Şaşırtan Viral İnfeksiyonlar: Sadece Bakılırsa Görülebilir!

Uzm. Dr. Aziz A. HAMİDİ

Şişli Hamidiye Etfal Eğitim ve Araştırma Hastanesi

İnfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Kliniği

Olgu

KK. 41 yaşında kadın hasta

Şikayet: Ateş, baş ağrısı, bulantı ve kusma, denge bozukluğu, titreme

Öykü: 18.08.2015'de bu şikayetlerle hastaneye başvurmuş. Kranyal MR çekilmiş ve normal olarak yorumlanmış. Lomber ponksiyon yapılmış, BOS'ta hücre saptanmamış. Seftriakson 2x1gr (im) ve levofloksasin 1x500mg (p.o) tedavisi başlanan hasta taburcu edilmiş. Bu tedavilere karşın şikayetleri geçmeyen hasta 5 gün sonra tekrar hastaneye başvurmuş. Fizik muayenesinde ense sertliği saptanması üzerine menenjit düşünülerek İstanbul Tıp Fakültesi acil birimine sevk edilmiş.

Olgu

Fizik muayene

- Bilinci açık, oryante, koopere. Ateş: 38.5^{0}C, DSS: 22, Nabız:95/dk, TA: 110/80mm/Hg saptandı.
- Solunum muayenesinde özellik saptanmadı.
- Kardiyovasküler muayenesi doğal bulundu.
- Nörolojik muayenesinde; **ataksi, denge bozukluğu, tremor ve ense sertliği** saptandı. Meningeal irritasyon bulguları negatif bulundu.

Olgu

Laboratuvar

- Lökosit:8800 (PNL:6100)/µl, Hb: 11gr/dl, Htc: %33, Trombosit:323000/µl
- İdrar tahlili normal, mikroskopisinde lökosit ve eritrosit görülmedi.
- CRP: 0.20 mg/l
- Eritrosit sedimantasyon hızı: 10 mm/saat
- Glukoz: 97mg/dl, Üre: 12mg/dl, Kreatinin: 0.52mg/dl, Ürik asit: 2.1mg/dl, Na: 137 mmol/dl, K: 3.9mmol/dl, Klor: 97mmol/dl, AST: 20 U/l, ALT: 10 U/l, ALP:85 U/l, GGT: 20 U/l

Olgu

- Kraniyal BT çekildi, bir özellik saptanmadı.

Yatışının 1. günü

Hastaya lomber ponksiyon yapıldı.

- ✓ BOS
  - ✓ Hücre: 97 polimorf nüveli lökosit, 6 lenfosit
  - ✓ Glukoz: 48 mg/dl (eş zamanlı kan glukozu 105 mg/dl)
  - ✓ Protein: 198 mg/dl

Hastaya seftriakson 2x2gr iv başlandı.

Yatışının 3. günü

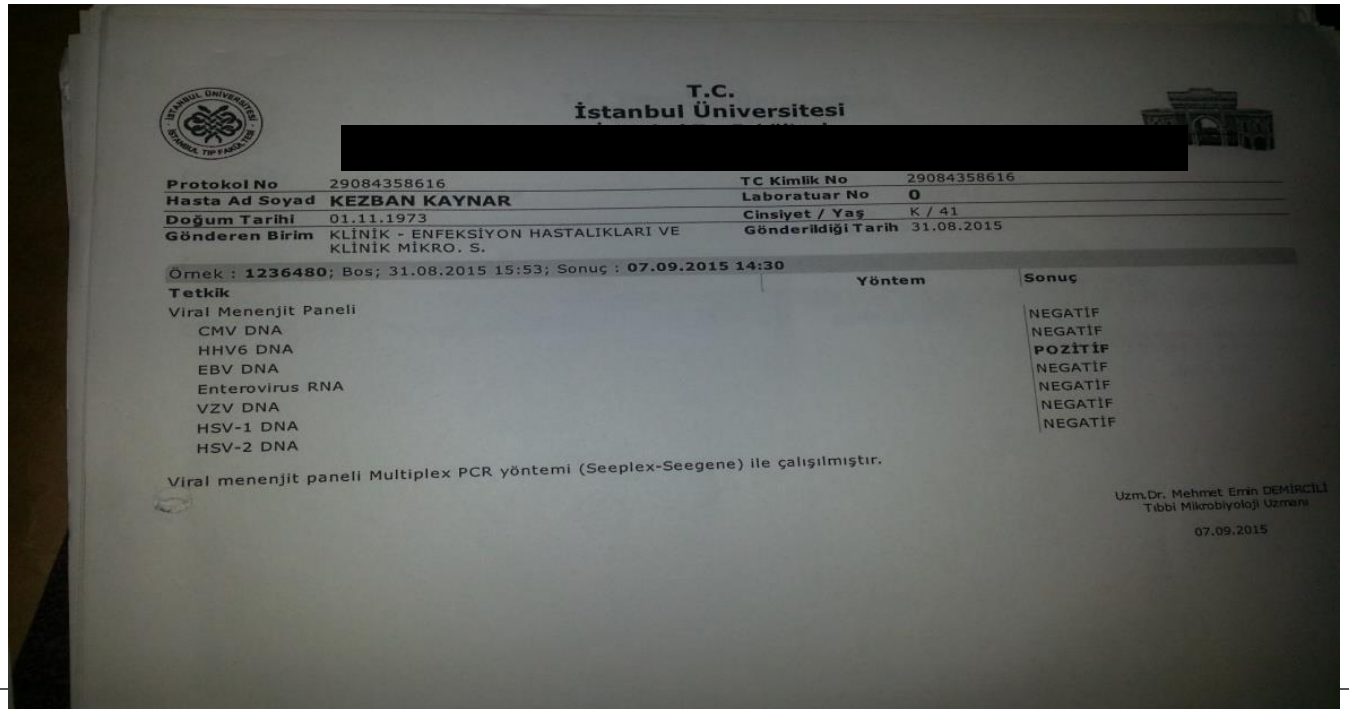
- VDRL: negatif
- Brusella aglütinasyon testi: negatif
- BOS’ta ARB: negatif
- BOS’ta tüberküloz PCR: negatif

Yatışının 6. gününde

- Şikayetleri devam ediyor.
- **Görme bulanıklığı ve çift görme** şikayeti gelişti.
- KBB konsultasyonu yapıldı- kliniği açıklayacak bir patoloji saptanmadı.
- Göz dibi muayenesinde **grade 3 papilla ödemi** saptandı.
- Nöroloji konsültasyonu - kranyal MR çekildi - normal

Yatışının 11. gününde

- BOS viral paneli testinde EBV-DNA pozitif saptandı.
- Hasta EBV'ye bağlı ensefalit olarak değerlendirildi. Seftriakson tedavisi kesildi.
- Gansiklovir (Cymevene) 2x300mg (5mg/kg) (iv) ve deksametazon (Dekort) 4x4mg (iv) tedavisi başlandı.



