Nörolojik Acillerde Tanı ve Tedavi Prensipleri

Editörler

Fettah EREN
Ayşegül DEMİR

ISBN
978-625-8430-74-5

Kitap Adı
Nörolojik Acillerde Tanı ve Tedavi Prensipleri

Editörler
Fettah EREN
ORCID iD: 0000-0001-6834-0827

Ayşegül DEMİR
ORCID iD: 0000-0002-5444-9837

Yayın Koordinatörü
Yasin DİLMEN

Sayfa ve Kapak Tasarımı
Akademisyen Dizgi Ünitesi

Yayıncı Sertifika No
47518

Baskı ve Cilt
Vadi Matbaacılık

Bisac Code
MED056000

DOI
10.37609/akya.996

UYARI

Bu üründe yer alan bilgiler sadece lisanslı tıbbi çalışanlar için kaynak olarak sunulmuştur. Herhangi bir konuda profesyonel tıbbi danışmanlık veya tıbbi tanı amacıyla kullanılmamalıdır. Akademisyen Kitabevi ve alıcı arasında herhangi bir şekilde doktor-hasta, terapist-hasta ve/veya başka bir sağlık sunum hizmeti ilişkisi oluşturmaz. Bu ürün profesyonel tıbbi kararların eşleniği veya yedeği değildir. Akademisyen Kitabevi ve bağlı şirketleri, yazarları, katılımcıları, partnerleri ve sponsorları ürün bilgilerine dayalı olarak yapılan bütün uygulamalardan doğan, insanlarda ve cihazlarda yaralanma ve/veya hasarlardan sorumlu değildir.

İlaçların veya başka kimyasalların reçete edildiği durumlarda, tavsiye edilen dozunu, ilacın uygulanacak süresi, yöntemi ve kontraendikasyonlarını belirlemek için, okuyucuya üretici tarafından her ilaca dair sunulan güncel ürün bilgisini kontrol etmesi tavsiye edilmektedir. Dozun ve hasta için en uygun tedavinin belirlenmesi, tedavi eden hekimin hastaya dair bilgi ve tecrübelerine dayanak oluşturması, hekimin kendi sorumluluğundadır.

Akademisyen Kitabevi, üçüncü bir taraf tarafından yapılan ürüne dair değişiklikler, tekrar paketlemeler ve özelleştirmelerden sorumlu değildir.

GENEL DAĞITIM
Akademisyen Kitabevi A.Ş.

Halk Sokak 5 / A Yenişehir / Ankara
Tel: 0312 431 16 33
siparis@akademisyen.com

www.akademisyen.com

Önsöz

Nörolojik acillere güncel yaklaşım ve tedaviye öncelik veren bu kitabı yoğun mesaileri arasında hazırlayan tüm yazarlara teşekkür ederiz. Bu kitap öncelikle nöroloji ve acil tıp uzman ve asistanları hedef alınarak hazırlanmış olmakla birlikte birinci basamak tıp merkezlerinde çalışmakta olan aile hekimi ve diğer branş hekimlerinin de yararlanabileceği şekilde hazırlanmıştır. Tedavi şemaları ve öneriler bilimsel çalışma ve kılavuzlar doğrultusunda hazırlanmıştır. Nörolojik hastalıkların akut müdahale gerektirmesi yanında ciddi özürlülük ve ölümle sonuçlanabilecek bir tablo meydana getirebildiği düşünülürse bu konunun önemi daha da anlaşılabilir olmaktadır. Kitabın kısa bir süre içerisinde basılması için gece-gündüz demeden çalışan Akademisyen Yayınevi çalışanlarına da teşekkür ederiz. Bu kitabın meslektaşlarımızın yanlarında her daim yararlanabilecekleri bir kaynak olmasını temenni ediyoruz.

Dr. Öğr. Üyesi Fettah EREN

İçindekiler

Yazarlar

Uzm. Dr. Nurcan AKBULUT
Bayburt Devlet Hastanesi Nöroloji Kliniği
0000-0002-6609-0016

Uzm. Dr. Tülin AKTÜRK
Kartal Dr. Lütfi Kırdar Şehir Hastanesi, Nöroloji Kliniği
0000-0003-1818-1578

Uzm. Dr. Umut Doğu AKTÜRK
Emsey Hospital, Beyin Cerrahi Kliniği

Uzm. Dr. Şule ÖZDEMİR ARMAĞAN
Konya Şehir Hastanesi
0000-0001-9137-7150

Uzm. Dr. Onur BULUT
(Klinik Nörofizyoloji), Konya Şehir Hastanesi
0000-0001-7869-9235

Uzm. Dr. Ahmet ÇAĞLAR
Aksaray Eğitim ve Araştırma Hastanesi
0000-0002-0161-1167

Uzm. Dr. Meltem KARACAN GÖLEN
Konya Numune Hastanesi
0000-0002-2422-9470

Uzm. Dr. Şeyda ÇEVİK GÜNERİ
Dr. Ersin Arslan Eğitim Araştırma Hastanesi Nöroloji Servisi
0000-0002-1756-5062

Uzm. Dr. Muhammet HACIMUSTAFAOĞLU
Aksaray Eğitim ve Araştırma Hastanesi

Uzm. Dr. Aysun Hatice AKÇA KARPUZOĞLU
Konya Özel Medova Hastanesi, Nöroloji Kliniği
0000-0002-3558-1218

Uzm. Dr. Ahmet KÜÇÜK
Sağlık Bilimleri Üniversitesi Beyhekim E.A.H. Nöroloji, Konya
0000-0003-1547-341X

Uzm. Dr. Oruç ŞAHİN
Sağlık Bilimleri Üniversitesi Beyhekim E.A.H. Nöroloji, Konya
0000-0003-2552-5527

Uzm. Dr. Nihal TEKİNALP
Necip Fazıl Şehir Hastanesi
0000-0002-1350-8837

Dr. Öğr. Üyesi Hikmet SAÇMACI
Yozgat Bozok Üniversitesi Tıp Fakültesi, Nöroloji AD.
0000-0003-1480-0562

Dr. Öğr. Üyesi Meryem Tuba SÖNMEZ
Yozgat Bozok Üniversitesi Tıp Fakültesi, Nöroloji AD.
0000-0003-4418-7906

BÖLÜM 1

NÖROLOJİK ACİLLERE GİRİŞ DEĞERLENDİRME VE TANI YÖNTEMLERİ

Şeyda ÇEVİK GÜNERİ[1]

Nörolojik hastalıklarda bazı semptom ve bulgular akut gelişmesine rağmen, bazı bulgular zamanla ortaya çıkmaktadır.

Hastalarda doğru tanının hızlı bir şekilde konulabilmesi için hastanın şikayeti, şikayetlerinin nasıl başladığı, hastanın detaylı nörolojik muayenesi sonrası semptom ve bulguların anatomik lokalizasyonu ve ayırıcı tanı açısından laboratuar, radyoloji ve elektrofizyolojik testlerin bütünsel olarak değerlendirilmesi gerekmektedir.

Acile başvuran hasta sistematik bir sıra ile hızlıca değerlendirilmelidir.

1. ÖYKÜ ALMA

Öncelikle bazı temel bilgiler yaş, cinsiyet, hangi eli daha çok kullandığı, mesleği öğrenilmeli sonrasında hastanın şikayetinin ne olduğu şikayetlerinin ne zaman, nasıl başladığı ne kadar zamandır devam ettiği ve eşlik eden başka bulgular olup olmadığı detaylıca sorgulanmalıdır.

Hastanın eşlik eden başka hastalığının olup olmadığı kullanıyorsa kullandığı ilaçlar, alkol, sigara, madde kullanımı ve sosyal durumuna bağlı toksin maruziyeti (meslek hastalığı) mutlaka not edilmelidir. Hipertansiyon, diyabet ,kalp hastalıkları ve genetik hastalık öyküsü sorgulanmalıdır.

Vital bulgular olan ateş, nabız, tansiyon, solunum sayısı, oksijen saturasyon değeri, EKG bulguları mutlaka muayeneye başlamadan değerlendirilmelidir.

[1] Uzm. Dr., Dr. Ersin Arslan Eğitim Araştırma Hastanesi Nöroloji Servisi,drseydacevik@hotmail.com

Kitle nedeniyle KİBAS, koagülopati, BOS dolaşımında obstrüksiyon, ponksiyon alanında enfeksiyon varsa LP kontrendikedir (7).

EEG (Elektroensefalografi)

Nöbetleri doğrulamak,lokalize etmek veya klasifiye etmek için kullanılan bir testtir.

EMG (Elektromiyografi)

EMG-ENMG (elektromyografi – elektronöromyografi) kasları veya sinirleri etkileyen hastalıkları tespit edebilmek için kullanılan elektrofizyolojik testlere denir. Klinikte tanı koymak ve yapılacak tedaviye yön vermek için kullanılır. En önemli acil kullanımı akut demiyelinizan polinöropati olan Guillain-barre sendromunun ayırıcı tanısı içindir.

KAYNAKLAR

1. Campbell WW. Dejong Nörolojik Muayene El Kitabı. (Candan GÜRSES, Çev.Ed.). Ankara: Güneş Tıp Kitapevi; 2010.
2. Magdy H.S., Jonathan A.E. Presenting Symptoms. Magdy H.S., Jonathan A.E(ed.) Neurology Emergencies içinde. New York: Oxford Press;2011.p.14-44.
3. Prof. Dr. BurhanettinUludağ. Nörolojik muayene. (03/12/2021 tarihinde https://www.burhanettinuludag.com.tr/Hekimler/Norolojikmuayene/ adresinden ulaşılmıştır).
4. Prof. Dr. Mehmet Özmenoğlu. Nörolojik muayene. (03/12/2021 tarihinde http://www.mehmetozmenoglu.com/index.php?link=100 adresinden ulaşılmıştır).
5. Aktin E., Bahar Z.S. Sinir Sistemi Semiyolojisinin Genel Prensipleri:Nörolojik Hastaya Yaklaşım. Öge A.E., Baykan B.(ed.) Nöroloji içinde.İstanbul:Nobel Tıp Kitapevi;2011.p.1-65
6. Balcı S.,Onur M.R. Acil Radyolojide Görüntüleme Protokolleri. Türk Radyoloji Seminerleri, 2016; 4: 178-197
7. Flaherty A.W.,Rost N.S., Nöroloji El Kitabı. (Şerefnur ÖZTÜRK, Çev.Ed.). Ankara: Güneş Tıp Kitapevi; 2013.
8. Sade R., Levent A. Nörovasküler Patolojilerde Teşhis ve İşlem Öncesi Görüntüleme. Türk Radyoloji Seminerleri, 2018; 6: 109-120
9. Provenzale J. M.,Nontraumatic Neurologic Emergencies: Imaging Findings and Diagnostic Pitfalls.Radiographics,1999; 19:1323–1331
10. İkizceli T.,Değer C.M. Nöroradyoloji Pratiğinde Susceptibility Weighted Imaging (Swi) Mrg Sekans Kullanim Alanlari. Journal of Anatolian Medical Research, 2018;3:75-92

BÖLÜM 2

BİLİNÇ BOZUKLUKLARI VE BİLİNCİ KAPALI HASTAYA YAKLAŞIM

Tülin AKTÜRK[1]
Umut Doğu AKTÜRK[2]

GİRİŞ

Bilinçlilik kişinin kendisinin ve çevresinin anlamlı bir şekilde farkında olma halidir. Koma, hastaların dış uyaranlara yanıt verme yeteneğinin etkilenerek yanıt vermediği veya uyandırılamaz olduğu klinik durumdur. Konfüzyon, somnolans ve stupor ise uyanıklık ile koma arasında kalan klinik durumları ifade eder.

Beyin sapında asendan retiküler aktive edici sistem (ARAS) (aquaduct etrafında dağılmış birkaç adet nükleus, raphe ve locus cereleus), talamus ve hipotalamus gibi diensefalik yapılar ve serebral korteks normal bilincin oluşumda rolü olan anatomik yapılardır. ARAS' ın en önemli parçası olan retiküler formasyon, periaquaduktal bölgede bulunur ve ponsun tegmentum bölgesinden hipotalamusa kadar uzanır. Yaygın ve dağınık yerleşimli bu nöron topluluğunun dorsal projeksiyonu talamusun intralaminer nükleuslarına uğrayarak serebral kortekse ulaşırken, ventral projeksiyonu direk olarak önbeyine uzanım gösterir. Retiküler formasyonun bağlantıları talamik retiküler nükleusa ve oradan kortekse, hipotalamusa, oradan da bazal önbeyine ve limbik sisteme ve ayrıca beyinsapında median raphe nükleusu ve lokus cereleusdan ilişkili kortikal yapılara diffüz projeksiyonlar şeklindedir.

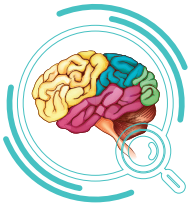
ARAS' a doğrudan etkilenmesine neden olan üst beyin sapındaki fokal lezyonlar veya serebral hemisferlerin iki taraflı ve yaygın etkilenimi ile bilinç bozukluğu

[1] Uzm. Dr., Kartal Dr. Lütfi Kırdar Şehir Hastanesi, Nöroloji Kliniği, tulin_birlik@hotmail.com
[2] Uzm Dr., Emsey Hospital, Beyin Cerrahi Kliniği, umutdoğuaktürk@hotmail.com

İleri yaş, koma süresinin uzun olması, beyinsapı reflekslerinin alınmaması kötü prognostik faktörlerdir.

KAYNAKLAR

1. Gerace, R. V., McCauley, W. A., & Wijdicks, E. F. (1998). Emergency management of the comatose patient. *Coma and Impaired Consciousness: a Clinical Perspective, Young, GB, Ropper, AH, Bolton, CF (Eds), McGraw Hill, New York*, 563.
2. Edlow, J. A., Rabinstein, A., Traub, S. J., & Wijdicks, E. F. (2014). Diagnosis of reversible causes of coma. *The Lancet*, *384*(9959), 2064-2076.
3. American Psychiatric Association. (1994). American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders.
4. Traub, S. J., & Wijdicks, E. F. (2016). Initial diagnosis and management of coma. *Emergency Medicine Clinics*, *34*(4), 777-793.
5. Ropper, A. H. (1986). Lateral displacement of the brain and level of consciousness in patients with an acute hemispheral mass. *New England Journal of Medicine*, *314*(15), 953-958.
6. Claassen, D. O., & Rao, S. C. (2008, November). Locked-in or comatose? Clinical dilemma in acute pontine infarct. In *Mayo Clinic Proceedings* (Vol. 83, No. 11, p. 1197). Elsevier.
7. Ackermann, H., & Ziegler, W. (1995). Akinetic mutism--a review of the literature. *Fortschritte der Neurologie-psychiatrie*, *63*(2), 59-67.
8. *Laureys, S., Owen, A. M., & Schiff, N. D. (2004). Brain function in coma, vegetative state, and related disorders. The Lancet Neurology, 3(9), 537-546.*
9. Wijdicks, E. F., Bamlet, W. R., Maramattom, B. V., Manno, E. M., & McClelland, R. L. (2005). Validation of a new coma scale: the FOUR score. *Annals of Neurology: Official Journal of the American Neurological Association and the Child Neurology Society*, *58*(4), 585-593.,
10. Weissenborn, K., Berding, G., & Köstler, H. (2000). Altered striatal dopamine D 2 receptor density and dopamine transport in a patient with hepatic encephalopathy. *Metabolic brain disease*, *15*(3), 173-178.
11. Wijdicks, Eelco FM, and Caterina Giannini. "Wrong side dilated pupil." *Neurology* 82, no. 2 (2014): 187-187.
12. Marshman, L. A., Polkey, C. E., & Penney, C. C. (2001). Unilateral fixed dilation of the pupil as a false-localizing sign with intracranial hemorrhage: case report and literature review. *Neurosurgery*, *49*(5), 1251-1256.
13. Bateman, D. E. (2001). Neurological assessment of coma. *Journal of Neurology, Neurosurgery & Psychiatry*, *71*(suppl 1), i13-i17.
14. Markand, O. N. (2003). Pearls, perils, and pitfalls in the use of the electroencephalogram. In *Seminars in neurology* (Vol. 23, No. 01, pp. 007-046). Copyright© 2002 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel.:+ 1 (212) 584-4662.
15. Towne, A. R., Waterhouse, E. J., Boggs, J. G., Garnett, L. K., Brown, A. J., Smith, J., & DeLorenzo, R. J. (2000). Prevalence of nonconvulsive status epilepticus in comatose patients. *Neurology*, *54*(2), 340-340.
16. Kaplan, P. W. (2004). The EEG in metabolic encephalopathy and coma. *Journal of clinical neurophysiology*, *21*(5), 307-318.).
17. [Ch'ien, L. T., Boehm, R. M., Robinson, H., Liu, C., & Frenkel, L. D. (1977). Characteristic early electroencephalographic changes in herpes simplex encephalitis: clinical and virologic studies. *Archives of neurology*, *34*(6), 361-364.].
18. Yemisci, M., Gurer, G., Saygi, S., & Ciger, A. (2003). Generalised periodic epileptiform discharges: clinical features, neuroradiological evaluation and prognosis in 37 adult patients. *Seizure*, *12*(7), 465-472.
19. Hoffman, R. S., & Goldfrank, L. R. (1995). The poisoned patient with altered consciousness: controversies in the use of a'coma cocktail'. *Jama*, *274*(7), 562-569.



BÖLÜM 3

BAŞAĞRISINA ACİL YAKLAŞIM

Ahmet KÜÇÜK[1]

İnsanlarda ağrılı tablolardan en bilineni başağrısıdır. Başağrısı nörolojik hastalıkların haricinde birçok hastalıklara da eşlik edebilen bir semptomdur. Acil servis ve nöroloji poliklinik başvurularının büyük çoğunluğunu primer başağrılarından migren ve gerilim başağrısı oluşturmaktadır. Hayatı tehdit edici sebepler ise çok az kısmını oluşturmaktadır. Hastaların %3.8'inde sekonder baş ağrısı bulunmaktadır (1).

Başağrısına acil yaklaşımda hastalardan anamnez alırken sorulması gereken önemli sorular vardır, bunlar tanıyı koymada bize çok yardımcı olmaktadır. Başağrısı anamnezi alırken aşağıdaki parametreler mutlaka sorulmalıdır.

BAŞAĞRISI;

- Ne zamandır var?
- Kaç yaşında başladı?
- Başlama şekli nasıldı?
- Ne sıklıkla geliyor?
- Karakteri nasıl? (Zonklayıcı, sıkıştırıcı, künt, patlayıcı, oyucu, yanıcı, saplayıcı, elektrik çarpması, şimşekvari gibi)
- Lokalizasyonu nedir? (tek ya da çift taraf, jeneralize, gözde, göz çevresinde, ağız içi, frontal, parieto-temporal, oksipital, kulak etrafı veya içi)
- Şiddeti nasıl? (Hafif, orta, şiddetli, dayanılmaz, hayatımın en şiddetli ağrısı gibi, ağrının şiddeti sorulurken önceki ve yeni ağrılar karşılaştırılmalıdır)

[1] Uzm. Dr., Sağlık Bilimleri Üniversitesi Beyhekim E.A.H. Nöroloji, Konya, ahmetkucuk426120@gmail.com

KAYNAKLAR

1. Henry GL. Headache. In: Rosen P, Barkin MR. *Emergency Medicine Consepts and Clinical Practice (4th Ed) St.Louis,Mosby-Year Book*. 1998; 2119-31
2. Clinch CR. Evaluation of acute headaches in adults. *Am Fam Physician*. 2001 Feb 15;63(4):685-92.
3. Uluslararası Baş Ağrısı Derneği (IHS) Baş Ağrısı Sınıflandırma Komitesi. *Uluslararası Baş Ağrısı Bozuklukları Sınıflandırması, 3. baskı. Cephalalgia.* 2018;38:1–211. doi:10.1177/0333102417738202
4. Cutrer FM, Wippold FJ , Edlow JA. Evaluation of the adult with nontraumatic headache in the emergency department. *Literature review current through:* Sep 2021.
5. Do TP , Remmers A , Schytz HW,et al. Red and orange flags for secondary headaches in clinical practice: SNNOOP10 list. *Neurology.* 2019 Jan 15;92(3):134144. doi:10.1212/WNL.0000000000006697.
6. Morey SS. Guidelines on migraine: part 4. General principles of preventive therapy. *Am Fam Physician*. 2000;62:2359–2360.
7. Silberstein SD, Holland S, Freitag F, et al. Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society. Evidence-based guideline update: pharmacologic treatment for episodic migraine prevention in adults: report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society. *Neurology.* 2012;78(17):1337-1345.
8. Hien HA, Pharm D, Gonzales A.Migraine Headache Prophylaxis, Christus Santa Rosa Family Medicine Residency Program, San Antonio, Texas. *Am Fam Physician*. 2019 Jan 1;99(1):17-24.
9. Jonathan Jia Yuan O , Felice MD. *Migraine Treatment: Current Acute Medications and Their Potential Mechanisms of Action*. 2018 Apr;15(2):274-290. doi: 10.1007/s13311-017-0592-1.
10. Sani MG, Silver N. Headache (chronic tension-type). *BMJ Clin Evid*. 2016 Feb 5;2016:1205.
11. Yi-Ting Wei D, Jia Yuan Ong J, Goadsby PJ. Cluster Headache: Epidemiology, Pathophysiology, Clinical Features, and Diagnosis. *Ann Indian Acad Neurol.* 2018 Apr; 21(Suppl 1): S3–S8.
12. Brandt RB, Doesborg PGG, Haan J,et al. Pharmacotherapy for Cluster Headache. *CNS Drugs.* 2020; 34(2): 171–184.
13. Wei DY , Jensen RH.Therapeutic Approaches for the Management of Trigeminal Autonomic Cephalalgias. *Neurotherapeutics*. 2018 Apr;15(2):346-360.
14. DYT , Ong JJY , Goadsby PJ. Overview of Trigeminal Autonomic Cephalalgias: Nosologic Evolution, Diagnosis, and Management. *Ann Indian Acad Neurol*. 2018 Apr;21(Suppl 1):S39-S44.
15. Bahra A . Other primary headaches;thunderclap, cough, exertional, and sexual headache. *J Neurol*. 2020 May;267(5):1554-1566.
16. May A. Hints on Diagnosing and Treating Headache. *Dtsch Arztebl Int.* 2018 Apr; 115(17): 299–308.
17. Oztürk V. Rare primary headache syndromes. *Agrl.* 2007 Jan;19(1):5-16.
18. Ravishankar K. Uncommon (Group 4.0) Primary Headaches: Less Familiarity and More Missed Diagnosis. *Neurol India*. Mar-Apr 2021;69(Supplement):S168-S172.
19. Becker WJ, Findlay T, Moga C ,et al. Guideline for primary care management of headache in adults. *Can Fam Physician.* 2015 Aug;61(8):670-9.

