FACIAL NERVE PERIPHERAL PARALYSIS IN 76 PATIENTS

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Summary. Aim of the study was to evaluate the etiology, clinical profile and evolution of the facial nerve peripheral paralysis (FNPP) and to assess the relationship between the different etiological and treatment modalities that influence the prognosis and recovery. A total of 76 patients with idiopathic or symptomatic facial lesion were evaluated. The assessment of the paresis was done according to a modified scale of House and Brackmann. Complex treatment received 56 patients. The time of complete recovery (CR) and number of patients at day 30, 45 and 90 were estimated, considering the different risk and prognostic factors. Sixty eight percent of the patients had idiopathic Bell's paralysis. The right side was affected in 42 patients; moderate paresis was observed in 34, and severe damage in 40 patients. The mean time of CR was estimated to be 34.7 $\pm$ 12 days; 49.3% of patients improved completely in 30 days, 73.6% in 45 days, and 88.2% in 90 days. Most of the patients with FNPP improve in less than three months. Complex examination including EMG is needed to predict the evolution of FNPP. Unfavorable factors for recovery are the advanced age, herpetic infection, delayed initiation of a complex therapy, diabetes mellitus, recurrent paresis and severe EMG changes.

Key words: *facial nerve, Bell's palsy, idiopathic facial paralysis, facial nerve peripheral lesion, electromyography*

INTRODUCTION

Facial nerve peripheral paralysis (FNPP) is a common virus-triggered immune-mediated disorder [3, 5, 6, 11, 13, 18, 20, 24] with an incidence of about 15-40/100 000 [14, 18]. Viral infection (HSV 1 and 2, HZV, EBV, CMV, Influenza A and B) usually causes segment demyelination, inflammation, and secondary edema of the facial nerve in its narrow bone canal

[3, 9, 15, 18, 19, 20]. There are many other diseases in which FNPP is a secondary or symptomatic manifestation, for example in acute inflammatory demyelinating polyradiculoneuropathy (AIDP), multiple sclerosis, Lyme disease, tuberculous meningitis, neurolues, carcinomatosis, sarcoidisis, as well as in some vascular, tumor, and traumatic disorders [5, 6, 11, 15, 17, 24]. Considering the differential diagnosis of FNPP, about 78% of the cases are a result of an idiopathic Bell's palsy (IBP), 10% of HZV infection, and 4-10% are attributed to other unusual causes. Evidence of edema, local ischemia and viral inflammation in the first ten days of disorder is the main reason to introduce early treatment with corticosteroids and acyclovir [16, 20]. This regimen was more effective than single use of corticosteroids, that is better than acyclovir treatment alone [4, 8, 12, 13, 18, 22, 24, 27]. In Bulgaria, in addition to corticosteroids and acyclovir treatment, traditionally the use of mannitol, pentoxifylline, and vitamins in acute FNPP, and galantamine hydrobromide (Nivalin®) in the late phase is accepted [1]. The prognosis of idiopathic FNPP is usually favorable. Complete recovery (CR) even without treatment is observed in about 71% of all patients, in 84-94% of treated ones, partial improvement in about 15%, and only a small part of them have a permanent deficit [2, 5, 11, 14, 19, 20, 25].

AIM OF THE STUDY

The aim of our work is to evaluate the etiology, clinical profile and evolution of the FNPP; to assess the relationship between different types of etiology and treatment modalities, and factors that influence the prognosis and recovery of the facial nerve peripheral injury.

MATERIALS AND METHODS

A total of 76 patients with idiopathic or symptomatic FNPP were examined and treated in the Clinic of neurology at the University Hospital "Tsaritsa Yoanna" of Sofia, between 2003 and 2007 year. The contingent includes 42 males and 34 females, age 14 to 79 years, mean age of 42.7 $\pm$ 18.2 years, with a different severity of FNPP. Two of the patients were 14-year-old children. The assessment of FNPP was made according to a modified by us scale of House and Brackmann scale (HBS) [16]. We divided the severity of FNPP into three categories (mild, moderate and severe), that in comparison to HBS are as follows: normal facial muscle status – 0; mild – I stage of HBS, moderate – II plus III stage of HBS; and severe – IV plus V stage of HBS. The diagnostic methods used were EMG, CT, MRI, hematology and biochemistry panel, serology and CSF examinations, angiography, ultrasound, biopsy, ENT examination, etc. The most commonly used medications in FNPP were 6-methylprednisolon (in a

