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INDICATORS OF DERMATOGLYPHIC DIAGNOSIS OF SEKELARY INFANTILE ENCEPHALOPATHYES (IEP)

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Abstract. The **aim** of this paper is a dermatoglyphic study in 200 children and teen-agers aged between 2 and 17 years with various infantile encephalopathy (IEP) sekeles, such as hemiplegy, paraplegy, tetraplegy from a dermatoglyfic pathological perspective. **Material and methods.** A total of 400 palmary prints have been collected between 1995 and 2003 in the Mental Health Center of Iaşi with the catchments area the Eastern part of the country. **Results and discussion.** Among the complex clinical symptoms evidenced in the affected people, mention should be made of the presence of epilepsy, autism, ocular diseases, which have been further used, along with the reference sample of Moldavia, in the comparative analysis of the obtained results. One of the first observations to be made is that the ample symptomatic polymorphism of patient's disease is suggestively illustrated in their palmary dermatoglyphic picture by multiple abnormalities or distortions (between 3 and 6 for each patient), with deep clinical implications. The frequency of them exceeds by far that of the reference sample, being instead much closer or even exceeding the values recorded in epilepsy, infantile autism or serious ocular diseases. Present in both boys and girls and on both hands of the affected ones, but especially on the left hands, these distortions, as ***malformative stigma***, suggest that, among the factors responsible for causing the disease, one should not leave aside the genetic or teratologic ones, which intervened in the first 3-5 months of intrauterine life (during the final establishment the papillary ridges); the lesions of central nervous system (CNS) produced in the last 4 months of pregnancy or in the first two years of post-natal life as considered as releasing factors of the clinical symptoms and of their amplification, as well. **Conclusions.** Among the factors responsible for the production of sekelary IEP-es, an important role is played by the genetic or teratological ones, known as intervening in the first 3-4 months of intrauterine life. Also the CNS lesions that occurring in the last 4 months of pregnancy and the first 2 years of post-natal life, act exclusively as elements that release the malady's symptoms and their amplification.

Key words: dermatoglyphics, sekelary infantile encephalopathyes, abnormalities or distortions

Rezumat. Obiectivul acestui studiu este examinarea dermatoglifică, din perspectivă patologică, asupra unui număr de 200 copii şi adolescenţi cu diferite sechele de encefalopatie infantilă (EPI), precum hemiplegie, paraplegie, tetraplegie etc., cu vârsta cuprinsă între 2 şi 17 ani, provenind din Moldova. **Material şi metodă.** Au fost recoltate, între anii 1995-2003 la Centrul de Sănătate Mintală din Iaşi, care are ca arie de distribuţie partea de Est a României, un număr de 400 amprente palmare. **Rezultate şi discuţii.** Între simptomele clinice complexe ale bolii multora dintre afectaţi, îşi fac simţită prezenţa: epilepsia, autismul şi bolile oculare grave, boli care ne-au servit ca referinţă împreună cu lotul martor în analiza comparativă a rezultatelor obţinute. Se constată că, amplul polimorfism simptomatic al bolii pacienţilor este

sugestiv ilustrat în tabloul dermatoglific al palmei acestora prin multiple anomalii sau distorsiuni cu adânci implicații clinice (între 3 şi 6 pentru fiecare pacient). Frecvența acestor anomalii şi distorsiuni depăşeşte valorile lotului martor, fiind mult mai apropiate sau chiar depăşind valorile raportate în epilepsie, autism infantil sau bolile oculare grave. Prezente atât la băieți cât şi la fete şi pe ambele mâini ale afectaților dar cu deosebire pe cele stângi, aceste distorsiuni care sunt de fapt ***stigmate malformative***, sugerează că, din punct de vedere etiologic printre factorii responsabili de producerea bolii nu pot fi neglijați cei de natură genetică sau teratologică care intervin în primele 3-5 luni de viață intrauterină (când se definitivează crestele papilare) - leziunile SNC, produse în ultimele 4 luni de sarcină ori în primii 2 ani de viață postnatală, fiind considerate drept factori de declanşare a simptomelor bolii şi de amplificare a acestora. **Concluzii.** Pentru factorii responsabili de producerea sechelelor de encefalopatie infantilă (SEI), un important rol îl deține factorul genetic sau teratologic, cunoscând faptul că aceştia intervin în primele 3-4 luni de viață intrauterină. De asemenea, la primele SNC care apar în ultimele 4 luni de sarcină şi primii 2 ani de viață, acționează exclusiv ca elemente care induc simptome ale bolii şi le amplifică.
Cuvinte cheie: dermatoglife, encefalopatii infantile sechelare, anomalii sau distorsiuni