T.C.
İstanbul Üniversitesi
[redacted]

Protokol No	29084358616	TC Kimlik No	29084358616
Hasta Ad Soyad	KEZBAN KAYNAR	Laboratuar No	0
Doğum Tarihi	01.11.1973	Cinsiyet / Yaş	K / 41
Gönderen Birim	KLİNİK - ENFEKSİYON HASTALIKLARI VE KLİNİK MİKRO. S.	Gönderildiği Tarih	31.08.2015

Örnek : **1236480**; Bos; 31.08.2015 15:53; Sonuç : **07.09.2015 14:30**

Tetkik	Yöntem	Sonuç
Viral Menenjit Paneli		
CMV DNA		NEGATİF
HHV6 DNA		NEGATİF
EBV DNA		**POZİTİF**
Enterovirus RNA		NEGATİF
VZV DNA		NEGATİF
HSV-1 DNA		NEGATİF
HSV-2 DNA		NEGATİF

Viral menenjit paneli Multiplex PCR yöntemi (Seeplex-Seegene) ile çalışılmıştır.

Uzm.Dr. Mehmet Emin DEMİRCİLİ
Tıbbi Mikrobiyoloji Uzmanı
07.09.2015

Yatışının 15. günü

- Genel durumu daha iyi. Baş ağrısı geriledi, bulantı ve kusma yakınması kayboldu.
- Göz dibi muayenesi tekrarlandı. Grade 1 papilla ödemi saptandı.
- Gansiklovir ve deksametazon tedavisine devam edildi.

Yatışının 19. günü

- EEG - Yaygın organizasyon bozukluğu ve non spesifik paroksismal anomali saptandı.

Yatışının 30. günü

Çift görme ve bulanık görme yakınması kayboldu.

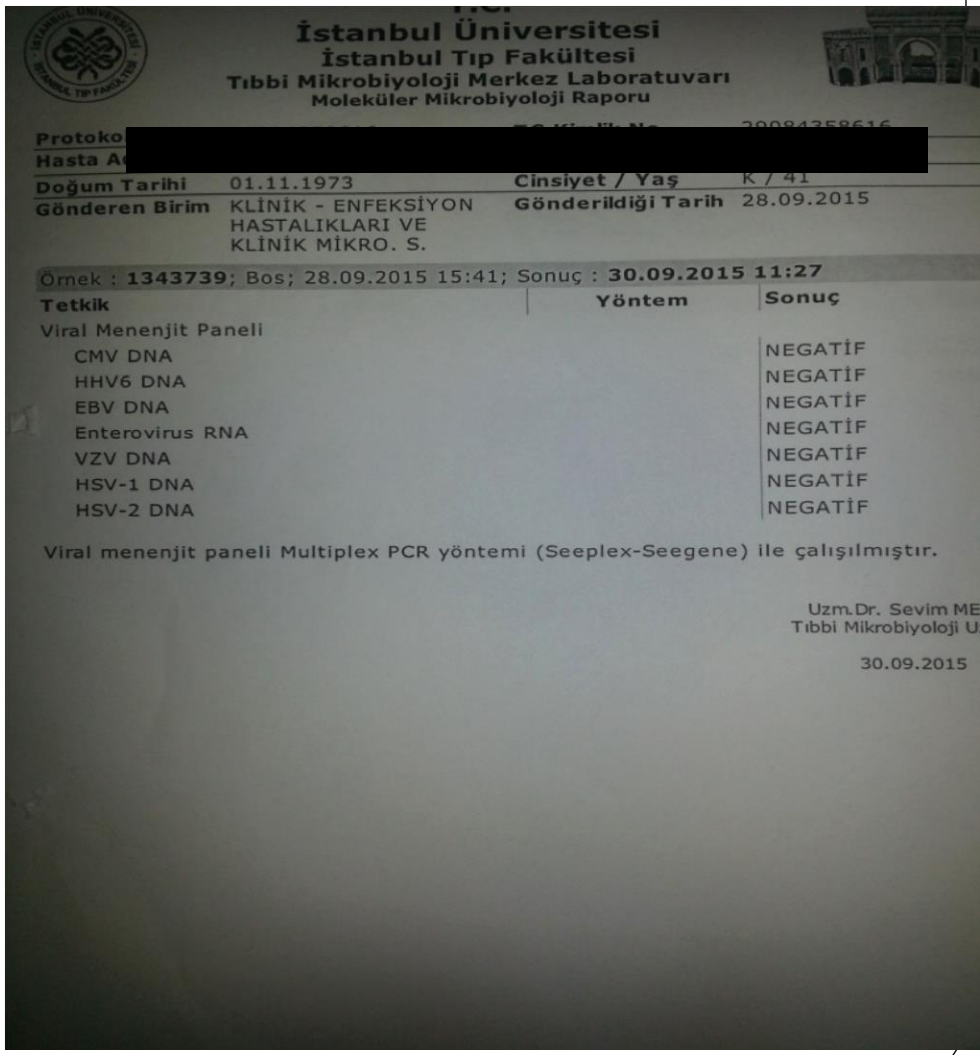
Lomber ponksiyon tekrarlandı.

- ✓ 33 lenfosit
- ✓ Glukoz 75mg/dl (eş zamanlı kan glukozu 148mg/dl)
- ✓ Protein: 35 mg/dl

Göz dibi muayenesinde papilla ödemi saptanmadı.

