Original Article / *Orijinal Makale*

DOI: 10.5152/tftrd.2014.42402

Turk J Phys Med Rehab 2014;60:134-8
Türk Fiz Tıp Rehab Derg 2014;60:134-8

Demographic and Clinical Findings of Cerebral Palsy Patients in Istanbul: A Multicenter Study

İstanbul'daki Serebral Palsi Olgularının Klinik ve Demografik Özellikleri: Çok Merkezli Çalışma

Ebru YILMAZ YALÇINKAYA[1], Berrin HÜNER[2], Ümit DİNÇER[3], Demirhan DIRAÇOĞLU[4], Resa AYDIN[4], and İstanbul Cerebral Palsy Study Group Other Members, Afitap İÇAĞASIOĞLU[5], Esma DEMİRHAN[5], Levent YALÇIN[6], Kadriye ÖNEŞ[1], Nil ÇAĞLAR[1], Adnan YÜKSEL[7], Şafak Sahir KARAMEHMETOĞLU[8], Dilşad TÜRKDOĞAN[9], Gazi ZORER[10], Zuhal YAPICI[11], Belgin ERHAN[1], Bora AKYÜREK[1], Banu KURAN[12], Hülya AKBAŞ[12], Nurdan PAKER[1], Demet UÇAR[1], Kahraman ÖZTÜRK[13], Nihal ÖZARAS[14]

[1]*Clinic of Physical Medicine and Rehabilitation, İstanbul Physical Medicine and Rehabilitation Training and Research Hospital, İstanbul, Turkey*
[2]*Clinic of Physical Medicine and Rehabilitation, İstanbul Okmeydanı Training and Research Hospital, İstanbul, Turkey*
[3]*Department of Physical Medicine and Rehabilitation, Gülhane Military Medical Academy Hospital, İstanbul, Turkey*
[4]*Department of Physical Medicine and Rehabilitation, İstanbul University İstanbul Faculty of Medicine, İstanbul, Turkey*
[5]*Clinic of Physical Medicine and Rehabilitation, Göztepe Training and Research Hospital, İstanbul, Turkey*
[6]*Manus Hand Surgery Group*
[7]*Department of Pediatric Neurology, İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul, Turkey*
[8]*Department of Physical Medicine and Rehabilitation, İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul, Turkey*
[9]*Institute of Neurological Sciences, Marmara University Faculty of Medicine, İstanbul, Turkey*
[10]*Department of Orthopaedics, Bezmialem Foundation University Faculty of Medicine, İstanbul, Turkey*
[11]*Department of Pediatric Neurology, İstanbul University İstanbul Faculty of Medicine, İstanbul, Turkey*
[12]*Clinic of Physical Medicine and Rehabilitation, Şişli Etfal Training and Research Hospital, İstanbul, Turkey*
[13]*Department of Orthopedics, Baltalimanı Bone Diseases Hospital, İstanbul, Turkey*
[14]*Department of Physical Medicine and Rehabilitation, Bezmialem Foundation University, İstanbul, Turkey*

Abstract

Objective: The objective of this study is to identify epidemiological characteristics of patients with cerebral palsy (CP) in Istanbul, including demographic information, clinical types, risk factors, and some clinical features.
Material and Methods: This is a retrospective and multicenter study, with the participation of 11 training and university hospitals in Istanbul. Demographic and clinical data of patients with CP presenting to university and training hospitals in Istanbul between 2005 and 2007 were recorded. Data were collected by the Istanbul Cerebral Palsy Study Group (ICPSG).
Results: A total of 730 patients with a mean age of 7.27±4.63 (2-18 years) were enrolled into the study; 429 (58.8%) of the patients were male and 301 (41.2%) were female. During clinical typing, it was seen that 91% of the patients were spastic, 3.6% was mixed, 3.2% was dyskinetic, and 0.7% was ataxic. Also, 51.9 % of the patients had a diagnosis of CP during 0-6 months of age, 24.6% had the diagnosis