dose of 1 mg/kg iv), mannitol (0.5-1 g/kg iv), acyclovir (1.5-4.0 g po), pentoxifylline (300 mg iv/po), vitamins of group B (Millgamma N); antibiotics, eye unguents and drops. The contingent of interest was divided into different groups (Table 1 and 2) according to the age, sex, type of most frequent etiology, severity of clinical or EMG findings, recurrent facial paralysis and three main treatment modes which included 1) complex treatment with corticosteroids, acyclovir, mannitol, pentoxifylline, vitamins of group B and/or other symptomatic remedies, massage; 2) without corticosteroids and acyclovir; and 3) with acyclovir alone. The time of CR of the patients with different FNPP etiology was estimated and the number of patients with CR at day 15, 30, 45 and 90 was calculated considering the different risk and prognostic factors, as well as the efficacy of the treatment.

Table 1. Number and percent of clinical symptoms, stage of paresis, EMG changes and complex treatment in patients with different etiology of FNPP

Group / FACTOR	IBP N=40 (52.6%)	IBP + HVI N=8 (10.5%)	FNPP + ENT N=12 (15.7%)	DM N=8 (10.5%)	REC N=8 (10.5%)	TOTAL N=76 (100%)
Age (years +SD)	34.1 ± 17.9	44.1 ± 17.7	44 ± 18.6	44.7 ± 18.2	43.7 ± 18.3	43.8 ± 18
LT (days)	1,79	1,84	1.72	1,61	1,87	1,9
Male / Female	M 23 / F 17	M 6 / F 2	M 5 / F 7	M 5 / F 3	M 3 / F 5	M 41 / F 34
Left Side	20 (50)	4 (50)	5 (41.7)	1 (12.5)	6 (75)	*38
Right Side	20 (50)	4 (50)	7 (58.3)	7 (87.5)	2 (25)	*42
BELL symptom	21 (52.5)	5 (62.5)	11 (91.6)	4 (50)	4 (50)	49 (64.5)
DYSGEUSIA	9 (22.5)	2 (25)	5 (41.7)	2 (25)	3 (37,5)	21 (27.6)
PAIN	23 (57.5)	5 (62.5)	7 (58.3)	4 (50)	4 (50)	46 (60.5)
SEN	8 (20)	2 (25)	3 (25)	3 (37.5)	2 (25)	18 (23.7)
EYE	13 (32.5)	4 (50)	6 (50)	1 (12.5)	2 (25)	28 (36.8)
MODERATE /	23 (57.5)	2 (25)	2 (16.7)	4 (50)	5 (62.5)	34 (45.3)
SEVERE	17 (42.5)	6 (75)	10 (83.3)	4 (50)	3 (37.5)	39 (54.7)
**EMG Mod /	14 (35)	4 (57.1)	2 (16.7)	3 (42.8)	1 (33.3)	24 (31.5)
EMG Severe	7 (17.5)	2 (28.5)	5 (41.7)	2 (28.5)	1 (33.3)	12 (15.8)
Complex Therapy	34 (85)	7 (87.5)	7 (58.3)	6 (75)	5 (62.5)	56 (73.7)

IBP, idiopathic Bell's palsy; IBP+HVI, patients with proved herpes virus infection; FNPP +ENT, patients with additional ear nose throat infection; DM, diabetes mellitus; REC, recurrent facial paralysis; *4 patients had bilateral FNPP; LT, latent time till paresis onset; BELL, Bell's symptom; SEN, sensory symptoms; EYE, eye symptoms that need local treatment; MODERATE / SEVERE, moderate and severe facial paresis; EMG Mod / Severe – moder-

ate and severe EMG findings, **6 patients with mild changes were not included; CPX TH, complex therapy;

Table 2. Factors and number of patients with complete recovery (CR) after FNPP on day 15, 30, 45, and 90