INTRODUCTION

Known as of brain paralyses, sekelary infantile encephalopathies (IEP) represent pathological processes at the level of the central nervous system (CNS), assuming its injuring during the period of its maturation. The lesions are manifested in a sekelary manner, as either paralyses or pareses, that may be uni- or bilateral and include: the area of the central driving neuron from the cortex, some subcortical (the thalamus, the hypothalamus) or medular areas. Such affections may have as clinical syptoms: monoparesis or monoplegy, hemiparesis or hemiplegy, paraparesis or paraplegy, tetraparesis or tetraplegy, etc., usually including large segments of the members, of the head and less frequently of the body. As the CNS lesions occur quite early, they act in a diffusion way within each form of paralysis, so that the driving deficit may be accompanied by multiple disorders, such as: the hyper- or hypotonia, the trophicity of the bone or a the muscle, disorders of speech, phonation, mastication, sight or behavior, epilepsy, etc., all of them adding to the malady an ample and highly complex symptomatic polymorphism. The most frequently forms of paralysis (50%) are the ***spastic ones***, in which the CNS lesions appear slowly, while the most rarely met ones ***are the atonic or flaccid forms,*** also known as the **"syndrom of the floppy infant",** in which the CNS lesions appear suddenly, assuming a generalized hypotony (1-4).

As to ***the causal factors involved*** in the production of CNS lesions, most of the specialists in the field divide them into: ***prenatal, intra - and perinatal, and post-natal ones***.

Within the first category, a special position is held by the dispregnancies of the last 4 gestation months, the toxi-infectious maladies, or endocrine disorders, irradiation with R-rays or the administration of forbidden drugs in mothers. Among the ***intra- and para-natal causes***, there are usually included

fetus's presentation anomalies, placenta previa, intra-cranial hemorrhages producing CNS lesions, etc. The ***post-natal causes***, that may be manifested between 0 and 2 years, which is a very important period for CNS maturation and mielinization, refer to possible infectious maladies such as: measles, scarlet fever, viral meningoencephalitis and even the prophylactic vaccines. In the early prenatal period, up to the 5th month of intrauterine life (when the formation and definitivation of the epidermal papillary ridges - known as remaining unchanged along the whole lifetime - take place), one can in no way leave aside a possible intervention of either the genetic component or of some teratogenic factors at the level of the uterus, which might be suggestively illustrated in the finger and palmar print by the well-known ***"malformative sketches"*** (1, 2, 3, 7, 12). Such a possibility is even more probable once known that the CNS, as well as the skin, comes from the same embrionary sheet, *i.e.,* ***the ectoblast***. Consequently, any disorder occurring in this early prenatal period, at the level of the encephalon, will have repercussions on the epidermal papillary ridges, manifested by the appearance, of certain distortions or anomalies bearing medical implications. Thus, the author devoted the present study, the first one, from such a perspective at national level, to the palmary dermatoglyphics of patients affected by various forms of sekelary IEP-es, that coming from Moldavia.