Özet

Amaç: Bu makalenin amacı İstanbul 'daki serebral palsi (SP) olgularının demografik özellikleri, klinik tipi, risk faktörleri ve bazı klinik özelliklerini içeren epidemiyolojik özelliklerini araştırmaktır.
Gereç ve Yöntemler: Eğitim, araştırma ve üniversite hastanelerinden oluşan 11 merkezin katıldığı çok merkezli ve retrospektif bir çalışmadır. 2005 ve 2007 yılları arasında eğitim, araştırma ya da üniversite hastanelerinde kayıt edilen SP olgularının demografik ve klinik verileri, İstanbul Serebral Palsi Çalışma Grubunca toplandı.
Bulgular: Yaş ortalamaları 7,27±4,63 (2-18) yıl olan 730 olgu çalışmaya alındı. Olguların 429'u (%58,8) erkek, 301'i (%41,2) kızdı. Klinik tiplendirmede, spastik tip %91, karma tip %3,6, diskinetik tip %3,2 ve ataksik tip % 0,7 olarak bulundu. Olguların %51,9'una yaşamlarının ilk 6 ayı içinde tanı konmuştu, %24,6'sı 2. altı ay; %23,5 'i ise 12. aydan sonra tanı almıştı. Yüzde 32 olguda konuşma bozukluğu, %23,1'inde mental gerilik ve %20,9'unda epilepsi mevcuttu.

Address for Correspondence / Yazışma Adresi: Ebru Yılmaz Yalçınkaya MD, Department of Physical Therapy, Training and Research Hospital, İstanbul, Turkey. Phone: +90 505 451 85 73 E-mail: ebru_yilmaz@hotmail.com

Received/Geliş Tarihi: May/Mayıs 2013 Accepted/Kabul Tarihi: August/Ağustos 2013

during 6-12 months of age, and 23.5% in the twelfth month or later. Of the cases, 32% had speech disorders, 23.1% had mental retardation, and 20.9% had epilepsy.
Conclusion: There are few studies about the demographic characteristics of patients with SP in our country .This study is a pilot study to determine the profile of cases of CP patients in our country and to create a CP patient pool for the future prospective studies.
Key Words: Cerebral palsy, demographic features, epidemiology, spasticity, epilepsy

Sonuç: Ülkemizde SP olguların demografik özellikleri ile ilgili az sayıda çalışma mevcuttur. Bu çalışma, Türkiye'deki SP olgu profilini belirlemede ve prospektif çalışmalara hasta havuzu oluşturmak için bir ön çalışma niteliğindedir.
Anahtar Kelimeler: Serebral palsi, demografik özellikler, epidemiyoloji, spastisite, epilepsi

Introduction

Cerebral palsy (CP) describes a group of permanent disorders of the development of movement and posture, causing activity limitation that is attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior; by epilepsy; and by secondary musculoskeletal problems (1). The prevalence of cerebral palsy (CP) has risen to well above 2.0 per 1000 live births over the last 40 years (2). The brain lesions that cause CP may occur during the prenatal, perinatal, or postnatal period. Any functional collapse caused by a non-progressive central nervous system (CNS) injury occurring during the first 2 years of life is considered to be CP. Classification is based on changes in muscle tone, the anatomical region affected, and severity of the impairment. Classification provides a clearer understanding of the individual patient's impairment and guides management of care (3).

Few studies have investigated the demographic and clinical features of CP in Turkey. The prevalence of CP was determined as 4.4 per 1000 live births in Turkey (4,5). Istanbul is home to 17% of the Turkish population and is the largest city in Turkey (12,915,158 people in 2009) (6). Moreover, Istanbul has the highest migration rate in the country and, as such, represents a wide variety of the Turkish population (7).

The present study aimed to identify demographic characteristics, clinical type, risk factors, and supplementary clinical findings in children with CP in Istanbul.

Material and Methods

This retrospective, multicenter study was conducted at 11 centers in Istanbul: three university hospitals, seven public training and research hospitals, and one private rehabilitation center. Clinical and demographic data received from each study center were combined and analyzed by the Istanbul Cerebral Palsy Study Group (ICPSG) in October 2007. The ISPSG is comprised of physiatrists, pediatricians, neurologists, orthopedists, neurosurgeons, ophthalmologists, and physiotherapists interested in CP. The medical records of 785 children with CP who attended the 11 study center outpatient clinic were collected. Common cases were removed from the study population to prevent duplication of data.

