Conclusions: Wider cages are biomechanically stable and have a significant impact on avoiding cage subsidence occurrence, while was not observed increment on complications.

BEST PAPERS

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Saphenous Nerve Somatosensory Evoked Potentials: Technique and Application for the Reduction of Femoral Nerve Injury during Lateral Access Surgery

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Introduction: Femoral nerve palsy is the most feared complication following an extreme lateral transpsoas interbody fusion of the lumbar spine. The authors intend to present a novel neurophysiological monitoring technique that may reduce post-operative femoral nerve deficits. Current techniques for neurophysiological monitoring include triggered EMG (t-EMG) and spontaneous EMG (s-EMG); however, these do not assess changes in nerve function caused by compression or stretching and are limited in sensitivity and specificity. Somatosensory evoked potentials (SSEPs) are sensitive to ischemic changes; however, current somatosensory techniques do not look at the femoral nerve and will not give any information should the femoral nerve become ischemic. The authors present saphenous nerve SSEPs to monitor for ischemic or compression changes to the femoral nerve after placement of the retractors.
Methods: Saphenous Nerve SSEPs were added to the monitoring of traditional multi-modality neurophysiological monitoring techniques including s-EMG and t-EMG with a Nuvasive Neurovision M5, as well as ulnar nerve and posterior tibial nerve SSEPs with a Cadwell Cascade Pro.
Stimulus is delivered through two subdermal needle electrodes (anode & cathode). The stimulating electrodes are placed in the groove between the vastus lateralis muscle and sartorius muscle in the medial distal thigh about 2cm apart. Bilateral stimulation is used with a focus on the side of access. 200-500 sweep trials are utilized to obtain the response and remove any ambient electrical interference. A pulse duration of 1ms, rep rate of 2.66 Hz and a stimulus intensity of 40mA is utilized. Acquisition sites include a subdermal needle electrode placed at or about the level of the C5 vertebrae (subcortical) and a subdermal needle electrode placed on the at the CPz location of the international 10-20 system (Cortical). Both acquisition sites are referenced to Fz of the international 10-20 system. An alarm criterion of 10% increase in latency and/or a 50% decrease in amplitude is used to relay changes to the surgeon for intervention.
Results: In the initial clinical sequence, adequate saphenous nerve SSEPs are obtained and the responses show reproducible latencies in the mid 30ms range. This is variable from patient to patient, taking into account body weight and underlying medical etiologies. During the course of the clinical trials, there was one intra-operative loss of left saphenous nerve SSEPs during a left sided approach after the retractors were placed. The patient woke up with paresthesia in the left femoral distribution and post-op, presented to clinic with pain and weakness in the left quadriceps muscles.
Conclusion: The saphenous nerve is the terminating sensory branch of the femoral nerve and is distal to the femoral motor branch distribution to the quadriceps. Adding saphenous nerve SSEPs to the neurophysiological monitoring paradigm during a transpoas lateral access approach at the L4-5 levels may reduce the incidences of iatrogenic femoral nerve injury. Currently research is ongoing and the patients are being followed post operatively to rule out false positive and/or false negative events. With increasing numbers of patients in this series, better statistical methods will allow better definition for the sensitivity and specificity of this modality.