RESEARCH STUDY

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Change in Taste in Diabetic Patients with Facial Nerve Palsy

Article Information

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Abstract

Background: Bell's palsy was defined as facial weakness of lower motor neuron type caused by idiopathic facial nerve involvement outside the central nervous system without evidence of aural or more widespread neurologic disease. The cause is unclear, but the disorder occurs more commonly in diabetics.
Objectives: to differentiate cases of idiopathic Bell's palsy from diabetic mononeuropathy presented with Facial nerve palsy by assessing the taste, because they differ in etiology, management & prognosis.
Patients &Methods: One hundred and fifteen consecutive patients were referred for the treatment of facial palsy, from May the 5th 2012 to April 12th 2013 in Al-Kindy Teaching Hospital and The Neurosciences Hospital, in Baghdad / Iraq. 70 diabetic patients and 45 non diabetics were involved to assay the taste.
RESULTS: of the 115 patients with facial nerve palsy 70 (61%) were diabetics&45(39%) non-diabetics.No differences of age or gender were found between the two groups. From those 70 diabetic patients 15(34.9%) had change in taste, and , 55(76.4%)had no change in taste, while for non-diabetics; from total 45 patients 28(65.1) had change in taste, and 17 (23.6%) had no change, and this was statistically significant ($p<0.001$)
CONCLUSION : Diabetic patients with isolated facial nerve palsy with sparing of taste sensation may be cases of diabetic mononeuropathy due to diabetic small vessel disease rather than concurrent cases of Bell's palsy.

Introduction: Facial weakness of lower motor neuron type caused by idiopathic facial nerve involvement outside the central nervous system, without evidence of aural or more widespread neurologic disease, has been designated as Bell's palsy. The cause is unclear, but the disorder occurs more commonly in pregnant women and diabetics.There may be associated impairment of taste, lacrimation, or hyperacusis(sensitivity to loud sounds). There may be paralysis of all muscles supplied by the affected nerve (complete palsy) or variable weakness in different muscles (incomplete palsy). Clinical examination reveals no abnormalities beyond the territory of the facial nerve. It is not clear whether treatment with acyclovir or other antiviral agents confers any benefit. Treatment with corticosteroids (prednisolone, 60 mg/d orally for 3 days, tapering over the next 7 days), beginning within 5 days after the onset of palsy; is said to increase the proportion of patients who recover completely. (1)

The seventh cranial nerve supplies all the muscles concerned with facial expression. The sensory component is small(the nervus intermedius); it conveys taste sensation from the anterior two-thirds of the tongue and probably cutaneuos impulses from the anterior wall of the external auditory canal.

A complete interruption of the facial nerve at the stylomastoid foramen paralyzes all muscles of facial expression. The patient complains of a heavinessor numbness in the face, but sensory loss is rarely demonstrable and taste is intact.

If the lesion is in the middle ear portion, taste is lost over the anterior two-thirds of the tongue on the same side. (2)

The aim of the study is to detect the difference in taste changes between patients

with idiopathic Bell's palsy and diabetic patients with facial nerve palsy.

Methods: One hundred and fifteen consecutive patients were referred for the treatment of Bell palsy, from May the 5th 2012to April12th 2013 in Al-Kindy Teaching Hospital& The Neurosciences Hospital, the out-patient clinic of neurology. It is a cross-sectional study in which patients with facial palsy were referred for consultation and management, they were examined by a neurologist and sent for plasma glucose testing the results were assigned as fasting or random, direct questioning about change or loss of taste sensation whether present or not and also history of diabetes. Patients with isolated facial palsy of lower motor neuron type within five days of insult were included in the study while patients with isolated facial palsy beyond this period were excluded in addition to cases that occurred as a result of trauma or surgery were also not included.

The results were analyzed by using Mini Tab Ver. 13, *P* value 5% statistically significant.

Results: From 115 patients 70(61%) were diabetics, 38(54.3%) of them were males and 32(45.7%) females , & 45(39%) were non diabetics, 29(64.4%) were males and 16(35.6) females. Total males in the study were 67(58.4) and total females were 48(41.7).

Table (1): Age and gender distribution

Age / yr. old	All patients		Diabetics		Non Diabetics	
	♂	♀	♂	♀	♂	♀
	Total		Total		Total	
0 - 9	2	-	2	0	-	-
	2		2		-	
10 - 19	6	8	5	6	1	2
	14		11		3	
20 - 29	7	7	7	7	-	-
	14		14		-	
30 - 39	10	7	8	6	2	1
	17		14		3	
40 - 49	13	9	6	4	7	5
	22		10		12	
50 - 59	12	4	5	4	7	-
	16		9		7	
60 - 69	16	7	4	2	12	5
	23		6		17	
70 - 79	1	4	1	2	-	2
	5		3		2	

80 - 89	-	2	-	1	-	1
	2		1		1	
Total	67 (58.3%)	48 (41.7 %)	38 (54.3%)	32 (45.7%)	29 (64.4%)	16 (35.6 %)
	115		70(61%)		45(39%)	

From 115 patients 70(61%) were diabetics & 45(39%) were non diabetics, from those 70 diabetic patients 15(21.4%) had change in taste, and 55(78.6%) had no change in taste, while for non-diabetics; from total 45 patients, 28(62.2%) had change in taste, and 17 (37.8%) had no change. These results revealed a highly significant difference between diabetics and non- diabetic patients who had no change in the taste. Results regarding patients with a change in their taste showed a significantdifference between the two groups in males while there is no significancy in females.

