J Surg Med. 2018;2(3):233-235.
DOI: 10.28982/josam.418229

Research article
Araştırma makalesi

Journal of Surgery and Medicine

e-ISSN: 2602-2079

The demographic and clinical characteristics of patients with cerebral palsy: A retrospective, single center, observational study

Serebral palsi'li hastalarda demografik ve klinik özellikler: Retrospektif tek merkezli gözlemsel çalışma

Yılmaz İnanç [1], Tuba Tülay Koca [2]

[1] Kahramanmaraş Sütçüimam University, School of Medicine, Department of Neurology, Turkey.
[2] Kahramanmaraş Sütçüimam University, School of Medicine, Department of Physical Therapy and Rehabilitation, Turkey

ORCID ID of the authors:
Yİ: 0000-0002-0423-0941
TTK: 0000-0002-4596-858X

Corresponding author / Sorumlu yazar:
Yılmaz İnanç
Address / Adres: Kahramanmaraş Sütçüimam Üniversitesi, Nöroloji Bölümü, Kahramanmaraş, Türkiye
E-mail: drinancc@gmail.com

Ethics Committee Approval: Ethics committee approval was received from local ethical committee.
Etik Kurul Onayı: Etik kurul onayı local etik kuruldan alınmıştır.

Conflict of Interest: No conflict of interest was declared by the authors.
Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Financial Disclosure: The authors declared that this study has received no financial support.
Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

Received / Geliş Tarihi: 24.04.2018
Accepted / Kabul Tarihi: 04.06.2018
Published / Yayın Tarihi: 05.06.2018

Abstract

Aim: Cerebral palsy (CP) is a disorder of movement, muscle tone or posture that is caused by damage that occurs to the immature, developing brain, most often before birth.

A good definition of the disease will help for early diagnosis and treatment. The aim of this study was to evaluate the sociodemographic, clinical and radiologic characteristics of patients who were followed up as CP diagnosis.

Methods: Our study was designed as a retrospective, cross-sectional and descriptive. Forty-six patients with CP were included in the study. The age, sex, type of CP, accompanying clinical findings, presence of mental retardation, and cranial magnetic resonance imaging (MRI) data were recorded in the patient files.

Results: The types of CP were determined as spastic hemiparesis in 12 (26.1%) patients, spastic paraparesis in 9 (19.6%), spastic tetraparesis in 17 (37.0%, most frequently)), ataxic in 3 (6.5%), hypotonic in 1 (2.2%), extrapyramidal in 2 (4.4%) and mixed type in 2 (4.4%). In the MRI findings, arachnoid cyst was observed in 4 (11.4%) patients, basal ganglion intensity in 8 (20.2%), encephalomalacia in 8 (20.2%), frontogliotic area in 30 (80.7%, mostly frequently), cortical atrophy in 6 (17.1%), megacisterna in 5 (14.3%), and centrum semiovale hyperintensity in 8 (20.2%). Findings of hypoxic ischemic brain injury were determined in 32 (91.4%) patients.

Conclusion: As CP is a group of diseases for which diagnosis may be difficult but early diagnosis can be beneficial, children at high-risk from birth must be closely monitored, the families must be warned, and if necessary early neuro-imaging tests should be requested. In the long-term follow-up process, in respect of both rehabilitation and the follow-up of comorbidities such as epilepsy, the treatment and follow-up of patients must be applied by a multidisciplinary team to be able to reach maximum physical capacity.

Keywords: Cerebral palsy, Clinical characteristics, Magnetic resonance imaging

Öz

Amaç: Serebral palsi (CP) genellikle doğumdan önce, olgunlaşmamış, gelişmekte olan beyinde meydana gelen hasarın neden olduğu bir hareket, kas tonusu veya postür bozukluğudur. Hastalığın iyi bir tanımlanması erken teşhis ve tedavi için yardımcı olacaktır. Burada CP tanısı ile takipli hastaların sosyodemografik, klinik ve radyolojik özelliklerinin değerlendirilmesini amaçladık.

Yöntemler: Çalışmamız retrospektif, kesitsel, tanımlayıcı olarak dizayn edildi. CP tanılı 46 hasta çalışmaya dahil edildi. Hasta dosyalarındaki yaş, cinsiyet, CP türü, eşlik eden klinik bulgular, mental retardasyon varlığı ve kraniyal magnetik rezonans görüntüleme (MRI) bulguları kayıt edildi.