N=	FACTOR	CR mean time Days (SD)	CR on day 15 N (%)	CR on day 30 N (%)	CR on day 45 N (%)	CR on day 90 N (%)
42*	Right side	34,4 (11,6)	13 (30.9)	15 (35.7)	27 (64.2)	35 (83.3)
38*	Left side	34,4 (11,7)	19 (46,3)	22 (57,9)	30 (78,9)	32 (84,2)
42	Males	34,8 (11,4)	16 (38)	21 (50)	30 (71.4)	39 (92.8)
34	Females	34,7 (11,7)	16 (47)	16 (47,1)	26 (78,5)	28 (82,4)
64	Age up to 65 years	35.6 (12.6)	33 (51.5)	39 (60.9)	54 (84.3)	60 (93.7)
12	Age above 65 years	36.0 (13.2)	0 (0)	0 (0)	4 (33.3)	7 (58.3)
40	Idiopathic facial paralysis	36.5 (13.5)	18 (45)	22 (55)	33 (82.5)	39 (97.5)
12	Symptomatic FNPP + ENT	34.9 (12.3)	4 (33.3)	6 (50)	9 (75)	10 (83.3)
8	Herpes virus infection	39.4 (11.0)	3 (37.5)	3 (37.5)	6 (75)	7 (87.5)
8**	Diabetes mellitus	43,9 (15,3)	2 (25)	2 (25)	4 (50)	7 (87.5)
34	Moderate clinical findings	35.3 (12.6)	21 (61.8)	23 (67.6)	27 (79.4)	29 (85.3)
40	Severe clinical findings	36.6 (13.5)	9 (22.5)	12 (30)	27 (67.5)	34 (85)
26	Moderate EMG findings	35.9 (13.2)	14 (53.8)	16 (61.5)	22 (84.6)	25 (96.2)
12	Severe EMG findings	36.4 (13.9)	1 (8.3)	1 (8.3)	4 (33.3)	9 (75)
56	Complex treatment	34,7 (11,7)	27 (48.2)	32 (57.1)	48 (85.7)	52 (92.8)
18	No CS and acyclovir	35.9 (13.4)	4 (22.2)	4 (22.2)	8 (44.4)	14 (77.8)
15	Acyclovir without CS	35.7 (12.7)	5 (33.3)	5 (33.3)	11 (73.3)	13 (86.7)
75 ŧ	TOTAL	34,7 (11,7)	31 (41.3)	37 (49.3)	56 (73.6)	67 (88.2)

ŧ 1 patient who died was not included;*4 had bilateral FNPP; **1 patient with diabetes mellitus had also herpes virus FNPP; CS, corticosteroid treatment

RESULTS

Etiology

Of all 76 patients, 52 (68.4%) had IBP and other 8 patients (10.5%) were confirmed as having herpes simplex or herpes zoster viral etiology (specific exanthema or positive serology of HSV type 1 or 2). Symptomatic FNPP had 9 patients with diabetes mellitus (DM), 12 of all patients (15.7%) had additional respiratory or ENT infection (including 5 with otitis media, 4 – tonsillitis, 3 – respiratory tract infections, such as rhinitis, bronchitis), 1 male had Wegener's granulomatosis and additional herpes zoster infection, 1 male had atypical AIDP, 2 patients were with meningitis, 1 female had multiple sclerosis. 1 female had small hemorrhage in dorsal

pontine area, 1 had ischemic stroke in VBS due to dolychoectasia of the basilar artery. Eight of the patients had previous facial nerve paralysis (recurrent). As accompanying diseases and risk factors, most frequently we observed: arterial hypertension - 16 patients, acute unspecified viral illness – 7, fever – 10, peptic ulcus and gastritis – 4, obesitas – 5, dyslipidemia – 4, migrain – 1, tick bite anamnesis – 1 female, herpes labialis – 1, hypo or hyperthyroid function – 4, ischemic stroke – 4, cerebral veins or sinus thrombosis – 1, basocellular skin carcinoma – 1, thyroid gland carcinoma – 1, schizophrenia – 1, anemia – 1 and some other rare disorders. For common cold, wind and cold weather exposure, reported 12 out of all patients (15.8%). Out of 52 with IBP, 8 gave history of severe cold; 8 of acute viral illness; 7 of fever. Complete development of paralysis was observed acutely for several hours, usually on awakening. Latent period till paralysis onset was described by the patients starting from half a day till maximum 5 days, mean time 1.85 $\pm$ 1.2 days. Occurrence of FNPP within one day was seen in 33 patients (43.4%). Mean hospital stay was 10.9 $\pm$ 6 days, with range from 3 to 30 days of treatment. Patients with DM had shorter latency till occurrence of paralysis – 1.6 days.