20. Gambeta E , Chichorro JG , Zamponi GW. Trigeminal neuralgia: An overview from pathophysiology to pharmacological treatments. *Mol Pain*. Jan-Dec 2020;16:1744806920901890.
21. Ekizoğlu E, Kocasoy Orhan E, Baykan B. Başağrısı. itf nöroloji. Nobel Tıp Kitapevi. Son güncelleştirme tarihi: 01.01.2019
22. Harriott AM , Karakaya F , Ayata C. Headache after ischemic stroke: A systematic review and meta-analysis. *Neurology*. 2020 Jan 7;94(1):e75-e86.doi: 10.1212/WNL.0000000000008591.
23. Kim JY , Bae HJ. Spontaneous Intracerebral Hemorrhage: Management. *J Stroke*. 2017Jan;19(1):28-39.
24. Kimura A , Kobayashi K , Yamaguchi H, et al. New clinical decision rule to exclude subarachnoid haemorrhage for acute headache: a prospective multicentre observational study. *BMJ Open*. 2016 Sep 9;6(9):e010999.
25. Corbelli I , Maria FD , Eusebi P,et al. Dural arteriovenous fistulas and headache features: an observational study. *J Headache Pain.* 2020 Jan 16;21(1):6.
26. Mollan SP , Paemeleire K , Versijpt J ,et al. European Headache Federation recommendations for neurologists managing giant cell arteritis. *J Headache Pain*. 2020 Mar 17;21(1):28.
27. Cumurciuc R, Crassard I, Sarov M,et al. Headache as the only neurological sign of cerebral venous thrombosis-a series of 17 cases. *J Neurol Neurosurg Psychiatry*. 2005 ;76:1084-7.
28. Sveinsson O , Love A, Vilmarsson V ,et al. Reversible cerebral vasoconstriction syndrome - a common cause of thunderclap headache. *Laeknabladid.* 2020 Feb;106(2):79-83.
29. Pilato F , Distefano M , Calandrelli R. Posterior Reversible Encephalopathy Syndrome and Reversible Cerebral Vasoconstriction Syndrome: Clinical and Radiological Considerations. *Front Neurol.* 2020 Feb 14;11:34.
30. Ranabir S , Baruah MP. Pituitary apoplexy. *Indian J Endocrinol Metab*. 2011 Sep;15 Suppl 3(Suppl3):S188-96.
31. Mollan SP , Hoffmann J , Sinclair AJ. Advances in the understanding of headache in idiopathic intracranial hypertension. *Curr Opin Neurol*. 2019 Feb;32(1):92-98.
32. D'Antona L , Merchan MAJ, Vassiliou A, et al. Clinical Presentation, Investigation Findings, and Treatment Outcomes of Spontaneous Intracranial Hypotension Syndrome: A Systematic Review and Meta-analysis. *JAMA Neurol*. 2021 Mar 1;78(3):329-337.
33. Caminero A , Manso-Calderón R. Links between headaches and epilepsy: current knowledge and terminology. *Neurologia*. 2014 Oct;29(8):453-63.
34. Tabby D , Majeed MH , Youngman B , et al. Headache in multiple sclerosis: features and implications for disease management. *Int J MS Care.* Summer 2013;15(2):73-80.
35. Inan N , Ateş Y. Cervicogenic headache: pathophysiology, diagnostic criteria and treatment. *Agri.* 2005 Oct;17(4):23-30.
36. Benseñor IM , Tófoli LF, Andrade L. *Headache complaints associated with psychiatric comorbidity in a population-based sample.* 2003 Oct;36(10):1425-32.
37. Dorsett M, Liang S. Diagnosis and Treatment of Central Nervous System Infections in the Emergency Department. *Emerg Med Clin North Am.* 2016 Nov; 34(4): 917–942.
38. Hainer BL , Matheson ER. Approach to acute headache in adults. *Am Fam Physician.* 2013 May 15;87(10):682-7.

BÖLÜM 4

EPİLEPTİK NÖBETE VE STATUS EPİLEPTİKUSA YAKLAŞIM

Oruç ŞAHİN[1]

NÖBET NEDİR ?

Epilepsi nöbeti beyindeki anormal aşırı deşarjlara ve senkron nöronal aktiviteye bağlı çeşitli bulgu ve işaretlerin geçici olarak ortaya çıkmasına denir. Nöbet bir semptomdur.

EPİLEPSİ NEDİR ?

Epilepsi beyinin nöbet geçirme potansiyeli ile karakterize olan ve bu durumun nörobiyolojik , kognitif, psikolojik ve sosyal sonuçları ile birlikte ortaya çıkan bir durumdur. Tekrarlayıcı provoke olmamış nöbetlerin olduğu veya nöbetlerin tekrarlama eğilimi olan kronik durumdur. Epilepsi tanımı için en az bir nöbet olması gerekir(1).

EPİLEPSİ PATOLOJİSİ

Dünya nüfusunun yaklaşık %1-2'si etkileyen epilepsi bir beyin bozukluğu/hastalığı olarak tanımlanmaktadır. Genetik yatkınlığın yanında, epileptogeneze neden olan faktörlerin başında beyini etkileyecek düzeye ulaşan akut enfeksiyonlar gelmektedir. Ayrıca, travmatik beyin hasarı, hipoglisemi diyabet, beyin içi kanama, beyin tümörü, febril nöbetler ve status epileptikus gibi birçok akut ve kronik patolojiler de fokal neokortikal epilepsinin ortaya çıkmasını tetikleyebilirler.

[1] Uzm. Dr., Sağlık Bilimleri Üniversitesi Beyhekim E.A.H. Nöroloji, Konya, oruc-sahin@hotmail.com

lirsiz, tartışılan ana patofizyolojik teoriler nöronal tükenme ve hiperinhibisyondur (125). Nöbet sonrası TP insidansı %0,6–13,4'tür. TP hastaları tipik olarak daha yaşlıdır ve sıklıkla daha fazla antiepileptik ilaç almaktadır. Klinisyenlerin TP'yi diğer klinik endikasyonlardan ayırt etmesine yardımcı olabilecek birkaç faktör sunulmuştur: 1- TP, genellikle kısmi nöbetler veya JTKN'den sonra gözlenir. 2-Epilepsi yaşlılık veya inme öyküsü ile ilişkiliyse TP insidansı daha fazladır. 3-TP'nin süresi, nöbet tipine veya hastanın kortikal yapısal hasar yaşayıp yaşamadığına bağlı olarak dakikalardan günlere kadar değişebilir. 4- TP etiyolojisi, nöbet sonrası serebral perfüzyon anormalliği ile ilişkilidir (124).

SONUÇ

Sonuçta SE acil müdahale gerektiren bir durumdur. SE dinamik bir süreç olduğundan tedavi algoritmaları net sınırlarla hala belirlenememiştir. Birçok karşılaştırmalı ilaç çalışmaları mevcuttur belirli oranlarda ilaçların birbirlerine üstünlüğü mevcuttur. Çok yönlü bir yaklaşım ayırıcı tanı erken müdahale dinamik bir süreç olması ve bunların bir bütün olarak ele alınması bunun bir sebebi sayılabilir. Son zamanlarda nöroloji disiplininin dünyaya duyurduğu "zaman eşittir beyin" kavramı burada da geçerlidir. SE'de ilk yaklaşım A-B-C ve sonrasında ayırıcı tanının yapılması, tedaviye hızla başlanması mortalite ve SE prognozu açısından çok önemli yer tutmaktadır. Güncel veriler, tedaviler yıllar içinde değişmekte, gelişmekte ve pratik uygulamaya girmektedir. SE 'de de gelecekte tedavi yaklaşımında değişiklikler olacaktır.

KAYNAKLAR

1. Fisher RS, van Emde Boas W, Blume W, et al. Epileptic seizures and epilepsy: definitions proposed by the International Leageue Against Epilepsia(ILAE) and the International Bureau for Epilpesi(IBE). *Jr. Epilepsia*.2005 Apr;46(4):470-2.)
2. Pitkänen A, Lukasiuk K, Dudek FE, et al . Epileptogenesis. *Cold Spring Harbor Perspectives in Medicine*2015;18:5(10). pii: a022822
3. Vezzani A, Fujinami RS, White HS, et al. Infections, inflammation and epilepsy. *Acta Neuropathologica*2016;131(2):211-34.
4. Lukasiuk K, Becker AJ.Molecular biomarkers of epileptogenesis. *Neurotherapeutics* 2014; 11:319-23.)
5. Blumcke, et al. Histopathological Findings in Brain Tissue Obtained during Epilepsy SurgeryIngmar. *New England Journal of Medicine* . 2017.
6. Thom M, Sisodiya S. Epilepsy. *In: Greenfield's Neuropathology. Vol 1*. In: Love S, Budka H. Ironside JW, Perry A, eds. 9th ed. London, New York: CRC Press; 2015. p.683-739.
7. Blümcke I, Coras R. International Summer School for Neuropathology and Epilepsy Surgery INES 2014
8. Epilepside Genetik Bebek N, Şahin E, *Türkiye klinikleri*cilt 10 sayı 1 yıl 2017 sayfa 11-16)
9. VarnadoS, PriceD. Basics of modern epilepsy classification and terminology PMID: 33153903DOI: 10.1016/j.cppeds.2020.1008912020 Nov;50(11):100891.doi: 10.1016/j.cppeds.2020.100891. Epub 2020 Nov 3.
10. S Benbadis. The differential diagnosis of epilepsy: a critical review*Epilepsy& Behavior*. 2009 May;15(1):15-21. doi: 10.1016/j.yebeh.2009.02.024. Epub 2009 Feb 21.
11. Baburoğlu M , SencerN.S., Nörogörüntüleme. *Turkiye Klinikleri J Neurol-Special Topics.*

2017;10(1):45-8
12. 5. Gaillard WD, Chiron C, Cross JH, et al. ILAE, Committee for Neuroimaging, Subcommittee for Pediatric. Guidelines for imaging infants and children with recent-onset epilepsy. *Epilepsia* 2009;50(9):2147-53.
13. KantiRoy M, Gupta RD, Kolkata. Usefulness and limitation of neuroimaging in epilepsy. *Medicine Update* 2010;20:740-3.
14. Bora , Yeni SN. Anormal EEG Bulguları *EEG Atlasi.1. baskı, İstanbul: Nobel Tip KitapEvleri Ltd. Şti*; 2012. p.201-22,
15. Emre M (ç. ed.), Epilepsi ve Bilinç Bozuklukları.*Adams and Victor's Principles of Neurology 9. Baskı*sayfa 303-339, 2013
16. Panayiotopoulos CP. The Epilepsies: Seizures, Syndromesand Management. *Brain Imaging in the Diagnosis and Management of Epilepsies Chapter 3. Oxfrodshire (UK): Bladon Medical Publishing;* 2005.
17. Fisher RS, Acevedo C. Arzimanolou A, et al. A practical clinical definition of epilepsy.*Epilepsia.* 2014;55(4):475-82.
18. Herman, ST. Single Unprovoked Seizures. *Current Treatment Options in Neurology*. 2004,6(3):243-255. doi: 10.1007/s11940-004-0016-5.
19. Sethi N.K. , Shinnar S. Evidence-based guideline: Management of an unprovoked first seizure in adults: Report of the Guideline Development Subcommittee of the American Academy of Neurology and the American Epilepsy Society. *Neurology.* 2015 Oct 27;85(17):1525.doi: 10.1212/WNL.0000000000002093.
20. Ascoli M, Ferlazzo E, Gasparini S, et al.Epidemiology and Outcomes of Status Epilepticus*Review International Journal of General Medicine* 2021 Jun 28;14:2965-2973. doi: 10.2147/IJGM.S295855. eCollection 2021. PMID: 34234526 PMCID: PMC8254099 DOI: 10.2147/IJGM.S295855
21. Glauser T, Shinnar S, Gloss D, et al. Evidence-based guideline: treatment of convulsive status epilepticus in children and adults: report of the guideline committee of the American Epilepsy Society. *Epilepsy Currents*. 2016;16:48–61
22. Alkhachroum A, Der-nigoghossian CA, Rubinos C, et al. Markers in status epilepticus prognosis. *Journal of Clinical Neurophysiology.* 2020;37(5):422–428. doi:10.1097/WNP.0000000000000761
23. Nelson SE, Varelas PN. Status Epilepticus, Refractory Status Epilepticus, and Super-refractory Status Epilepticus *Continuum Lifelong Learn Neurology*. 2018;24(6):1683-1707. doi:10.1212/CON.0000000000000668
24. Jagoda, A Riggio, S. Refractory status epilepticus in adults. *Annals of Emergency Medicine* 1993; 22: 1337–1348.
25. 25- Yechoor N, Adeli A, Hafeez S. External validation of the epidemiology based mortality score in status epilepticus in an American intensive care population. *Epilepsy Res.* 2018;148:32–36. doi:10.1016/j.eplepsyres.2018.10.001
26. TrinkaE, CockH, HesdorfferD, et al. A definition and classification of status epilepticus--Report of the ILAE Task Force on Classification of Status Epilepticus PMID: **26336950** DOI: 10.1111/epi.13121
27. Zehtabchi S, Silbergleit R, Chamberlain J.M, et al. Electroencephalographic Seizures in Emergency Department Patients After Treatment for Convulsive Status EpilepticusPMID: 33337664, PMCID: PMC8192587 (available on 2022-06-11), DOI: 10.1097/WNP.0000000000000800
28. Glauser T, Shinnar S,Gloss D, Evidence-Based Guideline: Treatment of Convulsive Status Epilepticus in Children and Adults: Report of the Guideline Committee of the American Epilepsy Society First Published January 1, 2016
29. Vossler D.G, Bainbridge J.L, Boggs J.G, Treatment of Refractory Convulsive Status Epilepticus: A Comprehensive Review by the American Epilepsy Society Treatments Committee First Published August 21, 2020 Research Article
30. Trinka E, Höfler J, Leitinger M ,et al. Pharmacotherapy for Status Epilepticus. *Drugs* volume 75, pages1499–1521 (2015)
31. Jones S, Pahl C, Trinka E, et al. A protocol for the inhospital emergency drug management of convulsive status epilepticus in adults. *Practical Neurology*. 2014;14(3):194–7.
32. Trinka E. Benzodiazepines used primarily for emergency treatment (diazepam, lorazepam, and midazolam).*Treatment of epilepsies In: Shorvon SD, Perucca E, Engel Jr J, editors. 3rd ed.* Oxford:

Blackwell Publishing; 2009. p. 470–84
33. Chamberlain JM, Okada P, Holsti M, et al. Lorazepam vs diazepam for pediatric status epilepticus: A randomized clinical trial. *JAMA*. 2014;311(16):1652–60
34. KobataH, HifumiT, HoshiyamaE, et al. Comparison of diazepam and lorazepam for the emergency treatment of adult status epilepticus: a systemic review and meta-analysisJapan Resuscitation Council (JRC) Neuroresuscitation Task Force and the Guidelines Editorial CommitteeAffiliations expand PMID: 33489240 PMCID: PMC7809602 DOI: 10.1002/ams2.582
35. Alldredge BK, Gelb AM, Isaacs SM, et al. Comparison of lorazepam, diazepam and placebo in the treatment of out-of-hospital status epilepticus. *The New England Journal of Medicine*. 2001; 345 :631–7. [Erratum, N Engl J Med 2001;345:1860.]
36. Prasad K, Krishnan PR, Al Roomi K, et al. Anticonvulsant therapy for status epilepticusBritish Journal of Clinical Pharmacology. 2007;63(6):640–7.
37. Prasad M, Krishnan PR, Sequeira R, et al. Anticonvulsant therapy for status epilepticus. *Cochrane Database Syst Rev*2014;9:CD003723.
38. Cereghino JJ, Cloyd JC, Kuzniecky RI. Rectal diazepam gel for treatment of acute repetitive seizures in adults. *Archives of Neurology*. 2002;59(12):1915–20.
39. Remy C, Jourdil N, Villemain D, et al. Intrarectal diazepam in epileptic adults. Epilepsia. 1992;33(2):353–8.
40. Basit H, Kahwaji CI. Clonazepam In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan.2021 Apr 29. Affiliations expand PMID: 32310470 Bookshelf ID: NBK556010
41. Congdon PJ, Forysthe WI. Intravenous clonazepam for the treatment of status epilepticus in children. *Epilepsy*. 1980;21:97–102.
42. Singh AN, Le Morvan P. Treatment of status epilepticus with intravenous clonazepam. *Progress in Neuro-Psychopharmacology & Biological Psychiatry* 1982;6(4–6):539–42.
43. Navarro V, Dagron C, Elie C, et al. Prehospital treatment with levetiracetam plus clonazepam or placebo plus clonazepam in status epilepticus (SAMUKeppra): a randomised, double-blind, phase 3 trial.*Lancet Neurology.* 2016 Jan;15(1):47-55. doi: 10.1016/S1474-4422(15)00296-3. Epub 2015 Nov 28.PMID: 26627366 Clinical Trial.
44. Silbergleit R, Durkalski V, Lowenstein D, et al. Intramuscular versus intravenous therapy for prehospital status epilepticus. *The New England journal of medicine*. 2012;366(7):591–600.
45. Lahat E, Goldman M, Barr J, et al. Comparison of intranasal midazolam with intravenous diazepam for treating febrile seizures in children: prospective randomised study. *The British Medical Journal.* 2000;321(7253):83–6.
46. Mahmoudian T, Zadeh MM. Comparison of intranasal midazolam with intravenous diazepam for treating acute seizures in children. *Epilepsy & Behavior*. 2004;5(2):253–5.
47. Thakker A, Shanbag P. A randomized controlled trial of intranasal-midazolam versus intravenous-diazepam for acute childhood seizures. *Journal of Neurology.* 2013;260(2):470–4
48. McIntyre J, Robertson S, Norris E, et al. Safety and efficacy of buccal midazolam versus rectal diazepam for emergency treatment of seizures in children: a randomised controlled trial. *Lancet.* 2005;366(9481):205–10.
49. Talukdar B, Chakrabarty B. Efficacy of buccal midazolam compared to intravenous diazepam in controlling convulsions in children: a randomized controlled trial. *Brain & Development.*2009;31(10):744–9.
50. Scott RC, Besag FM, Neville BG. Buccal midazolam and rectal diazepam for treatment of prolonged seizures in childhood and adolescence: a randomised trial. *Lancet.* 1999;353(9153):623–6.
51. Shah I, Deshmukh CT. Intramuscular midazolam vs intravenous diazepam for acute seizures. *Indian Journal of Pediatrics* . 2005;72(8):667–70.
52. Cranford RE, Leppik IE, Patrick B, et al. Intravenous phenytoin in acute treatment of seizures. *Neurology*. 1979;29(11):1474–9
53. Dalziel S.R, BorlandM.L, FurykJ, Levetiracetam versus phenytoin for second-line treatment of convulsive status epilepticus in children (ConSEPT): an open-label, multicentre, randomised controlled trial.*Lancet.* 2019 May 25;393(10186):2135-2145. doi: 10.1016/S0140-6736(19)30722-6. Epub 2019 Apr 7.PREDICT research network
54. J. M, KapurJ, Shinnar S, et al. Efficacy of levetiracetam, fosphenytoin, and valproate for established status epilepticus by age group (ESETT): a double-blind, responsive-adaptive, randomised controlled trial ChamberlainNeurological Emergencies Treatment Trials; Pediatric Emergency Care Applied Research Network investigators. *Lancet.* 2019 May 25;393(10186):2135-2145. doi:

10.1016/S0140-6736(19)30722-6. Epub 2019 Apr 17PMID: 32203691 PMCID: PMC7241415 DOI: 10.1016/S0140-6736(20)30611-5
55. Burneo JG, Anandan JV, Barkley GL. A prospective study of the incidence of the purple glove syndrome. *Epilepsia*. 2001;42(9):1156–9.
56. O'Brien TJ, Cascino GD, So EL, et al. Incidence and clinical consequence of the purple glove syndrome in patients receiving intravenous phenytoin. *Neurology.* 1998;51(4):1034–9.
57. Chhabra P, Gupta N, Kaushik A. Compartment syndrome as a spectrum of purple glove syndrome following intravenous phenytoin administration in a young male: A case report and review of literature. *Neurology India*. 2013;61(4):419–20.
58. Ramsay RE, Wilder BJ, Uthman BM, et al. Intramuscular fosphenytoin (cerebyx) in patients requiring a loading dose of phenytoin. *Epilepsy Research*. 1997;28(3):181–7.
59. Wilder BJ, Campbell K, Ramsay RE, et al. Safety and tolerance of multiple doses of intramuscular fosphenytoin substituted for oral phenytoin in epilepsy or neurosurgery. *Archives of Neurology*. 1996;53(8):764–8.
60. Emilio Perucca. Pharmacological and therapeutic properties of valproate: a summary after 35 years of clinical expece PMID: 12269862DOI: 10.2165/00023210-200216100-00004 2002;16(10):695-714 .
61. Limdi NA, Knowlton RK, Cofield SS, et al. Safety of rapid intravenous loading of valproate. *Epilepsia.* 2007 Mar; 48(3):478-83.
62. Trinka E, Höfler J, Zerbs A, et al. Efficacy and safety of intravenous valproate for status epilepticus: a systematic review. *CNS Drugs* 2014;28:623–639.
63. Agarwal P, Kumar N, Chandra R, et al. Randomized study of intravenous valproate and phenytoin in status epilepticus.*Seizure*. 2007 Sep; 16(6):527-32.
64. Patsalos P.N. Clinical pharmacokinetics of levetiracetam 2004;43(11):707-24.doi: 10.2165/00003088-200443110-00002.
65. Isguder, R, Guzel, O, Ceylan, et al. A comparison of intravenous levetiracetam and valproate for the treatment of refractory status epilepticus in children. *Journal of Child Neurology.* 2016;31(9):1120–1126.
66. Moddel, G, Bunten, S, Dobis C, et al. Intravenous levetiracetam: a new treatment alternative for refractory status epilepticus. *Journal of Neurology, Neurosurgery and Psychiatry*. 2009;80(6):689–692.
67. Trinka E, Dobesberger J. New treatment options in status epilepticus: a critical review on levetiracetam. *Therapeutic Advances in Neurological Disorders*. 2009;2(2):79–91.
68. Zelano J, Kumlien E. Levetiracetam as alternative stage two antiepileptic drug in status epilepticus: a systematic review. *Seizure.* 2012;21(4):233–6.
69. Yasiry Z, Shorvon SD. The relative effectiveness of five antiepileptic drugs in treatment of benzodiazepine-resistant convulsive status epilepticus: a meta-analysis of published studies. *Seizure* 2014;23(3):167–74.
70. Brophy GM, Bell R, Claassen J, et al. Guidelines for the evaluation and management of status epilepticus. Neurocritical Care.2012;17:3–23.
71. Haller J.T, Bonnin S , Radosevich J. Rapid administration of undiluted intravenous levetiracetam 2021 Aug;62(8):1865-1870. doi: 10.1111/epi.16961. Epub 2021 Jun 24.PMID: 34164804DOI: 10.1111/epi.16961
72. Beyreuther BK, Heers C, Krebsfanger N, et al. Lacosamide: a review of preclinical properties. *CNS Drug Review* 13:21-42. (2007)
73. Santamarina E, Toledo M, Sueiras M, et al. Usefulness of intravenous lacosamide in status epilepticus. *Journal of Neurology* 2013; 260: 3122–3128.
74. Höfler J, Trinka E. Lacosamide as a new treatment option in status epilepticus. *Epilepsia.* 2013 Mar; 54(3):393-404.
75. Krause LU, Brodowski KO, Kellinghaus C. Atrioventricular block following lacosamide intoxication. *Epilepsy & Behavior*. 2011 Apr; 20(4):725-7
76. Rai S and DrislaneF.W.Treatment of Refractory and Super-refractory Status Epilepticus. 2018 Jul; 15(3): 697–712.Published online 2018 Jun 19. doi: 10.1007/s13311-018-0640-5
77. Hocker S. Treatment of refractory and super-refractory status epilepticus. *Status epilepticus. A clinical perspective. Chap 17*. In: Drislane FW, Kaplan PW, editors. 2. Cham: Humana Press; 2017. pp. 201–214.