Yatışının 31. günü

- BOS viral panelinde EBV-DNA negatifleşti.
- Gansiklovir tedavisi 21. gününde kesildi.
- Şikayetleri gerileyen hasta taburcu edildi.
- 10 gün sonraki poliklinik kontrolünde hastanın bir şikayeti yoktu.



İstanbul Üniversitesi
İstanbul Tıp Fakültesi
Tıbbi Mikrobiyoloji Merkez Laboratuvarı
Moleküler Mikrobiyoloji Raporu

Protoko[redacted]
Hasta A[redacted]
Doğum Tarihi 01.11.1973 Cinsiyet / Yaş K / 41
Gönderen Birim KLİNİK - ENFEKSİYON HASTALIKLARI VE KLİNİK MİKRO. S. Gönderildiği Tarih 28.09.2015

Örnek : **1343739**; Bos; 28.09.2015 15:41; Sonuç : **30.09.2015 11:27**

Tetkik	Yöntem	Sonuç
Viral Menenjit Paneli		
CMV DNA		NEGATİF
HHV6 DNA		NEGATİF
EBV DNA		NEGATİF
Enterovirus RNA		NEGATİF
VZV DNA		NEGATİF
HSV-1 DNA		NEGATİF
HSV-2 DNA		NEGATİF

Viral menenjit paneli Multiplex PCR yöntemi (Seeplex-Seegene) ile çalışılmıştır.

Uzm.Dr. Sevim ME
Tıbbi Mikrobiyoloji U

30.09.2015

Viral Ensefalitler

Primer veya postinfeksiyöz viral ensefalit

1. Postinfeksiyöz ensefalit: Akut dissemine ensefalomyelit (ADEM). Perivasküler inflamasyon ve demiyelinizasyonla karakterize bir tablodur.

- Kızamık
- Kabakulak
- VZV
- Rubella
- İnfluenza

Viral Ensefalitler

2. Viral ensefalit: Viral etkenlerin merkezi sinir sistemi invazyonu yaptığı durumdur. Nöronal tutulum histopatolojik olarak gösterilebilir.

- Herpes simpleks virus tip 1
- St.Louis ensefaliti (Kuzey Amerika)
- Japon ensefaliti (Asya)
- Kuduz ensefaliti (hayvan ısırığı)
- Enterovirus tip 71(Colorado salgını, coxsackie virus, echovirus daha çok menejit)
- Batı Nil virusu ensefaliti (halsizlik ve döküntü)
- Yaygın olmayan etkenler (VZV, human herpes virus 6, HIV, EBV)

Ensefalit Kliniği

- Mental durum (hafif nörolojik defisit – tam yanıtsızlık)
- Ateş
- MİB (ense sertliği ve fotofobi) genellikle pür ensefalitte saptanmaz. Ancak meningoensefalitte saptanır.
- Nöbet
- Fokal nörolojik bulgular (hemiparezi, kranyal sinir defisiti, patolojik tendon refleksi)

Fizik muayene

Patognomik olan bir fizik muayene bulgusu yok. Bazı bulgular ipucu verebilir.

- Parotit varlığı → kabakulak ensefaliti
- Flask paralizi → Batı Nil ensefaliti (Guillien Barre sendromu)
- Göz kapakları, dil, dudak ve ekstremitede titreme → St.Louis ensefaliti, Batı Nil virusu ensefaliti
- Hidrofobi, aerofobi, farinks spazmı ve hiperaktivite → kuduz
- Dermatom boyunca veziküler döküntü → VZV ensefaliti (döküntü olmaması ekarte etmez)

Radyoloji

- Kranyal BT: Yer kaplayıcı lezyonları dışlamak
- Kranyal MR: Demyelinizan hastalıklar için duyarlı (progresif multifokal lökoensefalopati)
- ✓ Temporal lob tutulumu → HSV ensefaliti (VZV ve EBV, HHV-6 gibi diğer viral etkenler)
- ✓ Talamus ve bazal ganglion tutulumu → viral solunum etkenleri, Crutzfeld-Jacob hastalığı, arbovirus, tüberküloz

Radyoloji

- ✓ Hidrosefali varlığı → viral olmayan (bakteriyel, fungal ve paraziter) etkenler
- ✓ Serebellum tutulumu → EBV

- ❖ EEG: Akut ensefalitte her zaman anormal (Fokal temporal bölge organizasyon bozukluğu HSV lehine)