Clinical picture

Side of paralysis was the right one in 42 patients (55.2%), and left one in 38 patients. Bilateral paresis had 4 patients (2 female and 2 males, that is why total number of both sides affected is 80, not 76 patients, Table 1, 2). A ratio right-to-left side was 1.1 : 1. Severity of FNPP at admission to clinic according to our assessment was: mild or minimal in 2 patients (2.6%), moderate in 34 patients (44.7%), and severe in 40 ones (52.6%). The patients' most frequent early symptoms were retroauricular pain, disturbed lacrimation and salivation. On neurological examination, the following symptoms were found, as shown on the Table 1. Bell's symptom in different expression was observed in 49 patients (64.4%). This symptom was most frequent in patients with IBP – 65.4%. Pain behind, in or around the ear, as well as in the neck, face, eye, head, and occipital area had 46 patients (60.5%). The most severe pain symptoms had patients with herpes virus etiology (62.5%). Dysgeusia involving anterior third of the tongue had 21 patients (27.6%), seen most often in those with recurrent FNPP. Sensory disturbances such as cheek hypoesthesia, or at mouth, lips, tongue, face or behind the ear occurred in 18 patients (23.7%), more often in patients with DM – 37.5%. Disturbance of hearing, hyperacusis, or decrease/loss of hearing was reported in 9 patients. Increased lacrimation described 15 out of 70 (21.4%) patients, and loss of tears/tearing in 3 ones. Secondary eye symptoms (including keratitis, conjunctivitis) which need local eye treatment had 28 of the patients (36.8%), more frequently those with HVI (up to 50%). Additional symptoms such as, nystagmus, dizziness, ataxia, cranial nerve lesions, meningial signs, pyramidal signs were observed in 15 other patients. EMG was performed in 44 patients (57.8%) out of 76: 6 of 44 (13.6%) had mild EMG changes, 26 patients (59.1%) had moderate abnormal changes and partial axonal

lesion; and 12 (27.2%) had severe abnormalities, such as heavy denervation and absence of reinervation potentials (Table 1, 2). According to EMG findings (n = 24), upper facial branch involvement was worse in 8 patients (33.3%), and lower facial branch was affected worse in 12 patients (50%), while in 4 patients (16.6%) the lesion was equally expressed for both branches. CSF examination was carried out in 9 patients. Two of them had pleocytosis (meningitis), and the rest had normal values of CSF protein and cell count. We had diagnostic difficulties in differentiating pseudo-peripheral type of facial nerve lesion, stroke or other etiology in 8 patients. We recommended MRI examination in 3 patients with NFPL because of other neurological signs suspected for MS; in one due to suspicion of tumor and in one due to thyroid gland carcinoma. MRI in one patient revealed thrombosis of sinus sygmoideus and transversus ipsilateral to the FNPP. Only one patient with symptomatic trigeminal neuralgia and FNPP due to basilar artery dolychoectasia had died after severe thrombosis and brainstem stroke.

Therapy

Complex treatment received a total of 56 patients, 92.8% of whom had CR on day 90. Without corticosteroids and acyclovir were treated 18 patients (CR 77.8%); acyclovir (without corticosteroids) was given to 15 patients (CR 86.7%); and antibiotics were needed in 14 patients. Patients with specific etiology of FNPP had therapy relevant to the cause, (sometimes up to 25 differential diagnoses [8]). MS patient needed high dosages of corticosteroids, AIDP patient - high dose of immunoglobulins, and those with ENT infection, meningitis received appropriate antibiotic treatment, and one with granulomatosis adequate immunosuppression in order to recover after specific FNPP.