The following data were obtained for each patient: sex, age (at present time), age when impairment was first noticed, etiological risk factors classified as prenatal, natal, and postnatal, and specific risk factors, such as intermarriage, mother's age at birth, a history of abortus or stillbirth. Clinical type and CP-associated medical problems were noted. Every study center used the conventional CP classification system for clinical typing (4).

Statistical Analysis

Descriptive statistical tests were performed.

Results

Medical records were collected from 785 children with CP across the 11 study centers. A review of the records found that 55 patients had attended more than one center. Following the exclusion of duplicate cases, the study included 730 children (mean age, 7.27±4.63 years; range, 2-18 years), of whom 429 (58.8%) were males and 301 (41.2%) were females, with a male to female ratio was 1.4:1.

Clinical type was determined according to motor function, and subtyping was based on topographic involvement. We found that 88.2% of the patients were diagnosed as spastic, 3.2% was dyskinetic, and 0.7% was ataxic (Table 1). The most common spastic subtype was hemiplegia (31.4%), followed by diplegia (27.4%) and tetraplegia (25.3%). The least common clinical type was athetoid (0.5%), and CP type was unknown in the remaining 2.9% of patients.

The analysis of risk factors revealed that the cause of CP was related to natal, prenatal, and postnatal factors in 35.1%,

Table 1. Distribution of Cerebral Palsy (CP) subtypes in the patient population

CP Subtype	Number (n=730)	Ratio (%)
Spastic	644	88.2
Hemiplegic	229	31.4
Diplegic	230	31.5
Tetraplegic	185	25.3
Dyskinetic	23	3.2
Athetoid	4	0.50
Choreathetoic	8	1.1
Dystonic	11	1.5
Ataxic	5	0.7
Hypotonic	12	1.6
Mixed	25	3.4
Unclassified	21	2.9
Total	730	100

CP: cerebral palsy

14.5%, and 22% of patients, respectively. Moreover, 28.4% of the patients had more than one risk factor (Table 2). The ratio of intermarriage, a unique risk factor for CP in Turkey, was 21.4%. Risk factors specific to maternal history are shown in Table 3. CP was clinically recognized during the first 6 months of life in 51.9% of the patients, 24.6% was diagnosed between the ages of 6 and 12 months, and 23.5% of the patients were diagnosed after 12 months of age (Figure 1).

A total of 32% of the patients had speech impairments, and these, together with mental retardation, were the two most common CP-associated disorders. Visual disorders, epilepsy, growth retardation, dental problems, dysphagia, and behavioral disorders were less frequently reported (Figure 2).

Discussion

The point prevalence of CP among children between the ages of 2 and 16 years in Turkey was 4.4 per 1000 live births (95% CI=0.36-0.57) in 1996 (4). The male-to-female ratio has been reported to be 1.4:1 and 1.9/1, suggesting a slight male predominance (8,9). The male-to-female ratio of 1.4:1 found in our study was similar to that previously reported.

Our findings that 88.2% of patients were classified as spastic and 3.2% was classified as dyskinetic were consistent with previous studies (10,11). However, the ratio of our patients with the diplegia (31.5%) and hemiplegia (31.4%) spasticity subtypes differed from previous reports (10,11). Furthermore, our data were not consistent with previous Turkish studies. Serdaroglu et al. (4) reported that the most common spastic subtype in their sample was diplegia (39.8%), followed by hemiplegia (28.0%). A study conducted in Ankara by Erkin et al. (5) found that hemiplegia was the third most common subtype of spasticity, with a proportion of 12.8% of patients. However, a Swedish study conducted by Hagberg (12) found that 44% of 241 patients with CP were diplegic and 33% was hemiplegic. Ozmen et al. (13) found spastic quadriplegic as most common type. Varying classification systems may explain the nearly equal ratio of diplegic and hemiplegic patients in our study. Clinical typing in the 11 centers from which our data were taken was determined by the conventional classification system, whereas the Surveillance of Cerebral Palsy in Europe (SCPE) classification was used in other studies (9,14). The SCPE classification is a new and easy-to-use system that assesses spastic subtypes as unilateral (limbs on one side of the body are involved) or bilateral (limbs on both sides of the body are involved). Ataxic and dyskinetic are the other major types, according to this classification system (14). The comparison of varying classification systems was a limitation of our study.

