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Prevention and Treatment of Postoperative Epidural Scar Adhesions

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Postoperative epidural scar adhesions remain one of the most common late complications of microdiscectomy, which worsens the overall outcome in treatment of herniated lumbosacral discs. Despite a large number of conservative and surgical treatment options for epidural scar adhesions, the treatment outcome not always satisfies patients and doctors. The review was aimed at systematizing the available data on this complication and facilitating the choice of appropriate treatment strategy.

Keywords: epidural scar adhesion, epidural fibrosis, microdiscectomy, disc herniation, degenerative disc disease.

Despite the development of new techniques and achievements in the surgical treatment of herniated discs, the number of poor postoperative outcomes in the form of persistent radicular pain syndrome still remains high and accounts for 5—20% according to different authors [1—4].

The development of adhesive process known as epidural scar adhesions or epidural fibrosis is the most common cause of persistent radicular pain syndrome. The incidence of epidural scar adhesions among the other reasons of so-called "failed back surgery syndrome" is up to 8—70% [3, 5—9].

The causes of excessive formation of connective tissue in the epidural space after surgery are still not fully understood. It is still not clear, why the pronounced epidural fibrosis develops in the postoperative period in some cases, while it is less pronounced or absent in other cases under identical conditions.

The relationship between the severity of epidural fibrosis and discectomy technique still remains a debatable issue. Several authors suggest that the incidence of this postoperative complication is lower in the case of minimally invasive interventions, application of gel materials and insulating membranes, various surgical techniques preserving ligamenta flava, and intraoperative irrigation of nerve structures with steroidal and non-steroidal anti-inflammatory drugs. In the last few years, there were publications describing the prevention of scar-adhesions in the following way: the affected root and dural sac at the area of surgical trauma are enveloped with fat injected with methylprednisolone solution. The experimental studies showed that this method reduces the activity of prostaglandins E1 and E2 and leukotriene B, which are the triggering factor in the development of peridural fibrosis. There are significantly different opinions on the effectiveness of this method. Some authors [3, 5, 10—15] believe that it is useful; on the contrary, others believe that it increases scarring.

Many authors [16—21] believe that immuno-infiltrative aseptic inflammation form the basis for discogenic epidural scar adhesions, others note the important role of preoperative values of fibrinolytic activity of the blood in the development of epidural fibrosis, since decrease in fibrinolysis and anticoagulant mechanisms and increase in blood coagulation in the preoperative period increase the risk of epidural scar adhesions [6, 22, 23].

Pain syndrome caused by the development of epidural fibrosis is not characteristic of the early postoperative period, and patient's quality of life worsens due to persistent pain caused by fibrotic changes in the epidural space only 2—18 months after discectomy [6, 24, 25].

Clinical and neurological examination, including medical history, local status, and neuroimaging techniques is the main diagnostic method to verify the postoperative epidural scar adhesions. Magnetic resonance imaging (MRI), whose effectiveness is improved when using contrast enhancement (Magnevist, Gd-DTPA), is the most popular and informative imaging technique [26—32]. Electrophysiological methods of investigation (somatosensory evoked potentials, electroneuromyography) are no less informative [33].

Despite the fairly large number of treatment methods for epidural fibrosis after microdiscectomy, most authors [34—37] note that all of them lack clinical effectiveness. General treatment regimen should be based of general principles of vertebral pathology treatment, including pathogenetically oriented complex and stage-by-stage sparing therapeutic modalities with allowance for the individual characteristics of patients [28].

Medicinal treatment with nonsteroidal anti-inflammatory drugs was suggested as a conservative treatment, limiting the development of fibrous tissue in the postoperative period [38—40]. According to some researchers [41], the use of corticosteroids for the purpose of anti-inflammatory therapy in the treatment of epidural fibrosis is well founded. In the case of persisting long-term intractable pain syndrome caused by epidural fibrosis, epidural block is effective [42, 43]. Physiotherapy (amplipuls, magnetotherapy, electrophoresis with caripazim) is widely used as the non-drug treatments for pain [44]. Outcomes of reoperations carried out due to ineffective conservative therapy do not always satisfy patients and surgeons [45, 46].

Epidural scar adhesions are still quite common in today's neurosurgical practice. It is highly significant medical and social problem: recurrence of radicular pain in the postoperative period makes patients to feel desperate, destroying their social adaptation. The need for timely treatment and prevention of epidural scar adhesions is undoubted and dissatisfaction with clinical outcomes makes it a pressing problem.

There is no conflict of interests

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Commentary

Literature review "Prevention and treatment of postoperative epidural scar adhesions" focuses on the topical problem: scarring processes, developing after neurosurgical interventions for spinal pathology, in particular after microsurgical discectomy. It is well known that these processes to some extent develop in all the operated patients and can significantly reduce patient's quality of life and even destroy the results of formally successful surgery. The authors present data on the importance of epidural scar adhesions in the development of neurological symptoms, summarize the data obtained from Russian and international literature on the diagnosis and possible methods to prevent these processes.

Given the complexity and multidimensionality of these problems, it would be interesting to determine risk factors for adhesive processes in the case of decompressive and stabilysing interventions, including their relationships with the type and extent of stabilizing structure. The authors rightly pay attention to MRI and contrast-enhanced MRI in the diagnosis; it would be useful to mention the role of other techniques, such as percutaneous minimally invasive diagnostics, in particular flexible endoscopy (epiduroscopy and thecaloscopy). Among possible prevention methods, the use of type 3 collagen, and, more importantly, limited aggressiveness of discectomy, in particular by applying portal endoscopic techniques, are worth noticing.

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