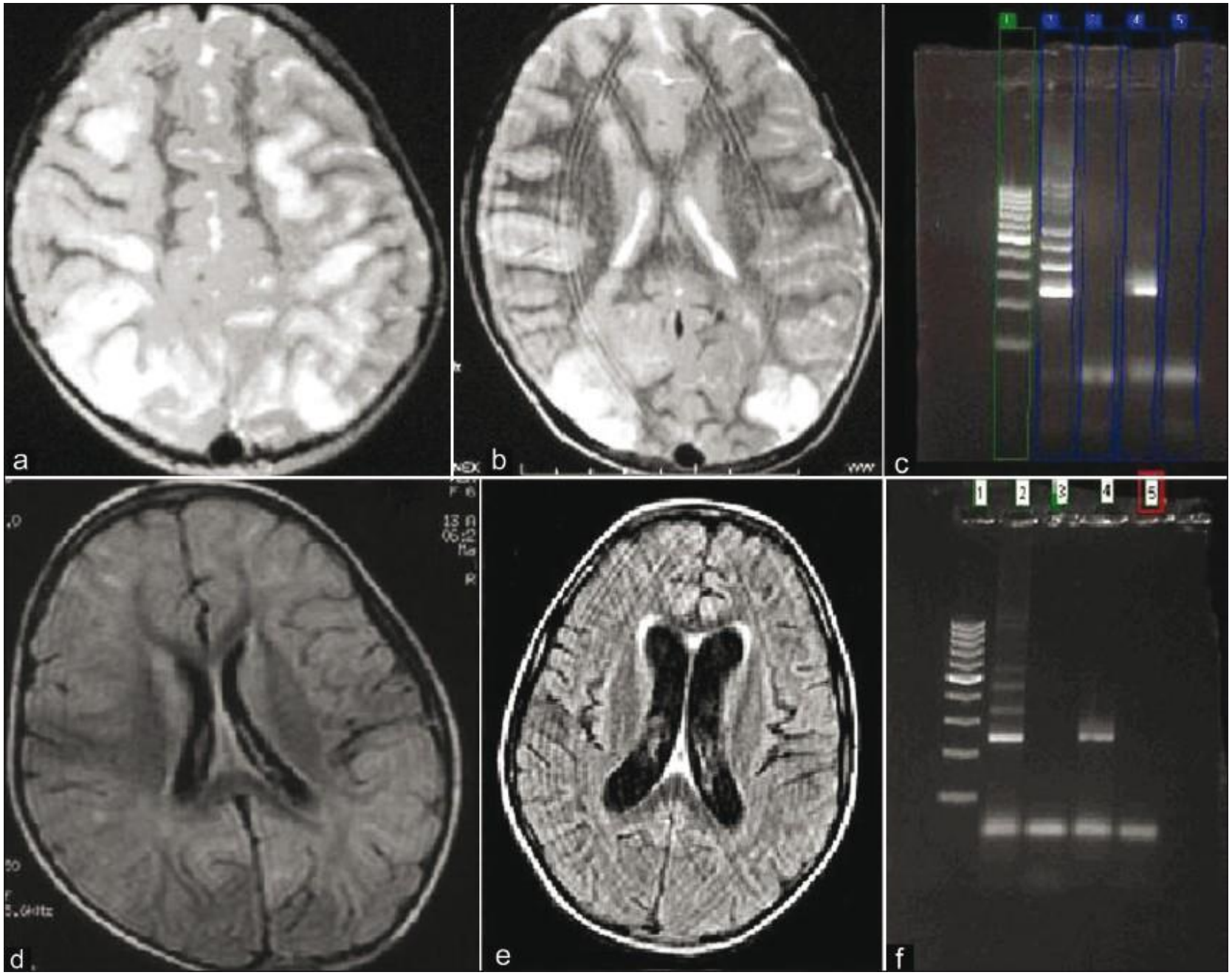
Olgu 1
BOS: Lökosit: 155 (%55 lenfosit), glukoz:43mg/dL, Protein: 64mg/dL, EBV-DNA (+)
Asiklovir 14 gün

Olgu 2
Lökosit: 10 (lenfosit), protein: 37mg/dL, glukoz: 57mg/dL, EBV-DNA (+)
Asiklovir 14 gün

Table 1: Summary of clinical and radiological findings of Epstein Barr Virus encephalitis

	Patient 1	Patient 2
Age/sex	6y/male	11y/female
Clinical	Fever, visual hallucination, altered sensorium, decerebration	Fever, altered sensorium, downward ocular deviation
MRI	Parieto-occipital hyperintensity in T2 and FLAIR	Parieto-occipital hyperintensity in T2 and FLAIR
3mo sequelae	Spasticity, visual impairment	Spasticity, dystonia, choreiform movement
Repeat MRI	Occipital hyperintensity in T2 and FLAIR	Normal

Kalita J et al. **Epstein Barr virus encephalitis: clinical diversity and radiological similarity.** Neurol India. 2011 Jul-Aug;59(4):605-7