78. Rossetti AO, Reichhart MD, Schaller MD, et al. Treatment of refractory status epilepticus: a study of 31 episodes. *Epilepsia.* 2004;45:757–763. doi: 10.1111/j.0013-9580.2004.01904.x.
79. Pugin D, Foreman B, De Marchis GM, et al. Is pentobarbital safe and efficacious in the treatment of super-refractory status epilepticus: a cohort study. *Critical Care* 2014;18:R103
80. Lee S.K. Diagnosis and Treatment of Status Epilepticus. *Korea Journal of Epilepsy Research* 2020; 10(2): 45-54. Published online: December 31, 2020 DOI: https://doi.org/10.14581/jer.20008
81. Ferlisi M, Hocker S, Grade M, et al. Preliminary results of global audit of refractory status epilepticus treatment of step IS. *Epilepsy Behavior*. 2015; 49 :318–324. doi: 10.1016/j.yebeh.2015.04.010.
82. Shorvon S, Baulac M, Cross H, et al.The drug treatment of status epilepticus in Europe: consensus document from a workshop at the first London Colloquium on Status Epilepticus. *Epilepsia*. 2008; 49 :1277–1285. doi: 10.1111/j.1528-1167.2007.01478.x
83. Claassen J, Hirsch L.J, Emerson R.G, et al. Treatment of refractory status epilepticus with pentobarbital, propofol, or midazolam: a systematic review. *Epilepsia*. 2002; 43 :146–153. doi: 10.1046/j.1528-1157.2002.28501.x.
84. Sokic D.V, Jankovic S.M, Vojvodic N.M, et al. Etiology of a short-term mortality in the group of 750 patients with 920 episodes of status epilepticus within a period of 10 years (1988–1997). *Seizure* 2009;18:215–219.
85. Sutter R, Marsch S, Fuhr P, et al. Anesthetic drugs in status epilepticus: risk or rescue? A 6-year cohort study. *Neurology* 2014;82:656–664.
86. Shank RP, Gardocki JF, Streeter AJ, et al.An overview of the preclinical aspects of topiramate: pharmacology, pharmacokinetics, and mechanism of action.*Epilepsia.* 2000; 41(S1):3-9.
87. Towne AR, Garnett LK, Waterhouse EJ, et al. The use of topiramate in refractory status epilepticus. *Neurology*. 2003 Jan 28; 60(2):332-4.
88. Synowiec AS, Yandora KA, Yenugadhati V, et al.The efficacy of topiramate in adult refractory status epilepticus: experience of a tertiary care center.*Epilepsy Research*. 2012 Feb;98(2-3):232-7. doi: 10.1016/j.eplepsyres.2011.09.017. Epub 2011 Oct 15. Epilepsy Res. 2012. PMID: 22000869
89. Patel V, Cordato DJ, Malkan A, et al. Rectal carbamazepine as effective long-acting treatment after cluster seizures and status epilepticus. *Epilepsy & Behavior* 2014;31:31–33.
90. Dubey D, Kalita J, Misra UK. Status epilepticus: refractory and super-refractory. *Neurology India.* 2017;65(7):12. doi:10.4103/neuroindia.NI_958_16
91. Arayakarnkul P, Chomtho K. Treatment options in pediatric super-refractory status epilepticus. *Brain* and *Development* . 2019;41(4):359–366. doi:10.1016/j.braindev.2018.11.011
92. Hocker S, Nagarajan E, Rabinstein AA, et al. Progressive brain atrophy in super-refractory status epilepticus. *JAMA Neurology*. 2016;73(10):1201–1207. doi:10.1001/jamaneurol.2016.157
93. Ochoa JG, Dougherty M, Papanastassiou A, et al. Treatment of Super-Refractory Status Epilepticus: A Review.*Epilepsy Currents.* 2021 Mar 10:1535759721999670. doi: 10.1177/1535759721999670. Online ahead of print. Epilepsy Curr. 2021. PMID: 33719651
94. Motamedi GK, Lesser RP, Vicini S. Therapeutic brain hypothermia, its mechanisms of action, and its prospects as a treatment for epilepsy. *Epilepsia.* 2013;54(6):959–970. doi:10.1111/epi.12144
95. Juge N, Gray JA, Omote H, et al. Metabolic control of vesicular glutamate transport and release. *Neuron.* 2010;68(1):99–112. doi:10.1016/j.neuron.2010.09.002
96. Dupuis N, Curatolo N, Benoist J.F, et al. Ketogenic diet exhibits anti-inflammatory properties. *Epilepsia*. 2015;56(7):e95–98. doi:10.1111/epi.13038
97. Yamamoto H, Aihara M, Niijima S, et al. Treatments with midazolam and lidocaine for status epilepticus in neonates. *Brain* and *Development*. 2007;29(9):559–564. doi:10.1016/j.braindev.2007.02.003
98. Bien CG, Holtkamp M Autoimmune Epilepsy": Encephalitis With Autoantibodies for Epileptologists.*Epilepsy Currents.* 2017 May-Jun; 17(3):134-141.
99. Brenner RP. EEG in convulsive and nonconvulsive status epilepticus. *Journal of Clinical Neurophysiology* 21: 319– 331. (2004)
100. D. Nonconvulsive Status Epilepticus in Adults and Children,First published: January 1993https://doi.org/10.1111/j.1528-1157.1993.tb05903.xCitations: 68.
101. Uysal U, Quigg M, Bittel B, et al.ntravenous anesthesia in treatment of nonconvulsive status epilepticus: Characteristics and outcomes. *Epilepsy Research.* 2015 Oct;116:86-92. doi: 10.1016/j.eplepsyres.2015.07.005. Epub 2015 Jul 26. Epilepsy Res. 2015. PMID: 26280805 Free PMC article.

102. Kubota Y, Nakamoto H, Egawa S, et al. Continuous EEG monitoring in ICU. *Journal of Intensive Care*2018;6:1–8. 10.1186/s40560-018-0310-z –
103. Bauer G, Trinka E. Nonconvulsive status epilepticus and coma. *Epilepsia* 51: 177– 190.Wiley Online Library(2010)
104. Sutter R, Kaplan PW. Electroencephalographic criteria for nonconvulsive status epilepticus: synopsis and comprehensive survey. *Epilepsia* 53(Suppl. 3): 1– 51(2012)
105. ThomasP, ValtonL, Genton P.Absence and myoclonic status epilepticus precipitated by antiepileptic drugs in idiopathic generalized epilepsy. Brain. Volume 129, Issue 5, May 2006, Pages 1281–1292, https://doi.org/10.1093/brain/awl047
106. ShorvonS, BaulacM,CrossH, et al. The drug treatment of status epilepticus in Europe: Consensus document from a workshop at the first London Colloquium on Status Epilepticus,for the TaskForce on Status Epilepticus of the ILAECommission for European Affairs.*Epilepsia.*First published: 04 July 2008https://doi.org/10.1111/j.1528-1167.2008.01706_3.x
107. Khan Z, Arya K, Bollu PC.Epilepsia Partialis Continua.2021 Sep 2. *In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing;* 2021 Jan–.PMID: 30335308
108. Shorvon S, Baulac M, Cross H, et al. The drug treatment of status epilepticus in europe: Consensus document from a workshop at the first london colloquium on status epilepticus. *Epilepsia*. 2008;49(7):1277–85.
109. Serafini A, Gerard EE, Schuele SU. Myoclonic status epilepticus., editors. *Status epilepticus. A clinical perspective*. Chap 12. In: Drislane FW, Kaplan PW 2. Cham: Humana Press; 2017. pp. 139–153.
110. Wilkerson RG, Ogunbodede AC. Hypertensive Disorders of Pregnancy. *Emergency Medicine Clinics of North America* . 2019 May;37(2):301-316.
111. Sutton ALM, Harper LM, Tita ATN. Hypertensive Disorders in Pregnancy. *Obstetrics and Gynecology Clinics of North America*. 2018 Haz; 45 (2):333-347.
112. Magley M, Hinson M.R. Eclampsia Last Update: June 12, 2021.
113. Gill P, Tamirisa A.P, Van HookJ.W. Acute Eclampsia Last Update: July 19, 2021.
114. Sesar A, Cavar I, Sesar AP, et al. Transient cortical blindness in posterior reversible encephalopathy syndrome after postpartum eclampsia. *Taiwan Journal of Ophthalmology*. 2018 Nisan-Haziran; 8 (2):111-114.
115. PattersonJ.L, CarapetianS.A, HagemanJ.R, Febrile seizures. Pediatric Annals2013 Dec;42(12):249-54.doi: 10.3928/00904481-20131122-09.
116. LeungA.K, HonK.L, LeungT.Nh.Febrile seizures: an overview 2018 Jul 16;7:212536. doi: 10.7573/dic.212536. eCollection 2018.PMID: 30038660PMCID: PMC6052913DOI: 10.7573/dic.212536.
117. Sadleir LG, Scheffer I.E. Febrile seizures.*British Medical Journal* 2007 Feb 10; 334(7588):307-11. FC,
118. Tu YF, Lin CL, Lin CH, et al. Febrile convulsions increase risk of Tourette syndrome.*Seizure.* 2014 Sep; 23(8):651-6.
119. Xixis KL, Samanta D, Keenaghan M. Febrile Seizure Author InformationLast Update: July 6, 2021.
120. Laino D, Mencaroni E, Esposito S.Management of Pediatric Febrile Seizures 2018 Oct; 15(10): 2232.Published online 2018 Oct 12. doi: 10.3390/ijerph15102232. PMCID: PMC6210946PMID: 30321985
121. Subcommittee on Febrile Seizures; American Academy of Pediatrics.Clinical pratictice guideline-febrile seizures: guideline for the neurodiagnostic evaluation of the child with a simple febrile seizures.*Pediatrics*.2011;127:389-94.
122. Steering Committee on Quality Improvement and Management, Subcommittee on Febrile Seizures American Academy of PediatricsFebrile seizures: clinical practice guideline for the long-term management of the child with simple febrile seizures.*Pediatrics.* 2008 Jun; 121(6):1281-6
123. Mewasingh LD Febrile seizures.*British Medical Journal*Clin Evid. 2014 Jan 31; 2014():
124. Xu SY, Li ZX, Wu XW, et al. Frequency and Pathophysiology of Post-Seizure Todd's Paralysis.*Medical Science Monitor*. 2020 Mar 5;26:e920751. doi: 10.12659/MSM.920751.PMID: 32134903
125. Werhahn KJ. Weakness and focal sensory deficits in the postictal state. *Epilepsy & Behavior.* 2010 Oct; 19(2):138-9.

BÖLÜM 5

VERTİGOYA ACİL YAKLAŞIM

Nihal TEKİNALP[1]

GİRİŞ

Vertigo, toplumda oldukça yaygın olup, nörolojik aciller arasında ilk sıralarda yer alır. Hasta çevredeki her şeyin ve kendisinin hareket ettiğini hisseder. Hastalar sıklıkla bu hissi dönme hissi olarak tanımlar (1). Genel nüfusun yaklaşık dörtte birini etkiler. Hem yaygın olması hem hayatı tehdit edici hastalıkların belirtisi olması, hem de önemli ölçüde iş gücü kaybına neden olması, vertigoya doğru ve hızlı tanı konulmasının önemini ortaya koyar.

Dizziness, vertigo ile sık karıştırılan bir durum olup, kafanın hafifliği, dengesizlik, hareketle şikayetlerin artması, sallanma veya itilme hissi olarak tanımlanır (2). Dizziness dört grupta sınıflandırılır:

1. Dönme hissi yani vertigo (vakaların %50'sinden fazlası)
2. Presenkop (beyin perfüzyonunun azalmasına bağlı olarak bayılacak gibi hissetme)
3. Kafada hafiflik (sersemlik hissi)
4. Dengesizlik (dengesizlik hissi).

Vertigoyu dizzinessin diğer çeşitlerinden ve baş dönmesinin diğer nedenlerinden ayırt etmek için iyi bir anamnez almak ve fizik muayene oldukça önemlidir.

Vertigo ile başvuran bir hastada öncelik vital bulguların kontrol edilmesidir.

[1] Uzm.Dr., Necip Fazıl Şehir Hastanesi, ntekinalp23@hotmail.com

6.2. Vestibüler Rehabilitasyon Egzersizleri (Cawthorne-Cooksey Egzersizleri)

Bu egzersizler, vestibüler semptomlu hastaların hızlı bir şekilde normal aktivitelerine dönmelerine yardımcı olur. Yatakta veya otururken baş hareket ettirilmeden gözler bir yandan diğer yana, sonra yukarı ve aşağı hareket ettirilir. Bu hareketler 10 ila 20 kez tekrarlanır. Yavaşça başlanır, sonra daha hızlı hareket etmeye çalışılır. Ardından baş yavaşça bir yandan diğer yana ve yukarı-aşağı hareket ettirilir ve gözler açık tutulur ve ardından gözler kapatılır. Başlamak için yavaş hareket edilir ve hasta kendini rahat hissettikçe daha hızlı hareket ederek 10 ila 20 kez tekrarlanır (30).

SONUÇ

Nörolojik aciller arasında ilk sıralarda yer alan vertigo, nedenleri dikkate alındığında basit medikal tedavi veya manevralarla tedavisi mümkün olan bir durumken, altta yatan kardiyak ya da nörolojik bir patolojiye bağlı olarak hayatı tehdit edici duruma kadar geniş bir dağılım gösterebilir. Bu hayati durumların önüne geçmek için vertigo şikayetiyle gelen hastalarda ayırıcı tanının geniş tutulması gereklidir. Hastaların şikayetleri dikkatli değerlendirilerek vertigo ve dizziness ayrımı yapılmalıdır. Her hastada ayrıntılı anamnez alınmalı, vital bulgular ve fizik muayene detaylandırılmalıdır. Periferik nedenlerin daha sık görüldüğü dikkate alınırsa, iyi bir anamnez ve fizik muayene ile gereksiz görüntüleme yöntemlerinden kaçınılabilir. Özellikle yaşlılarda kardiyovasküler sebeplerin ve santral nedenlerin ön planda yer aldığı bilinmeli ve bu yaş grubu hastalarda daha dikkatli olunmalıdır. Acil tedavide öncelikle vertigo nedeni hızlı bir şekilde tespit edilmeli, tedaviler nedene yönelik olmalıdır. BPPV'de medikal tedavinin yerine spesifik manevralar yapılmalıdır. Gereksiz medikasyondan kaçınılmalıdır. Semtomatik düzelme sağlayan İV, İM ve oral çok sayıda ilaç grubundan yan etkileri ve kontrendikasyonları da dikkate alınarak, nedene yönelik en uygun olan ilaç seçilmelidir.

KAYNAKLAR

1. Labuguen RH. Initial evaluation of vertigo. Am Fam Physician 2006;73(2):244–51.
2. Post RE, Dickerson LM. Dizziness: A diagnostic approach. Am Fam Physician 2010;82(4):361–69.
3. Kuo CH, Pang L, Chang R. Vertigo – Part 1 – Assessment in general practice. Aust Fam Physician. 2008;37(5):341–47.
4. A delicate balance: Managing vertigo in general practice. Best Practice Journal 2012;46(Sep):30–37.
5. Ranalli P.Adv Otorhinolaryngol. 2019;82:127-133. doi: 10.1159/000490281. Epub 2019 Jan 15.PMID: 30947212.
6. Omron R.Emerg Med Clin North Am. 2019 Feb;37(1):11-28.
7. De Roeck F, Tijskens M, Segers VFM.Catheter Cardiovasc Interv. 2020 Sep 1;96(3):614-619.
8. Sarna B, Abouzari M, Merna C, Jamshidi S, Saber T, Djalilian HR.Front Neurol. 2020 Sep 15;11:1046.
9. Dabboucy B, Yazbeck M, Bassim M, Comair Y.Neurochirurgie. 2021 Sep;67(5):500-502.
10. Wang Y, Wang L, Jing Y, Yu L, Ye F. Front Neurol. 2020 Dec 17;11:579757.

11. Taxak P, Ram C.J Radiol Case Rep. 2020 May 31;14(5):1-6
12. Imai T, Takeda N, Ikezono T, Shigeno K, Asai M, Watanabe Y, Suzuki M; Committee for Standards in Diagnosis of Japan Society for Equilibrium Research.Auris Nasus Larynx. 2017 Feb;44(1):1-6).
13. Bhattacharyya N, Gubbels SP, Schwartz SR, Edlow JA, El-Kashlan H et all .Otolaryngol Head Neck Surg. 2017 Mar;156(3_suppl): S1-S47.
14. Cohen HS.J Neurophysiol. 2019 Jul 1;122(1):81-92. doi: 10.1152/jn.00819.2018. Epub 2019 Apr 17.PMID: 30995137
15. Gebhart I, Götting C, Hool SL, Morrison M, Korda A, Caversaccio M, Obrist D, Mantokoudis G.Otol Neurotol. 2021 Mar 1;42(3):e341-e347
16. Gibson WPR. Adv Otorhinolaryngol. 2019;82:77-86).
17. Ismail EI, Morgan AE, Abdel Rahman AM.J Vestib Res. 2018;28(5-6):417-424.
18. Lempert T, von Brevern M.Neurol Clin. 2019 Nov;37(4):695-706.
19. Cassano D, Pizza V, Busillo V. P074. Almotriptan in the acute treatment of vestibular migraine: a retrospective acute treatment of vestibular migraine: a retrospective study. J Headache Pain 2015;16(Suppl 1):A114.
20. Scholtz AW, Hahn A, Stefflova B, Medzhidieva D, Ryazantsev SV et all. Clin Drug Investig. 2019 Nov;39(11):1045-1056
21. Ercin D, Erdur B, Turkcuer I, Seyit M, Ozen M, Yilmaz A, Zincir Ercin DO.Am J Emerg Med. 2021 Feb;40:77-82.
22. Shih RD, Walsh B, Eskin B, Allegra J, Fiesseler FW, Salo D, Silverman M.J Emerg Med. 2017 Jan;52(1):23-27
23. Bhattacharyya N, Baugh RF, Orvidas L, et al. Clinical practice guideline: Benign paroxysmal positional vertigo. Otolaryng Head Neck 2008;139(5, Suppl 4):S47–81
24. Cesarani A, Alpini D, Monti B, Raponi G; ENT Department, University of Milan, Milan, Italy.Neurol Sci. 2004 Mar;25
25. Swartz R, Longwell P.Am Fam Physician. 2005 Mar 15;71(6):1115-22
26. Murdin L, Hussain K, Schilder AG.Cochrane Database Syst Rev. 2016 Jun 21;2016(6)
27. Orhan I, Aydın S, Altın G, Yılmaz F. An efficacy comparison of betahistin, trimetazidine and ginkgo biloba extract in patients with tinnitus. Kulak Burun Bogaz Ihtis Derg 2013; 23: 143-7).
28. Sokolova L, Hoerr R, Mishchenko T.Int J Otolaryngol. 2014;2014:682439.
29. Yoo MH, Yang CJ, Kim SA, Park MJ, Ahn JH et all. Eur Arch Otorhinolaryngol. 2017 Jun;274(6)
30. Int J Occup Med Environ Health. 2020 Apr 30;33(3):273-282. doi: 10.13075/ijomeh.1896.01330. Epub 2020 Mar 26.

BÖLÜM 6

İNMEDE ACİL TANI VE TEDAVİ YÖNTEMLERİ

Hikmet SAÇMACI[1]
Meryem Tuba SÖNMEZ[2]

1. İNME İLE İLGİLİ GENEL TANIMLAR

İnme, genel olarak iskemik ve hemorajik olarak sınıflandırılmakla birlikte patofizyolojik süreçleri, klinik seyir ve sonuçları ile akut tedavi yaklaşımları birbirinden farklı olan alt tiplere ayrılır. İnme alt tipleri: intraserebral kanama (İSK), spontan subaraknoid kanama (SAK)'dan oluşan hemorajik inmeler ile tromboz, emboli ve sistemik hipoperfüzyona bağlı beynin bir bölümüne besin ve oksijen desteğinde yetersizlik ile sonuçlanan iskemik inmelerdir (1). İnmeli hastaların uzun vadeli tedavisi, nüksleri önlemek ve rehabilitasyon olmakla birlikte akut dönemde farklı tedavi prensipleri uygulanmaktadır.

Modern müdahalelerden önce, inme sonrası erken ölüm oranı neredeyse %10'du ve yaşayanların dörtte biri başkalarına bağımlıydı (2). Son yıllarda tanı ve tedavi basamağındaki gelişmeler ile birlikte akut iskemik inme belli koşullar altında tedavi edilebilir nörolojik acile dönüştürülerek büyük aşamalar kaydetmiştir. Ancak teşhis ve doğru tedavinin mümkün olan en kısa sürede uygulanması gereklidir (3). Günümüzde nörogörüntüleme, akut inmelerin tespiti, karakterizasyonu ve prognozu için önemli bir araç haline gelmiştir (4).

Genel risk faktörleri – Yaş, cinsiyet, ırk, aile öyküsü, hipertansiyon, dislipidemi, diabet, kalp hastalıkları, önceki inme öyküsü, sigara kullanımı, lohusalık dönemi ile

1 Dr. Öğr. Üyesi, Yozgat Bozok Üniversitesi Tıp Fakültesi, Nöroloji AD, hsacmaci@hotmail.com
2 Dr. Öğr. Üyesi Yozgat Bozok Üniversitesi Tıp Fakultesi, Nöroloji AD, mtubas@gmail.com

sine neden olabilir. Serebral vazospazm klinik olarak 4.günden sonra görülür ve 14.güne kadar geriler. Baş ağrısında artış, subfebril ateş, nörolojik tabloda kötüleşme vazospazmı düşündürür. Bu olgularda BT, transkranial Doppler ultrasonografi ve DSA yapılabilir. Serebral vazospazmla karşılaşmamak için operasyon öncesinde kan basıncının kontrollü düşürülmesi, profilaktik nimodipin kullanımı, hastanın ilk 72 saat içinde cerrahiye alınması önerilir (5, 44). Güncel yayınlar anevrizmatik SAK sonrası gelişebilecek serebral vazospazmın önlenmesi ve tedavisinde seçici bir "Endotelin A Reseptör Antagonisti" olan "Clazosentan" üzerinde durmaktadır (45).