Bulgular: CP tiplerinden 12 hasta (%26.1) spastik hemiparezik, 9 hasta (%19,6) spastik paraparezik, 17 hasta (%37.0, en sık) spastik tetraparezik, 3 hasta (%6,5) ataksik, 1 hasta (%2,2) hipotonik, 2 hasta (%4,4) ekstrapiramidal, 2 hasta (%4,4) mikst tipte idi. MRI bulgularından araknoid kist 4 hastada (%11.4), bazal ganglion intensitesi 8 hastada (%20,2), ensefalomalazik alan 8 hastada (%20,2), frontogliotik alan 30 hastada (%80,7, en sık), kortikal atrofi 6 hastada (%17,1), megasisterna 5 hastada (%14.3), sentrum semiovale hiperintensitesi 8 hastada (%20,2), ensefalomalazi 8 hastada (%20,2) gözlendi. Hipoksik iskemik beyin hasarı bulguları hastaların 32 (%91.4)'ünde saptandı.

Sonuç: CP tanısı güç koyulabilen fakat erken tanı konulması durumunda daha faydalı olunabilen bir grup hastalık olduğundan özellikle riskli doğan çocuklar yakın takip edilmeli, aileleri uyarılmalı, gerekli görülürse erken dönemde nörogörüntüleme tetkikleri istenmelidir. İleri dönem takip sürecinde hem epilepsi gibi eşlik eden durumların takibi hem de rehabilitasyon açısından hastanın maksimum fiziksel kapasitesine ulaşması için multidisipliner bir ekip tarafından tedavi ve takibinin yapılması gerekmektedir.

Anahtar kelimeler: Serebral palsi, Klinik karakteristikler, Manyetik rezonans görüntüleme

How to cite / Atıf için: İnanç Y, Koca TT. The demographic and clinical characteristics of patients with cerebral palsy: A retrospective, single center, observational study. J Surg Med. 2018;2(3):233-235.

Introduction

The syndrome of Cerebral Palsy (CP) encompasses a large group of childhood movement and posture disorders. It is defined as static encephalopathy which is formed in either the prenatal, perinatal or postnatal period. Severity, patterns of motor involvement, and associated impairments such as those of communication, intellectual ability, and epilepsy vary widely [1].

Incidence has been reported as 1.5-2.5/1,000 live births. In a multi-center, cross-sectional study conducted in Turkey in 1996, 50,000 children in the 0-16 year age group were examined in respect of chronic diseases in childhood and CP prevalence was found to be 0.2%. Several factors are implicated in cerebral palsy etiology. Risk factors include prenatal maternal infection, trauma, brain lesions, asphyxia and trauma at birth, premature birth and very low birth weight. In the etiology of cerebral palsy, prenatal risk factors are 70-80%, postnatal and postnatal risk factors are 20%. The most important risk factors are prematurity and low birth weight. There may be inadequate cognitive functions, epilepsy, emotional problems or musculoskeletal system problems that develop secondary to hearing and sight problems [1-3].

The clinical manifestations of CP vary greatly in the type of movement disorder, the degree of functional ability and limitation and the affected parts of the body. There is currently no cure, but progress is being made in both the prevention and the amelioration of the brain injury. Although the disorder affects individuals throughout their lifetime, most cerebral palsy research efforts and management strategies currently focus on the needs of children [4,5].

The aim of this study was to evaluate the sociodemographic, clinical and radiologic characteristics of CP patients in our center.

Materials and methods

Our study was designed as a retrospective, cross-sectional and descriptive. Forty-six (N=46) patients with CP were included in the study. The age, sex, type of CP, accompanying clinical findings, presence of mental retardation, and cranial magnetic resonance imaging (MRI) data were recorded in the patient files. The age, gender, CP type, concomitant clinical findings (epilepsy, hearing and sight impairments, joint deformities), the presence of mental retardation and MRI findings (conventional T1, T2 sequences) were recorded from the patient data.

Statistical Analysis

SPSS 17 (SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc, USA) was used for statistical analysis. The normal distribution of the data was evaluated using Kolmogorov–Smirnov test. Some descriptive tests were used for the descriptive data. For each parameter, a comparison was done between the two groups. The t test was used for the groups that showed normal distribution. The Mann–Whitney U test was used for the groups that did not show normal distribution. A P value <0.05 was considered statistically significant. The study has been done in accordance with the prıncıples of Helsınkı declaratıon. Approval for the study was granted by the local ethics committee.