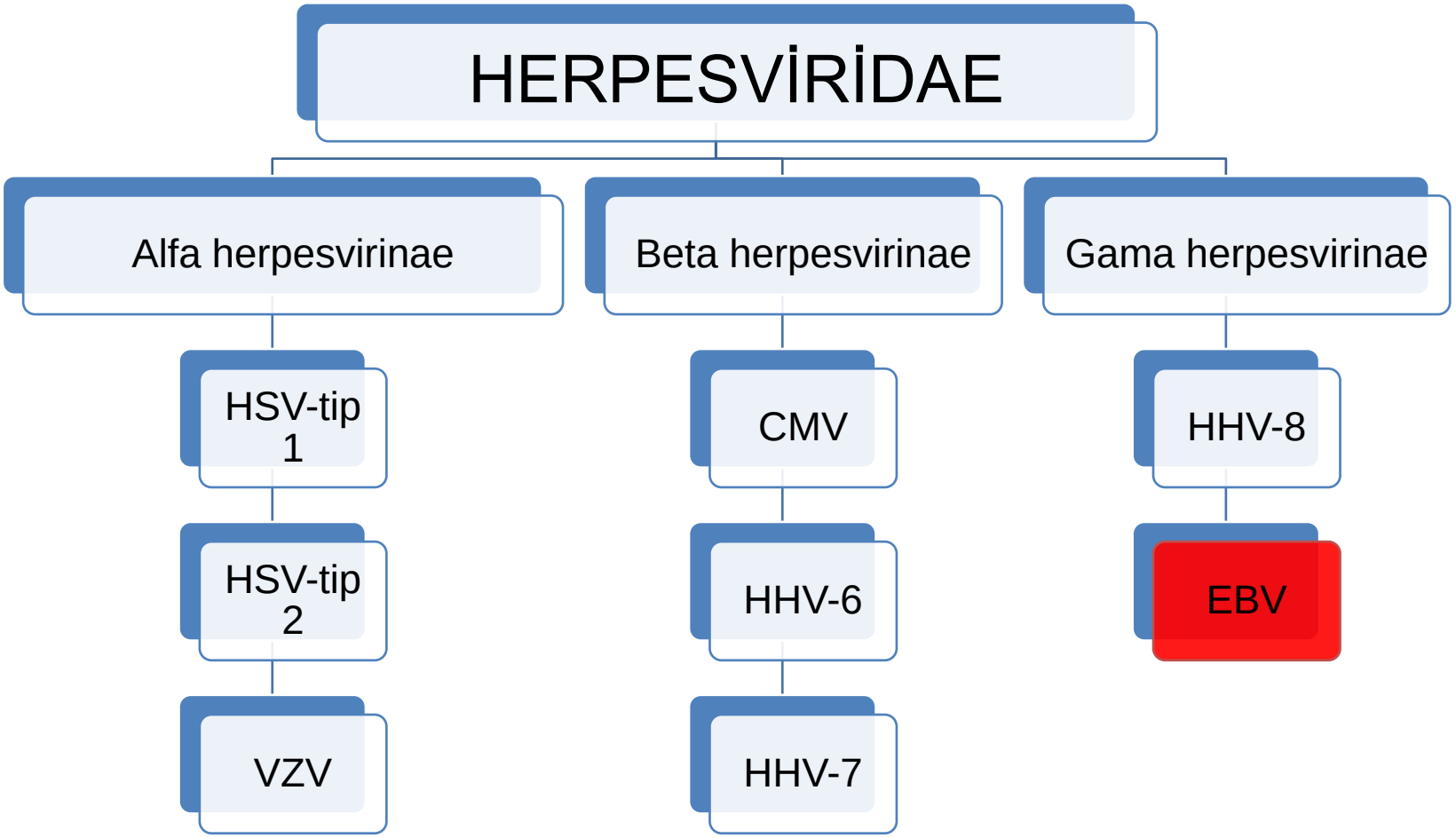


a. T2 parieto-oksipital hiperintes, b. 2 ay sonraki görüntü. c. FLAİR parieto-oksipital lezyon, d. 1 ay sonraki görüntü

Viral Ensefalitte BOS bulguları

- Lökosit: genellikle <250/mm3 ve lenfositer.
- Protein: Yüksek <150mg/dl
- Glukoz: genellikle normal (kan glukozun yarısı). HSV, kabakulak ve enterovirus ensefalitlerinde orta derecede düşük.
- Eritrosit: genellikle saptanmaz. Uygun klinik ile birlikte HSV ensefalitinde bulunabilir.

Epstien-Barr virus (EBV)



Epstien-Barr virus (EBV)

- Zarflı DNA virusu
- İnsan B lenfositleri
- Nazofarengeal epitel hücreleri

Antijenleri;

- EBV nükleer antijen (EBVNA IgM, IgG)
- Viral kapsid antijeni (EBV-VCA IgM, IgG),
- Early antijen EA

EBV'nin Sorumlu Olduğu Hastalıklar

- Enfeksiyöz mononükleoz
- Burkitt lenfoma
- Nazofarengeal karsinoma
- Menenjit/ensefalit
- Hodgkin lenfoma
- İmmünkompromize hastalarda gelişen lenfoproliferatif hastalıklar
- Gastrik karsinomlar
- Tonsil karsinomu
- Supraglottik laringeal karsinom
- Timik karsinom
- Tükrük bezi karsinomları
- Geniş granüler lenfositik lösemi

EBV Ensefaliti

- EBV primer infeksiyonu (infeksiyöz mononukleoz) şeklinde seyreder.
- %1 oranında merkezi sinir sistemi tutulumu olabilir.
- Menenjit, ensefalit, transver myelit, Guillian- Barre sendromu
- Ensefalit etkeni olarak EBV'nin hangi sıklıkla olduğu bilinmemektedir.
- Tanı için BOS'da EBV-DNA saptanması veya antikor testleri yapılabilir.
- Tedavisi hakkında kontrollü çalışmalar yoktur - gansiklovir önerilir.
- KİBAS varsa steroid yararlı olabilir.
- Mortalite <%10. İyileşenlerin %10'unda orta dereceli sekellller kalabilir.

Backam JD and Tyler KL. Encephalitis. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 8.th ed. Philadelphia: Churchill Livingstone, 2015: 1144-63

Abstract ▾ Send to: ▾

J Child Neurol. 2006 May 1;21(5):385-391.

Pediatric Epstein-Barr Virus-Associated Encephalitis: 10-Year Review.

Doja A, Bitnun A, Jones EL, Richardson S, Tellier R, Petric M, Heurter H, Macgregor D.

Abstract

Many neurologic manifestations of Epstein-Barr virus (EBV) infection have been documented, including encephalitis, aseptic meningitis, transverse myelitis, and Guillain-Barr?yndrome. These manifestations can occur alone or coincidentally with the clinical picture of infectious mononucleosis. Since 1994, The Hospital for Sick Children has maintained a prospective registry of all children admitted with acute encephalitis. This report summarizes all cases of Epstein-Barr virus-associated encephalitis compiled from

1994-2003 yılları arasında toplam akut ensefalit olguları incelenmiş.
206 hastadan 21 (%6)'i EBV'ye bağlı ensefalit.

Semptom/bulgu	Hasta sayısı	%
ateş	17	81
başağrısı	14	66
nöbet	10	48
BOS'ta pleositoz	17	81
Anormal MR bulguları	15	71
Ölüm	2	9
Orta derecede nörolojik defisit	2	9
İyileşen	17	80

Infectious Encephalitis in France in 2007: A National Prospective Study

Alexandra Mailles[1] and Jean-Paul Stahl,[2] on behalf of the Steering Committee and the Investigators Group[a]

[1]Institut de Veille Sanitaire, Saint-Maurice, and [2]Infectious Diseases Unit, University Hospital of Grenoble, Grenoble, France

• CID 2009:49 (15 December) • Mailles and Stahl

- Fransa'da 2007 yılında tüm ülkede yatarak tedavi edilen akut ensefalit hastaları.
- 253 hastada
- 131 (%52)'sinde etiyolojik etken sapandı.
- HSV en sık etken
- En yüksek mortalite bakteriyel etkenlerde

Table 3. Identified Etiologic Causes of Encephalitis, France, 2007 ($n = 131$)