Hidrosefali akut veya kronik dönemde karşılaşılabilecek bir komplikasyondur. İntraventriküler kanama söz konusu ise ilk 24 saatte ortaya çıkabilir. Eksternal ventriküler drenajın, özellikle de hastanın bilinç düzeyinin kötü olduğu durumlarda en uygun tedavi şekli olduğu bildirilmektedir. Ancak akabinde anevrizma kapatılmamışsa yeniden kanama riskini yükseltir. Kronik hidrosefali geliştiğinde ventrikülöperitoneal ya da lumboperitoneal şant cerrahisi gerekebilir (46).

SAK seyri sırasında ortaya çıkabilecek diğer komplikasyonlar başlıca epileptik nöbetler, sıvı-elektrolit dengesizlikleri (uygunsuz ADH sendromu, tuz kaybettirici sendrom, diabetes insipitus), solunumsal (aspirasyon pnömonisi) ve kardiyovasküler (kardiyopulmoner olaylar) komplikasyonlar ile diğer sistemik tromboembolik (pulmoner emboli, derin ven trombozu) olaylar olarak sıralanabilir (43).

KAYNAKLAR

1. Caplan LR. Basic pathology, anatomy and pathophysiology of stroke. Caplan's stroke: a clinical approach. 2000:34-80.
2. Carandang R, Seshadri S, Beiser A, et al. Trends in incidence, lifetime risk, severity, and 30-day mortality of stroke over the past 50 years. Jama. 2006;296(24):2939-2946.
3. Zubair AS, Sheth KN. Emergency Care of Patients with Acute Ischemic Stroke. Neurol Clin. 2021;39(2):391-404.
4. Lee E-J, Kim Y-H, Kim N, et al. Deep into the brain: artificial intelligence in stroke imaging. Journal of stroke. 2017;19(3):277.
5. Öge AE, Baykan B, Bilgiç B, Serebrovasküler Hastalıklar, Nöroloji e-ders kitabı, 2020. (05.12.2021 tarihinde http://www.itfnoroloji.org/ekitap.htm)
6. Adams Jr HP, Bendixen BH, Kappelle LJ, et al. Classification of subtype of acute ischemic stroke. Definitions for use in a multicenter clinical trial. TOAST. Trial of Org 10172 in Acute Stroke Treatment. stroke. 1993;24(1):35-41.
7. Panuganti KK, Tadi P, Lui F. Transient Ischemic Attack. StatPearls. Treasure Island (FL): StatPearls Publishing Copyright © 2021, StatPearls Publishing LLC.; 2021.
8. Ferro JM, Aguiar de Sousa D. Cerebral Venous Thrombosis: an Update. Curr Neurol Neurosci Rep. 2019;19(10):74.
9. Bladin CF, Alexandrov AV, Bellavance A, et al. Seizures after stroke: a prospective multicenter study. Archives of neurology. 2000;57(11):1617-1622.
10. Powers WJ, Rabinstein AA, Ackerson T, et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. stroke. 2019;50(12):e344-e418.
11. Isenegger J, Meier N, Lämmle B, et al. D-dimers predict stroke subtype when assessed early. Cerebrovascular diseases. 2010;29(1):82-86.

12. Molina CA, Saver JL. Extending reperfusion therapy for acute ischemic stroke: emerging pharmacological, mechanical, and imaging strategies. stroke. 2005;36(10):2311-2320.
13. Méndez-Gallardo JJ, Méndez B, Cano-Nigenda V, et al. Update on the management of acute stroke. A practical clinical guide. Revista mexicana de neurociencia. 2020;21(4):163-177.
14. Zerna C, Thomalla G, Campbell BC, et al. Current practice and future directions in the diagnosis and acute treatment of ischaemic stroke. The Lancet. 2018;392(10154):1247-1256.
15. Wardlaw JM, Seymour J, Cairns J, et al. Immediate computed tomography scanning of acute stroke is cost-effective and improves quality of life. stroke. 2004;35(11):2477-2483.
16. El-Koussy M, Schroth G, Brekenfeld C, et al. Imaging of acute ischemic stroke. Eur Neurol. 2014;72(5-6):309-316.
17. Marks MP, Holmgren EB, Fox AJ, et al. Evaluation of early computed tomographic findings in acute ischemic stroke. stroke. 1999;30(2):389-392.
18. Hacke W, Kaste M, Fieschi C, et al. Intravenous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke: the European Cooperative Acute Stroke Study (ECASS). Jama. 1995;274(13):1017-1025.
19. Wardlaw J, Dorman P, Lewis S, et al. Can stroke physicians and neuroradiologists identify signs of early cerebral infarction on CT? Journal of Neurology, Neurosurgery & Psychiatry. 1999;67(5):651-653.
20. Barber PA, Demchuk AM, Zhang J, et al. Validity and reliability of a quantitative computed tomography score in predicting outcome of hyperacute stroke before thrombolytic therapy. The Lancet. 2000;355(9216):1670-1674.
21. von Kummer R, Weber J. Brain and vascular imaging in acute ischemic stroke: the potential of computed tomography. Neurology. 1997;49(5 Suppl 4):S52-S55.
22. Latchaw RE, Alberts MJ, Lev MH, et al. Recommendations for imaging of acute ischemic stroke: a scientific statement from the American Heart Association. stroke. 2009;40(11):3646-3678.
23. Schellinger P, Bryan R, Caplan L, et al. Evidence-based guideline: the role of diffusion and perfusion MRI for the diagnosis of acute ischemic stroke: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology. 2010;75(2):177-185.
24. Beauchamp Jr NJ, Barker PB, Wang PY, et al. State of the Art-Imaging of Acute Cerebral Ischemia-This State of the Art describes the central role of the radiologist and neuroimaging in the diagnosis and subsequent management of acute. Radiology-Radiological Society of North America. 1999;212(2):307-324.
25. Sorensen AG, Buonanno FS, Gonzalez RG, et al. Hyperacute stroke: evaluation with combined multisection diffusion-weighted and hemodynamically weighted echo-planar MR imaging. Radiology. 1996;199(2):391-401.
26. Schlaug G, Siewert B, Benfield A, et al. Time course of the apparent diffusion coefficient (ADC) abnormality in human stroke. Neurology. 1997;49(1):113-119.
27. Hunsche S, Moseley ME, Stoeter P, et al. Diffusion-tensor MR imaging at 1.5 and 3.0 T: initial observations. Radiology. 2001;221(2):550-556.
28. Rosso C, Drier A, Lacroix D, et al. Diffusion-weighted MRI in acute stroke within the first 6 hours: 1.5 or 3.0 Tesla? Neurology. 2010;74(24):1946-1953.
29. Kang D-W, Chalela JA, Dunn W, et al. MRI screening before standard tissue plasminogen activator therapy is feasible and safe. stroke. 2005;36(9):1939-1943.
30. Ay H, Buonanno F, Rordorf G, et al. Normal diffusion-weighted MRI during stroke-like deficits. Neurology. 1999;52(9):1784-1784.
31. Patel MR, Edelman RR, Warach S. Detection of hyperacute primary intraparenchymal hemorrhage by magnetic resonance imaging. stroke. 1996;27(12):2321-2324.
32. Kidwell CS, Chalela JA, Saver JL, et al. Comparison of MRI and CT for detection of acute intracerebral hemorrhage. Jama. 2004;292(15):1823-1830.
33. Schramm P, Schellinger PD, Klotz E, et al. Comparison of perfusion computed tomography and computed tomography angiography source images with perfusion-weighted imaging and diffusion-weighted imaging in patients with acute stroke of less than 6 hours' duration. stroke. 2004;35(7):1652-1658.
34. Albers GW, Marks MP, Kemp S, et al. Thrombectomy for stroke at 6 to 16 hours with selection by perfusion imaging. New England Journal of Medicine. 2018;378(8):708-718.

35. Chalela JA, Alsop DC, Gonzalez-Atavales JB, et al. Magnetic resonance perfusion imaging in acute ischemic stroke using continuous arterial spin labeling. stroke. 2000;31(3):680-687.
36. Johnston DC, Chapman KM, Goldstein LB. Low rate of complications of cerebral angiography in routine clinical practice. Neurology. 2001;57(11):2012-2014.
37. Kaufmann TJ, Huston III J, Mandrekar JN, et al. Complications of diagnostic cerebral angiography: evaluation of 19 826 consecutive patients. Radiology. 2007;243(3):812-819.
38. Silva GS, Nogueira RG. Endovascular Treatment of Acute Ischemic Stroke. Continuum (Minneap Minn). 2020;26(2):310-331.
39. Rabinstein AA. Update on Treatment of Acute Ischemic Stroke. Continuum (Minneap Minn). 2020;26(2):268-286.
40. Kurian C, Kaur K, Kaur G, et al. Assessment of the Patient With Intracerebral Hemorrhage: A Review of the Literature. Cardiol Rev. 2021;29(1):20-25.
41. Rajashekar D, Liang JW. Intracerebral Hemorrhage. StatPearls. Treasure Island (FL): StatPearls Publishing Copyright © 2021, StatPearls Publishing LLC.; 2021.
42. Kobata H, Ikeda N. Recent Updates in Neurosurgical Interventions for Spontaneous Intracerebral Hemorrhage: Minimally Invasive Surgery to Improve Surgical Performance. Front Neurol. 2021;12:703189.
43. Ziu E, Mesfin FB. Subarachnoid Hemorrhage. StatPearls. Treasure Island (FL): StatPearls Publishing Copyright © 2021, StatPearls Publishing LLC.; 2021.
44. Etminan N, Macdonald RL. Neurovascular disease, diagnosis, and therapy: Subarachnoid hemorrhage and cerebral vasospasm. Handb Clin Neurol. 2021;176:135-169.
45. Juif PE, Dingemanse J, Ufer M. Clinical Pharmacology of Clazosentan, a Selective Endothelin A Receptor Antagonist for the Prevention and Treatment of aSAH-Related Cerebral Vasospasm. Front Pharmacol. 2020;11:628956.
46. Chen S, Luo J, Reis C, et al. Hydrocephalus after Subarachnoid Hemorrhage: Pathophysiology, Diagnosis, and Treatment. 2017;2017:8584753.

BÖLÜM 7

HAREKET BOZUKLUĞUNDA ACİL DURUMLARA KLİNİK YAKLAŞIM

Meltem KARACAN GÖLEN[1]

GİRİŞ

Hareket Bozuklukları istemsiz hareketler ve/veya istemli hareketleri sürdürmede zorlanma ile karakterize akut ve kronik hastalıkların tümünü tanımlar. Hareket bozukluğu acil durumları ise hastaların saatler veya birkaç gün içinde hareket bozukluğu geliştirmesi ve hastanın uygun şekilde teşhis ve tedavi edilemez ise morbidite ve mortalitenin ortaya çıkabileceği bir durumdur (1). Semptomların ve belirtilerin şiddeti genellikle hastaların tedavi almasını gerektirir. Bu grup hastalar acil servis, poliklinik muayenesi ve yoğun bakım takipleri sırasında karşımıza çıkabilir. Hastaları tanımak tedavinin önemli bir basamağını oluşturur, bu da ayrıntılı muayene ve güvenilir bir anamnezle mümkündür. Hastaların ilaç kullanımları, ko-morbid hastalıkları, akut dönemde kullanılan medikasyonlar, toksik maruziyetleri ayrıntılı sorgulanmalıdır. Ayrıntılı nörolojik muayene ile hastanın hareket bozukluğu tanımlanmalıdır. Gerekli görülen laboratuar tetkikleri ve santral görüntülemeler planlanmalıdır. Anamnez, klinik ve yardımcı tetkikler neticesinde ekartasyon tanıları gözden geçirilmeli ve hareket bozukluğu tanımlanarak tedavi planı yapılmalıdır (1).

Bu bölümde klinik pratik de en sık gördüğümüz hareket bozukluğu acilleri konularına değineceğiz.

[1] Uzm. Dr., Konya Numune Hastanesi, drmeltemkaracan@hotmail.com

Tedavi konusunda hastaların metabolik hemodinamik sürecini düzenlemeye yönelik tedaviler uygulanır. Hidrasyon, monitorizasyon vital bulguların stabilizasyonu, ateşin düşürülmesi ilk aşamada tedavinin temelini oluşturur. Distoni tedavisi için vaka bildirimleri ile uygulanan tedavilerin çok çeşitli olduğu bilinmektedir. Tedavide tetrabenazin, baklofen, klormetiazol, antikolinerjikler, dopamin reseptör blokerleri, antiepileptikler, levadopa, asetozolamid, benzodiazepinler, barbitüratlar, son dönemde ise anestezik ilaçlar ve muskuler blokerler tercih edilebilir. Bunların dışında cerrahi seçeneklerde baklofen pompası , sterotaksik cerrahi ile talamotomi, pallidotomi, ve DBS uygulanabilir (35).

AKUT KORE-HEMİBALLİSMUS

Hemiballismus düzensiz, geniş amplitüdlü, ekstremite proksimal ve aksiyal kasları etkileyen nadir görülen bir hareket bozukluğudur. Hemiballismus ve hemikore birbiriyle ilişkilendirilmiş olup klinik sendromu tanımlamak için hemikore-hemiballismus birlikte kullanılmaktadır. 36 Akut vasküler lezyonlar bazal ganglia düzleminde orta ve arka serebral arter sulama alanında ise akut kore -hemiballismus şeklinde hareket bozuklukları gözlenir. Kontrlateral subtalamik nükleusu etkileyen lezyonlarda hemiballismus gözlenir. Bunun dışında ipsilateral subtalamik nükleus, kaudat nükleus, putamen, talamus, substantia nigra ve premotor ve motor korteks lezyonlarında da gözlenebilir (37).

Vasküler olaylar dışında yer kaplayan lezyonlar, multiple skleroz, hiperglisemi, hipoglisemi, hipertroidizm, kardiyak cerrahi sonrası gelişen kore (posy-pumb kore),santral sinir sistemi infeksiyon-otoimmun hastalıkları ,kore gelişimine neden olabilecek diğer nedenlerdir. Hastaların primer nedenlerine göre semptomtik tedavi planı yapılmalıdır (30).

KAYNAKLAR

1. Poston kl, Fruncht SJ.Movement disorder emergencies.J Neurol 2008;255(Suppl.4):2-13
2. Hassin-Baer S, Sirota P,Korczyn AD et al. Clinical characteristic of neurolopetıc-induced parkinsonism. J Nerual Transm 2001;108(11):1299-1308
3. BhattMG, EliasMA,Mankodi AK. Acute and reversible parkinsonism due to organophosphate pesticide intoxication: five cases.Neurology 1999;52:1467–1471.
4. Robottom BJ, Weiner WJ, Factor SA. Movement disorders emergencies part 1:hypokinetic disorders. Arch Neurol 2011;68:567–72.
5. Hubble JP. Drug-Induced Parkinsonism. In: Watts RL, Koller WC,editors. Movement Disorders Neurological Principles & Practice (second edition). New York: McGraw-Hill:2004.p.395-9
6. Jankovic J, Shannon KM. Movement Disorders. In: Bradley WG, Daroff RB, Fenichel GM, Jankovic J, edıtors. Clinical Practice Volume II (Fourth edition). Philedelphia :Butterworth-Heinemann:2008.p. 2081-122
7. Rail D, Scholtz C, Swash M. Post-encephalitic parkinsonism: current experience. J Neurol Neurosurg Psychiatry 1981;44:670 676.
8. Ogata A, Tashiro K, Pradhan S. Parkinsonism due to predominant involvement of substantia nigra in Japanese encephalitis. Neurology 1999;53:1781–1786.
9. Less AJ.Secondaary Parkinson's Syndrome. In :Jankovicc J,Tolosa E, editors. Parkinson's Disease &Movement Disorders (fifth edition). Philedelphia :Lippincott Wiliams&Wilkins;2007.p.213-22.

10. Zijlmas JC, Daniel SE, Hughes AJ, Revesz T, Lees AJ. Clinicopathological investigation of vasculer parkinsonism, including clinical criteria for diagnosis. MOv. Didord 2004;19(6):630-40.
11. Schramm A, Grunwald S, Lorenz R, Classen J, Naumann M.Paarkinsonism due to bilateral basal ganglia lesions following mastocytosis-induced hypoxia. J Neurol 2004:251(10):1270-2.
12. Choi IS,Cheon HY.Deloyed movement disorders after carbon monoxide poisoning. Eur Neurol 1999; 42:141-4
13. Frucht SJ. Treatment of movement disorder emergencies. Neurotherapeutics. 2014 Jan;11(1):208-12. doi: 10.1007/s13311-013-0240-3.
14. Sacks O. Awakenings. Harper Perennial, New York, 1990.
15. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision. Washington, DC, American Association, 2000.
16. Peiris DTS, Kuruppuarachchi KALA,Weresena LP, et al:Neuroleptic malignant syndrome without fever: A report of three cases. J Neurol Neurosurg Psychiatry 2000;69:277-278
17. Kellam AMP. The neuroleptic malignant syndome, so-called:a survey of the World literatüre Br J psychiatry 1987;150:752-759
18. Shalev A, Hermesh H, Munitz H. Moratility from neuroleptic malignanat syndrome. J Clin Psychiatry 1989;50:18-25
19. Schönfeldt-Lecuona C, Kuhlwilm L, Cronemeyer M, Neu P, Connemann BJ, Gahr M, Sartorius A, Mühlbauer V. Treatment of the Neuroleptic Malignant Syndrome in International Therapy Guidelines: A Comparative Analysis. Pharmacopsychiatry. 2020 Mar;53(2):51-59. doi: 10.1055/a-1046-1044.
20. Susman VL. Clinical management of neuroleptic malignant syndrome. Psychiatr Q. 2001 Winter;72(4):325-36. doi: 10.1023/a:1010389215197.
21. Wang HC, Hsich H (2001) Treatment of neuroleptic malignant syndrome with subcutaneous apomophine monotherapy. Mov Disord 16:765-767
22. Ener RA, Meglathery SB, Van Decker WA, Gallagher RM. Serotonin syndrome and other serotonergic disorders. Pain Med 2003;4:63-74
23. Miyasaki JM, Lang AE. Treatment of drug-induced movement disorders. In: Kurlan R (Ed). Treatment of movement disorders. Philadelphia: Lippincott; 1995:429-474.
24. Gillman PK. Monoamine oxidase inhibitors, opioid analgesics and serotonin toxicity. Br J Anaesth. 2005 Oct;95(4):434-41. doi: 10.1093/bja/aei210.
25. Bronstein AC, Spyker DA, Cantilena LR Jr., Rumack BH, Dart RC. 2011 Annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 29th Annual Report. Clin Toxicol (Phila) 2012; 50:911.
26. Volpi-Abadie J, Kaye AM, Kaye AD.. Serotonin syndrome. The Ochsner Journal 2013; 13:533-540.
27. Lane R, Baldwin D. Selective serotonin reuptake inhibitor-induced serotonin syndrome: review. J Clin Psychopharmacol 1997;17:208–221.
28. Dunkley EJ, Isbister GK, Sibbritt D, Dawson AH, Whyte IM. The Hunter Serotonin Toxicity Criteria: simple and accurate diagnostic decision rules for serotonin toxicity. QJM 2003;96:635-642.
29. Ables AZ, Nagubilli R. Prevention, recognition, and management of serotonin syndrome. Am Fam Physician 2010;81:1139-1142.
30. Munhoz RP, Moscovich M, Araujo PD, Teive HA. Movement disorders emergencies: a review. Arq Neuropsiquiatr. 2012 Jun;70(6):453-61. doi: 10.1590/s0004-282x2012000600013.
31. Graudins A, Stearman A, Chan B. Treatment of the serotonin syndrome with cyproheptadine. J Emerg Med 1998;16:615–619.
32. Jankovic J, Penn AS. Severe dystonia and myoglobinuria. Neurology 1982;32:1195-1197
33. Mariotti P, Fasano A, Contrarino MF, et al. Management of status dystonicus: our experience and review of the literature. Mov Disord 2007;22:963-968.
34. Manji H, Howard RS, Miller DH, et al. Status dystonicus: the syndrome and its management. Brain 1998;121:243-252
35. Teive HA, Sá DS, Grande CV, Antoniuk A, Werneck LC. Bilateral pallidotomy for generalized dystonia. Arq Neuropsiquiatr 2001; 59:353-357.
36. Dewey RB, Jankovic J. Hemiballism-hemichorea. Clinical and pharmacologic findings in 21 patients. Arch Neurol 1989;46:862-867.
37. Lang AE. Persistent hemiballismus with lesions outside the subthalamic nucleus. Can J Neurol Sci 1985;12:125-128.

BÖLÜM 8

İNFLAMATUVAR NÖROPATİLERDE ACİL TANI VE TEDAVİ YÖNTEMLERİ

Onur BULUT[1]

Akut inflamatuar polinöropatiler, başta akut inflamatuar demyelinizan polinöropati (AIDP) olmak üzere varyantları ve diğer alt tipleri ile birlikte Guillain-Barré Sendromu (GBS) başlığı altında değerlendirilir. Bu sendrom, genellikle bir solunum yolu enfeksiyonu veya gastroenteritten yaklaşık 10 – 14 gün sonra ortaya çıkan akut veya subakut başlangıçlı bir poliradikülonöropatidir (1). 1916 yılında başlıca motor güçsüzlük, tendon refleksi kaybı ve beyin-omurilik sıvısında (BOS) hücresel reaksiyon olmadan albümin yüksekliği fenomenleri ile tanımlanmış ve adlandırılmıştır (2).

EPİDEMİYOLOJİ

Batı ülkelerindeki çalışmaların ağırlıklı olarak dahil edildiği bir meta-analize göre insidans hızı 100,000 kişide yılda 0,81 – 1,89 (medyan 1,11) olarak düşünülmektedir (3). Yaş arttıkça insidansı katlanarak artmaktadır (3).

ETYOLOJİ VE PATOFİZYOLOJİ

Genellikle bir enfeksiyon sonrası görülen sendromda en sık önceleyen enfeksiyonun Campylobacter Jejuni olduğu, vakaların %41'ine kadarından sorumlu olduğu düşünülmektedir (4,5). Daha az sıklıkla olmak üzere Influenza virüsleri, Hepatit A virüs, Sitomegalovirüs (CMV), Epstein-Barr Virüs, Mycoplasma Pneumoniae, Haemophilus İnfluenzae gibi enfeksiyonların da önceleyebileceği serolojik çalışmalarla gösterilmiştir (5,6).

[1] Uzm. Dr. (Klinik Nörofizyoloji), Konya Şehir Hastanesi, bulut8286@yahoo.co.uk

dönebildikleri, %20-25'nin bazı kısıtlılıkları olduğu ancak yine de günlük yaşamlarına ve işlerine devam edebildikleri, %10-15'inin de ciddi rezidüel kısıtlılıkları kaldığı görülmüştür (72,73).

Hastalarda mekanik ventilasyona ihtiyaç gerektirecek solunum yetmezliği gelişme oranı ile ilgili %14-22 arasında oranlar literatürde verilmektedir (74,75,76). Hangi hastaların mekanik ventilasyon gerektirecek solunum yetmezliği geliştireceği ve bu konudaki risk faktörlerini araştırmak için yapılan çalışmalarda semptomların başlangıcından hastaneye yatışa kadar geçen sürenin kısa olması, fasiyal ve bulber güçsüzlük, boyun güçsüzlüğü, sinir iletim çalışmalarında aksonal tipte olmanın kötü prognoz göstergesi ve solunum yetmezliği gelişimi için risk faktörü oldukları gösterilmiştir (77,78).