Consanguinity is a risk factor for CP, and elevated rates of CP have been reported among a Pakistani community in the United Kingdom (15). Turkey has a high rate of consanguineous marriage (21.1%) , and between 16.1% and 23.8% of the parents of patients with CP were found to have consanguineous marriages (16,17). Our finding of consanguineous marriages in 21.4% of the parents is similar to the 21% penetration reported by Serdaroğlu et al. (4).

Previous studies have found a higher prevalence of natal and prenatal, as compared to postnatal, risk factors; (14,17) however, prenatal risk factors were the least prevalent in our study.

Table 2. Distribution of risk factors for cerebral palsy in the patient population

Type of risk factor	Number (n=730)	Ratio (%)
Prenatal	106	14.5
(Peri)natal	256	35.1
Postnatal	161	22
Combined (More than one type risk factor)	207	28.4
Total	730	100

Table 3. Maternal history of the patients

Risk Factors Specific To Maternal Anamnesis	Number	Ratio (%)
Intermarriage	156	21.4
Abortus	138	18.9
Stillbirth	54	7.4
Mother's age at birth	26.06±5.99	-

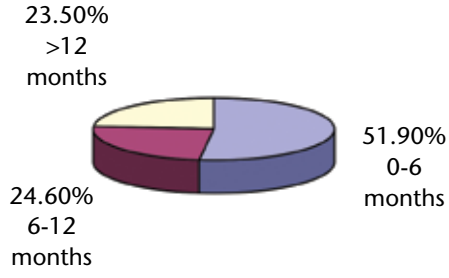

Figure 1. Time problem first noticed

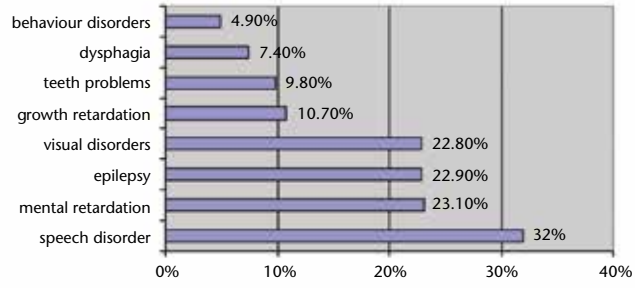

Figure 2. Associated problems with cerebral palsy of the patients

Accompanying pathologies compound the difficulty in coping with motor dysfunction in patients with CP. Intellectual disability is the single strongest predictor of survival, and severity of physical impairment is the second most significant predictor of life expectancy (18). Nordmark et al. (14,19) found that 26% of patients with CP in Sweden were severely retarded, and the SCPE reported that 31% of patients with CP in Europe had a severe intellectual deficit. Please indicate which reference is Nor-

dmark and which the SCPE study. The medical records verified mental retardation in 23.1% of our patients, which was slightly lower than that of previous studies.

Epilepsy has been estimated to be present in 15%-60% of patients with CP (20). We found that 22.9% of our patients had epilepsy.

In general, visual disorders in patients with CP are studied according to specific subtype and MRI findings (21,22). In our study, the frequency of basic visual disorders was found in 22.8% of the patients. The proportion of patients with moderate and severe visual impairments has been reported to be between 62%-71% (23). A previous study found that 58% of patients with CP had a vision disorder, of which strabismus (43.9%) was the most common impairment (24). The low proportion of patients reported to have vision impairments in our study is a reminder of the importance of administering ophthalmological examinations.

Dysarthria is a speech impairment in which the child has difficulty producing sound and articulating words. Dysarthria occurs in 40% of patients with CP (25). Involvement of the respiratory muscles and larynx and oromotor dysfunction cause respiratory, phonation, and articulation difficulties (25). Russman and Ashwal (26) found both speech and language disorders in 38% of their patients with CP. Speech disorders (32%) were the most common CP-associated dysfunction in our patients, followed by dysphagia (7.4%) and dental disorders (9.8%).