MATERIAL AND METHODS

Along the years 2000-2003, there have been investigated dermatoglyphically, 200 children and teen-agers (100 girls and 100 boys) aged between 10 and 17 years, all coming from Eastern part of Romania, in the Center for Mental Health of Jassy, including 200 persons, (100 men and 100 women) – as a reference sample. Out of the 200 affected ones, **73 (34 boys and 39 girls)** are paraplegic, **61 (32 boys and 29 girls)** - tetraplegic, **29 (17 boys and 12 girls)** - hemiplegic, **6 (2 boys and 4 girls)** - diplegic, the remaining **31 ones (15 boys and 16 girls)** evidencing mild forms of paralysis, as: paralysis of the optical nerve, facial paralysis, head's tremulus, etc. With the exception of the last above-mentioned cases, in **132** of the patients **(69 boys and 63 girls),** paralysis is of ***the spastic type***, while in the **37** of them **(15 boys and 22 girls),** of ***the flaccid or atonic type***. Also, in **99** of the affected patients **(56 boys and 43 girls) -** IEP ***associated with mild to severe mental deficiency***, in **26 (10 boys and 16 girls)** - ***with epilepsy***, in **21 (7 boys and 14 girls) - *with autism*** or only with some of the elements of this complex sydrome, and, finally, in **22 patients (12 boys and 10 girls)** - ***with eneuresis or double incontinence***.

Statistical processing of the data was performed at the level of the whole batch. There were not considered the categories of paralyses, which have no statistical support. For all pathological indicators put into evidence, on following the sexual dimorphism, the bilateral differences as well as their disposition on carriers (on either one

or, simultaneously, on both hands). The results obtained have been compared with those registered for epilepsy, infantile autism and severe ocular diseases (OD), all these affections being present in the large spectrum of IEP's symptomatic polymorphism (9-11).
The working methods applied are those usually employed in studies of pathological dermatoglyphics (7, 12).

RESULTS AND DISCUSSION

The ample symptomatic polymorphism of the studied IEP-es is suggestively illustrated in the individual palmary print of the affected ones by 2 up to 5 anomalies or distortions, occurring in various combinations. The deep clinical implications of them result also from the fact that they have been recorded in other sever genetic or teratological maladies, as well as in some anomalies of the sexual and somatic chromozomes - even if, obviously, in different ratios (2, 3, 7, 9, 11-13). At the level of the whole sample of affected people, such "***malformative sketches"*** attain percent values which differentiate them considerably from the reference group, being instead quite close, equal or even exceeding the values registered in OD, autism and epilepsy, which are quite frequently met in the clinical picture of the sekelary IEP-es (9-12). A general type distortion at the level of the affected one's palm refers ***to the substantial diminution in the frequency of the patterns from the interdigital space III, up to 25.7% comparatively with 36.1%*** - the value of the reference sample, such reduction being more intense in boys (24.5%, *vs* 27.5% - in girls), and on the left hands, in both sexes (11.5% *vs* 40.0% on the right ones). Such a high deviation from normality is mainly caused by another severe distortion, namely the ***unexpectedly high increase, comparatively with the normal values, of the weight for the partial and total supression of line C*** (Cx and, respectively, Co) direction, the former being more intense in boys and the latter - in girls. Both of them are especially present on the left hands of both the male and female affected ones (table 1). Out of the 5 compartments of the palm, a richer range of distortions, bearing deep pathological significance, has been provided by the **hypothenary areal (Hp),** among which mention should be made of: ***a higher incidence for the ulnar loop (L^u), for the presence in the same palm of 2, 3 or even 4 triradia - of which at least one in distal position (t',*** t'', t''', etc.), for ***the absence, from the palm, of the axial triradius t (t_o)*** and for ***the finalization of line T's course, which starts from triradius t, in palm's fields 11 and 12 instead of 13***, as usually occurring in more than 95% of the normal people (table 1).
As table 1 shows,, out of the 4 palmary anomalies, $\mathbf{L^u}$ and $\mathbf{t_o}$ are more frequently appearing in boys, while tt't'', etc., and $T_{11} + T_{12}$ on the contrary - in girls, which is a dimorphic tendency actually present in OD, epilepsy and autism, too. As to its distribution as a function of hand, both in the series of boys and of girls, $\mathbf{L^u}$, $\mathbf{t_o}$ and $\mathbf{T_{11} + T_{12}}$ are more frequent on the left hands, while **tt't''** - on the right ones of the affected people.