Results

The study included 46 patients, comprising 33 (71.7%) males and 13 (28.3%) females with a mean age of 22.5 ± 8.1 years. The types of CP were determined as spastic hemiparesis in 12 (26.1%, patients, spastic paraparesis in 9 (19.6%), spastic tetraparesis in 17 (37.0%, most frequently)), ataxic in 3 (6.5%), hypotonic in 1 (2.2%), extrapyramidal in 2 (4.4%) and mixed type in 2 (4.4%). Epilepsy was determined in 10 (23.9%) patients, sight impairments in 5 (10.9%), hearing impairment in 1 (2.2%), and joint deformities in 17 (37.4%, most frequently). In 16 (34.7%) patients, mental retardation was determined (Table 1). MRI findings were available for 35 (76%) patients. In the MRI findings, arachnoid cyst was observed in 4 (11.4%) patients, basal ganglion intensity in 8 (20.2%), encephalomalacia in 8 (20.2%), frontogliotic area in 30 (80.7%, most frequently), cortical atrophy in 6 (17.1%), megacisterna in 5 (14.3%), and centrum semiovale hyperintensity in 8 (20.2%). Findings of hypoxic ischemic brain injury were determined in 32 (91.4%) patients (Table 2).

Table 1: Distribution of clinical types of patients and associated comorbid pathologies

Patients	Total n=46 (%)
Age (yrs)	22.5
Clinical types of patients	
Spastic hemiparesis	12 (26.1%)
Spastic paraparesis	9 (19.6%)
Spastic tetraparesis	17 (37.0%)
Ataxic	3 (6.5%)
Hypotonic	1 (2.2%)
Extrapyramidal	2 (4.4%)
Mixed	2 (4.4%)
Comorbidities	
Epilepsy	10 (23.9)
Defect of vision	5 (10.9)
Hearing impairment	1 (2.2)
Joint deformities	17 (37.4)
Mental retardation	16 (34.7)

Table 2: Magnetic resonance imaging findings

Patients	Total n=35 (%)
Arachnoid cyst	4 (11.4)
Basal ganglion intensities	8 (20.2)
Encephalomalacic area	8 (20.2)
Frontogliotic area	30 (80.7)
Cortical atrophy	6 (17.1)
Megasisterna magna	5 (14.3)
Sentrum semiovale hyperintensity	8 (20.2)
Encephalomalacia	8 (20.2)

Discussion

Patients with CP at our center were mostly males at 20 years of age. The most common type was spastic tetraparesis type. The most common joint problems were accompanied. Epilepsy was observed in one quadrant of the cases. We have seen the most commonly frontogliotic region on MRI. A third of the cases were mental retarded. Almost all have hypoxic ischemic brain lesions.

Cerebral palsy (CP) develops secondary to lesions in the immature brain and is a non-progressive disease including tonus of varying severity and impairments in posture and movements. Brain development continues until the age of 6-8 years.

Therefore, the clinical table and all kinds of cerebral damage occurring in the first 6-8 years of life that do not show progression are accepted as CP. However, the American Academy for Cerebral Palsy and Developmental Medicine has reported that injury occurring in the central nervous system up to the age of 5 years is valid in the diagnosis of CP [4]. This is one of the reasons for significant morbidity and mortality in short and long-term results. Hypoxic ischemic injury in CP occurs at a high rate in the prenatal period and especially in the third trimester, and perinatal events are responsible at a lower rate [5,6]. In most epidemiological studies, CP has been reported more in males than females [7]. In the current study, 71.7% of the patients were male. The determination of the clinical situation in CP, which is basically a motor disorder, can be made according to the location of the lesion in the brain, changes in tonus, the type of movement impairments and the number of extremities affected [8,9]. Sigurdardottir et al. [8] reported spastic type CP in 87% of patients. Consistent with these findings in literature, spastic type CP was determined at 82% in the current study and the vast majority of these (37%) had tetraparetic involvement.

Although the basic clinical table in children with CP is formed of movement and posture impairments, mental retardation, seizures, ophthalmological problems (e.g., homogeneous hemianopsy, strabismus), asterognosis, proprioception impairments and hearing defects may also be present currently [10]. These accompanying situations cause a significant decrease in the quality of life of patients and can be a significant obstacle to acquiring psychomotor skills. Management strategies include enhancing neurological function during early development; managing medical co-morbidities, weakness and hypertonia; using rehabilitation technologies to enhance motor function; and preventing secondary musculoskeletal problems. Meeting the needs of people with CP in resource-poor settings is particularly challenging [4,5].

In the current study, visual impairment was determined in 10.9% of the patients, hearing impairment in 2.2% and joint deformities in 37.4%. Epileptic seizures may be seen at rates of up to 50% according to the clinical sub-group. These are more frequent in hemiplegic and tetraplegic types in particular [11-14]. Epilepsy was present in 23.9% of the current study patients. Mental status changes ranging from mild to severe are observed at 35%-57%, depending on the area of brain involvement, with a greater likelihood in severe tetraplegic cases. Mental retardation was determined in 34.7% of patients in the current study [15].

