

Peripheral Nerve Function During Shoulder Arthroplasty Using Intraoperative Nerve Monitoring

Content

Nagda SH, Rogers KJ, Sestokas AK, Getz CL, Ramsey ML, Glaser DL, Williams GR Jr. Neer Award 2005: Peripheral nerve function during shoulder arthroplasty using intraoperative nerve monitoring. J Shoulder Elbow Surg. 2007 May-Jun;16(3 Suppl):S2-8. Epub 2006 Jul 26.

Division of Orthopaedic Surgery, University of Pennsylvania School of Medicine, Philadelphia, USA.

The incidence of neurologic injury after shoulder arthroplasty has been reported to be 1% to 4%. However, the true incidence may be higher, because injury is identified only clinically and examination of the post-arthroplasty shoulder is difficult. This study used intraoperative nerve monitoring to identify the incidence, pattern, and predisposing factors for nerve injury during shoulder arthroplasty. Continuous intraoperative monitoring of the brachial plexus was performed in 30 consecutive patients undergoing shoulder arthroplasty. Impending intraoperative compromise of nerve function was signaled by sustained neurotonic electromyographic activity or greater than 50% amplitude attenuation of transcranial electrical motor evoked potentials (or both). Arm and retractor positions were recorded and adjusted to relieve tension. Patients with intraoperative nerve alerts underwent diagnostic electromyography at least 4 weeks postoperatively. Of the patients, 17 (56.7%) had 30 episodes of nerve dysfunction (ie, nerve alerts) during surgery. None of these 30 nerve alerts returned to baseline with retractor removal alone. Of the 30 alerts, 23 (76.7%) returned to baseline after repositioning of the arm into a neutral position. Postoperative electromyography results were positive in 4 of 7 patients (57.1%) who did not have a return to baseline transcranial electrical MEPs intraoperatively and in 1 of 10 (10%) whose nerve function did return to baseline. In all cases of positive postoperative electromyographic results, the pattern of nerve involvement matched the pattern of intraoperative nerve dysfunction. The affected nerves included the following: combined (ie, mixed plexopathy) (46.7%), musculocutaneous (20%), axillary (16.7%), ulnar (10%), and radial (6.7%). Prior shoulder surgery and passive external rotation of less than 10 degrees were associated with an increased incidence of nerve dysfunction ($P < .05$). The incidence of nerve injury during shoulder arthroplasty is likely greater than reported. Positioning of the arm at the extremes of motion should be minimized. Patients with decreased motion (<10 degrees passive external rotation with the arm at the side) and a history of prior open shoulder surgery are at higher risk for nerve injury and should be counseled on the increased risk. This patient population may also be considered for routine nerve monitoring.