Table 1. Distribution of the palmary distortions according to hand and sex (%)

Distortions	Malady	Boys			Girls			Total		
		L	R	L+R	L	R	L+R	L	R	L+R
L^U in Hp	Sekelary IEP	11.00	8.00	9.50	9.00	9.00	9.00	10.00	8.50	9.25
	OD	15.00	11.00	13.00	8.00	13.00	10.50	13.50	12.00	12.75
	Epilepsy	1.96	7.84	4.90	5.88	5.88	5.88	3.92	6.86	5.39
	Autism	8.95	13.43	11.19	10.00	5.71	7.85	9.49	9.49	9.49
	Reference sample	**1.00**	**2.00**	**1.50**	**3.00**	**1.00**	**2.00**	**2.00**	**1.50**	**1.75**
tt',tt't'' etc. in Hp	Sekelary IEP	26.00	29.00	27.50	26.00	39.00	32.50	26.00	34.00	30.00
	OD	27.00	35.00	31.00	25.00	35.00	30.00	26.00	35.00	30.50
	Epilepsy	17.64	21.57	19.60	23.53	25.49	24.51	20.58	23.53	22.05
	Autism	22.40	32.83	27.61	32.86	40.00	36.43	27.74	36.49	32.11
	Reference sample	**15.00**	**16.00**	**15.50**	**16.00**	**17.00**	**16.50**	**15.50**	**16.50**	**15.75**
t_0 in Hp	Sekelary IEP	11.00	10.00	10.50	6.00	4.00	5.00	8.50	7.00	7.75
	OD	-	1.00	0.50	1.00	1.00	1.00	0.50	1.00	0.75
	Epilepsy	5.88	1.96	3.92	5.88	3.92	4.90	5.88	2.94	4.21
	Autism	2.98	1.49	2.24	10.00	4.28	7.14	6.57	2.92	4.75
	Reference sample	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
T_{11} and T_{12} instead T_{13}	Sekelary IEP	23.00	11.00	17.00	36.00	23.00	29.50	29.50	17.00	23.25
	OD	25.00	3.00	14.00	23.00	15.00	19.00	24.00	9.00	16.50
	Epilepsy	25.50	17.60	21.60	39.20	23.50	31.40	32.30	20.60	26.50
	Autism	41.80	22.40	32.10	30.00	27.10	28.60	35.80	24.80	30.30
	Reference sample	**5.00**	**2.00**	**3.50**	**7.00**	**4.00**	**5.50**	**6.00**	**3.00**	**4.50**
Dense and very dense network in Th/I	Sekelary IEP	23.00	27.00	25.00	30.00	32.00	31.00	26.50	29.50	28.00
	OD	21.00	26.00	23.50	57.00	60.00	58.50	39.00	43.00	41.00
	Epilepsy	29.41	37.25	33.33	58.82	58.82	58.82	44.11	48.03	46.08
	Autism	29.90	29.90	29.90	61.43	55.71	58.57	45.98	43.06	44.52
	Reference sample	**3.00**	**5.00**	**4.00**	**5.00**	**7.00**	**6.00**	**4.00**	**6.00**	**5.00**
Distance a-b <21mm in F and <24mm in M	Sekelary IEP	72.00	80.00	76.00	70.00	76.00	73.00	71.00	78.00	74.50
	OD	48.00	59.00	53.50	23.00	27.00	25.00	35.50	43.00	39.20
	Epilepsy	58.80	82.30	70.50	39.20	51.00	45.10	49.00	66.60	57.80
	Autism	61.20	67.20	64.20	55.70	57.10	56.40	58.40	62.00	60.20
	Reference sample	**11.00**	**13.00**	**12.00**	**9.00**	**12.0**	**10.50**	**10.0**	**12.50**	**11.25**
Cx	Sekelary IEP	48.00	31.00	39.50	44.00	28.00	36.00	46.00	29.50	37.75
	OD	41.00	27.00	33.50	26.00	16.00	21.00	33.00	21.50	27.20
	Epilepsy	41.17	25.49	33.33	45.10	37.25	41.17	43.13	31.37	37.25
	Autism	37.31	35.82	36.56	32.86	27.14	30.00	35.03	31.38	33.20
	Reference sample	**14.00**	**8.00**	**11.00**	**7.00**	**3.00**	**5.00**	**10.50**	**5.50**	**8.00**
Co	Sekelary IEP	8.00	7.00	7.50	18.00	17.00	17.50	13.00	12.00	12.50
	OD	13.00	8.00	10.50	18.00	10.00	14.00	15.50	9.00	12.25
	Epilepsy	7.84	9.80	8.82	17.65	9.80	13.72	12.74	9.80	11.27
	Autism	5.97	4.47	5.22	11.43	8.57	10.00	8.76	6.56	7.66
	Reference sample	**3.00**	**2.00**	**2.50**	**5.00**	**2.00**	**3.50**	**4.00**	**2.00**	**2.00**
Transverse palmary sulcus	Sekelary IEP	18.00	12.00	15.00	15.00	8.00	11.50	16.50	10.00	13.50
	OD	5.00	4.00	4.50	6.00	2.00	4.00	5.50	3.00	4.25
	Epilepsy	7.83	3.92	5.87	-	5.88	2.94	3.92	4.90	4.41
	Autism	11.94	11.94	11.94	10.00	2.86	6.43	10.95	7.30	9.12
	Reference sample	**3.00**	**1.00**	**2.00**	**1.00**	**1.00**	**1.00**	**2.00**	**1.00**	**1.50**

