Intra-operative Neuromonitoring During 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, allowing the surgeon to take intra-operative measures to reduce this risk.

Methods: 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. 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 'nerve alert' 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: 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 occur were glenoid exposure (12 alerts) and graft insertion (17 alerts). 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. Four nerve palsies resolved completely, 3 were improving at latest follow up but had not completely resolved.

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.

Before we implemented neuromonitoring, 5 in a series of 48 shoulders (10.4%) had nerve palsies after the Latarjet procedure, 2 of which did not improve and required return to the operating room for neurolysis. In this series, 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 nerves are at risk during the Latarjet procedure, in particular the axillary nerve and the musculocutaneous nerve. The most common stages of the Latarjet procedure during which the nerves are under excessive tension are glenoid exposure and graft insertion. The surgeon should be especially meticulous and consider duration of retraction during these stages. Attention to graft placement is important. A more superior position of the graft may be protective with regard to axillary nerve palsy. It is possible that neuromonitoring leads to decreased severity of post-operative nerve deficits, but in this series it did not reduce the actual rate of clinically detectable deficits.

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