Evolution of FNPP in time

For all patients in the study, CR was calculated to be 34.72 ± 11.7 days, ranging 17 to over 70 days. Improved facial status and CR of paralysis in 30 days had 37 patients (48.6%); on day 45 – 56 patients (73.6%); and on day 90 – 67 of our patients (88.1%). Ability to close the eye at the affected side on day 15 was observed in 31 patients (40.7%). All patients who could close their eye on day 15, even without maximal strength, had favorable prognosis and recovered almost 100% on the day 45 and 90. This subgroup of NFPL patients had mean time of CR 36.16 ± 13.1 days. Results of other factors that influence recovery are shown on Table 2. Eight out of 75 patients (the patient who died was not included) did not improve in 90 days: two with IBP, 1 with DM, 1 with granulomatosis of Wegener, 1 with complicated ENT infection (otitis and mastoiditis), one 78-year-old patient with heart disease, and history of thyroid disorder, and one patient with bilateral facial paresis who had history of tick biting. A woman with dorsal pontine hemorrhage involving nucleus and tractus of facial nerve had also horizontal eye movement paralysis. She was treated symptomatically without corticosteroids and had incomplete recovery on day 90.

DISCUSSION

Our study is mainly clinical and observational, smaller in size of subgroups than others [5, 9]. We were interested in evaluating clinical presentation and relation between etiology, treatment and prognostic factors for CR in most common FNPP. Prognosis and complete restoration of FNPP depend on many factors, which were discussed in many studies [2, 5, 9, 10, 11, 13, 14, 20, 25]. More of our patients were men with IBP and severe FNPP. Almost two thirds received complex therapy. Bell's symptom was more often in IBP, severe pain and eye involvement – in patients with herpes infection, while sensory disturbances were predominant in patients with DM. According to the data from Table 2, the mean time of CR is not different between males and females, however in 45 days and in 90 days more males had CR than females. There is no difference in mean time of CR between patients with right or left FNPP, as well as at day 90. Age appeared to be an important negative prognostic factor. There was a definite trend for CR from day 30 to 90 in younger patients, aged up to 65 years, than in older ones aged above 65 years, among whom approximately 60% had CR at day 90. More patients with IBP had improvement more quickly than those with DM and those with proven virus etiology [3, 18, 21, 22, 23]. Restoration of facial nerve functions in DM patients (they also were older than other groups) was slower in the first seven weeks, however at day 90 their number was approximately equal to that of those with herpes virus infection, where facial paresis was usually more severe. This result could be due to the small number of our patients [11, 18, 26]. Our patients with DM had the longest mean time of CR – 43.9 +15.3 days, than other subgroups. Our clinical assessment of the paralysis correlated poorly to the prognosis. Improvement was slower within first 6-7 weeks however in a long term, at day 90, there was no difference between patients with moderate and severe facial paresis at the onset of disorder. EMG evidence of severe peripheral nerve lesion, such as denervation changes, reinervation potentials and absence of reinervation, demonstrated in the first 3 weeks from onset, in contrast to our clinical assessment, could be a better prognostic factor for worse recovery (at day 90, 75% versus 96.2% of the patients) [2, 9, 10, 14, 17, 25]. Improvement of the upper facial branch was more often and faster, however in one third of the patients that was true for lower affected nerve branch, as well. Despite suggested therapeutic regimens and recommendations in patients with FNPP, standardized therapy is a matter of debate and physicians' judgment, based on evidence that many patients recovered even without special treatment [10, 11, 14, 15, 26]. Complex treatment applied in our patients gave better results of CR (92.8%) at day 90 after FNPP than those treated only with acyclovir (86.7%), and especially better than those treated without corticosteroids and acyclovir (77.8%). We have no statistical confirmation, however similar results were reported in the current literature [8, 13, 22, 26, 27].

CONCLUSION

A complex and detailed clinical, etiological, and EMG examination is needed to predict the evolution of facial paresis. Most of the patients and especially those with IBP improve in less than three months. A specific etiology is to be found in order to properly apply the necessary treatment. Unfavorable factors for recovery after facial nerve peripheral paresis are the advanced age, herpes virus infection, delayed initiation of a complex therapy, diabetes mellitus, recurrent paresis and the observation of severe EMG changes.

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