In the Th/I areal of the patients of both sexes suffering from IEP, although more frequent in girls and on the right hands, ***the epidermal papillary ridges appear as a dense and very dense network instead of their curved disposition towards palm's radial margin*** - as it is the case of the normal ones. Present with an average frequency of 28% at the level of the group with sekelary IEP -es (31% in girls and 25% in boys), this distortion has been noticed in much higher percent ratios in the 3 affections considered for comparison, with values ranging between 41% in severe OD and, 46.08% in epilepsy, the same line of the sexual dimorphism and of bilateral differences with IEP-es - identical with that of the reference batch - being nevertheless maintained (table 1).

In the interdigital space II, the series under study evidences an extremely high percent ratio (74.50%) for the ***reduction of the distance between triradia a and b delimitating this compartment,*** which is a quite frequently reported distortion in the anomalies of the sexual and somatic chromozomes, but also in severe OD, epilepsy and infantile autism. As in the last mentioned affections, in the patients with sekelary IEP-es, this distortion is more frequent in the affected boys and on the right palms of the affected people of both sexes.

A last distortion mentioned by the author at the level of the affected ones'palm refers to ***the transverse palmary sulcus, or the Simian line***, which is an atavistic formation with deep clinical implications for the carriers, its average frequency of 13.50% exceeding the one reported in autism (9.17%) or in epilepsy and grave respectively OD (14.41% and 4.25%), being instead significantly different from that of the reference sample - of only 1.50%. In all cases, the transverse palmary sulcus is more frequently occurring in the masculine series and on the left palms of the male and female affected patients - which is actually the case of the normal ones.

The high level to which the patients with sekelary IEP-es are being affected, viewed from a dermatoglyphic perspective, is suggestively illustrated, by the ratio attained by the uni- or bilateral disposition of the distortions in their carriers (table 2).

Special mention should be made of the very high frequency for the disposition on both palms, in the case of the **a-b** distance (77.38%), of the dense and very dense network of the ridges from Th/I (60%), of the absence of the axial triradius ($\mathbf{t_o}$ - 47.62%), and of the total supression of line C (C_0 = 38.88%) (table 2).

To this, one should also add the high incidence of the unilateral distribution of many of the distortions under analysis, all these suggesting the multiple pathological meanings and their malformative effects upon the carriers.

Table 2. Bilateral disposition as palmary distortions in carriers (%)