Mortalite

Mortalite üzerine yapılmış, tamamına yakınının intravenöz immunglobulin (IVIg) tedavisi aldığı geniş bir hasta popülasyonunun dahil edildiği bir çalışmada mortalite oranının ilk 6 ay içinde %2,8 bir yıl içinde %3.9 olduğu, bu oranın yoğun bakıma yatan hastalarda %7,5'a çıkığı, ölüm nedenlerinin ise genellikle solunum, kardiyovasküler veya otonom komplikasyonlar olduğu belirtilmiştir (79). Mortalite üzerine yapılan başka çalışmalarda %2.5 ile %10.5 arasında değişken oranlar verilmektedir (80-83).

KAYNAKLAR

1. Donofrio PD. Guillain-Barré Syndrome. Continuum (Minneap Minn). 2017;23:1295-1309. Doi: 10.1212/CON.0000000000000513.
2. Guillain G, Barré, JA, Strohl, A. Sur un syndrome de radiculonévrite avec hyper-albuminose du liquide céphalo-tachidien sans réaction cellulaire. Remarques sur les caractères cliniques et graphiques des réflexes tendineux. Bul Mém Soc Med Hôp Paris. 1916;40:1462-1470.
3. Sejvar JJ, Baughman AL, Wise M, et al. Population incidence of Guillain-Barré syndrome: a systematic review and meta-analysis. Neuroepidemiology. 2011;36(2):123-133. Doi:10.1159/000324710
4. Scallan Walter EJ, Crim SM, Bruce BB, et al. Incidence of Campylobacter-Associated Guillain-Barré Syndrome Estimated from Health Insurance Data. Foodborne Pathog Dis. 2020;17(1):23-28. Doi:10.1089/fpd.2019.2652
5. Hao Y, Wang W, Jacobs BC, et al. Antecedent infections in Guillain-Barré syndrome: a single-center, prospective study. Ann Clin Transl Neurol. 2019;6(12):2510-2517. Doi:10.1002/acn3.50946
6. Jacobs BC, Rothbarth PH, van der Meché FG, et al. The spectrum of antecedent infections in Guillain-Barré syndrome: a case-control study. Neurology. 1998;51(4):1110-1115. Doi:10.1212/wnl.51.4.1110
7. Asbury AK, Cornblath DR. Assessment of current diagnostic criteria for Guillain-Barré syndrome. Ann Neurol. 1990;27 Suppl:S21-S24. Doi:10.1002/ana.410270707
8. Ropper AH. The Guillain-Barré syndrome. N Engl J Med. 1992;326(17):1130-1136. Doi:10.1056/NEJM199204233261706
9. Karimzadeh P, Bakhshandeh Bali MK, Nasehi MM, Taheri Otaghsara SM, Ghofrani M. Atypical findings of guillain-barré syndrome in children. Iran J Child Neurol. 2012;6(4):17-22.
10. Sharma K, Tengsupakul S, Sanchez O, et al. Guillain-Barré syndrome with unilateral peripheral facial and bulbar palsy in a child: A case report. SAGE Open Med Case Rep. 2019;7:2050313X19838750. Published 2019 Mar 21. Doi:10.1177/2050313X19838750

11. Ruts L, Drenthen J, Jongen JL, et al. Pain in Guillain-Barre syndrome: a long-term follow-up study. Neurology. 2010 Oct 19;75(16):1439-1447. Doi: 10.1212/WNL.0b013e3181f88345.
12. Mukerji S, Aloka F, Farooq MU, et al. Cardiovascular complications of the Guillain-Barré syndrome. Am J Cardiol. 2009;104(10):1452-1455. Doi:10.1016/j.amjcard.2009.06.069
13. Fryman E, Saleem S, Singh A. Guillain-Barré Syndrome Induced Dysautonomia Resulting in Cardiac Arrest. Cureus. 2020;12(12):e12149. Published 2020 Dec 18. Doi:10.7759/cureus.12149
14. Zaeem Z, Siddiqi ZA, Zochodne DW. Autonomic involvement in Guillain-Barré syndrome: an update. Clin Auton Res. 2019;29(3):289-299. Doi:10.1007/s10286-018-0542-y
15. Chakraborty T, Kramer CL, Wijdicks EFM, et al. Dysautonomia in Guillain-Barré Syndrome: Prevalence, Clinical Spectrum, and Outcomes. Neurocrit Care. 2020;32(1):113-120. Doi:10.1007/s12028-019-00781-w
16. Wong AH, Umapathi T, Nishimoto Y, et al. Cytoalbuminologic dissociation in Asian patients with Guillain-Barré and Miller Fisher syndromes. J Peripher Nerv Syst. 2015;20(1):47-51. Doi:10.1111/jns.12104
17. Fokke C, van den Berg B, Drenthen J, et al. Diagnosis of Guillain-Barré syndrome and validation of Brighton criteria. Brain. 2014;137(Pt 1):33-43. Doi:10.1093/brain/awt285
18. Willison HJ, Jacobs BC, van Doorn PA. Guillain-Barré syndrome. Lancet. 2016;388(10045):717-727. Doi:10.1016/S0140-6736(16)00339-1
19. Albers JW, Donofrio PD, McGonagle TK. Sequential electrodiagnostic abnormalities in acute inflammatory demyelinating polyradiculoneuropathy. Muscle Nerve. 1985;8(6):528-539. Doi:10.1002/mus.880080609
20. Vucic S, Cairns KD, Black KR, et al. Neurophysiologic findings in early acute inflammatory demyelinating polyradiculoneuropathy. Clin Neurophysiol. 2004;115(10):2329-2335. Doi:10.1016/j.clinph.2004.05.009
21. Preston DC., Shapiro BE. (2013). Polyneuropathy. In Electromyography and Neuromuscular Disorders içinde (p.384–416). Elsevier Inc.
22. Albers JW, Kelly JJ Jr. Acquired inflammatory demyelinating polyneuropathies: clinical and electrodiagnostic features. Muscle Nerve. 1989;12(6):435-451. Doi:10.1002/mus.880120602
23. Leonhard SE, Mandarakas MR, Gondim FAA, et al. Diagnosis and management of Guillain-Barré syndrome in ten steps. Nat Rev Neurol. 2019;15(11):671-683. Doi:10.1038/s41582-019-0250-9
24. van den Berg B, Walgaard C, Drenthen J, et al. Guillain-Barré syndrome: pathogenesis, diagnosis, treatment and prognosis. Nat Rev Neurol. 2014;10(8):469-482. Doi:10.1038/nrneurol.2014.121
25. Hughes, R. A. Guillain–Barré Syndrome p.124–130 Springer-Verlag, 1990.
26. Ropper AH, Brown RH. (2005) Adams and Victor's Principles of Neurology (Eighth edit). New York: McGraw-Hill Medical. p. 1110 – 1177
27. Kuwabara S, Yuki N. Axonal Guillain-Barré syndrome: concepts and controversies. Lancet Neurol. 2013;12(12):1180-1188. Doi:10.1016/S1474-4422(13)70215-1
28. Yuki N, Kokubun N, Kuwabara S, et al. Guillain-Barré syndrome associated with normal or exaggerated tendon reflexes. J Neurol. 2012;259(6):1181-1190. Doi:10.1007/s00415-011-6330-4
29. Capasso M, Caporale CM, Pomilio F, et al. Acute motor conduction block neuropathy Another Guillain-Barré syndrome variant. Neurology. 2003;61(5):617-622. Doi:10.1212/wnl.61.5.617
30. Uncini A, Zappasodi F, Notturno F. Electrodiagnosis of GBS subtypes by a single study: not yet the squaring of the circle. J Neurol Neurosurg Psychiatry. 2015;86(1):5-8. Doi:10.1136/jnnp-2014-308220
31. Kuwabara S, Yuki N, Koga M, et al. IgG anti-GM1 antibody is associated with reversible conduction failure and axonal degeneration in Guillain-Barré syndrome. Ann Neurol. 1998;44(2):202-208. Doi:10.1002/ana.410440210
32. Griffin JW, Li CY, Ho TW, et al. Pathology of the motor-sensory axonal Guillain-Barré syndrome. Ann Neurol. 1996;39(1):17-28. Doi:10.1002/ana.410390105
33. Fisher M. An unusual variant of acute idiopathic polyneuritis (syndrome of ophthalmoplegia, ataxia and areflexia). N Engl J Med. 1956;255(2):57-65. Doi:10.1056/NEJM195607122550201
34. Mori M, Kuwabara S, Yuki N. Fisher syndrome: clinical features, immunopathogenesis and management. Expert Rev Neurother. 2012;12(1):39-51. Doi:10.1586/ern.11.182
35. Chiba A, Kusunoki S, Shimizu T, et al. Serum IgG antibody to ganglioside GQ1b is a possible marker of Miller Fisher syndrome. Ann Neurol. 1992;31(6):677-679. Doi:10.1002/ana.410310619

36. Ryabinkina YV, Piradov MA, Gnedovskaya EV, Suponeva NA, Prokazova PR. Zh Nevrol Psikhiatr Im S S Korsakova. 2016;116(5):13-18. doi:10.17116/jnevro20161165113-18
37. Hughes RA, Wijdicks EF, Benson E, et al. Supportive care for patients with Guillain-Barré syndrome. Arch Neurol. 2005;62(8):1194-1198. doi:10.1001/archneur.62.8.1194
38. Hund EF, Borel CO, Cornblath DR, et al. Intensive management and treatment of severe Guillain-Barré syndrome. Crit Care Med. 1993;21(3):433-446. Doi:10.1097/00003246-199303000-00023
39. Mehta S. Neuromuscular disease causing acute respiratory failure. Respir Care. 2006;51(9):1016-1023.
40. Pearse RM, Draper A, Grounds RM. Non-invasive ventilation to avoid tracheal intubation in a patient with Guillain-Barré syndrome. Br J Anaesth. 2003;91(6):913-916. Doi:10.1093/bja/aeg252
41. Vianello A, Bevilacqua M, Arcaro G, et al. Non-invasive ventilatory approach to treatment of acute respiratory failure in neuromuscular disorders. A comparison with endotracheal intubation. Intensive Care Med. 2000;26(4):384-390. Doi:10.1007/s001340051171
42. Craig VJ. Ford V. Chakrabarti B. Non Invasive Ventilation In The Weaning Of Patients With Acute Guillain Barre Syndrome Requiring Invasive Ventilation. Am J Respir Crit Care Med 2017;195:A3691
43. Yavagal DR, Mayer SA. Respiratory complications of rapidly progressive neuromuscular syndromes: Guillain-Barré syndrome and myasthenia gravis. Semin Respir Crit Care Med. 2002;23(3):221-229. Doi:10.1055/s-2002-33030
44. Shang P, Zhu M, Baker M, et al. Mechanical ventilation in Guillain-Barré syndrome. Expert Rev Clin Immunol. 2020;16(11):1053-1064.
45. Wongsurakiat P, Pierson DJ, Rubenfeld GD. Changing pattern of ventilator settings in patients without acute lung injury: changes over 11 years in a single institution. Chest. 2004;126(4):1281-1291.
46. Ali MI, Fernández-Pérez ER, Pendem S, et al. Mechanical ventilation in patients with Guillain-Barré syndrome. Respir Care. 2006;51(12):1403-1407.
47. Nguyen TN, Badjatia N, Malhotra A, et al. Factors predicting extubation success in patients with Guillain-Barré syndrome. Neurocrit Care. 2006;5(3):230-234. Doi:10.1385/NCC:5:3:230
48. Walgaard C, Lingsma HF, van Doorn PA, et al. Tracheostomy or Not: Prediction of Prolonged Mechanical Ventilation in Guillain-Barré Syndrome. Neurocrit Care. 2017;26(1):6-13. Doi:10.1007/s12028-016-0311-5
49. Greene-Chandos D, Torbey M. Critical Care of Neuromuscular Disorders. Continuum (Minneap Minn). 2018;24(6):1753-1775.
50. Cortese I, Chaudhry V, So YT, et al. Evidence-based guideline update: Plasmapheresis in neurologic disorders: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology. 2011;76(3):294-300.
51. Appropriate number of plasma exchanges in Guillain-Barré syndrome. The French Cooperative Group on Plasma Exchange in Guillain-Barré Syndrome. Ann Neurol. 1997;41(3):298-306. Doi:10.1002/ana.410410304
52. Türk Nöroloji Derneği. Guillain-Barré Sendromunda Tedavi Rehberi (01/12/2021 tarihinde https://www.noroloji.org.tr/TNDData/Uploads/files/GBS%20Tedavi%20Rehberi.pdf adresinden ulaşılmıştır).
53. Efficiency of plasma exchange in Guillain-Barré syndrome: role of replacement fluids. French Cooperative Group on Plasma Exchange in Guillain-Barré syndrome. Ann Neurol. 1987;22(6):753-761.
54. Hughes RA, Swan AV, van Doorn PA. Intravenous immunoglobulin for Guillain-Barré syndrome. Cochrane Database Syst Rev. 2014;2014(9):CD002063. Published 2014 Sep 19.
55. Randomised trial of plasma exchange, intravenous immunoglobulin, and combined treatments in Guillain-Barré syndrome. Plasma Exchange/Sandoglobulin Guillain-Barré Syndrome Trial Group. Lancet. 1997 Jan 25;349(9047):225-30. PMID: 9014908
56. Brennan VM, Salomé-Bentley NJ, Chapel HM; Immunology Nurses Study. Prospective audit of adverse reactions occurring in 459 primary antibody-deficient patients receiving intravenous immunoglobulin. Clin Exp Immunol. 2003;133(2):247-251.
57. Dalakas MC. The use of intravenous immunoglobulin in the treatment of autoimmune neuromuscular diseases: evidence-based indications and safety profile. Pharmacol Ther. 2004;102(3):177-193.

58. Dalakas MC. High-dose intravenous immunoglobulin and serum viscosity: risk of precipitating thromboembolic events. Neurology. 1994;44(2):223-226. Doi:10.1212/wnl.44.2.223
59. Ahsan N. Intravenous immunoglobulin induced-nephropathy: a complication of IVIG therapy. J Nephrol. 1998;11(3):157-161.
60. Ellie E, Combe C, Ferrer X. High-dose intravenous immune globulin and acute renal failure. N Engl J Med. 1992;327(14):1032-1033. Doi:10.1056/nejm199210013271416
61. Björkander J, Hammarström L, Smith CI, et al. Immunoglobulin prophylaxis in patients with antibody deficiency syndromes and anti-IgA antibodies. J Clin Immunol. 1987;7(1):8-15. Doi:10.1007/BF00915419
62. Burks AW, Sampson HA, Buckley RH. Anaphylactic reactions after gamma globulin administration in patients with hypogammaglobulinemia. Detection of IgE antibodies to IgA. N Engl J Med. 1986;314(9):560-564. Doi:10.1056/NEJM198602273140907
63. Elovaara I, Apostolski S, van Doorn P, et al. EFNS guidelines for the use of intravenous immunoglobulin in treatment of neurological diseases: EFNS task force on the use of intravenous immunoglobulin in treatment of neurological diseases [published correction appears in Eur J Neurol. 2009 Apr;16(4):547]. Eur J Neurol. 2008;15(9):893-908. Doi:10.1111/j.1468-1331.2008.02246.x
64. Walgaard C, Jacobs BC, Lingsma HF, et al. Second intravenous immunoglobulin dose in patients with Guillain-Barré syndrome with poor prognosis (SID-GBS): a double-blind, randomised, placebo-controlled trial. Lancet Neurol. 2021;20(4):275-283.
65. Kleyweg RP, van der Meché FG. Treatment related fluctuations in Guillain-Barré syndrome after high-dose immunoglobulins or plasma-exchange. J Neurol Neurosurg Psychiatry. 1991;54(11):957-960. doi:10.1136/jnnp.54.11.957
66. Osterman PO, Fagius J, Säfwenberg J, Wikström B. Early relapse of acute inflammatory polyradiculoneuropathy after successful treatment with plasma exchange. Acta Neurol Scand. 1988;77(4):273-277. doi:10.1111/j.1600-0404.1988.tb05909.x
67. van Doorn PA, Ruts L, Jacobs BC. Clinical features, pathogenesis, and treatment of Guillain-Barré syndrome. Lancet Neurol. 2008;7(10):939-950. doi:10.1016/S1474-4422(08)70215-1
68. Verboon C, van Doorn PA, Jacobs BC. Treatment dilemmas in Guillain-Barré syndrome. J Neurol Neurosurg Psychiatry. 2017;88(4):346-352. doi:10.1136/jnnp-2016-314862
69. van der Meché FG, Schmitz PI. A randomized trial comparing intravenous immune globulin and plasma exchange in Guillain-Barré syndrome. Dutch Guillain-Barré Study Group. N Engl J Med. 1992;326(17):1123-1129. doi:10.1056/NEJM199204233261705
70. Hughes RA, Brassington R, Gunn AA, van Doorn PA. Corticosteroids for Guillain-Barré syndrome. Cochrane Database Syst Rev. 2016;10(10):CD001446. Published 2016 Oct 24.

71. van Koningsveld R, Schmitz PI, Meché FG, et al. Effect of methylprednisolone when added to standard treatment with intravenous immunoglobulin for Guillain-Barré syndrome: randomised trial. Lancet. 2004;363(9404):192-196. doi:10.1016/s0140-6736(03)15324-x
72. Bernsen RA, Jacobs HM, de Jager AE, et al. Residual health status after Guillain-Barré syndrome. J Neurol Neurosurg Psychiatry. 1997;62(6):637-640. Doi:10.1136/jnnp.62.6.637
73. de Jager AE, Minderhoud JM. Residual signs in severe Guillain-Barré syndrome: analysis of 57 patients. J Neurol Sci. 1991;104(2):151-156. Doi:10.1016/0022-510x(91)90304-p
74. Wu X, Li C, Zhang B, et al. Predictors for mechanical ventilation and short-term prognosis in patients with Guillain-Barré syndrome. Crit Care. 2015;19(1):310. Published 2015 Sep 2. Doi:10.1186/s13054-015-1037-z
75. González-Suárez I, Sanz-Gallego I, Rodríguez de Rivera FJ, Arpa J. Guillain-Barré syndrome: natural history and prognostic factors: a retrospective review of 106 cases. BMC Neurol. 2013;13:95. Published 2013 Jul 22. Doi:10.1186/1471-2377-13-95
76. Walgaard C, Lingsma HF, Ruts L, et al. Prediction of respiratory insufficiency in Guillain-Barré syndrome. Ann Neurol. 2010;67(6):781-787. Doi:10.1002/ana.21976
77. Luo H, Hong S, Li M, et al. Risk factors for mechanical ventilation in children with Guillain-Barré syndrome. Muscle Nerve. 2020;62(2):214-218. Doi:10.1002/mus.26905
78. Umer SR, Nisa Q, Kumari M, et al. Clinical Features Indicating the Need for Mechanical Ventilation in Patients with Guillain Barre Syndrome. Cureus. 2019;11(8):e5520. Published 2019 Aug 29. Doi:10.7759/cureus.5520
79. van den Berg B, Bunschoten C, van Doorn PA, et al. Mortality in Guillain-Barre syndrome. Neurology. 2013;80(18):1650-1654. doi:10.1212/WNL.0b013e3182904fcc
80. Randomised trial of plasma exchange, intravenous immunoglobulin, and combined treatments in Guillain-Barré syndrome. Plasma Exchange/Sandoglobulin Guillain-Barré Syndrome Trial Group. Lancet. 1997 Jan 25;349(9047):225-30. PMID: 9014908
81. Alshekhlee A, Hussain Z, Sultan B, et al. Guillain-Barré syndrome: incidence and mortality rates in US hospitals. Neurology. 2008;70(18):1608-1613. doi:10.1212/01.wnl.0000310983.38724.d4
82. Domínguez-Moreno R, Tolosa-Tort P, Patiño-Tamez A, et al. Mortalidad asociada al diagnóstico de síndrome de Guillain-Barré en adultos ingresados en instituciones del sistema sanitario Mexicano [Mortality associated with a diagnosis of Guillain-Barré syndrome in adults of Mexican health institutions]. Rev Neurol. 2014;58(1):4-10.
83. Chiò A, Cocito D, Leone M, et al. Guillain-Barré syndrome: a prospective, population-based incidence and outcome survey. Neurology. 2003;60(7):1146-1150. Doi:10.1212/01.wnl.0000055091.96905.d0

BÖLÜM 9

NÖROMUSKULER KAVŞAK HASTALIKLARINDA ACİL YAKLAŞIMLAR

Aysun Hatice AKÇA KARPUZOĞLU[1]

Nöromuskuler kavşak hastalıklarına acil yaklaşımı değerlendirmeden önce nöromuskuler bileşke organizayonunu, fizyolojisini, hastalıklarını anlamak önemlidir.

NÖROMUSKULER KAVŞAK ORGANİZASYONU VE FİZYOLOJİSİ

Nöromuskuler kavşak organizasyonu: Medulla spinalis ön boynuz motor nöronlarından çıkan miyelinli sinir lifleri çizgili kasları innerve eder. Her sinir lifi kasa girince miyelinini kaybedip, pekçok uç dala ayrılır. Miyelinsiz uç dallar sinir iletim yüzeyini genişletmek için genişler ve 'Terminal buton' olarak adlandırılır. Terminal buton ve kas lifi(iletimi kolaylaştırmak için girinti ve çıkıntılardan oluşur) birlikte, biyoelektriksel aktivitesiyle özelleşmiş motor son plak - Nöromuskuler kavşağı(NMK) oluştururlar. Sinir liflerinin terminal dalları(presinaptik membran), kas lifi (postsinaptik membran), sinir kas kavşağı denen bir bağlantı bölgesi–sinaps alanından (sinaptik aralık) oluşur.

Nöromuskuler kavşak fizyoljisi (Şekil 1a): Presinaptik membranda yaklaşık 100.000 asetil kolin (ACh) vezikülü bulunmaktadır. Her bir ACh vezikülünde, yaklaşık olarak 10.000 kadar ACh molekülü bulunmaktadır. Genel olarak, bir aksiyon potansiyeli 50-300 ACh vezikülünün ekzositozuyla sonuçlanır(1); bu, postsinaptik ACh reseptör eşiğine ulaşmak için gereken ACh miktarının yaklaşık 10 katını temsil eder. Bu fazla salınınan miktara güvenlik faktörü denir(2).

Aksiyon potansiyeli terminal butona ulaştığında, buradaki voltaj kapılı kalsiyum kanalları(VGCC) hızla açılır, hücre içi Ca+2 artışı olur. Presinaptik alandaki

[1] Uzm. Dr., Konya Özel Medova Hastanesi, Nöroloji Kliniği, aysunakca2000@gmail.com

Ülkemizde halen at kaynaklı trivalan yapıda A, B ve E tipi toksinlere karşı üretilmiş antitoksin kullanılmaktadır. Mevcut antitoksin 250 ml'lik şişelerde olup, 750 IU/ml tip A, 500 IU/ml tip B, 50 IU/ml tip E içermektedir. Bu antitoksin sağlık bakanlığı bünyesinde faaliyet gösteren Ulusal Zehir Danışma Merkezi(UZEM) danışmalığında 15 il ve 21 stok merkezi hastane aracılığı ile hastalara en hızlı şekilde ulaştırılmaktadır.

