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TRAUMATIC FACIAL PALSY

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Summary. *Facial nerve palsy may represent an important complication of head trauma; yet, an adequate surgical treatment can reduce negative effects of such injuries. The surgical treatment usually consists of nerve decompression, nerve anastomosis and graft technique with n. auricularis magnus. In this study a retrospective analysis of the patients treated from the traumatic facial palsy in a ten-year period was performed. The patients were divided into groups according to etiology and intensity of facial damage. Clinical examination, topodiagnostics, electrodiagnostics and radiography were applied as routine. The House Brackmann scale was used for evaluation of results of medicaments and surgical therapy.*

The traumatic facial palsy was mainly incomplete (62.9%) with other frequent otologic symptoms. The temporal bone fracture was verified in 88.6% of patients and an intraoperative lesion of the nerve was predominantly suprastapedial (69.2%). Edema of nerve and fracture line were usually found. Different surgical techniques were applied (decompression in 84%, termino-terminal anastomosis in 9% and nerve graft in 7% of cases). The recovery of the facial function was good and fast in idiopathic cases with a significant difference between complete and incomplete palsy. In surgical cases, the best recovery was achieved with decompression while nerve anastomosis and nerve graft had similar time course and outcome in the House grades.

Conclusion: The surgical therapy in selected cases of peripheral facial palsy gives good results. The decompression of the nerve is significantly more effective than nerve anastomosis and nerve graft, concerning both time and outcome. The type of surgery and the results depend on etiology, intensity, location and time of treatment of the facial palsy.

Key words: *Facial nerve, palsy, trauma, surgery*

Introduction

The facial nerve paralysis leads to distortion of the face outlook at rest and in the activity state; it is also accompanied with various social and psychological consequences. Due to this, the patient is unable to express various emotional states.

The electronic microscopy of the damaged facial nerve reveals the degeneration of the myelin sheath and of the axon cylinder, the compression of vascular channels, the infiltration with lymphocytes and phagocytes, the proliferation of the endoneurium and multiplication of the connective tissue. The nerve recovery is characterized by the resolution of the described morphological changes (1-3).

The facial nerve state analysis is done in various ways in order to give a prognosis and to follow-up the therapy effects. There are scales based on the explorer's observations; likewise, analyses can be done of the mimic musculature movements. There is no universally applicable simple and reliable test; nor is there any test based on the state assessment by the patient (4-7).

The traumatic paralysis of the facialis represents an important group regarding both diagnosis and therapy so that an analysis of the results obtained by treating post-traumatic changes of the facial nerve is of special interest (8,9).

Material and methods

A retrospective study of the ten-year material of the Clinic of Otorhinolaryngology in Niš is done. The clinic examination, topodiagnostics, electrodiagnostics and radiography are applied to all the patients. The surgical treatment comprises nerve decompression, termino-terminal anastomosis and application of the *n. auricularis magnus* transplant. The result evaluation is done on the basis of the House Brackmann scale. The obtained results are statistically analyzed with the use of the student t-test.

Results

Out of the overall number of the treated patients the traumatic facial palsy made up 14% (35/258) but, from the surgical therapy aspect, it was one of the most important ones with 37% of all the operated cases.

The traumatic facial palsy was predominantly incomplete (62.9%) with other otological symptoms present as well (Table 1). The temporal bone fracture was verified in 88.6% of the patients while the intraoperative finding determined that the palsy was mostly suprastapedial (69.2%). The nerve edema and fracture line are often found (Table 2).

Table 1. Clinical characteristics of the traumatic facial palsy

Parameter	No	%
Incomplete	22	62.9
Complete	13	37.1
Hearing damage	35	100.0
Vertigo	31	88.6
Otorrhagia	19	54.2
Tympanic membrane rupture	11	31.4
Incus dislocation	1	2.9
Temporal bone fracture	31	88.6

Table 2. Intraoperative findings in the traumatic facial palsy

Parameter	No	%
Suprastapedial paralysis	9	69.2
Infrastapedial paralysis	4	30.8
Fracture line	8	61.6
Bone fragment	3	23.0
Nerve edema	13	100.0
Nerve hyperemia	10	76.9
Nerve atrophy	3	23.0

Various surgical techniques were applied such as decompression in 84%, termino-terminal anastomosis in 9% and nerve transplant in 7% of the cases.

The facial function recovery was fast and good in the nerve decompression group while anastomosis and transplant application were similar with poorer and slower recovery (Fig. 1).

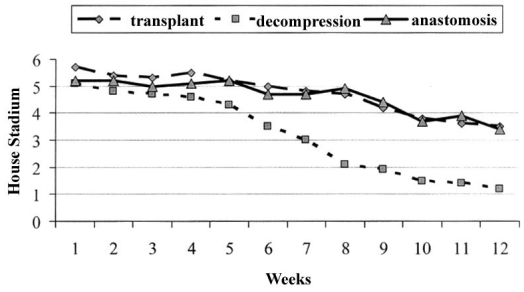

Fig. 1. Recovery of the traumatic facial palsy on the basis of the house Brackmann scale

Discussion

The facial nerve palsy may arise due to various reasons such as idiopathic, traumatic, inflammatory, tumor and others. The traumatic facial palsy, due to its variety of forms and outcomes, its difficult diagnostics and other accompanying injuries, represents a challenge especially from the therapy standpoint. Most of the cases of the traumatic facial paralysis occur in traffic accidents and they are usually visible immediately after an injury has been inflicted.

