predictive value of the DTD for recurrent instability.

RESULTS:

We identified 78 Latarjet procedures meeting inclusion and exclusion criteria for analysis. There were 31 primary and 47 revision Latarjets (Table 1). The overall cohort was 94.8% male with median age 24.0 years (IQR 21.6-29.3), median GBL 22.6% (IQR 17.4-28.0), and median follow-up 6.4 years (IQR 4.1-9.4). Median number of preoperative instability events was 6.5 (IQR 4-12.3). 79.2% had a GBL >15%. Mean coracoid graft thickness was 11.4 ± 10.6 mm. The mean preoperative DTD was 2.6 ± 8.1 mm, which improved to 13.9 ± 8.7 mm postoperatively ($p<0.0001$). There were 39 patients with near-track lesions and 30 with off-track lesions preoperatively. Following Latarjet, only 1/30 patients that were off-track preoperatively remained off-track ($p<0.0001$).

Overall, 20 patients (25.6%) had recurrent instability. Preoperative DTD was not associated with recurrent instability in primary (-0.8 vs. -4.3 mm, $p=0.053$) or revision Latarjet (4.5 vs. 7.0 mm, $p=0.409$). Postoperative distance to dislocation was associated with recurrence in primary (10.1 vs. 6.4 mm, $p=0.009$) but not revision Latarjet (16.0 vs. 18.7 mm, $p=0.438$). On ROC analysis for primary Latarjet, postoperative DTD <8.5 mm was 100% sensitive and 58.3% specific for recurrent instability. On multivariate analysis of recurrent instability when considering age, sex, DTD, resorption, primary vs. revision status, follow-up, and GBL, no factor reached statistical significance. Decreased GBL was nearly associated with failure ($p=0.069$) though this was accounted for by the association of revision Latarjet with decreased GBL.

DISCUSSION AND CONCLUSION: In patients undergoing primary Latarjet as the index bone block augmentation procedure, postoperative DTD was associated with recurrent instability. Despite coracoid grafts reliably converting off-track to on-track lesions, recurrent instability was high and only found in cases with a postoperative DTD <8.5 mm for primary Latarjet. However, DTD was not predictive of recurrence following revision Latarjet procedures and may not be as informative in this setting.

Table 1: Comparison of patient, surgical, and imaging characteristics and outcomes for primary and revision Latarjets.

	Primary Latarjet	Revision Latarjet	p-value
n	31	47	-
Mean age, years	25.0 ± 5.2	26.0 ± 5.3	0.396
Median GBL, % (IQR)	24.2% (21.4 – 29.1)	22.2% (14.4 – 27.7)	0.023*
Median follow-up, years (IQR)	6.4 (3.4 – 9.3)	7.1 (4.4 – 9.4)	0.465
Mean preoperative DTD, mm	-1.3 ± 5.1	5.3 ± 8.1	<0.001*
Mean postoperative DTD, mm	9.6 ⊥ 5.2	16.9 ⊥ 8.7	<0.001*
Preoperative off-track	17/28 (60.7%)	13/41 (31.7%)	0.017*
Preoperative near-track	10/28 (35.7%)	16/41 (39.0%)	0.781
Postoperative off-track	1/28 (3.6%)	0/41 (0%)	0.406
Major resorption, Zhu 2+	15/31 (48.4%)	24/47 (51.1%)	0.817
Failure	11/31 (35.5%)	22/47 (46.8%)	0.357
Recurrent instability	5/31 (16.1%)	15/47 (31.9%)	0.185
Revision stabilization procedure	5/31 (16.1%)	7/47 (14.9%)	1.000

* $p<0.05$