

Articles of Interest - Anterior Cervical Discectomy and Fusion (ACDF)



Fountas, K. N.; Kapsalaki, E. Z.; Nikolakakos, L. G.; Smisson, H. F.; Johnston, K. W.; Grigorian, A. A.; Lee, G. P. & Robinson, J. S. (2007), 'Anterior cervical discectomy and fusion associated complications.', *Spine* 32(21), 2310 – 2317.

STUDY DESIGN:

Retrospective review study with literature review. **OBJECTIVE:** The goal of our current study is to raise awareness on complications associated with anterior cervical discectomy and fusion (ACDF) and their early detection and proper management.

SUMMARY OF BACKGROUND DATA:

It is known that ACDF constitutes one of the most commonly performed spinal procedures. Its outcome is quite satisfactory in the majority of cases. However, occasional complications can become troublesome, and in rare circumstances, catastrophic. Although there are several case reports describing such complications, their rate of occurrence is generally underreported, and data regarding their exact incidence in large clinical series are lacking. Meticulous knowledge of potential intraoperative and postoperative ACDF-related complications is of paramount importance so as to avoid them whenever possible, as well as to successfully and safely manage them when they are inevitable.

METHODS:

In a retrospective study, 1015 patients undergoing first-time ACDF for cervical radiculopathy and/or myelopathy due to degenerative disc disease and/or cervical spondylosis were evaluated. A standard Smith-Robinson approach was used in all our patients, while an autologous or allograft was used, with or without a plate. Operative reports, hospital and outpatient clinic charts, and radiographic studies were reviewed for procedure-related complications. Mean follow-up time was 26.4 months.

RESULTS:

The mortality rate in our current series was 0.1% (1 of 1015 patients, death occurred secondary to an esophageal perforation). Our overall morbidity rate was 19.3% (196 of 1015 patients). The most common complication was the development of isolated postoperative dysphagia, which observed in 9.5% of our patients. Postoperative hematoma occurred in 5.6%, but required surgical intervention in only 2.4% of our cases. Symptomatic recurrent laryngeal nerve palsy occurred in 3.1% of our cases. Dural penetration occurred in 0.5%, esophageal perforation in 0.3%, worsening of preexisting myelopathy in 0.2%, Horner's syndrome in 0.1%, instrumentation backout in 0.1%, and superficial wound infection in 0.1% of our cases.

CONCLUSION:

Meticulous knowledge of the ACDF-associated complications allows for their proper management. Postoperative dysphagia, hematoma, and recurrent laryngeal nerve palsy were the most common complications in our series. Management of complications was successful in the vast majority of our cases.

Bose, B.; Sestokas, A. K. & Schwartz, D. M. (2007), 'Neurophysiological detection of iatrogenic C-5 nerve deficit during anterior cervical spinal surgery.', *J Neurosurg Spine* 6(5), 381 – 385.

OBJECT:

The incidence of postoperative C-5 spinal nerve root palsy following decompressive cervical spinal surgery has been reported to be as high as 12% for anterior procedures and 30% for posterior procedures. The present study was conducted to document the prevalence of iatrogenic C-5 nerve root deficit during anterior cervical spinal surgery, as well as to evaluate the sensitivity and specificity of intraoperative transcranial electrical stimulation (TES)-induced motor evoked potentials (MEPs) and spontaneous electromyographic (EMG) activity for identifying evolving C-5 nerve root impairment.

METHODS:

The authors conducted a retrospective study of 238 consecutive anterior cervical spinal procedures performed by a single surgeon at Christiana Care Hospital within a 48-month period. Techniques used to monitor spinal nerve root function included TES-induced MEPs and spontaneous EMG activity from deltoid, biceps, triceps, wrist extensor, and hand intrinsic muscles innervated by the C5-T1 spinal nerve roots. Spinal cord function was monitored by recording TES-induced MEPs from upper- and lower-extremity muscles as well as somatosensory evoked potentials from stimulation of the ulnar and posterior tibial nerves.

CONCLUSIONS: Transcranial electrical stimulation-induced MEPs and spontaneous EMG activity offer complementary information about evolving iatrogenic C-5 spinal nerve root impairment during anterior cervical spinal surgery. The TES-induced MEPs provide prognostic information and show increased sensitivity to C-5 deficit compared with spontaneous EMG activity alone. Monitoring of spinal nerve root function using only EMG activity carries a risk of false-negative findings; without timely warning of impending neurological impairment, timely intervention to prevent permanent deficit cannot occur.

Smith, P. N.; Balzer, J. R.; Khan, M. H.; Davis, R. A.; Crammond, D.; Welch, W. C.; Gerszten, P.; Sclabassi, R. J.; Kang, J. D. & Donaldson, W. F. (2007), 'Intraoperative somatosensory evoked potential monitoring during anterior cervical discectomy and fusion in nonmyelopathic patients – a review of 1,039 cases.', Spine J 7(1), 83 – 87.

BACKGROUND CONTEXT:

Intraoperative somatosensory evoked potential (SSEP) monitoring has been shown to reduce the incidence of new postoperative neurological deficits in scoliosis surgery. However, its usefulness during cervical spine surgery remains a subject of debate. **PURPOSE:** To determine the utility of intraoperative SSEP monitoring in a specific patient population (those with cervical radiculopathy in the absence of myelopathy) who underwent anterior cervical discectomy and fusion (ACDF) surgery.

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STUDY DESIGN:

Retrospective review.

PATIENT SAMPLE:

A total of 1,039 nonmyelopathic patients who underwent single or multilevel ACDF surgery. The control group (462 patients) did not have intraoperative SSEP monitoring, whereas the monitored group (577 patients) had continuous intraoperative SSEP monitoring performed.

OUTCOME MEASURE:

A new postoperative neurological deficit.

METHODS:

SSEP tracings were reviewed for all 577 patients in the monitored group and all significant signal changes were noted. Medical records were reviewed for all 1,039 patients to determine if any new neurological deficits developed in the immediate postoperative period. **RESULTS:** None of the patients in the control group had any new postoperative neurological deficits. In the monitored group there were six instances of transient SSEP changes (1 due to suspected carotid artery compression; 5 thought to be due to transient hypotension) which resolved with the appropriate intraoperative intervention (repositioning of retractors; raising the arterial blood pressure). Upon waking up from anesthesia, one patient in the monitored group had a new neurological deficit (partial central cord syndrome) despite normal intraoperative SSEP signals.

CONCLUSIONS:

ACDF appears to be a safe surgical procedure with a low incidence of iatrogenic neurological injury. Transient SSEP signal changes, which improved with intraoperative interventions, were not associated with new postoperative neurological deficits. An intraoperative neurological deficit is possible despite normal SSEP signals.