Distortions	Maladies	Only on the left palm	Only on the right palm	On both palms	Total carriers
L^u in Hp	Sekelary IEP	39.28	28.57	32.14	**14.00**
	OD	29.41	32.35	38.23	**17.00**
	Epilepsy	30.00	60.00	10.00	**9.80**
	Autism	45.83	45.83	8.83	**17.52**
tt', tt't^u, etc.	Sekelary IEP	21.84	40.23	37.93	**43.50**
	OD	19.54	40.23	40.23	**43.50**
	Epilepsy	27.27	36.36	36.36	**32.35**
	Autism	25.37	43.28	31.34	**48.50**
t_0	Sekelary IEP	33.33	19.04	47.62	**10.50**
	OD	-	50.00	50.00	**1.00**
	Epilepsy	42.85	-	57.14	**6.86**
	Autism	70.00	10.00	20.00	**7.29**
T_{11} and T_{12} instead of T_{13}	Sekelary IEP	54.66	21.33	24.00	**37.50**
	OD	66.66	11.11	22.22	**27.00**
	Epilepsy	47.50	17.50	35.00	**39.21**
	Autism	25.37	43.28	31.34	**48.90**
Dense and very dense network in Th/I	Sekelary IEP	15.71	24.28	60.00	**35.00**
	OD	11.34	19.59	69.07	**48.50**
	Epilepsy	7.62	13.46	78.84	**50.98**
	Autism	13.23	14.70	72.07	**49.63**
Distance a-b<21mm in F and <24mm in M	Sekelary IEP	7.14	15.47	77.38	**84.00**
	OD	12.94	27.55	60.20	**49.00**
	Epilepsy	6.84	31.51	61.64	**71.56**
	Autism	10.52	15.78	73.68	**69.34**
Cx	Sekelary IEP	49.13	20.69	30.17	**58.00**
	OD	51.72	25.29	23.00	**43.50**
	Epilepsy	45.76	25.42	28.81	**57.84**
	Autism	34.33	28.36	37.31	**48.90**
Co	Sekelary IEP	33.33	27.77	38.88	**18.00**
	OD	51.72	25.29	23.00	**43.50**
	Epilepsy	41.17	23.52	35.29	**16.66**
	Autism	47.06	41.17	11.76	**12.40**
Transverse palmary sulcus	Sekelary IEP	46.15	15.38	38.46	**19.50**
	OD	57.14	21.43	21.43	**7.00**
	Epilepsy	37.50	50.00	12.50	**7.84**
	Autism	47.22	25.00	27.77	**26.27**

CONCLUSIONS

Study of the palmary dermatoglyphics of the patients from Eastern part of the country diagnosed with sekelary IEP-es put into evidence an ample pathological charge of their picture, suggestively expressed by significant distortions or anomalies, the weight of which, considerably different from that of the reference samples, being nevertheless quite close to or even exceeding the values recorded for other severe genetic or teratological maladies, severe OD, epilepsy and infantile autism.

With only a few, insignificant exceptions, sexual dimorphism in the ***distribution of distortions maintains the line signaled out in the three affections under comparison***, which assumes higher ratios in the affected boys for***:*** ***L^u from Hp, reduced a-b distance, the transverse palmary sulcus, and, on the contrary, in the case of girls, where mention is to be made of tt'', $T_{11} + T_{12}$, the dense and very dense network of the ridges in Th/I and Co***. As to the bimanual differences, they are expressed by higher frequencies of ***L^u, t_o, $T_{11} + T_{12}$, Cx, Co, and of the sulcus on the left palms of both male and female patients, and for tt't''***, ***the dense network of the ridges from Th/I and the reduced a-b distance on the right palms***, tendencies again more or less similar to those reported in OD, epilepsy and infantile autism. It has been observed that the sexual and the bilateral differences in the distribution of the dermatoglyphic distortions generally maintain the line present in the reference group too, which demonstrates that all series considered for analysis result from the same apparently normal population in which the distortions are either very reduced or are even absent.

The ample symptomatic polymorphism of the sekelary IEP-es under study, as well as the high affection level of the patients are suggestively illustrated too, by the very high ratios of the presence on both palms, of many of the distortions put into evidence, to which one should add the still rather high frequencies for the exclusive presence on one or another of the two hands.

The results of this first study at national level from such perspective support the idea that, among the factors responsible for the production of sekelary IEP-es, an important role is played by the genetic or teratological ones, known as intervening in the first 3-4 months of intrauterine life. Also the CNS lesions that occurring in the last 4 months of pregnancy and the first 2 years of post-natal life, act exclusively as elements that release the malady's symptoms and their amplification. Consequently, the dermatoglyphics could be used as a test of screening for a precocious tracing of sekelary IEP-es, while the results obtained should be corroborated with those attained from clinical, genetic, electro-encephalo-graphical, investigations.

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