Children with CP and their families must cope with a number of health-related issues. For example, two literature reviews found hearing impairments in approximately 12% (26) and 25% (23) of patients with CP. None of the centers in our study had records of hearing impairments. This may be the result of parental neglect and the technical difficulties involved in conducting hearing tests in this patient group.

Nearly a quarter of children and adolescents with CP have primary urinary incontinence. Oddinga et al. (23) found that 85% of patients referred with daytime urinary incontinence at 10 years of age showed abnormal urinary patterns on a video urodynamic test. Our records did not contain information about urinary continence. This may be a type of medical neglect.

Conclusion

Our descriptive, retrospective study was the first extensive investigation of patients with CP in Istanbul. However, it was conducted as a preliminary study to identify a patient pool for further studies. Our study is unique in that it was multidisciplinary and involved multiple centers. Neurologists and orthopedists contributed patient records. The primary objective of the study was to create common interdisciplinary terminology and a standard CP evaluation form.

The primary limitation of our study was that we did not involve more medical disciplines. Furthermore, the analysis was limited by differences in terminology and scaling, which resulted in missing data. Nevertheless, the goal of this preliminary study was to identify a pool of patients with CP in Istanbul for further studies using common terminology among the various medical disciplines treating patients with CP.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Okmeydanı Training and Research Hospital.

Informed Consent: There is not informed consent form because it was a retrospective and descriptive study. There was not any treatment method that applied to the patient and names of the patients were not displayed.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - R.A.; Design - R.A., E.Y.Y., B.H., U.D., D.D.; Supervision - R.A.; Funding - İ.C.P.S.G.O.M.; Materials - İ.C.P.S.G.O.M.; Data Collection and/or Processing - E.Y.Y.; Analysis and/or Interpretation - E.Y.Y., B.H., U.D., D.D.; Literature Review - E.Y.Y., B.H., R.A.; Writer - E.Y.Y., B.H.; Critical Review - R.A., D.D., U.D.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

Etik Komite Onayı: Bu çalışma için etik komite onayı Okmeydanı Eğitim Araştırma Hastanesi'nden alınmıştır.

Hasta Onamı: Retrospektif tanımlayıcı bir çalışma olduğundan hastalara herhangi bir tedavi yöntemi uygulanmadığından ve isimleri teşhir edilmediğinden onam formu yoktur.

Hakem değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Yazar Katkıları: Fikir - R.A.; Tasarım - R.A., E.Y.Y., B.H., U.D., D.D.; Denetleme - R.A.; Kaynaklar - İ.C.P.S.G.O.M.; Malzemeler - İ.C.P.S.G.O.M.; Veri toplanması ve/veya işlemesi - E.Y.Y.; Analiz ve/veya yorum - E.Y.Y., B.H., U.D., D.D.; Literatür taraması - E.Y.Y., B.H., R.A.; Yazıyı yazan - E.Y.Y., B.H.; Eleştirel İnceleme - R.A., D.D., U.D.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

References

1. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M, Damiano D, et al. A report: the definition and classification of cerebral palsy 2006. Dev Med Child Neurol 2007;109:8-14.
2. Odding E, Roebroeck ME, Stam HJ. The epidemiology of cerebral palsy: Incidence, impairments and risk factors. Disabil and Rehabil 2006;28:183-91. [CrossRef]
3. Himmelmann K, Hagberg G, Beckung E, Hagberg B, Uvebprant P. The changing panorama of cerebral palsy in Sweden. IX.Prevalence and origin in the birth-year period 1995-1998. Acta Pediatr 2005;94:287-94. [CrossRef]
4. Serdaroğlu A, Cansu A, Ozkan S, Tezcan S. Prevalance of cerebral palsy in Turkish Children between the ages of 2 and 16 years. Dev Med Child Neurol 2006;48:413-6. [CrossRef]
5. Erkin G, Delialioglu SU, Ozel S, Culha C, Sirzai H. Risk factors and clinical profiles in Turkish children with cerebral palsy: analysis of 625 cases. Int J Rehabil Res 2008;31:89-91. [CrossRef]

