TECHNIQUE, INSTRUMENTATION, MATERIALS

Use of Gore-Tex in Neurosurgical Practice

Nöroşirürjide Gore-Tex Kullanımı

HAKAN CANER, NUR ALTINÖRS, AHMET ALBAYRAK, TARKAN ÇALIŞANELLER

Başkent University Hospital, Department of Neurosurgery, Ankara, Turkey

Abstract: Five patients in whose surgical interventions Gore-Tex graft has been used for various reasons are presented.
Key Words:Gore-Tex surgical membrane, hemifacial spasm, magnetic resonance imaging, tethered spinal cord, trigeminal neuralgia

Özet: Cerrahi tedavilerinde değişik amaçlarla Gore-Tex cerrahi membranı kullanılan beş hasta bildirilmiştir.
Anahtar Sözcükler: Gergin omurilik, Gore-Tex cerrahi membran, hemifasiyal spazm, manyetik rezonans görüntüleme, trigeminal nevralji

INTRODUCTION

Gore-Tex surgical membrane is a polytetrafluoroethylene which was developed for cardiovascular surgery to prevent tissue adhesions (5,10,11). Gore-Tex is also used as a vascular graft.These nonabsorbable grafts have inner diameters of 3-10 mm and are resistant to the spread of infection.

CASE REPORTS

Case 1: A 73 year old male was hospitalized for severe left hemifacial spasm including the eye and mouth. His medical history included two operations in another center for hemifacial spasm. Hemifacial spasm, trigeminal neuralgia and trigeminal pain had developed shortly after the second operation in April 1992. On examination, frequent hemifacial spasm (3-4/minute) was noted. Left facial paralysis was also evident. His gaze was full and the fifth nerve was intact. Magnetic resonance angiogram revealed a stenotic segment in the right distal vertebral artery.The basilar and left vertebral arteries seemed dilated and had close relationship with the seventh nerve in the cerebellopontine angle. The patient was operated on in January 16,1995.The facial nerve, surrounded by cerebellar gliotic tissue, was isolated by microdissection.The arterial loop compressing the nerve from above and below and another fine arterial branch lying completely on the nerve were decompressed by placement of three pieces of Gore-Tex vascular graft. Postoperatively hemifacial spasm resolved completely in two weeks with improvement of facial paralysis and relief of trigeminal pain.

Case 2: A 40 year old male patient complained of an electric shock- like sensation over the right side of his face which had been refractory to medical therapy. Cranial magnetic resonance imaging (MRI) and neurologic examination were normal. He was operated on in October 31,1995. Through a right retrosigmoid approach the cerebellopontine angle was explored.The arachnoid over the fifth nerve was markedly thickened and the nerve showed adhesion to a vein crossing it.The adhesions were carefully dissected and the relation between the trigeminal nerve and the vein was terminated by placing a piece

of Gore-Tex in between. Postoperatively the patient was completely free of his complaints.

Case 3: A 25 year old male had suffered a gunshot wound in his left arm six months ago. He had received no treatment. He was admitted to our hospital due to the atrophy of the left forearm. On physical examination the entrance and exit wounds of the bullet were evident above the elbow. Pulse over the axillary artery was normal, but was absent distal to the axillary artery. Motor and sensory findings were consistent with median and ulnar nerve lesions along with 3 cm atrophy of the left forearm. Angiography revealed normal subclavian and axillary arteries.The left brachial artery was interrupted at about mid-humerus and was reconstructed about 6 cm. proximal to the elbow joint.The artery showed normal calibration at the elbow joint. The radial, ulnar and digital arteries were all normal. Electromyography (EMG) showed marked partial lesions of the left median and ulnar nerves. Only the pronator teres muscle showed reinnervation.The patient was operated on in January 25,1996 by the vascular and neurosurgical teams. Initially, an axillo-brachial by-pass was performed with restoration of normal blood flow. Following this procedure, the median and the ulnar nerves were explored and identified. Both nerves were anatomically intact but were swollen, more pronounced on the median nerve. Additionally, the median nerve was encircled by dense granulation tissue. This tissue was dissected and removed under the microscope. Neurolysis was performed for both nerves and the median nerve was wrapped with a single piece of Gore-Tex. The patient had marked motor and sensory improvement at the postoperative second month.

Case 4: A 41 year old female had been operated on for L4-5 disc herniation in the previous year. She had been suffering from severe causalgic pain and hyperesthesia in her left leg. Neurological examination revealed a positive Lasegue test at 30 degrees on the left and at 60 degrees on the right side. Anterior tibial power was markedly diminished on the left and hypoesthesia was observed over the left L4, L5 and S1 dermatomes. Lumbar motion was limited and painful. Lumbar MRI revealed granulation tissue surrounding the left L5 root.The patient was operated on in March 13, 1996. The granulation tissue was completely removed thus isolating the root selectively. The root was encircled by two semicylindrical pieces of Gore-Tex put together by stay sutures.

Case 5: A 65 year old woman had very irritating, nearly continuous left hemifacial spasm. She had used carbamazepine with no practical benefit. The neurological examination was normal except for hemifacial spasm. MR tomographic angiography (MRTA) and MR angiography both revealed compression of the left facial nerve by left PICA at the root entry zone. The patient was operated on through the retrosigmoid approach. The pulsatile effect of PICA on the facial nerve was very obvious. This relation was terminated by placing a small piece of Gore-Tex over the facial nerve. Hemifacial spasm resolved completely and immediately after the operation and did not recur.

DISCUSSION

Neurovascular compression of the cranial nerves as a possible mechanism for clinical syndromes like hemifacial spasm and trigeminal neuralgia was first postulated by Gardner (4) and microvascular decompression (MVD) as treatment was initiated and popularized by Jannetta (8). MVD has a success rate of about 75-90 % (3,6,14). In some instances, no improvement at all or recurrence after an initial phase of remission following MVD have been correlated with the type of prosthesis used. Muscle, surgicel,Teflon cotton and collagen sponge are some of the materials used for this purpose. Vascular compression resulting in hemifacial spasm and trigeminal neuralgia are well delineated by magnetic resonance imaging and magnetic resonance tomographic angiography (1,2,9). We used Gore-Tex in our cases 1, 2 and 5 for decompression of the offended nerves.There is only one similar experience in the literature related to the use of Gore-Tex for MVD (12). These authors report 10 patients with hemifacial spasm treated by MVD using Gore-Tex. All of their patients have been cured and they have encountered only one case of transient deafness.

In neurosurgical practice, Gore-Tex surgical membrane has been used in the treatment and prevention of tethered and retethered spinal cord (7) and has also been used as an artificial dura mater in preventing the adhesion of the brain tissue to the repair site (13). We have no information in the literature about the use of Gore-Tex to prevent granulation tissue adhesions to the peripheral or spinal nerves as we have used in our cases 3 and 4.

Three main points which prompted us to report

this paper are to advocate the use of Gore-Tex in MVD procedures, to point out the possibility of success with MVD in multiple surgical interventions since in most incidents of failure, reported in the literature, patients have been reoperated on only once (14) (our case 1 showed excellent clinical improvement after the third surgery); and to initiate new research activity to study the efficacy of Gore-Tex in preventing tissue adhesions.

Correspondence: Hakan Caner, MD
Başkent University Hospital
Department of Neurosurgery
Bahçelievler, Ankara, Turkey
Phone: (312) 212 6868/ext. 1283 - 1179
Fax: (312) 223 7333

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