KAYNAKLAR

1. Rizzoli SO, Betz WJ. Synaptic vesicle pools. Nat Rev Neurosci 2005;6: 57-69. doi:10.1038/nrn1583
2. Wood SJ, Slater CR. Safety factor at the neuromuscular junction. Prog Neurobiol. 2001;64:393-429. doi: 10.1016/S0301-0082(00)00055-1
3. Zucker RS, Kullmann DM, Kaeser PS. Release of Neurotransmitters(Chapter 15). Byrne JH, Heidelberger R, Waxham MN (ed.) From Molecules to Networks II(third edition). Elsevier Inc; 2014 443-488. doi: 10.1016/B978-0-12-397179-1.00015-4
4. Rizo, J, Xu, J. The synaptic vesicle release machinery. Annu. Rev. Biophys. 2015; 44: 339–367. doi: 10.1146/annurev-biophys-060414-034057
5. Lee S, Shin J, Jung Y, et al. Munc18-1 induces conformational changes of syntaxin-1 in multiple intermediates for SNARE assembly. Sci Rep. 2020;10: 11623.doi: 10.1038/s41598-020-68476-3
6. Trinidad JC. Synaptosomes and Synaptic Vesicles. Bradshaw R, Stahl P (ed). Encyclopedia of Cell Biology II. Elsevier Inc. 2016. 293–301. doi:10.1016/B978-0-12-394447-4.20025-4
7. Ramakrishnan S, Bera M, Coleman J. Synergistic roles of Synaptotagmin-1 and complexin in calcium- regulated neuronal exocytosis. Elife. 2020; 9: 2-18. doi: 10.7554/eLife.54506
8. Ohkawara B, Ito M, Ohno K. Secreted Signaling Molecules at the Neuromuscular Junction in Physiology and Pathology. Int J Mol Sci. 2021; 22(5): 2455. doi: 10.3390/ijms22052455
9. Lindstrom JM. Acetylcholine receptors and myasthenia. Muscle & Nerve. 2000; 23(4), 453–477. doi:10.1002/(sici)1097-4598(200004)23:4<453::aid-mus3>3.0.co;2-o
10. Mazman S, Odabaşı Z. Nöromusküler kavşak fizyolojisi. Tanrıdağ T(ed.), Nöromusküler Kavşak hastalıkları, Türkiye klinikleri, 2019; özel sayı: 6-15
11. Nishimune H, Shigemoto K. Practical Anatomy of the Neuromuscular Junction in Health and Disease. Neurologic Clinics. 2018; 36(2), 231–240. doi:10.1016/j.ncl.2018.01.009
12. Carr AS, Cardwell CR, McCarron PO, et al. A systematic review of population based epidemiological studies in Myasthenia Gravis. BMC Neurol. 2010; 10: 46-54. doi: 10.1186/1471-2377-10-46
13. Gilhus NE. Autoimmune myasthenia gravis. Expert Review of Neurotherapeutics. 2009; 9(3): 351–8. doi: 10.1586/14737175.9.3.351
14. Bubuioc AM, Kudebayeva A, Turuspekova S. The epidemiology of myasthenia gravis. Journal of medicine and life. 2021; 14: 7-16. doi: 10.25122/jml-2020-0145
15. Narayanaswami P, Sanders DB, Wolfe G, et al. International consensus guidance for management of myasthenia gravis: 2020 update. Neurology.2021, 96 (3) 114-122; doi: 10.1212/WNL.0000000000011124
16. Avidan N, Panse RL, Berrih-Aknin S. Genetic basis of myasthenia gravis– A comprehensive review. Journal of Autoimmunity. 2014; 52: 146-153. doi: 10.1016/j.jaut.2013.12.001
17. Lopomo A, Berrih-Aknin S. Autoimmune thyroiditis and myasthenia gravis. Front Endocrinol. 2017; 8: 1–8. doi: 10.3389/fendo.2017.00169
18. Nancy P, Berrih-Aknin S. Differential estrogen receptor expression in autoimmune myasthenia gravis. Endocrinology. 2005;146(5):2345–53. doi: 10.1210/en.2004-1003
19. Silva JAPD. Sex hormones and glucocorticoids: Interactions with the immune system. Annals of the New York Academy of Sciences. 1999; 876: 102–18.doi:10.1111/j.1749-6632.1999.tb07628.x
20. Restivo DA, Centonze D, Alesina A, et al. Myasthenia Gravis Associated With SARS-CoV-2 Infection. Ann Intern Med. 2020; 2: 2019–20. doi:10.7326/L20-0845
21. Nemet AY, Kaiserman I, Mimouni M, et al. High prevalence of myasthenia gravis among rural adult populations. J Clin Neuromuscul Dis. 2014;16(2):47–50. doi:10.1097/CND. 0000000000000054

22. Samih M, Ahami AOT. Excessive pesticide use likely to cause the onset of Myasthenia gravis in the Moroccan agricultural population. Pakistan J Biol Sci. 2020;23(7):917–21. doi: 10.3923/pjbs.2020.917.921
23. Dresser L, Wlodarski R, Rezania K, et al. Myasthenia Gravis: Epidemiology, Pathophysiology and Clinical Manifestations. Jour Clin Med. 2021; 10(11): 2235. doi: 10.3390/jcm10112235
24. Gilhus NE, Verschuuren JJ. Myasthenia gravis: subgroup classification and therapeutic strategies. Lancet Neurol. 2015;14(10):1023–36. doi:10.1016/S1474-4422(15)00145-3
25. Szczudlik P, Szyluk B, Lipowska M, et al. Antititin Antibody in Early- and Late-Onset Myasthenia Gravis. Acta Neurol. Scand. 2014;130:229–233. doi: 10.1111/ane.12271
26. Kufukihara K, Watanabe Y, Inagaki T, et al. Cytometric Cell-Based Assays for Anti-Striational Antibodies in Myasthenia Gravis with Myositis and/or Myocarditis. Sci. Rep. 2019;9:5284. doi: 10.1038/s41598-019-41730-z
27. Guptill JT, Sanders DB, Evoli A. Anti-MuSK antibody myasthenia gravis: clinical findings and response to treatment in two large cohorts. Muscle Nerve. 2011;44(1):36–40. doi: 10.1002/mus.22006
28. Rodolico C, Toscano A, Autunno M. Limb-girdle myasthenia: clinical, electrophysiological and morphological features in familial and autoimmune cases. Neuromuscular Disorders. 2002; 12: 964–969. doi:10.1016/s0960-8966(02)00137-2
29. Nair AG, Patil-Chhablani P, Venkatramani DV, et al. Ocular myasthenia gravis: A review. Indian J Ophthalmol. 2014; 62(10): 985–991. doi: 10.4103/0301-4738.145987
30. Bekircan-Kurt CE, Kurne A, Erdem Ozdamar S, et al. Myasthenia gravis; single entity, variable clinical features: Ten years of clinical experience in a tertiary care center ten years clinical experience of a tertiary care center. J Neurol Sci-Turk. 2013;30:135-43.
31. Godoy DA, Mello LJ, Masotti L, et al. The myasthenic patient in crisis: an update of the management in Neurointensive care unit. Arq Neuropsiquiatr. 2013;71(9A):627–639. doi: 10.1590/0004-282X2013010
32. Wendell LC, Levine JM. Myasthenic crisis. Neurohospitalist. 2011;1:16-22. doi: 10.1177/1941875210382918
33. König N, Stetefeld HR, Dohmen C, et al. MuSK-antibodies are associated with worse outcome in myasthenic crisis requiring mechanical ventilation. J Neurol. 2021; 268(12):4824–4833. 2021 May 10. doi: 10.1007/s00415-021-10603-9
34. Neumann B, Angstwurm K, Mergenthaler P, et al. Myasthenic crisis demanding mechanical ventilation: a multicenter analysis of 250 cases. Neurology. 2020;94(3):299–313. doi:10.1212/WNL.0000000000008688
35. Stetefeld H, Schroeter M. SOP myasthenic crisis. Neurological Research and Practice. 2019;1(1):19-24. doi:10.1186/s42466-019-0023-3
36. Lacomis D. Myasthenic crisis. Neurocrit Care. 2005;3:189–194. doi:10.1385/NCC:3:3:189
37. Elsheikh B, Arnold WD, Gharibshahi S, et al. Correlation of single-breath count test and neck flexor muscle strength with spirometry in myasthenia gravis. Muscle Nerve. 2016;53: 134-6. doi:10.1002/mus.24929
38. Alshekhlee A, Miles JD, Katirji B, et al. Incidence and mortality rates of myasthenia gravis and myasthenic crisis in us hospitals. Neurology. 2009; 72: 1548-54. doi:10.1212/WNL.0b013e3181a41211
39. Baraka A. Anaesthesia and myasthenia gravis. Can J Anaesth. 1992;39:476–486.
40. Thomas CE, Mayer SA, Gungor Y, et al. Myasthenic crisis: clinical features, mortality, complications, and risk factors for prolonged intubation. Neurology. 1997;48:1253–1260. doi:10.1212/WNL.48.5.1253
41. Rabinstein AA, Mueller-Kronast N. Risk of extubation failure in patients with myasthenic crisis. Neurocrit Care. 2005;3:213–215. doi:10.1385/NCC:3:3:213
42. Wu JY, Kuo PH, Fan PC, et al. The role of non-invasive ventilation and factors predicting extubation outcome in myasthenic crisis. Neurocrit Care. 2009;10:35–42. doi: 10.1007/s12028-008-9139-y
43. O'Riordan JI, Miller DH, Mottershead JP, et al. The management and outcome of patients with myasthenia gravis treated acutely in a neurological intensive care unit. Eur J Neurol. 1998;5:137–142. doi:10.1046/j.1468-1331.1998.520137.x
44. Seneviratne J, Mandrekar J, Wijdicks EF, et al. Predictors of extubation failure in myasthenic crisis. Arch Neurol. 2008;65:929–933. doi:10.1001/archneur.65.7.929

45. Varelas PN, Chua HC, Natterman J, et al. Ventilatory care in myasthenia gravis crisis: assessing the baseline adverse event rate. Crit Care Med. 2002;30:2663–2668.
46. Seneviratne J, Mandrekar J, Wijdicks EF, et al. Noninvasive Ventilation in Myasthenic Crisis. Arch Neurol . 2008; 65 :54–58. doi:10.1001/archneurol.2007.1
47. Ciafaloni E. Myasthenia gravis and congenital myasthenic syndromes. Continuum. 2019; 25(6): 1767-1784. doi: 10.1212/CON.0000000000000800.
48. Sonkar KK, Bhoi SK, Dubey D, et al. Direct and indirect cost of myasthenia gravis: a prospective study from a tertiary care teaching hospital in India. J Clin Neurosci. 2017;38:114–117. doi: 10.1016/j.jocn.2016.11.003.
49. Prado MB, Adiao KJ. Acetylcholinesterase Inhibitors in Myasthenic Crisis: A Systematic Review of Observational Studies. Neurocrit Care. 2021;22 :1–17. doi: 10.1007/s12028-021-01259-4
50. Sonkar KK, Bhoi SK, Dubey D, et al. Direct and indirect cost of myasthenia gravis: a prospective study from a tertiary care teaching hospital in India. J Clin Neurosci. 2017;38:114–117. doi: 10.1016/j.jocn.2016.11.003.
51. Mishra SK, Krishnappa S, Bhat RR. Role of intermittent noninvasive ventilation in anticholinesterase dose adjustment for myasthenic crisis. Acta Anaesthesiol Taiwanica. 2010;48(1):53–54. doi: 10.1016/S1875-4597(10)60012-4
52. Comerci G, Buffon A, Biondi-Zoccai GGL, et al. Coronary vasospasm secondary to hypercholinergic crisis: An iatrogenic cause of acute myocardial infarction in myasthenia gravis. Int J Cardiol. 2005; 103 (3):335–337. doi:10.1016/j.ijcard.2004.06.026
53. Shivamurthy P, Parker MW. Cardiac manifestations of myasthenia gravis: A systematic review. IJC Metab Endokr. 2014; 5 :3–6. doi:10.1016/j.ijcme.2014.08.003
54. Ahmed S, Kirmani JF, Janjua N, et al. An update on myasthenic crisis. Curr Treat Options Neurol. 2005 Mar;7(2):129–141. doi: 10.1007/s11940-005-0022-2
55. Jani-Acsadi A, Lisak RP. Myasthenic crisis: guidelines for prevention and treatment. J Neurol Sci. 2007;261(1–2):127–133. doi: 10.1016/j.jns.2007.04.045
56. Ipe TS, Davis AR, Raval JS. Therapeutic Plasma Exchange in Myasthenia Gravis: A Systematic Literature Review and Meta-Analysis of Comparative Evidence. Front Neurol. 2021;12. doi:10.3389/fneur.2021.662856
57. Dogra A, Rana K, Rathod C, et al. Outcome of therapeutic plasma exchange in Myasthenia gravis patients. J Family Med Prim Care. 2020; 9(12):5971-5975. doi: 10.4103/jfmpc.jfmpc_1026_20
58. Titulaer MJ, Lang B and Verschuuren JJ. Lambert-Eaton myasthenic syndrome: from clinical characteristics to therapeutic strategies. Lancet Neurol. 2011;10(12):1098-107. doi: 10.1016/S1474-4422(11)70245-9
59. Nicolle MW. Myasthenia gravis and Lambert Eaton myasthenic syndrome. Continuum 2016;22(6):1978-2005. doi: 10.1212/CON.0000000000000415
60. Wirtz PW, Nijnuis MG, Sotodeh M, et al. Dutch Myasthenia Study Group. The epidemiology of myasthenia gravis, Lambert-Eaton myasthenic syndrome and their associated tumours in the northern part of the province of South Holland. J. Neurol. 2003;250:698–701. doi: 10.1007/s00415-003-1063-7
61. Baslo MB, Deymeer F, Serdaroglu P, et al. Decrement pattern in Lambert-Eaton myasthenic syndrome is different from myasthenia gravis. Neuromuscul. Disord. 2006;16:454–458. doi: 10.1016/j.nmd.2006.05.009
62. Sanders DB, Cao L, Massey JM, et al. Is the decremental pattern in Lambert-Eaton syndrome different from that in myasthenia gravis? Clin. Neurophysiol. 2014;125:1274–1277. doi: 10.1016/j.clinph.2013.11.007
63. Rao AK, Sobel J, Stephens KC, et al. Clinical Guidelines for Diagnosis and Treatment of Botulism, 2021. MMWR Recomm Rep. 2021; 70(2): 1–30. doi: 10.15585/mmwr.rr7002a1
64. Humeau Y, Doussau F, Grant NJ, et al. How botulinum and tetanus neurotoxins block neurotransmitter release. Biochimie 2000;82:427–46. doi:10.1016/S0300-9084(00)00216
65. Rosow LK, Strober JB. Infant botulism: review and clinical update. Pediatr Neurol. 2015; 52(5):487-92. doi: 10.1016/j.pediatrneurol.2015.01.006
66. Rossetto O, Pirazzini M, Montecucco C. Botulinum neurotoxins: genetic, structural and mechanistic insights. Nat Rev Microbiol. 2014; 12(8):535-49. doi: 10.1038/nrmicro3295
67. Woodruff BA, Griffin PM, McCroskey LM, et al. Clinical and laboratory comparison of botulism from toxin types A, B, and E in the United States, 1975–1988. J Infect Dis 1992;166:1281–6. doi: 10.1093/infdis/166.6.1281

68. Chatham-Stephens K, Fleck-Derderian S, Johnson SD, et al. Clinical features of foodborne and wound botulism: a systematic review of the literature, 1932–2015. Clin Infect Dis 2017;66(suppl_1):11–6. doi:10.1093/cid/cix811
69. Rao AK, Lin NH, Griese SE, et al. Clinical criteria to trigger suspicion for botulism: an evidence-based tool to facilitate timely recognition of suspected cases during sporadic events and outbreaks. Clin Infect Dis 2017;66(suppl_1):38–42. doi:10.1093/cid/cix814
70. Potulska-Chromik A, Zakrzewska-Pniewska B, Szmidt-Sałkowska E, et al. Long lasting dysautonomia due to botulinum toxin B poisoning: clinical-laboratory follow up and difficulties in initial diagnosis. BMC Res Notes 2013;6:438. doi: 10.1186/1756-0500-6-438
71. Schussler E, Sobel J, Hsu J, et al. Workgroup report by the Joint Task Force Involving American Academy of Allergy, Asthma & Immunology (AAAAI); Food Allergy, Anaphylaxis, Dermatology and Drug Allergy (FADDA) (Adverse Reactions to Foods Committee and Adverse Reactions to Drugs, Biologicals, and Latex Committee); and the Centers for Disease Control and Prevention Botulism Clinical Treatment Guidelines Workgroup—Allergic reactions to botulinum antitoxin: a systematic review. Clin Infect Dis 2017;66(suppl_1):S65–72. doi: 10.1093/cid/cix827

BÖLÜM 10

TRAVMATİK NÖROLOJİK ACİLLERE YAKLAŞIM

Ahmet ÇAĞLAR[1]
Muhammet HACIMUSTAFAOĞLU[2]

Travmatik beyin yaralanması (TBY), maruz kalınan mekanik bir kuvvet sonucu oluşan beyin fonksiyon bozukluğu olarak tanımlanır. Klinik bulgular kısa süreli bilinç bulanıklığından komaya, ciddi nörolojik defisitlere ve ölüme kadar değişebilir. Bu fonksiyon bozukluğu geçici ya da kalıcı şekilde olabilir (1). Kafa travmaları, 25 yaşından küçüklerde travmatik ölümün önde gelen nedenidir. Amerika Birleşik Devletleri'nde her yıl 1,2-2 milyon kişi kafa travmasına maruz kalır. TBY, yıllık 50.000'den fazla ölüm ve 370.000 hastaneye yatıştan sorumludur. Akut ve kronik TBY hastalarının bakımıyla ilişkili maliyetler astronomiktir ve yılda 4 milyar doları aşar (2).

Travma sonrası görülen birincil yaralanmalar kontuzyon, hematom (subdural, epidural, intraparankimal, ventrikül içi ve subaraknoid), diffüz aksonal yaralanma, doğrudan hücresel hasar, doku yırtılma ve kesilmeleri, kan-beyin bariyerinin bozulması, nörokimyasal hemostazın bozulması ve elektrokimyasal fonksiyonların bozulmasını içerir (3). İkincil hasar ise "ikincil nörotoksik kaskad" olarak da adlandırılan, çeşitli nörotransmitterler ile ilişkili olan ve birincil yaralanmanın etkilerinin devam etmesine sebep olan hücresel olaylar zinciridir (4,5). İkincil nörotoksik hasarı hızlandıran ve uzun vadeli sonuçları kötüleştiren diğer sistemik bozukluklarla (örneğin hipotansiyon, hipoksemi gibi sistemik sorunlar) karıştırılmamalıdır (6).

TBY olan hastalarda yeterli kan dolaşımının devamı son derece önemlidir. Se-

[1] Uzm. Dr. Aksaray Eğitim ve Araştırma Hastanesi drcaglar4@gmail.com
[2] Uzm. Dr. Aksaray Eğitim ve Araştırma Hastanesi muhammethmd@gmail.com

KAYNAKLAR

1. Menon DK, Schwab K, Wright DW, et al. Demographics and Clinical Assessment Working Group of the International and Interagency Initiative toward Common Data Elements for Research on Traumatic Brain Injury and Psychological Health. Position statement: definition of traumatic brain injury. Arch Phys Med Rehabil. 2010;91(11):1637-1640. doi:10.1016/j.apmr.2010.05.017
2. Tataris K. Head Injuries. In: Sherman SC, Weber JM, Patwari RG, Schindbeck MA (eds) Clinical Emergency Medicine. New York: McGraw-Hill; 2014. p. 363-370.
3. Taylor CA, Bell JM, Breiding MJ, et al. Traumatic Brain Injury-Related Emergency Department Visits, Hospitalizations, and Deaths - United States, 2007 and 2013. MMWR Surveill Summ. 2017;66(9):1-16. doi:10.15585/mmwr.ss6609a1
4. McIntosh TK, Smith DH, Meaney DF, et al. Neuropathological sequelae of traumatic brain injury: relationship to neurochemical and biomechanical mechanisms. Lab Invest. 1996;74(2):315-342.
5. Goodman JC, Van M, Gopinath SP, et al. Pro-inflammatory and pro-apoptotic elements of the neuroinflammatory response are activated in traumatic brain injury. Acta Neurochir Suppl. 2008;102:437-439. doi:10.1007/978-3-211-85578-2_85
6. Butcher I, Maas AI, Lu J, et al. Prognostic value of admission blood pressure in traumatic brain injury: results from the IMPACT study. J Neurotrauma. 2007;24(2):294-302. doi:10.1089/neu.2006.0032
7. Rangel-Castilla L, Lara LR, Gopinath S, et al. Cerebral hemodynamic effects of acute hyperoxia and hyperventilation after severe traumatic brain injury. J Neurotrauma. 2010;27(10):1853-1863. doi:10.1089/neu.2010.1339
8. Robertson CS. Management of cerebral perfusion pressure after traumatic brain injury. Anesthesiology. 2001;95(6):1513-1517. doi:10.1097/00000542-200112000-00034
9. Wright DW, Merck LH. Head Trauma. In: Tintinalli JE (ed) Tintinalli's Emergency Medicine: A Comprehensive Study Guide. 9th ed. New York: McGraw-Hill; 2016. p. 1695-1711.
10. Stiell IG, Wells GA, Vandemheen K, et al. The Canadian CT Head Rule for patients with minor head injury. Lancet. 2001;357(9266):1391-1396. doi:10.1016/s0140-6736(00)04561-x
11. Haydel MJ, Preston CA, Mills TJ, et al. Indications for computed tomography in patients with minor head injury. N Engl J Med. 2000;343(2):100-105. doi:10.1056/NEJM200007133430204
12. Chesnut RM, Marshall LF, Klauber MR, et al. The role of secondary brain injury in determining outcome from severe head injury. J Trauma. 1993;34(2):216-222. doi:10.1097/00005373-199302000-00006
13. Marmarou A, Lu J, Butcher I, et al. Prognostic value of the Glasgow Coma Scale and pupil reactivity in traumatic brain injury assessed pre-hospital and on enrollment: an IMPACT analysis. J Neurotrauma. 2007;24(2):270-280. doi:10.1089/neu.2006.0029
14. Berry C, Ley EJ, Bukur M, et al. Redefining hypotension in traumatic brain injury. Injury. 2012;43(11):1833-1837. doi:10.1016/j.injury.2011.08.014