Table (2): Change in Taste

	No			Yes			Total
	Diabetics	Non diabetics	*P* value	Diabetics	Non diabetics	*P* value	
male	31	11	**0.02***	7	18	**0.02***	67
female	24	6	**0.01***	8	10	**0.6**	48
Total	55(76.4%)	17(23.6%)	**0.001****	15(34.9%)	28(65.1)	**0.154**	115

P*value : <0.05 significant
P** value: <0.005 highly significant

Discussion

Sixty percent of the 115 patients with Facial nerve palsy evaluated by this study had diabetes mellitus & this differs from other studies were the percentage was lower (39%).(3,4)This is because in our study we depends on 2006 WHO criteria for the diagnosis of DM. Thirty seven point four percent (37.4%) of the patients had taste disturbance, & this is competent with other studies results.(5,6,7) However, in the sub-group of diabetic patients a considerably lower frequency of taste impairment was found. 76.4% of diabetics hadno taste involvement as compared to 23.6% of the patients without diabetes mellitus. This difference is suggestive of a pathogenesis which is directly related to the diabetes, in most of the cases of concurrent diabetes mellitus & Bell's palsy.(8,9) The sparing of taste inmost of these cases is analogous to the sparing ofpupillary fibers in third nerve lesions due to diabetesbut not to other causes,and likewise may havean anatomical explanation.(8,9) The chorda tympanicarrying taste fibers from the anterior two thirds ofthe tongue, joins the facial nerve in its bony canal5-6 mm above the stylomastoid foramen.(10) To spare taste, nerve lesion in diabetics with Bell's palsywould have to be located distal to the bifurcation ofthe chorda tympani. In the rest of the cases whereanother etiology, possibly viral, is involved.(11,12) This study shows no evidence of such a localized lesion and thefacial nerve seems to be affected throughout ormainly proximal to the chorda tympani, involvingtaste as well as motor function. Pathological studiesof diabetes with a recent Bell's palsy are unavailable,so the nature of the facial nerve lesion and thereasons for the special vulnerability of the distal partof the facial nerve in diabetes

cannot be ascertained.However, it seems that no generalizedmetabolic abnormality in the Schwann cell andmyelin sheath of diabeticscan account for such aselective lesion, while a vascular pathogenesis ismore probable.(13,14)

The relationship of small vessel disease in diabetesto neuropathy and mononeuropathy inparticular has been reported and related tonerve ischemia in infarcts.(14,15,16,17,18) This was confirmed byseveral pathological studiesand by the similarity to the mononeuro- pathy of polyarteritis nodosa,in which nerve infarcts have also been demonstrated.(8,19,20,21) The blood supply of the facial nerve in the petrous bone comes from two main sources : thes tylomastoid artery (originating from the occipital or posterior-auricular arteries and ascending through the stylomastoid foramen), and the branches of thepetrosal artery (originating from the middlemeningeal artery, entering the hiatus Fallopii and descending in the bony canal).(22,23) Ample anastomosis exist between them, however, this does not precludethe possibility of diabetic small vessel diseaseaffecting the blood supply of the distal part of the facial nerve, possibly at the loop formed by thestylomastoid artery on entering the skull, or at itsbifurcation at an acute angle to form the chordatympani branch.(22,24,25) Indeed, embolization of both arteries was followed by a clinical picture very similar to Bell's palsy.(26,27) It may be argued that a highlysusceptible area of the microcirculation often occursdistal to the chorda tympani, hence diabetic smallvessel disease may cause localized facial nerve ischemia (infarction?) and edema, which wouldfurther compromise the nerve's blood supply due tothe rigid Fallopian canal at that area.(28) In thatrespect, the facial nerve shows marked similarity tothe other nerves commonly affected by diabeticmononeuropathy. all traverse an enclosed spacewhich makes them especially vulnerable to theeffects of ischemia.

(29,30) The clinical profile of Bell'spalsy, with sudden, painful asymmetrical onset andthe pattern of gradual recovery, also is suggestive ofnerve ischemia and similar to a diabetic mononeuropathy,although most of the cases have a differentetiology, and nerve edemas and ischemia are probably secondary phenomena.(18,26,3132)

Conclusion

Diabetic patients with isolated facial nerve palsy with sparing of taste sensation may be cases of diabeticmononeuropathy due to diabetic small vessel disease rather than concurrent cases of Bell's palsy.

Recommendations

More comprehensive studies about the relationship between diabetes mellitus types, duration, & control with facial nerve palsy, to predict future prognosis.

Inquiry about change in taste specifically in each patient with isolated facial nerve palsy of lower motor neuron type.

Any patient with isolated facial nerve palsy of lower motor neuron type without change in taste sensation, we recommend sending him/her for blood sugar testing, because this may be the first presentation of diabetes mellitus.

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