6. Turkish Statistical Institute. Adress Based population Registration System Population Concensus 2009 Turkish Statistical Institute, Printing Division, Ankara.
7. Kırdar MG, Saracoğlu Ş. Does ınternal migration lead to faster regional convergence in Turkey? An empirical investigation Turkish Economic Association Discussion Paper 2006/6.
8. Pharoah PO, Cooke T, Rosenbloom I, Cooke RW. Trends in Birth Prevalence of Cerebral Palsy. Arch Dis Child 1987;62:379-84. [CrossRef]
9. Laisram N, Srivastava VK, Srivastava RK. Cerebral Palsy-An Etiological Study. Indian J Pediatr 1992;59:723. [CrossRef]
10. Jacobsson B, Hagberg G. Antenatal risk factors for cerebral palsy. Best Pract Res Clin Obstet Gynaecol 2004;18:425-36. [CrossRef]
11. Wichers MJ, Odding E, Stam HJ. Clinical presentation, associated disorders and aetiological moments in Cerebral Palsy: A Dutch population-based study. Disabil Rehabil 2005;27:583-9. [CrossRef]
12. Hagberg B, Hagberg G, Beckung E, Uvebrant P. Changing Panorama of Cerebral Palsy in Sweeden. 8th Prevalenceand Origin in The Birth Year Period 1991-94. Acta Pediatr 2001;90:271-7. [CrossRef]
13. Ozmen M, Calişkan M, Apak S, Gökçay G. 8-year clinical experience in cerebral palsy. J Trop Pediatr 1993;39:52-4. [CrossRef]
14. Surveillance of Cerebral Palsy in Europe (SCPE); Prevalence and characteristics of children with cerebral palsy in Europe. Dev Med Child Neurol 2002;44:633-40.
15. Bittles AH. Consanguineous marriage and childhood health. Dev Med Child Neurol 2003;45:571-6. [CrossRef]
16. Tuncbilek E, Koc I. Consanguineous marriage in Turkey and its impact on fertility and mortality. Ann Hum Genet 1994;58:321-9. [CrossRef]
17. Oztürk A, Demirci F, Yavuz T, Yildiz S, Değirmenci Y, Döşoğlu M. Antenatal and delivery risk factors and prevalance of cerebral palsy in Düzce (Turkey). Brain Dev 2007;29:39-42. [CrossRef]
18. Katz RT. Life expectancy for children with cerebral palsy and mental retardation:Implications for life care planning. NeuroRehab 2003;18:3:261-70.
19. Nordmark E, Hagglund G, Lagergren J. Cerebral palsy in southern Sweeden I. Prevalence and clinical features. Acta Pediatr 2001;90:1271-6. [CrossRef]
20. Kwong KL, Wong SN, So KT. Epilepsy in children with cerebral palsy. Pediatr Neurol 1998;19:31-6. [CrossRef]
21. Jacobson LK, Dutton GN. Periventricular Leukomalacia: an important cause of visual and ocular motility dysfunction in childen. Surv Ophthalmol 2000;45:1-13. [CrossRef]
22. Fedrizzi E, Anderloni A, Bono R. Eye movement disorders and visual perceptual and visual-perceptual impairment in diplegic children born preterm. Clinical evulation. Dev Med Child Neurol 1998;40:682-8. [CrossRef]
23. Odding E, Roebroeck ME, Stam HJ. The epidemiology of cerebral palsy: incidence, impairments and risk factors. Disabil Rehabil 2006;28:183-91. [CrossRef]
24. Yüksel A, Suyugül Z, Seven M. Visual disorders in patients with cerebral palsy. T Klin J Pediatr 1998:7:87-92.
25. Berker N, Yalçın S. The Help Guide to Cerebral Palsy; Mart Printing Co;2005.
26. Russman B, Ashwal S. Evaluation of the child with cerebral palsy. Semin Pediatr Neurol 2004;11:47-57. [CrossRef]