Etiologic diagnosis	No. (%) of patients	No. of patients with confirmed cases	No. of patients with probable cases	No. of patients with possible cases	Comments
HSV	55 (42)	55	0	0	All had an initial positive PCR result of a CSF specimen, although 27 of 55 had their initial HSV PCR performed during the first 2 days of neurologic signs
VZV	20 (15.2)	16	0	4	...
Mycobacterium tuberculosis	20 (15.2)	13	3	4	Patients with probable cases had an isolation of bacteria in urine, sputum, and gastric tube. Patients with possible cases of encephalitis were 63 to 72 years old. Two were born in France, 1 in China, and 1 in Algeria. All 4 experienced rapid loss of weight before onset of neurologic signs. All had high levels of protein in the CSF and high WBC counts in the CSF. One had lesions evocative of ancient tuberculosis on chest radiography examination.
Listeria monocytogenes	13 (10)	11	1	1	...
Cytomegalovirus	3 (2.3)	2	0	1	...
Epstein-Barr virus	3 (2.3)	1	2	0	...
Tick-borne encephalitis	3 (2.3)	0	1	2	...
Enterovirus	2 (1.5)	0	2	0	...
Toscana virus	2 (1.5)	1	1	0	1 Patient infected in Southeast France and 1 in Italy
Lyme disease	2 (1.5)	1	1	0	...
Mycoplasma pneumoniae	2 (1.5)	0	2	0	...
Rickettsia conorii	1 (0.8)	0	1	0	...
Francisella tularensis	1 (0.8)	0	1	0	...
Legionella pneumophila	1 (0.8)	0	1	0	...
Influenza A	1 (0.8)	0	1	0	...
West Nile virus	1 (0.8)	0	1	0	Patient infected in Egypt
Cryptococcus neoformans	1 (0.8)	1	0	0	...

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journal homepage: www.elsevier.com/locate/ijid

Short Communication

Viral infections of the central nervous system in elderly patients: a retrospective study☆

Q2 Saverio G. Parisi [a,b,*], Monica Basso [a,b], Claudia Del Vecchio [a,b], Samantha Andreis [a], Elisa Franchin [a,b], Federico Dal Bello [a,b], Silvana Pagni [a,b], Maria Angela Biasolo [a,b], Riccardo Manganelli [a,b], Luisa Barzon [a,b], Giorgio Palù [a,b]

[a] Department of Molecular Medici
[b] Microbiology and Virology Unit,

- Ağustos 2012 – Mayıs 2015 tarihlerindeki PCR sonuçları incelenmiş.
- 502 örnekten 65 pozitif sonuç
- En sık etken HSV
- Yaşlılarda en sık VZV

Viral CSF RT-PCR results in 502 elderly patients with suspected meningitis and encephalitis

	Patients aged 65–79 years, *n* (%)	Patients aged ≥80 years, *n* (%)	*p*-Value	Total, *n* (%)
(A) RT-PCR performed in the two groups of patients, evaluated both as the absolute value and as the percentage with respect to the number of patients included in each age group. The viruses are listed according to the number of patients tested.				
HSV tested	358 (98.3)	138 (100)	0.12	496 (98.8)
VZV tested	308 (84.6)	118 (85.5)	0.8	426 (84.9)
CMV tested	262 (72)	92 (66.7)	0.24	354 (70.5)
EV tested	258 (70.9)	91(65.9)	0.28	349 (69.5)
HPeVs tested	253 (69.5)	85 (61.6)	0.09	338 (67.3)
EBV tested	243 (66.7)	82 (59.4)	0.12	325 (64.7)
TBEV tested	107 (29.4)	30 (21.7)	0.08	137 (27.3)
HAdV tested	76 (20.9)	30 (21.7)	0.83	106 (21.1)
HHV-6 tested	100 (27.5)	39 (28.3)	0.86	139 (27.7)
HHV-7 tested[a]	72 (19.8)	28 (20.3)	0.89	100 (19.9)
HHV-8 tested	70 (19.2)	28 (20.3)	0.78	98 (19.5)
(B) Positive RT-PCR in the two groups of patients, evaluated both as the absolute value and as the percentage with respect to the number of tests performed for the specific virus (37 positive RT-PCRs for patients aged 65–79 years and 28 positive RT-PCRs for patients aged ≥80 years: total 65 positive RT-PCRs).				
HSV-positive	16 (4.5)	7 (5.1)	0.77	23 (4.6)
EV-positive	8 (3.1)	7 (7.7)	0.06	15 (4.3)
EBV-positive	8 (3.3)	6 (7.3)	0.12	14 (4.3)
VZV-positive	5 (1.6)	7 (5.9)	0.03[b]	12 (2.8)
CMV-positive	0	1 (1.1)	0.09	1 (0.3)
HPeVs-positive	0	0	-	0
TBEV-positive	0	0	-	0
HAdV-positive	0	0	-	0
HHV-6-positive	0	0	-	0
HHV-7-positive	0	0	-	0
HHV-8-positive	0	0	-	0

Olgu	Klinik	Laboratuvar	Tedavi	Tedavi süresi	Sonuç
Carman KB, et al. Türkiye 2013	15 yaş K, ateş, başağrısı, kusma, öfori, isimlendirme bozukluğu	BOS: pleositoz, normal protein ve glukoz Serumda EA IgM (+), EBNA IgM (+), MR'da sol temporal hiperintens	Asiklovir	2 hafta	Şifa
Hashemian S, et al. İran 2015	10 yaş K, nöbet, başağrısı, ateş, küfürlü konuşma	BOS: nötrofilik pleositoz, normal protein ve glukoz VCA IgM (+) MR'da beyin ödemi, bazal ganglionlarda hiperintens alan	Asiklovir	2 hafta	Şifa, Kısmi sekel
Husain R, et al. ABD 2013	25 yaş K, ateş, ataksi, baş ağrısı, nistagmus,	Kanda VCA IgM (+), VCA IgG (-) LP yapılmadı.	Gansiklovir+ Prednizolon	10 gün	Şifa
Garamendi I, et al. İspanya 2002	55 yaş K, 5 yıldır böbrek nakilli, ateş, vertigo, görsel halüsinasyonlar, nöbet	BOS: 300 PNL, normal protein ve glukoz, EBV-DNA (+)	Gansiklovir	4 hafta	Şifa
Baron J, et al. İspanya 2013	51 yaş E, baş ağrısı, ateş, uyku hali ve konuşma bozukluğu	BOS:lenfositer pleositoz (422), normal glukoz ve protein. EBV-DNA pozitif Kan: VCA IgG (+), IgM (-)	Asiklovir	3 hafta	Şifa
Zhang S, et al. Çin 2015	8 yaş K, ateş, baş ağrısı, kusma, nöbet,	BOS: 125 lökosit (%75 lenfosit), glukoz ve protein normal. VCA-IgM (+), EBV-DNA (+) MR'da parieto-oksipital hiperintens	Gansiklovir + prednizolon	2 hafta	Şifa