Magnetic resonance imaging (MRI) must be a part of the routine clinical and laboratory evaluations of CP patients, and is an important diagnostic method in the determination of pathological changes in cerebral tissue. Abnormal MRI findings were reported at the rate of 86% in a study by Reid et al. [16] and at 93% by Piovesana et al. [17]. Consistent with these findings in literature, findings of hypoxic ischemic injury were determined in 91.4% of the patients in the current study.

Our study has some limitations. The low number of cases and the presence of data from a single center are limitations to the generalization of the results.

Conclusion

As CP is a group of diseases for which diagnosis may be difficult but early diagnosis can be beneficial, children at high-risk from birth must be closely monitored, the families must be warned, and if necessary early neuro-imaging tests should be requested. In the long-term follow-up process, in respect of both rehabilitation and the follow-up of comorbidities such as epilepsy, the treatment and follow-up of patients must be applied by a multidisciplinary team to be able to reach maximum physical capacity.

References

1. Colver A, Fairhurst C, Pharoah PO. Cerebral palsy. Lancet. 2014;383(9924):1240-9. doi: 10.1016/S0140-6736(13)61835-8.
2. MacLennan AH, Thompson SC, Gecz J. Cerebral palsy: causes, pathways, and the role of genetic variants. Am Jour Obst Gynecol. 2015; 213(6):779-88.
3. Richards CL, Malouin F. Cerebral palsy: definition, assessment and rehabilitation. Handb Clin Neurol. 2013;111:183-95.
4. Graham HK, Rosenbaum P, Paneth N, Dan B, Lin JP, Damiano DL, et al. Cerebral palsy. Nat Rev Dis Primers. 2016;2:15082. doi: 10.1038/nrdp.2015.82.
5. Winter L, Colditz PB, Sanders MR, Boyd RN, Pritchard M, Gray PH, et al. Depression, posttraumatic stress and relationship distress in parents of very preterm infants. Arch Womens Ment Health. 2018 Mar 3. doi: 10.1007/s00737-018-0821-6.
6. Yöneyman F, Gürvit G, Yusuf M. Ro-CODEC Screening of the frequency of chronic diseases in children 1997;83-84.
7. Umphred DA. Neurological Rehabilitation. Mosby Inc. 2001;259-86.
8. Sigurdardottir S, Thorkelsson T, Halldorsdottir M, Thorarensen O, Vik T. Trends in prevalence and characteristics of cerebral palsy among Icelandic children born 1990 to 2003. Dev Med Child Neurol. 2009;51(5):356-63.
9. Pereira A, Lopes S, Magalhães P, Sampaio A, Chaleta E, Rosário P. How Executive Functions Are Evaluated in Children and Adolescents with Cerebral Palsy? A Systematic Review. Frontiers in Psychology. 2018;9:21.
10. O'Callaghan ME, MacLennan AH, Gibson CS, et al. Epidemiologic associations with cerebral palsy. Obstet Gynecol. 2011;118:576-82.
11. Oğuz H, Dursun E, Dursun N. Medical Rehabilitation. Istanbul, Nobel Medicine Publisher 2004;957-74.
12. Weir FW, Hatch JL, McRackan TR, Wallace SA, Meyer TA. Hearing loss in pediatric patients with cerebral palsy. Oto & Neur. 2018;39(1):59-64.
13. Yalçın S, Özaras N, Dormans J. Cerebral Palsy Treatment and Rehabilitation. Mas Printing. 2000;13-31:51-6.
14. Downs J, Blackmore AM, Epstein A, Skoss R, Langdon K, Jacoby P at al. The prevalence of mental health disorders and symptoms in children and adolescents with cerebral palsy: a systematic review and meta-analysis. Develop Med & Child Neur. 2018;60(1):30-8.
15. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M, Damiano D at al. Dev Med Child Neurol Suppl. 2007;109:8-14.
16. Reid SM, Dagia CD, Ditchfield MR, Carlin JB, Reddihough DS. Population-based studies of brain imaging patterns in cerebral palsy. Develop Med & Child Neur. 2014;56(3):222-32.
17. Piovesana AM, De Moura-Ribeiro MV, Zanardi VA, Gonçalves VM. Hemiparetic cerebral palsy etiological risk factors and neuroimaging. Arq Neuropsiquiatr 2001;59:29-34.