15. Tasker RC. Intracranial pressure: influence of head-of-bed elevation, and beyond. Pediatr Crit Care Med. 2012;13(1):116-117. doi:10.1097/PCC.0b013e318219295b
16. Edwards P, Arango M, Balica L, et al. Final results of MRC CRASH, a randomised placebo-controlled trial of intravenous corticosteroid in adults with head injury-outcomes at 6 months. Lancet. 2005;365(9475):1957-1959. doi:10.1016/S0140-6736(05)66552-X
17. Silbergleit R, Lowenstein D, Durkalski V, Conwit R; Neurological Emergency Treatment Trials (NETT) Investigators. RAMPART (Rapid Anticonvulsant Medication Prior to Arrival Trial): a double-blind randomized clinical trial of the efficacy of intramuscular midazolam versus intravenous lorazepam in the prehospital treatment of status epilepticus by paramedics. Epilepsia. 2011;52 Suppl 8(Suppl 8):45-47. doi:10.1111/j.1528-1167.2011.03235.x
18. Smits M, Dippel DW, de Haan GG, et al. Minor head injury: guidelines for the use of CT--a multicenter validation study. Radiology. 2007;245(3):831-838. doi:10.1148/radiol.2452061509
19. Friedman JA, Ebersold MJ, Quast LM. Post-traumatic cerebrospinal fluid leakage. World J Surg. 2001;25(8):1062-1066. doi:10.1007/s00268-001-0059-7
20. King WJ, MacKay M, Sirnick A; Canadian Shaken Baby Study Group. Shaken baby syndrome in Canada: clinical characteristics and outcomes of hospital cases. CMAJ. 2003;168(2):155-159.
21. Ibañez J, Arikan F, Pedraza S, et al. Reliability of clinical guidelines in the detection of patients at risk following mild head injury: results of a prospective study. J Neurosurg. 2004;100(5):825-834. doi:10.3171/jns.2004.100.5.0825
22. Fabbri A, Servadei F, Marchesini G, et al. Clinical performance of NICE recommendations versus NCWFNS proposal in patients with mild head injury. J Neurotrauma. 2005;22(12):1419-1427. doi:10.1089/neu.2005.22.1419
23. Smits M, Dippel DW, de Haan GG, et al. Minor head injury: guidelines for the use of CT--a multicenter validation study. Radiology. 2007;245(3):831-838. doi:10.1148/radiol.2452061509
24. Bazarian JJ, Zhong J, Blyth B, et al. Diffusion tensor imaging detects clinically important axonal damage after mild traumatic brain injury: a pilot study. J Neurotrauma. 2007;24(9):1447-1459. doi:10.1089/neu.2007.0241
25. Bigler ED, Bazarian JJ. Diffusion tensor imaging: a biomarker for mild traumatic brain injury?. Neurology. 2010;74(8):626-627. doi:10.1212/WNL.0b013e3181d3e43a
26. Sabharwal RK, Sanchetee PC, Sethi PK, et al. Chronic traumatic encephalopathy in boxers. J Assoc Physicians India. 1987;35(8):571-573.
27. Omalu BI, Hamilton RL, Kamboh MI, et al. Chronic traumatic encephalopathy (CTE) in a National Football League Player: Case report and emerging medicolegal practice questions. J Forensic Nurs. 2010;6(1):40-46. doi:10.1111/j.1939-3938.2009.01064.
28. Mucha A, Collins MW, Elbin RJ, et al. A Brief Vestibular/Ocular Motor Screening (VOMS) assessment to evaluate concussions: preliminary findings. Am J Sports Med. 2014;42(10):2479-2486. doi:10.1177/0363546514543775

BÖLÜM 11

ENFEKTİF NÖROLOJİK ACİLLERDE TANI VE TEDAVİ YÖNTEMLERİ

Şule ÖZDEMİR ARMAĞAN[1]

Nörolojik acil durumlar, yaşamı tehdit etmesi veya derhal tedavi edilmediği takdirde hastada ciddi morbiditeye sebep olması nedeniyle önem arz etmektedir. Santral sinir sistemi (SSS) enfeksiyonları söz konusu olduğunda, en büyük zorluk, spesifik olmayan semptomlarla başvuran çok sayıda hasta arasında yaşamı tehdit eden nadir bir tanıya sahip hastaları belirlemektir. Tek başına veya birlikte, ateş, baş ağrısı, mental durum değişikliği ve davranış değişiklikleri geniş bir ayırıcı tanıyı kapsar.

Enfektif nörolojik acil olarak değerlendirilen SSS enfeksiyonları; Menenjit, Ensefalit ve Fokal enfeksiyöz kitle lezyonlarıdır (beyin apsesi, subdural ampiyem ve spinal epidural apse).

SSS enfeksiyonları akut veya kronik seyirli olabilir. Biz bu bölümde yetişkinlerde akut gelişen SSS enfeksiyonlarına deyineceğiz.

AKUT BAKTERİYEL MENENJİT

Akut pürülan menenjit olarak da adlandırılır. Mikroorganizmaların, korunma mekanizmaları sınırlı olan subaraknoid mesafeye ulaşmaları ile birlikte menenjit tablosu gelişir. BOS'a yayılım hematojen, komşuluk, anatomik defektten direkt (konjenital, travmatik, cerrahi) ve intranöral yollar ile olabilir. En sık görülen yayılım şekli

[1] Uzm. Dr., Konya Şehir Hastanesi, dr_suleozdemir@hotmail.com

KAYNAKLAR

1. Takhar SS, Ting SA, Camargo CA, et al. U.S. emergency department visits for meningitis, 1993–2008. Acad Emerg Med 2012;19(6):632–9.
2. Castelblanco RL, Lee M, Hasbun R. Epidemiology of bacterial meningitis in the USA from 1997 to 2010: a population-based observational study. Lancet Infect Dis 2014;14(9):813–9.
3. Brouwer MC, de Gans J, Heckenberg SG, et al. Host genetic susceptibility to pneumococcal and meningococcal disease: a systematic review and meta-analysis. Lancet Infect Dis 2009;9:31–44.
4. Brouwer MC, Tunkel AR, van de Beek D. Epidemiology, diagnosis, and antimicrobial treatment of acute bacterial meningitis. Clin Microbiol Rev 2010;23:467–92.
5. Koopmans MM, Brouwer MC, Bijlsma MW, Bovenkerk S, Keijzers W, van der Ende A, et al. Listeria monocytogenes sequence type 6 and increased rate of unfavorable outcome in meningitis: epidemiologic cohort study. Clin Infect Dis 2013;57:247–53.)].
6. van de Beek D, Cabellos C, Dzupova O, et al, ESCMID Study Group for Infections of the Brain (ESGIB). ESCMID guideline: diagnosis and treatment of acute bacterial meningitis. Clin Microbiol Infect. 2016 May;22 Suppl 3:S37-62. doi: 10.1016/j.cmi.2016.01.007. Epub 2016 Apr 7. PMID: 27062097.
7. Bijlsma MW, Brouwer MC, Kasanmoentalib ES, et al. Community-acquired bacterial meningitis in adults in the Netherlands, 2006-14: a prospective cohort study. Lancet Infect Dis 2016; 16:339.
8. Bodilsen J, Dalager-Pedersen M, Schonheyder HC, Nielsen H. Dexamethasone treatment and prognostic factors in communityacquired bacterial meningitis: a Danish retrospective populationbased cohort study. Scand J Infect Dis 2014;46:418–25.
9. van de Beek D, de Gans J, Spanjaard L, Weisfelt M, Reitsma JB, Vermeulen M. Clinical features and prognostic factors in adults with bacterial meningitis. N Engl J Med 2004;351:1849–59.
10. Sigurdardottir B, Bjornsson OM, Jonsdottir KE, Erlendsdottir H, Gudmundsson S. Acute bacterial meningitis in adults. A 20-year overview. Arch Intern Med 1997;157:425–30.
11. Weisfelt M, van de Beek D, Spanjaard L, et al. Community-acquired bacterial meningitis in older people. J Am Geriatr Soc 2006; 54:1500.
12. Aronin SI, Peduzzi P, Quagliarello VJ. Community-acquired bacterial meningitis: risk stratification for adverse clinical outcome and effect of antibiotic timing. Ann Intern Med 1998; 129:862.
13. Attia J, Hatala R, Cook DJ, Wong JG. The rational clinical examination. Does this adult patient have acute meningitis? JAMA 1999; 282:175.
14. Brouwer MC, Thwaites GE, Tunkel AR, van de Beek D. Dilemmas in the diagnosis of acute community-acquired bacterial meningitis. Lancet 2012;380:1684–92.
15. Zoons E, Weisfelt M, de Gans J, et al. Seizures in adults with bacterial meningitis. Neurology 2008; 70:2109.
16. Schut ES, Lucas MJ, Brouwer MC, et al. Cerebral infarction in adults with bacterial meningitis. Neurocrit Care 2012; 16:421.
17. Mylonakis E, Hohmann EL, Calderwood SB. Central nervous system infection with Listeria monocytogenes. 33 years' experience at a general hospital and review of 776 episodes from the literature. Medicine (Baltimore) 1998; 77:313.
18. Weisfelt M, van de Beek D, Spanjaard L, de Gans J. Arthritis in adults with community-acquired bacterial meningitis: a prospective cohort study. BMC Infect Dis 2006; 6:64.
19. Thomas KE, Hasbun R, Jekel J, Quagliarello VJ. The diagnostic accuracy of Kernig's sign, Brudzinski's sign, and nuchal rigidity in adults with suspected meningitis. Clin Infect Dis 2002; 35:46.
20. Uchihara T, Tsukagoshi H. Jolt accentuation of headache: the most sensitive sign of CSF pleocytosis. Headache 1991; 31:167.
21. Tamune H, Takeya H, Suzuki W, et al. Absence of jolt accentuation of headache cannot accurately rule out meningitis in adults. Am J Emerg Med 2013; 31:1601.
22. Kaplan SL. Clinical presentations, diagnosis, and prognostic factors of bacterial meningitis. Infect Dis Clin North Am 1999; 13:579.
23. Brouwer MC, van de Beek D, Heckenberg SG, et al. Hyponatraemia in adults with community-acquired bacterial meningitis. QJM 2007; 100:37.
24. Rogers T, Sok K, Erickson T, et al. Impact of Antibiotic Therapy in the Microbiological Yield of Healthcare-Associated Ventriculitis and Meningitis. Open Forum Infect Dis 2019; 6:ofz050.
25. Hasbun R, Abrahams J, Jekel J,et al. Computed tomography of the head before lumbar puncture in adults with suspected meningitis. N Engl J Med 2001; 345:1727.

26. Tunkel AR, Hartman BJ, Kaplan SL, et al. Practice guidelines for the management of bacterial meningitis. Clin Infect Dis 2004; 39:1267.
27. Salazar L, Hasbun R. Cranial Imaging Before Lumbar Puncture in Adults With Community-Acquired Meningitis: Clinical Utility and Adherence to the Infectious Diseases Society of America Guidelines. Clin Infect Dis 2017; 64:1657.
28. Durand ML, Calderwood SB, Weber DJ, et al. Acute bacterial meningitis in adults. A review of 493 episodes. N Engl J Med 1993; 328:21.
29. van de Beek D, Brouwer M, Hasbun R, et al. Community-acquired bacterial meningitis. Nat Rev Dis Primers 2016; 2:16074.
30. Spanos A, Harrell FE Jr, Durack DT. Differential diagnosis of acute meningitis. An analysis of the predictive value of initial observations. JAMA 1989; 262:2700.
31. Montes K, Jenkinson H, Habib OB, et al. Corrected white blood cell count, cell index, and validation of a clinical model for the diagnosis of health care-associated ventriculitis and meningitis in adults with intracranial hemorrhage. Clin Neurol Neurosurg 2019; 178:36.
32. Sakushima K, Hayashino Y, Kawaguchi T, et al. Diagnostic accuracy of cerebrospinal fluid lactate for differentiating bacterial meningitis from aseptic meningitis: a meta-analysis. J Infect 2011; 62:255.
33. Huy NT, Thao NT, Diep DT, et al. Cerebrospinal fluid lactate concentration to distinguish bacterial from aseptic meningitis: a systemic review and meta-analysis. Crit Care 2010; 14:R240.
34. Srihawan C, Castelblanco RL, Salazar L, et al. Clinical Characteristics and Predictors of Adverse Outcome in Adult and Pediatric Patients With Healthcare-Associated Ventriculitis and Meningitis. Open Forum Infect Dis 2016; 3:ofw077.
35. Gallegos C, Tobolowsky F, Nigo M, Hasbun R. Delayed Cerebral Injury in Adults With Bacterial Meningitis: A Novel Complication of Adjunctive Steroids? Crit Care Med 2018; 46:e811.
36. Fitch MT, van de Beek D. Emergency diagnosis and treatment of adult meningitis. Lancet Infect Dis 2007; 7:191.
37. Saha SK, Darmstadt GL, Yamanaka N, et al. Rapid diagnosis of pneumococcal meningitis: implications for treatment and measuring disease burden. Pediatr Infect Dis J 2005; 24:1093.
38. Werno AM, Murdoch DR. Medical microbiology: laboratory diagnosis of invasive pneumococcal disease. Clin Infect Dis 2008; 46:926.
39. Leber AL, Everhart K, Balada-Llasat JM, et al. Multicenter Evaluation of BioFire FilmArray Meningitis/Encephalitis Panel for Detection of Bacteria, Viruses, and Yeast in Cerebrospinal Fluid Specimens. J Clin Microbiol 2016; 54:2251.
40. McGill F, Heyderman RS, Michael BD, et al. The UK joint specialist societies guideline on the diagnosis and management of acute meningitis and meningococcal sepsis in immunocompetent adults. J Infect 2016; 72:405.
41. Tzanakaki G, Tsopanomichalou M, Kesanopoulos K, et al. Simultaneous single-tube PCR assay for the detection of Neisseria meningitidis, Haemophilus influenzae type b and Streptococcus pneumoniae. Clin Microbiol Infect 2005; 11:386.
42. González-Donapetry P, García-Rodríguez J, Cendejas-Bueno E. A case of a FilmArray® ME false negative in meningococcal meningitis. J Infect 2019; 79:277.
43. Koopmans MM, Brouwer MC, Bijlsma MW, Bovenkerk S, Keijzers W, van der Ende A, et al. Listeria monocytogenes sequence type 6 and increased rate of unfavorable outcome in meningitis: epidemiologic cohort study. Clin Infect Dis 2013;57:247–53.
44. Rodrigo Hasbun. Clinical features and diagnosis of acute bacterial meningitis in adults. Available from: https://www.uptodate.com (Accessed 30th November 2021)
45. Ravindra Kumar Garg. Central nervous system tuberculosis: An overview. Available from: https://www.uptodate.com (Accessed 30th November 2021)
46. Leonard JM. Central Nervous System Tuberculosis. Microbiol Spectr 2017; 5.
47. Sharma P, Garg RK, Verma R, et al. Incidence, predictors and prognostic value of cranial nerve involvement in patients with tuberculous meningitis: a retrospective evaluation. Eur J Intern Med 2011; 22:289.
48. Sinner SW, Tunkel AR. Approach to the Diagnosis and Management of Tuberculous Meningitis. Curr Infect Dis Rep 2002; 4:324.
49. Thwaites GE, Chau TT, Farrar JJ. Improving the bacteriological diagnosis of tuberculous meningitis. J Clin Microbiol 2004; 42:378.
50. Kennedy DH, Fallon RJ. Tuberculous meningitis. JAMA 1979; 241:264.

51. Pormohammad A, Nasiri MJ, McHugh TD, et al. A Systematic Review and Meta-analysis of the Diagnostic Accuracy of Nucleic Acid Amplification Tests for Tuberculous Meningitis. J Clin Microbiol 2019; 57.
52. Lewinsohn DM, Leonard MK, LoBue PA, et al. Official American Thoracic Society/Infectious Diseases Society of America/Centers for Disease Control and Prevention Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children. Clin Infect Dis 2017; 64:e1.
53. Parra-Ruiz J, Ramos V, Dueñas C, et al. Rational application of adenosine deaminase activity in cerebrospinal fluid for the diagnosis of tuberculous meningitis. Infection 2015; 43:531.
54. Xu HB, Jiang RH, Li L, et al. Diagnostic value of adenosine deaminase in cerebrospinal fluid for tuberculous meningitis: a meta-analysis. Int J Tuberc Lung Dis 2010; 14:1382.
55. Tuon FF, Higashino HR, Lopes MI, et al. Adenosine deaminase and tuberculous meningitis--a systematic review with meta-analysis. Scand J Infect Dis 2010; 42:198.
56. Azeemuddin M, Alvi A, Sayani R, et al. Neuroimaging Findings in Tuberculosis: A Single-Center Experience in 559 Cases. J Neuroimaging 2019; 29:657.
57. Tuberculosis, CNS. Available from: https://www.sanfordguide.com (Accessed 30th November 2021)
58. Parasuraman TV, Frenia K, Romero J. Enteroviral meningitis. Cost of illness and considerations for the economic evaluation of potential therapies. Pharmacoeconomics 2001; 19:3.
59. Connolly KJ, Hammer SM. The acute aseptic meningitis syndrome. Infect Dis Clin North Am 1990; 4:599.
60. Allan R. Tunkel. Aseptic meningitis in adults. Available from: https://www.uptodate.com (Accessed 30th November 2021)
61. Kupila L, Vuorinen T, Vainionpää R, et al. Etiology of aseptic meningitis and encephalitis in an adult population. Neurology 2006; 66:75.
62. Shalabi M, Whitley RJ. Recurrent benign lymphocytic meningitis. Clin Infect Dis 2006; 43:1194.
63. Jolles S, Sewell WA, Leighton C. Drug-induced aseptic meningitis: diagnosis and management. Drug Saf 2000; 22:215.
64. Marinac JS. Drug- and chemical-induced aseptic meningitis: a review of the literature. Ann Pharmacother 1992; 26:813.
65. Ellul M, Solomon T. Acute encephalitis - diagnosis and management. Clin Med (Lond). 2018;18(2):155-159. doi:10.7861/clinmedicine.18-2-155
66. Griffin DE, Encephalitis, myelitis and neuritis. In: Mandell GL, Bennet JC, Dolin R. Principles and Practice of Infectious Diseases. 6th ed. Vol. 1 Philedelphia: Elsevier, 2005:1143-50
67. Granerod J. Ambrose HE. Davies NW, et al. Causes of encephalitis and differences in their clinical presentations in England: a multicentre, population-based prospective study. Lancet Infect Dis. 2010;10:835–44.
68. Glaser CA. Gilliam S. Schnurr D, et al. In search of encephalitis etiologies: diagnostic challenges in the California Encephalitis Project, 1998–2000. Clin Infect Dis. 2003;36:731–42.
69. Stephen J Gluckman. Viral encephalitis in adults. Available from: https://www.uptodate.com (Accessed 30th November 2021)

70. Whitley RJ. Viral encephalitis. N Engl J Med 1990; 323:242.
71. Connolly KJ, Hammer SM. The acute aseptic meningitis syndrome. Infect Dis Clin North Am 1990; 4:599.
72. Sonneville R, Klein I, de Broucker T, Wolff M. Post-infectious encephalitis in adults: diagnosis and management. J Infect 2009; 58:321.
73. Reimann CA, Hayes EB, DiGuiseppi C, et al. Epidemiology of neuroinvasive arboviral disease in the United States, 1999-2007. Am J Trop Med Hyg 2008; 79:974.
74. Centers for Disease Control and Prevention. Powassan virus. Statistics and maps. https://www.cdc.gov/powassan/statistics.html (Accessed on July 02, 2019).
75. United States Centers for Disease Control. Eastern Equine Encephalitis. https://www.cdc.gov/easternequineencephalitis/ (Accessed on October 30, 2019).
76. Hsu VP, Hossain MJ, Parashar UD, et al. Nipah virus encephalitis reemergence, Bangladesh. Emerg Infect Dis 2004; 10:2082.
77. de Jong MD, Bach VC, Phan TQ, et al. Fatal avian influenza A (H5N1) in a child presenting with diarrhea followed by coma. N Engl J Med 2005; 352:686.
78. Nash D, Mostashari F, Fine A, et al. The outbreak of West Nile virus infection in the New York City area in 1999. N Engl J Med 2001; 344:1807.
79. Glaser CA, Honarmand S, Anderson LJ, et al. Beyond viruses: clinical profiles and etiologies associated with encephalitis. Clin Infect Dis 2006; 43:1565.
80. Beattie GC, Glaser CA, Sheriff H, et al. Encephalitis with thalamic and basal ganglia abnormalities: etiologies, neuroimaging, and potential role of respiratory viruses. Clin Infect Dis 2013; 56:825.
81. Feigin RD, Shackelford PG. Value of repeat lumbar puncture in the differential diagnosis of meningitis. N Engl J Med 1973; 289:571.
82. Kupila L, Vuorinen T, Vainionpää R, et al. Etiology of aseptic meningitis and encephalitis in an adult population. Neurology 2006; 66:75.
83. Durand ML, Calderwood SB, Weber DJ, et al. Acute bacterial meningitis in adults. A review of 493 episodes. N Engl J Med 1993; 328:21.
84. Polage CR, Petti CA. Assesment of the utility of viral culture of cerebrospinal fluid. Clin Infect Dis 2006; 43:1578
85. Benson PC, Swadron SP. Empiric acyclovir is infrequently initiated in the emergency department to patients ultimately diagnosed with encephalitis. Ann Emerg Med 2006; 47:100.
86. Brouwer MC, Coutinho JM, van de Beek D. Clinical characteristics and outcome of brain abscess: systematic review and meta-analysis. Neurology 2014;82(9): 806–13.
87. Helweg-Larsen J, Astradsson A, Richhall H, et al. Pyogenic brain abscess, a 15 year survey. BMC Infect Dis 2012;12:332.
88. Brouwer MC, Tunkel AR, McKhann GM, et al. Brain abscess. N Engl J Med 2014; 371(5):447–56.
89. Rath TJ, Hughes M, Arabi M, et al. Imaging of cerebritis, encephalitis, and brain abscess. Neuroimaging Clin N Am 2012;22(4):585–607.
90. Sunford guide App Version 5.0.5 Brain abscess, bacterial. (Accessed 30th November 2021).

BÖLÜM 12

COVID-19 ve TEDAVİ İLİŞKİLİ ACİL NÖROLOJİK DURUMLAR

Nurcan AKBULUT[1]

GİRİŞ

Dünya çapında birçok insanı etkilemiş, global bir sağlık sorunu olan akut ağır solunum yetmezliği sendromu koronavirüsü 2 (SARS-CoV-2) veya daha çok bilinen ismi ile koronavirüs hastalığı 2019 (COVID-19) tipik olarak ateş, öksürük, solunum sıkıntısı, kas-eklem ağrıları, halsizlik gibi semptomlarla seyretmektedir. SARS-CoV-2 enfeksiyonu, sayısız nörolojik komplikasyonlarla ilişkilendirilmiştir ve nörolojik semptomlar, şiddetli SARS-CoV-2 enfeksiyonu olup kritik düzeyde hastalığı olanların %84'ünde meydana gelmektedir (1). SARS-CoV-2'nin nöroinvaziv ve nörotropik özellikleri sorgulanmıştır (2) ve nörolojik tablo, SARS-CoV-2 enfeksiyonuna ('sitokin salınan sendrom' veya 'sitokin fırtınası') bağlı inflamatuar yanıtın sonucu olarak kabul edilmiştir. Dolaşımdaki artmış sitokin seviyeleri ve immün hücre hiperaktivasyonu, sekonder organ disfonksiyonuna ve nihayetinde yaşamı tehdit eden sistemik inflamatuar sendroma yol açabilir (3). Virüsler santral sinir sistemine (SSS) iki farklı yoldan girebilir: hematojen yayılım veya nöronal retrograd yayılım (4). Son zamanlarda COVID-19'un SSS girişinin, olfaktör yol aracılığı ile de olabileceği belirtilmektedir (5).