During the surgical exploration of the temporal bone for the sake of identifying the facial nerve, it is necessary to take care about surgical field width, adequate chemostasis, aspiration and direction of work with the diamond cutter. The best thing to do is to identify the facial nerve in the healthy part by applying operational microscope and nerve stimulator (5-7).

The facial nerve neurosuture can be immediate or delayed. The former requires a surgically clean injury and an uncontaminated trauma. The delayed nerve suture is applied to a contaminated injury, a missile wound or in the case of poor general health state. Many surgical techniques are available such as termino-terminal anastomosis, "rerouting", transplant interposition, "crossover" of XI or XII nerve and neuromuscular transfer. The local conditions of the neurosuture failure are: lesion's closeness to the stylomastoid opening, a time lag between the injury and the operation, the number of anastomoses and the presence of an infection. The surgical success factors comprise absence of nerve tension, proper positioning of the nerve ends, minimal debridement and minimal number of atraumatic sutures (8,9).

Generally speaking, the facial nerve surgery is directed towards achieving a facial symmetry at rest, balanced movements of the upper and the lower halves of the face for both voluntary and involuntary movements. By a proper surgical technique this can be achieved in a considerable number of cases of traumatic facial paralyses (10).

The axon survival after the nerve transection varies according to its kind; with man it lasts from three to five days. The survival is longer in a distal nerve segment with complete axonolyse seven days later and myelolyse after a somewhat longer period of time. The degeneration front is not linear with different degrees of degeneration of some fibers and preservation of a small number of the facial nerve fibers (11).

Synkinesis represents an involuntary muscle contraction during voluntary contraction of some other muscle; it represents an unfavorable course of the nerve regeneration. The surgical selective nervectomy gives mixed results while there are also experiments made with synkinesis prevention by using vincristine (12).

The nerve regeneration factors include components of extracellular matrix, neural promotive factors, neurotropic factors, inhibitor molecules and cellular components. The immediate nerve surroundings have a very important role in recovering the damaged nerve while there is a considerable functional reserve in the peripheral nerve. The achievement of the completely normal mimic face function after complete nerve transection is not altogether possible. The nerve transplant provides for the existence of direct humoral and cellular components for regeneration while due to disturbances of circulation and perfusion only about 40% of the fibers achieves contact in the proximal end and slightly less in the distal part of the anastomosis. The overall effective number of re-grown axons with precise enervation is about 12%. The nerve tubulization gives somewhat better experimental results of the facial nerve regeneration (13).

The final outcome of the facial defect reconstruction by applying the nerve transplant gives the House Brackmann stadiums III and IV which is statistically worse than the nerve decompression that in most cases results in the stadium II.

Conclusion

1. Surgical therapy of precisely determined cases of peripheral traumatic facial palsy gives good functional results.
2. Nerve decompression gives statistically better results comparing to anastomosis and nerve transplant.
3. Choice of surgical technique and results directly depend on intensity, place of injury and time of therapy.

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TRAUMATSKA PARALIZA FACIJALISA

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Kratak sadržaj: *Paraliza facijalnog nerva može biti značajna komplikacija traume glave, a pravilan hirurški tretman može umanjiti njihov negativan efekat. Hirurška terapija se obično sastoji od dekompresije nerva, anastomoze ili primene transplantata nerva. U ovom radu učinjena je retrospektivna analiza desetogodišnje terapije traumatskih paraliza facijalisa je sprovedena. Klinički pregled, topodijagnostika, elektrodijagnostika i radiografija su bile rutinski primenjene kod svih pacijenata. House Brackmann-ova skala je korišćena za evaluaciju rezultata medikamentne i hirurške terapije.*

Traumatska paraliza facijalisa bila je pretežno nekompletna (62,9%) sa prisutnim drugim otološkim simptomima. Fraktura temporalne kosti verifikovana je u 88,6% pacijenata, a intraoperativnim nalazom utvrđeno je da je paraliza uglavnom suprastapedijalna (69,2%). Edem nerva i frakturna linija su često nađeni. Primenjene su različite hirurške tehnike: dekompresija u 84%, termino-terminalna anastomoza i transplantat imali sličan ishod.

Zaključak: Hirurška terapija u određenim slučajevima traumatske paralize facijalnog nerva daje dobre rezultate. Dekompresija nerva daje značajno bolji uspeh od anastomoze ili transplantata nerva. Tip hirurške terapije i rezultat je u korekciji sa etiologijom, intenzitetom, mestom i vremenom tretmana traumatske paralize facijalisa.

Ključne reči: *Facijalni nerv, paraliza, trauma, hirurško lečenje*