Clinical Infectious Diseases 2013;57(8):1114–28

Case Definitions, Diagnostic Algorithms, and Priorities in Encephalitis: Consensus Statement of the International Encephalitis Consortium

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Table 2. Diagnostic Algorithm for Initial Evaluation of Encephalitis in Adults[a]

ROUTINE STUDIES
CSF
Collect at least 20 cc fluid, if possible; freeze at least 5–10 cc fluid, if possible
Opening pressure, WBC count with differential, RBC count, protein, glucose
Gram stain and bacterial culture
HSV-1/2 PCR (if test available, consider HSV CSF IgG and IgM in addition)
VZV PCR (sensitivity may be low; if test available, consider VZV CSF IgG and IgM in addition)
Enterovirus PCR
Cryptococcal antigen and/or India Ink staining
Oligoclonal bands and IgG index
VDRL
SERUM
Routine blood cultures
HIV serology (consider RNA)
Treponemal testing (RPR, specific treponemal test)
Hold acute serum and collect convalescent serum 10–14 d later for paired antibody testing
IMAGING
Neuroimaging (MRI preferred to CT, if available)
Chest imaging (Chest x-ray and/or CT)
NEUROPHYSIOLOGY
EEG
OTHER TISSUES/FLUIDS
When clinical features of extra-CNS involvement are present, we recommend additional testing (eg, biopsy of skin lesions; bronchoalveolar lavage and/or endobronchial biopsy in those with pneumonia/pulmonary lesions; throat swab PCR/culture in those with upper respiratory illness; stool culture in those with diarrhea); also see below
CONDITIONAL STUDIES
HOST FACTORS
Immunocompromised—CMV PCR, HHV6/7 PCR, HIV PCR (CSF); *Toxoplasma gondii* serology and/or PCR; MTB testing[b]; fungal testing[c]; WNV testing[d]
GEOGRAPHIC FACTORS
Africa—malaria (blood smear), trypanosomiasis (blood/CSF smear, serology from serum and CSF); dengue testing[d]
Asia—Japanese encephalitis virus testing[d]; dengue testing[d]; malaria (blood smear); Nipah virus testing (serology from serum and CSF; PCR, immunohistochemistry, and virus isolation in a BSL4 lab can also be used to substantiate diagnosis)
Australia—Murray Valley encephalitis virus testing[d], Kunjin virus testing[d], Australian Bat Lyssavirus (ABLV) testing[e]
Europe—Tick-borne encephalitis virus (serology); if Southern Europe, consider WNV testing[d], Toscana virus testing[d]
Central and South America—dengue testing[d]; malaria (blood smear); WNV, Venezuelan equine encephalitis testing[d]
North America—Geographically appropriate arboviral testing (eg, WNV, Powassan, LaCrosse, Eastern Equine Encephalitis viruses[d], Lyme (serum ELISA and Western blot)

SEASON AND EXPOSURE
Summer/Fall: Arbovirus[d] and tick-borne disease[f] testing
Cat (particularly if with seizures, paucicellular CSF)—Bartonella antibody (serum), ophthalmologic evaluation
Tick exposure—tick borne disease testing[f]
Animal bite/bat exposure—rabies testing[e]
Swimming or diving in warm freshwater or nasal/sinus irrigation—*Naegleria fowleri* (CSF wet mount and PCR[g])
SPECIFIC SIGNS AND SYMPTOMS
Psychotic features or movement disorder—anti-NMDAR antibody (serum, CSF); rabies testing[e]; screen for malignancy, Creutzfeld-Jakob disease
Prominent limbic symptoms—Autoimmune limbic encephalitis testing[h]; HHV6/7 PCR (CSF); screen for malignancy
Rapid decompensation (particularly with animal bite history or prior travel to rabies-endemic areas)—rabies testing[e]
Respiratory symptoms—*Mycoplasma pneumoniae* serology and throat PCR (if either positive, then do CSF PCR); respiratory virus testing[i]
Acute flaccid paralysis—Arbovirus testing[d]; rabies testing[e]
Parkinsonism –Arbovirus testing[d]; Toxoplasma serology
Nonhealing skin lesions—*Balamuthia mandrillaris, Acanthamoeba* testing[g]

LABORATORY FEATURES
Elevated transaminases—Rickettsia serology, tick borne diseases testing[f]
CSF protein >100 mg/dL, or CSF glucose <2/3 peripheral glucose, or lymphocytic pleocytosis with subacute symptom onset—MTB testing[b], fungal testing[c]
CSF protein >100 mg/dL or CSF glucose <2/3 peripheral glucose and neutrophilic predominance with acute symptom onset and recent antibiotic use—CSF PCR for *S. pneumoniae* and *N. meningiditis*
CSF eosinophilia –MTB testing[b]; fungal testing[c]; *Baylisascaris procyonis* antibody (serum); *Angiostrongylus cantonensis* and *Gnathostoma* sp. testing[j]
RBCs in CSF—*Naegleria fowleri* testing[g]
Hyponatremia—anti-VGKC antibody (serum); MTB testing[a]
NEUROIMAGING FEATURES
Frontal lobe—*Naegleria fowleri* testing (CSF wet mount and PCR[g])
Temporal lobe—VGKC antibodies (serum and CSF); HHV 6/7 PCR (CSF)
Basal ganglia and/or thalamus—Arbovirus[d] testing; MTB testing[a]
Brainstem—Arbovirus testing[d]; Listeria PCR(if available); Brucella antibody (serum); MTB testing[b]
Cerebellum—EBV PCR (CSF) and serology
Diffuse cerebral edema—Respiratory virus testing[i]
Space occupying and/or ring-enhancing lesions—MTB testing[b]; fungal testing[c]; *Balamuthia mandrillaris* and *Acanthamoeba* testing[g]; Toxoplasma serology
Hydrocephalus and/or basilar meningeal enhancement—MTB testing[b]; fungal testing[c]
Infarction or hemorrhage—MTB testing[b]; fungal testing[c]; respiratory virus testing[i]