[1] Uzm. Dr., Bayburt Devlet Hastanesi Nöroloji Kliniği, nurcanakbulut@gmail.com.

KAYNAKLAR

1. Helms J, Kremer S, Merdji H, et al. Neurologic Features in Severe SARS-CoV-2 Infection. N Engl J Med 2020;382(23):2268–70.
2. Solomon T. Neurological infection with SARS-CoV-2 — the story so far. Nat Rev Neurol 2021 Feb;17(2):65-66.
3. Fajgenbaum DC, June CH. Cytokine Storm. N Engl J Med 2020;383 (23):2255–73.
4. Desforges M, Le Coupanec A, Brison E, et al. Neuroinvasive and neurotropic human respiratory coronaviruses: potential neurovirulent agents in humans. Infectious Diseases and Nanomedicine I. 2014;807:75-96.
5. Cooper KW, Brann DH, Farruggia MC, et al. COVID-19 and the chemical senses: supporting players take center stage. Neuron. 2020.
6. Shulman JG, Ford T, Cervantes-Arslanian AM. Neurologic Emergencies during the Coronavirus Disease 2019 Pandemic. Neurol Clin 39 (2021) 671–687.
7. Elmalı AD, Bebek N, Yıldırım I, et al. COVID-19 and Epilepsy: Its Effects on seizures, Treatment and social life. 2020;26(2):49-58.
8. Mao L, Jin H, Wang M, et al. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan, China. JAMA Neurol. 2020;77(6):683-690.
9. Lu L, Xiong W, Liu D, et al. New onset acute symptomatic seizure and risk factors in coronavirus disease 2019: a retrospective multicenter study. Epilepsia 2020;(6):61.
10. Narula N, Joseph R, Katyal N, et al. Seizure and COVID-19: association and review of potential mechanism. Neurol Psychiatry Brain Res 2020;38:49–53.
11. Anand P, Zhou L, Bhadelia N, et al. Neurologic findings among inpatients with COVID-19 at a safety-net US hospital. Neurol Clin Pract 2021 Apr;11(2):e83-e91.
12. Albert DVF, Das RR, Acharya JN, et al. The Impact of COVID-19 on epilepsy care: a survey of the American Epilepsy Society membership. Epilepsy Curr 2020;20(5):316–24.
13. Karimi N, Sharifi Razavi A, Rouhani N. Frequent convulsive seizures in an adult patient with COVID-19: a case report. Iranian Red Crescent Med J 2020;22(3).
14. Vollono C, Rollo E, Romozzi M, et al. Focal status epilepticus as unique clinical feature of COVID-19: a case report. Seizure. 2020;78:109-12.
15. Asadi-Pooya AA, Simani l. Central nervous system manifestations of COVID-19: a systematic review. Journal of the Neurological Sciences. 2020:116832.
16. Anand P, Al-Faraj A, Sader E, et al. Seizure as the presenting symptom of COVID-19: a retrospective case series. Epilepsy Behav 2020;112:107335.
17. Sohal S, Mansur M. COVID-19 presenting with seizures. IDCases 2020;20: e00782.
18. Anand P, Zakaria A, Benameur K, et al. Myoclonus in patients with coronavirus disease 2019: a multicenter case series. Crit Care Med 2020 Nov;48(11):1664-1669.
19. Moriguchi T, Harii N, Goto J, et al. A first case of meningitis/encephalitis associated with SARS-Coronavirus-2. Int J Infect Dis 2020;94:55–8.
20. Antony A, Haneef Z. Systematic review of EEG findings in 617 patients diagnosed with COVID-19. Seizure. 2020 Dec; 83: 234–241.
21. Galanopoulou AS, Ferastraoaru V, Correa DJ, et al. EEG findings in acutely ill patients investigated for SARS-CoV-2/COVID-19: a small case series preliminary report. Epilepsia Open. 2020;5:314–324.
22. Vespignani H, Colas D, Lavin BS, et al. Report on electroencephalographic findings in critically ill patients with COVID-19. Ann Neurol. 2020 doi: 10.1002/ana.25814.
23. DosSantos MF, Devalle S, Aran V, et al. Neuromechanisms of SARS-CoV-2: a review. Front Neuroanat. 2020;14:37.
24. Haseli S, Karimi-Galougahi M. Reply to "MRI Evaluation of the Olfactory Clefts in Patients with SARS-CoV-2 Infection Revealed an Unexpected Mechanism for Olfactory Function Loss. Acad Radiol. 2020;27:1192.
25. Leitinger M, Poppert KN, Mauritz M, et al. Status epilepticus admissions during the COVID-19 pandemic in Salzburg-A population-based study. Epilepsia. 2020;61(12):e198-e203.
26. Dono F, Nucera B, Lanzone J et al. Status epilepticus and COVID-19: A systematic review. Epilepsy & Behavior 118 (2021) 107887.
27. Asadi-Pooya AA, Attar A, Moghadami M, et al. Management of COVID-19 in people with epilepsy: drug considerations. Neurol Sci 2020;41(8):2005–11.

28. Elavarasi A, Prasad M, Seth T, et al. Chloroquine and hydroxychloroquine for the Treatment of COVID-19: a systematic Review and Metaanalysis. J Gen Intern Med. 2020;35(11):3308- 314.
29. Bebek N. Epilepsi. Çelik Gökyiğit M, editör. COVID-19 ve Nöroloji. 1. Baskı. Ankara: Türkiye Klinikleri; 2021. p.32-9.
30. Melmed KR, Cao M, Dogra S, et al. Risk factors for intracerebral hemorrhage in patients with COVID-19. J Thromb Thrombolysis 2021 May;51(4):953-960.
31. Nwajei F, Anand P, Abdalkader M, et al. Cerebral Venous Sinus Thromboses in Patients with SARS-CoV-2 infection: three cases and a review of the literature. J Stroke Cerebrovasc Dis 2020 Dec; 29(12): 105412.
32. Anand P, Lau KHV, Chung DY, et al. Posterior reversible encephalopathy syndrome in patients with coronavirus disease 2019: two cases and a review of the literature. J Stroke Cerebrovasc Dis 2020;29(11):105212.
33. Dakay K, Kaur G, Gulko E, et al. Reversible cerebral vasoconstriction syndrome and dissection in the setting of COVID-19 infection. J Stroke Cerebrovasc Dis 2020;29(9):105011.
34. Pugin D, Vargas M-I, Thieffry C, et al. COVID-19–related encephalopathy responsive to high-dose glucocorticoids. Neurology 2020;95(12):543–6.
35. Li Y, Li M, Wang M, et al. Acute cerebrovascular disease following COVID-19: a single center, retrospective, observational study. Stroke Vasc Neurol 2020;5(3): 279–84.
36. Kihira S, Schefflein J, Mahmoudi K, et al. Association of Coronavirus Disease (COVID-19) with large vessel occlusion strokes: a case-control study. AJR Am J Roentgenol 2020;29:1–6.
37. Rothstein A, Oldridge O, Schwennesen H, et al. Acute cerebrovascular events in hospitalized COVID-19 patients. Stroke 2020;51:e219–e222.
38. Jillella DV, Janocko NJ, Nahab F, et al. Ischemic stroke in COVID-19: an urgent need for early identification and management. PLoS One 2020;15(9): e0239443.
39. Majidi S, Fifi JT, Ladner TR, et al. Emergent large vessel occlusion stroke during New York City's COVID-19 outbreak: clinical characteristics and paraclinical findings. Stroke 2020 Sep;51(9):2656-2663.
40. Yaghi S, Ishida K, Torres J, et al. SARS-CoV-2 and Stroke in a New York Healthcare System. Stroke 2020;51(7):2002–11.
41. Siegler JE, Cardona P, Arenillas JF, et al. Cerebrovascular events and outcomes in hospitalized patients with COVID-19: the SVIN COVID-19 Multinational Registry. Int J Stroke 2021 Jun;16(4):437-447.
42. Benussi A, Pilotto A, Premi E, et al. Clinical characteristics and outcomes of inpatients with neurologic disease and COVID-19 in Brescia, Lombardy, Italy. Neurology 2020;95(7):e910–20.
43. Dogra S, Jain R, Cao M, et al. Hemorrhagic stroke and anticoagulation in COVID-19. J Stroke Cerebrovasc Dis 2020;29(8):104984.
44. Kvernland A, Kumar A, Yaghi S, et al. Anticoagulation use and Hemorrhagic Stroke in SARS-CoV-2 Patients Treated at a New York Healthcare System. Neurocrit Care 2021 Jun;34(3):748-759.
45. Pezzini A, Padovani A. Lifting the mask on neurological manifestations of COVID-19. Nat Rev Neurol 2020; 16, pages636–644.
46. Ellul MA, Benjamin L, Singh B, et al. Neurological associations of COVID-19. Lancet Neurol 2020;19(9):767–83.
47. Beyrouti R, Adams ME, Benjamin L, et al. Characteristics of ischaemic stroke associated with COVID-19. J Neurol Neurosurg Psychiatry 2020;91(8):889–91.
48. Zhang Y, Xiao M, Zhang S, et al. Coagulopathy and antiphospholipid antibodies in patients with Covid-19. N Engl J Med 2020;382(17):e38.
49. Bhaskar S, Sinha A, Banach M, et al. Cytokine storm in COVID-19- immunopathological mechanisms, clinical considerations, and therapeutic approaches: the REPROGRAM Consortium position paper. Front Immunol 2020; 11:1648.
50. Divani AA, Andalib S, Di Napoli M, et al. Coronavirus disease 2019 and stroke: clinical manifestations and pathophysiological insights. J Stroke Cerebrovasc Dis 2020;29(8):104941.
51. South AM, Tomlinson L, et al. Controversies of renin-angiotensin system inhibition during the COVID-19 pandemic. Nat Rev Nephrol 2020;16(6):305-7.
52. Çoban E. Beyin damar hastalıkları. Çelik Gökyiğit M, editör. COVID-19 ve Nöroloji. 1. Baskı. Ankara: Türkiye Klinikleri; 2021. p.8-12.
53. Larson AS, Savastano L, Kadirvel R, et al. Coronavirus disease 2019 and the cerebrovascular-cardio,vascular systems: What do we know so far? J Am Heart Assoc. 2020;9:e016793.

54. Hanafi R, Roger PA, Perin B, et al. COVID-19 Neurologic Complication with CNS Vasculitis-like pattern. AJNR Am J Neuroradiol. 2020;41: 1384-7.
55. Li W, Ding J, Sui X, et al. Prognosis and risk factors for reocclusion after mechanical thrombectomy. Ann Clin TranslNeurol. 2020;7:420-8.
56. Bhattacharjee S, Banerjee M. Immune thrombocytopenia secondary to COVID-19: a systematic review. SN Compr Clin Med 2020;1–11.
57. Tang N, Li D, Wang X, et al. Abnormal coagulation parameters are associated with poor prognosis in patients with novel coronavirus pneumonia. J Thromb Haemost 2020;18(4):844–7.
58. Thachil J, Tang N, Gando S, et al. ISTH interim guidance on recognition and management of coagulopathy in COVID-19. J Thromb Haemost 2020;18(5): 1023–6.
59. Tan Y-K, Goh C, Leow AST, et al. COVID-19 and ischemic stroke: a systematic review and meta-summary of the literature. J Thromb Thrombolysis 2020 Oct;50(3):587-595.
60. Carneiro T, Dashkoff J, Leung LY, et al. Intravenous tPA for Acute Ischemic Stroke in Patients with COVID-19. J Stroke Cerebrovasc Dis 2020 Nov; 29(11): 105201.
61. Mansour OY, Malik AM, Linfante I. Mechanical Thrombectomy of COVID-19 positive acute ischemic stroke patient: a case report and call for preparedness. BMC Neurol 2020;20:358.
62. Pop R, Hasiu A, Bolognini F, et al. Stroke thrombectomy in patients with COVID-19: initial experience in 13 cases. AJNR Am J Neuroradiol 2020 Nov;41(11):2012-2016.
63. Escalard S, Maı¨er B, Redjem H, et al. Treatment of acute ischemic stroke due to large vessel occlusion with COVID-19: experience from Paris. Stroke 2020; 51(8):2540–3.
64. Wang A, Mandigo GK, Yim PD, et al. Stroke and mechanical thrombectomy in patients with COVID-19: technical observations and patient characteristics. J Neurointerv Surg 2020;12(7):648–53.
65. Kaplan PW, Rossetti AO. EEG Patterns and Imaging Correlations in Encephalopathy: Encephalopathy Part II. J. Clin. Neurophysiol. 2011, 28, 233–251.
66. Beach SR, Praschan NC, Hogan C, et al. Delirium in COVID-19: a case series and exploration of potential mechanisms for central nervous system involvement. General Hospital Psychiatry. 2020;65:47-53.
67. Liotta EM, Batra A, Clark JR, et al. Frequent neurologic manifestations and encephalopathy associated morbidity in Covid-19 patients. Ann Clin Transl Neurol 2020; 7:2221.
68. Kennedy M, Helfand BKI, Gou RY, et al. Delirium in Older Patients With COVID-19 Presenting to the Emergency Department. JAMA Netw Open 2020; 3:e2029540.
69. Dogan L, Kaya D, Sarikaya T, et al. Plasmapheresis treatment in COVID-19–related autoimmune meningoencephalitis: case series. Brain Behav Immun. 2020;87:155-158.
70. Cao A, Rohaut B, Le Guennec L, et al. Severe COVID-19-related encephalitis can respond to immunotherapy. 2020.
71. Pilotto A, Masciocchi S, Volonghi I, et al. The clinical spectrum of encephalitis in COVID-19 disease: the ENCOVID multicentre study. Medrxiv. 2020.
72. Siow I, Lee KS, Zhang JJY, et al. Encephalitis as a neurological complication of COVID-19: A systematic review and meta-analysis of incidence, outcomes, and predictors. Eur J Neurol. 2021;00:1–12.
73. Koh JS, De Silva DA, Quek AML, et al. Neurology of COVID-19 in Singapore. J Neurol Sci. 2020;418:117118.
74. Pouga L. Encephalitic syndrome and anosmia in COVID-19: do these clinical presentations really reflect SARS-CoV-2 neurotropism? A theory based on the review of 25 COVID-19 cases. J Med Virol. 2021;93(1):550-558.
75. Umapathi T, Quek WMJ, Yen JM, et al. Encephalopathy in COVID-19 patients; viral, parainfectious, or both? Eneurologicalsci. 2020;21:100275.
76. Paterson RW, Brown RL, Benjamin L, et al. The emerging spectrum of COVID-19 neurology: clinical, radiological and laboratory findings. Brain. 2020;143(10):3104-3120.
77. Monti G, Giovannini G, Marudi A, et al. Anti-NMDA Receptor Encephalitis Presenting as New Onset Refractory Status Epilepticus in COVID-19. Seizure. Eur. J. Epilepsy. 2020;81:18–20.
78. Moideen S, Thomas R, Suresh Kumar PN, et al. Psychosis in a Patient with Anti-NMDA-Receptor Antibodies Experiencing Significant Stress Related to COVID-19. Brain Behav. Immun. Health. 2020;7:100125.
79. Kihira S, Delman B, Belani P, et al. Imaging features of acute encephalopathy in patients with COVID-19: a case series. Am J Neuroradiol. 2020;41(10):1804-1808.

80. Benameur K, Agarwal A, Auld SC, et al. Early release-encephalopathy and encephalitis associated with cerebrospinal fluid cytokine alterations and coronavirus disease, Atlanta, Georgia, USA, 2020.
81. Poyiadji N, Shahin G, Noujaim D, et al. COVID-19 associated acute hemorrhagic necrotizing encephalopathy: CT and MRI features. Radiology. (2020) 201187.
82. Klironomos S, Tzortzakakis A, Kits A, et al. Nervous System Involvement in Coronavirus Disease 2019: Results from a Retrospective Consecutive Neuroimaging Cohort. Radiology 2020; 297:E324.
83. Chougar L, Shor N, Weiss N, et al. Retrospective Observational Study of Brain MRI Findings in Patients with Acute SARS-CoV-2 Infection and Neurologic Manifestations. Radiology 2020; 297:E313.
84. Haider A, Siddiqa A, Ali N, Dhallu M. COVID-19 and the brain: acute encephalitis as a clinical manifestation. Cureus. 2020;12(10):e10784.
85. Yousuf F, King R, Ainger T, et al. Autoimmune encephalitis following recovery of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection (2756). April 13,2021; 96 (15 Supplement)
86. Tenembaum S, Chitnis T, Ness J, Hahn JS. Acute disseminated encephalomyelitis. Neurology. 2007;68(16 suppl 2):S23-S36.
87. Zhang T, Rodricks MB, Hirsh E. COVID-19-associated acute disseminated encephalomyelitis: a case report. MedRxiv. 2020.
88. Yeh EA, Collins A, Cohen M, Duffner PK, Faden H. Detection of coronavirus in the central nervous system of a child with acute disseminated encephalomyelitis. Pediatrics. 2004;113:e73–76.
89. Beh SC, Greenberg BM, Frohman T, Frohman EM. Transverse myelitis. Neurologic clinics. 2013;31(1):79-138.
90. Román GC, Gracia F, Torres A, et al. Acute Transverse Myelitis (ATM):Clinical Review of 43 Patients With COVID-19-Associated ATM and 3 Post-Vaccination ATM Serious Adverse Events With the ChAdOx1 nCoV-19 Vaccine (AZD1222). Front Immunol. 2021; 12: 653786.
91. Trigo J, GarcíaAzorín D, Planchuelo-Gómez A, et al. Phenotypic characterization of acute headache attributed to SARS-CoV-2: an ICHD-3 validation study on 106 hospitalized patients. Cephalalgia 40(13), 1432–1442 (2020).
92. Porta-Etessam J, Matías-Guiu JA, González-García N, et al. Spectrum of headaches associated with SARS-CoV-2 infection: Study of healthcare professionals. Headache 60(8), 1697–1704 (2020).
93. García-Azorín D, Trigo J, Talavera B, et al. Frequency and type of red flags in patients with Covid-19 and headache: Series of 104 hospitalized patients. Headache 60(8), 1664–1672 (2020).
94. Belvis R. Headaches during COVID-19: My clinical case and review of the literature. Headache. 2020;60:1422-1426.
95. Guan W, Ni Z, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382:1708-1720.
96. GarcíaAzorín D, Sierra A, Trigo J, et al. Frequency and phenotype of headache in covid19: a study of 2194 patients. Scientific Reports | (2021) 11:14674.
97. Headache Classifcation Committee of the International Headache Society (IHS). The International Classifcation of Headache Disorders, 3rd edition. Cephalalgia. 38, 1–211 (2018).
98. Membrilla JA, de Lorenzo Í, Sastre M & Díaz de Terán J. Headache as a cardinal symptom of coronavirus disease 2019: a cross-sectional study. Headache 60(10), 2176–2191 (2021).
99. Gonzalez-Martinez A, Fanjul V, Ramos C, et al. Headache during SARS-CoV-2 infection as an early symptom associated with a more benign course of disease: a case-control study. Eur. J. Neurol. 2021 Oct;28(10):3426-3436.
100. Trigo J, GarcíaAzorín D, Planchuelo-Gómez A, et al. Factors associated with the presence of headache in hospitalized COVID-19 patients and impact on prognosis: a retrospective cohort study. J. Headache Pain 21(1), 94 (2020).
101. Toscano G, Palmerini F, Ravaglia S, et al. Guillain-Barré Syndrome Associated with SARS-CoV-2. N Engl J Med 2020; 382:2574.
102. Rumeileh SA, Abdelhak A, Foschi M, et al. Guillain–Barré syndrome spectrum associated with COVID19: an uptodate systematic review of 73 cases. Journal of Neurology (2021) 268:1133–1170.

103. Su XW, Palka SV, Rao RR, et al. SARS-CoV-2–Associated Guillain-Barré Syndrome with Dysautonomia. Muscle Nerve 2020, 62, 48–49.
104. Guidon AC, Amato AA. COVID-19 and neuromuscular disorders. Neurology 2020; 94:959.
105. Suwanwongse K, Shabarek N. Rhabdomyolysis as a Presentation of 2019 Novel Coronavirus Disease. Cureus 2020; 12:e7561.
106. Jin M, Tong Q. Rhabdomyolysis as Potential Late Complication Associated with COVID-19. Emerg Infect Dis 2020; 26:1618.
107. Manzano GS, Woods JK, Amato AA. Covid-19-Associated Myopathy Caused by Type I Interferonopathy. N Engl J Med 2020; 383:2389.
108. Goh Y, Beh DLL, Makmur A, et al. Pearls & Oy-sters: Facial nerve palsy in COVID-19 infection. Neurology 2020; 95:364.
109. Lin E, Lantos JE, Strauss SB, et al. Brain Imaging of Patients with COVID-19: Findings at an Academic Institution during the Height of the Outbreak in New York City. AJNR Am J Neuroradiol 2020; 41:2001.
110. Dinkin M, Gao V, Kahan J, et al. COVID-19 presenting with ophthalmoparesis from cranial nerve palsy. Neurology 2020; 95:221.
111. Decavel P, Petit C, Tatu L. Tapia syndrome at the time of the COVID-19 pandemic: Lower cranial neuropathy following prolonged intubation. Neurology 2020; 95:312.
112. Todisco M, Alfonsi E, Arceri S, et al. Isolated bulbar palsy after SARS-CoV-2 infection. Lancet Neurol 2021; 20:169.
113. Gutiérrez-Ortiz C, Méndez-Guerrero A, Rodrigo-Rey S, et al. Miller Fisher syndrome and polyneuritis cranialis in COVID-19. Neurology 2020; 95:e601.
114. García CAC, Sánchez EBA, Huerta DH, et al. Covid-19 Treatment-Induced Neuropsychiatric Adverse Effects. Gen. Hosp. Psychiatry 2020, 67, 163–164.
115. Fardet L, Flahault A, et al. Corticosteroid-Induced Clinical Adverse Events: Frequency, Risk Factors and Patient's Opinion. Br. J. Dermatol. 2007, 157, 142–148.
116. Fearon C, Fasano A. Parkinson's disease and the COVID-19 pandemic. Journal of Parkinson's Disease 11 (2021) 431–444.
117. Estes ML, Ewing-Wilson D, Chou SM, et al. Chloroquine neuromyotoxicity. Clinical and Pathologic Perspective. 1987;82:447-55.
118. Jallouli M, Saadoun D, Eymard B, et al. The association of systemic lupus erythematosus and myasthenia gravis: a series of 17 cases, with a special focus on hydroxychloroquine use and a review of the literature. J Neurol. 2012;259:1290-7.
119. Gummi RR, Kukulka NA, Deroche CB, Govindarajan R. Factors associated with acute exacerbations of myasthenia gravis. Muscle Nerve. 2019;60:693-9.
120. University of Liverpool. COVID-19 Drug Interactions. 2020. https://www.covid19- druginteractions.org. Accessed 21 April, 2020.