Neuromonitoring the Latarjet Procedure

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Background: The purpose of this study was to use intra-operative neuromonitoring to define the stages of the Latarjet procedure during which the nerves are at greatest risk; this would allow the surgeon the potential to take intra-operative measures in order to reduce this risk.

Methods: This was a two-part study. Part I: an anonymous, 9-item online survey was distributed to the membership of the ASES to query them about their approach to the Latarjet procedure and the complications they have experienced, with particular emphasis on neurologic complications. Part II: 34 patients were included in this prospective study. Mean patient age was 28.4 years. Upper extremity neurologic function was assessed pre-operatively, immediately post-operatively in the recovery room before any neurologic block was performed, and at routine follow up visits. The Latarjet procedure was divided into 9 defined stages: 1. Incision, 2. Coracoid exposure, 3. Coracoid harvest, 4. Subscapularis split, 5. Glenoid exposure, 6. Glenoid preparation, 7. Graft insertion, 8. Subscapularis closure, 9. Skin closure. All surgeries were performed under total intravenous anesthesia. Bilateral median and ulnar somatosensory evoked responses (SSEPs) and transcranial motor evoked potentials (tcMEPs) from all arm myotomes were continuously monitored. A 'nervealert' was defined as averaged 50% amplitude attenuation, or 10% latency prolongation of ipsilateral SSEPs and tcMEPs. For each nerve alert, the surgeon altered retractor placement, and if no response to this, then changed the position of the operative extremity.

Results: Part I: Twenty-six percent of sub-specialty shoulder surgeons had observed musculocutaneous nerve palsies after the Latarjet procedure and 20% had observed axillary nerve palsies. Number of years in practice did not influence neurologic complication rates. There was no significant difference between open or arthroscopic Latarjet surgeons in either estimated rate or actual observed rate of neurologic complications (p = 0.18 and 0.22, respectively). Part II: 26 of 34 patients (76.5%) had 45 separate nerve alert episodes. Forty-one of these alerts were based on attenuation of tcMEPs. Thirteen patients (38.2%) had 2 or more nerve alerts, with 2 patients having 4 nerve alert episodes. The most common stages of the procedure for a nerve alert to 4 occur were glenoid exposure (12alerts) and graft insertion(17alerts). The axillary nerve was involved in 35 alerts; the musculocutaneous nerve in 22. Fourteen alerts involved both nerves. Seven of the 34 patients (20.6%) had a clinically detectable nerve deficit post-operatively. In all 7 cases, the neurapraxia correlated with an intra-operative nerve alert. All cases involved the axillary nerve, and all 7 nerve palsies resolved completely, in a timeframe ranging from 28–165 days post surgery. Prior surgery, BMI and number of nerve alerts during surgery were not predictive of a clinically detectable neurologic deficit post-operatively, however total operative time ($p = 0.042$) and duration of the stage of procedure in which the concordant nerve alert occurred ($p = 0.010$) were statistically significant predictors of a post-op nerve deficit. No post-operative nerve palsy was severe enough to require intervention, however there was a 20.6% rate of clinically detectable nerve palsy, despite neuromonitoring.

Conclusion: The axillary and musculocutaneous nerves are at risk during the Latarjet procedure. The most common stages of the Latarjet procedure during which the nerves are under tension are glenoid exposure and graft insertion. Therefore, the surgeon should be especially meticulous and consider duration of retraction during these stages. Neuromonitoring has demonstrated that nerve alerts happen frequently and it may be possible for the surgeon to reduce such alerts by technical measures; however such nerve alerts do not result in a lasting neurologic deficit. Such transient neurologic deficits after surgery seem to be more common than reported.