Table 3. Diagnostic Algorithm for Initial Evaluation of Encephalitis in Children[a]

ROUTINE STUDIES
CSF[b]
Collect at least 5 cc fluid, if possible; freeze unused fluid for additional testing
Opening pressure, WBC count with differential, RBC count, protein, glucose
Gram stain and bacterial culture
HSV-1/2 PCR (if test available, consider HSV CSF IgG and IgM in addition)
Enterovirus PCR
SERUM
Routine blood cultures
EBV serology (VCA IgG and IgM and EBNA IgG)
Mycoplasma pneumoniae IgM and IgG
Hold acute serum and collect convalescent serum 10–14 d later for paired antibody testing
IMAGING
Neuroimaging (MRI preferred to CT, if available)
NEUROPHYSIOLOGY
EEG
OTHER TISSUES/FLUIDS
Mycoplasma pneumoniae PCR from throat sample
Enterovirus PCR and/or culture of throat and stool
When clinical features of extra-CNS involvement are present, we recommend additional testing (eg, biopsy of skin lesions; bronchoalveolar lavage and/or endobronchial biopsy in those with pneumonia/pulmonary lesions; throat swab PCR/culture in those with upper respiratory illness; stool culture in those with diarrhea); also see below
CONDITIONAL STUDIES
HOST FACTORS
Age <3 y—Parechovirus PCR (CSF)
Immunocompromised—CMV PCR, HHV6/7 PCR, HIV PCR (CSF); cryptococcal antigen; *Toxoplasma gondii* serology and/or PCR; MTB testing[c]; fungal testing[d]; WNV testing[e]
GEOGRAPHIC FACTORS
Africa—malaria (blood smear); trypanosomiasis (blood/CSF smear, serology from serum and CSF); dengue testing[e]
Asia—Japanese Encephalitis Virus testing[e]; dengue testing[e]; malaria (blood smear); Nipah virus testing (serology from serum and CSF; PCR, immunohistochemistry, and virus isolation in a BSL4 lab can also be used to substantiate diagnosis)
Australia—Murray Valley encephalitis virus testing[e]; Kunjin virus testing[e], Australian Bat Lyssavirus (ABLV) testing[f]
Europe—Tick-borne Encephalitis Virus (serology); if Southern Europe, consider WNV testing[e], Toscana virus testing[e]
Central and South America—dengue testing[e]; malaria (blood smear)
North America—Geographically—appropriate arboviral testing (eg, WNV, Powassan, LaCrosse, Eastern Equine Encephalitis viruses,[e] Lyme (serum ELISA and Western blot)
SEASON AND EXPOSURE
Summer/Fall: Arbovirus[e] and tick-borne disease[g] testing
Cat (particularly if with seizures, paucicellular CSF)—Bartonella antibody (serum), ophthalmologic evaluation
Tick exposure– Tick borne disease testing[g]

LABORATORY FEATURES
If EBV serology is suggestive of acute infection, perform EBV PCR (CSF)
Elevated transaminases—Rickettsia serology, tick borne diseases testing[g]
CSF protein >100 mg/dL, or CSF glucose <2/3 peripheral glucose, or lymphocytic pleocytosis with subacute symptom onset—MTB testing[c], fungal testing[d], *Balamuthia mandrillaris* testing[h]
CSF protein >100 mg/dL or CSF glucose <2/3 peripheral glucose and neutrophilic predominance with acute symptom onset and recent antibiotic use—CSF PCR for *S. pneumoniae* and *N. meningiditis*
CSF eosinophilia –MTB testing[c]; fungal testing[d]; *Baylisascaris* procyonis antibody (serum and CSF); *Angiostrongylus cantonensis*, *Gnathostoma* sp. testing[k]
Hyponatremia—MTB testing[c]
Mycoplasma pneumoniae serology or throat PCR positive— *Mycoplasma pneumoniae* PCR (CSF)
NEUROIMAGING FEATURES
Frontal lobe—*Naegleria fowleri* (CSF wet mount and PCR[h])
Temporal lobe—HHV 6/7 PCR (CSF)
Basal ganglia and/or thalamus—Respiratory virus testing[i]; Arbovirus testing[e]; MTB testing[c]
Brainstem—respiratory virus testing[j]; Arbovirus testing[e]; Listeria PCR (if available); Brucella antibody (serum); MTB testing[c]
Cerebellum—VZV PCR from CSF (sensitivity may be low; if test available, consider CSF IgG and IgM); VZV IgG and IgM from serum; EBV PCR (CSF)
Diffuse cerebral edema—respiratory virus testing[j]
Space occupying and/or ring-enhancing lesions—MTB testing[c]; fungal testing[d]; *Balamuthia mandrillaris* and Acanthamoeba testing[h], *Toxoplasma gondii* serology
Hydrocephalus and/or basilar meningeal enhancement—MTB testing[c]; fungal testing[d]; *Balamuthia mandrillaris* testing[h]; Infarction or hemorrhage—MTB testing[c]; fungal testing[d]; respiratory virus testing[i];
White matter lesions—Oligoclonal bands, IgG index, Lyme (serum ELISA and Western blot); Brucella (serology or CSF culture);
Measles virus testing for SSPE; *Baylisascaris procyonis* antibody (serum and CSF); *Balamuthia mandrillaris* testing[h]

Özet

- Özellikle çocuk ve genç erişkinlerde EBV önemli bir ensefalit nedenidir.
- Kliniği ve BOS bulguları diğer viral ensefalitler gibidir.
- Tanıda BOS'ta EBV-DNA ve antikor testlerin yapılması önerilir.
- Farklı radyolojik bulgular olablilir, HSV ensefalitini taklit edebilir. Serebellum tutulumu önemlidir.
- Tedavide asiklovir veya gansiklovir
- KİBAS varsa steroid kullanılabilir.
- Prognozu tam şifa ya da sekelle iyileşebilir.

Dinlediğiniz için Teşekkürler