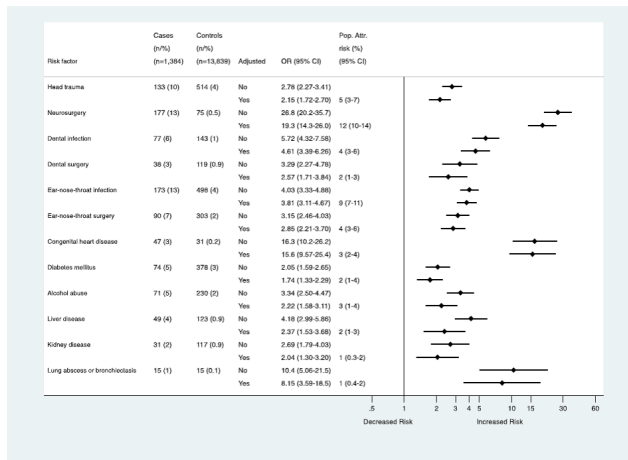Figure 1: Risk factors and their population attributable fractions among patients hospitalized with brain abscess and age-, sex-, and resident-matched population control subjects.
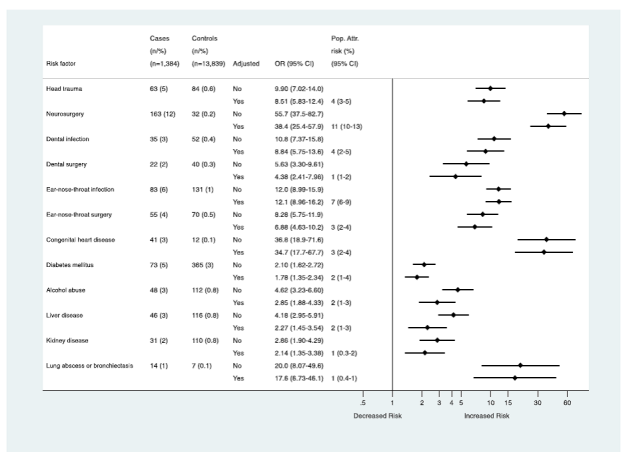

* Adjustments: Head trauma: alcohol abuse and nervous system disease. Neurosurgery: alcohol abuse, cancer, and head trauma. Dental infection and surgery: alcohol abuse, diabetes mellitus, cancer, connective tissue disease, and HIV. Ear-nose-throat infection and surgery: diabetes mellitus, dental infections, cancer, connective tissue disease, and HIV. Congenital heart disease: hematological (proxy for hypervicosity) and cerebrovascular disease. Diabetes mellitus: alcohol abuse, connective tissue disease, cancer, and liver disease. Alcohol abuse: diabetes mellitus, nervous system disease, dental infections, and cancer. Liver and kidney disease: alcohol abuse, diabetes mellitus, and cancer. Lung abscess or bronchiectasis: alcohol abuse, diabetes mellitus, ear-nose-throat disease, and cancer.

Table 2: Risk factors associated with immuno-compromise among patients hospitalized with brain abscess and age-, sex-, and resident-matched population control subjects.

Exposure	Total number (%)		OR (95% CI)		Attributable risk (%) (95% CI)
	Cases (n=1,384)	Controls (n=13,839)	Crude	Adjusted	
Primary immunodeficiency	3 (0.2)	2 (0.01)	15.0 (2.50-89.8)	-	
Solid cancer[a]	200 (14)	628 (5)	4.19 (3.43-5.12)	4.12 (3.37-5.04)	11 (9-13)
Hematological cancer[a]	41 (3)	51 (0.4)	8.56 (5.58-13.1)	8.77 (5.66-13.6)	3 (2-4)
Connective tissue disease[a]	44 (3)	214 (2)	2.11 (1.52-2.94)	2.05 (1.47-2.87)	2 (1-3)
HIV[b]	23 (2)	18 (0.1)	12.8 (6.89-23.7)	12.0 (6.13-23.7)	2 (1-2)
Solid organ transplant	8 (0.8)	9 (0.09)	9.00 (3.66-22.2)	-	
Bone marrow transplant	6 (0.6)	1 (0.01)	60.0 (7.22-499)	-	
Other stem cell treatments	4 (0.4)	1 (0.01)	40.0 (4.47-358)	-	
Immuno-modulating treatments[a]	77 (10)	153 (2)	5.72 (4.27-7.67)	5.71 (4.22-7.75)	5 (3-6)
Cytostatic agents[a]	65 (9)	112 (1)	6.67 (4.80-9.27)	6.65 (4.71-9.39)	4 (3-5)
Alkylating agents[a]	20 (3)	27 (0.4)	7.90 (4.35-14.3)	7.48 (3.90-14.4)	1 (1-2)
Antimetabolites[a]	12 (2)	52 (0.7)	2.37 (1.26-4.48)	2.22 (1.16-4.24)	1 (0-1)
Antimitotic drugs	8 (1)	13 (0.2)	6.15 (2.55-14.9)		
Topoisomerase inhibitors	4 (0.5)	8 (0.1)	5.00 (1.50-16.6)	-	
Other immuno-modulating therapy[a]	42 (6)	71 (0.9)	6.35 (4.28-9.41)	6.44 (4.31-9.62)	3 (2-3)
Intravenous immunoglobulin (IVIG)	12 (2)	4 (0.05)	30.0 (9.67-93.1)	-	
Anti-CD20 antibody	11 (1)	9 (0.1)	12.2 (5.06-29.5)		
TNF-alfa inhibitors[a]	11 (1)	25 (0.3)	4.47 (2.21-9.06)	4.33 (2.11-8.89)	1 (0.1-1)
Other antibody treatment	12 (1)	9 (0.1)	8.75 (3.17-24.1)	-	

[a] Adjusted for diabetes mellitus and alcohol abuse.
[b] Adjusted for dental and ear-nose-throat infections, diabetes mellitus, and cancer

Figure 2: Risk factors within five years and their population attributable fractions among patients hospitalized with brain abscess and age-, sex-, and resident-matched population control subjects.

* Adjustments: Head trauma: alcohol abuse and nervous system disease. Neurosurgery: alcohol abuse, cancer, and head trauma. Dental infection and surgery: alcohol abuse, diabetes mellitus, cancer, connective tissue disease, and HIV. Ear-nose-throat infection and surgery: diabetes mellitus, dental infections, cancer, connective tissue disease, and HIV. Congenital heart disease: hematological (proxy for hypervicosity) and cerebrovascular disease. Diabetes mellitus: alcohol abuse, connective tissue disease, cancer, and liver disease. Alcohol abuse: diabetes mellitus, nervous system disease, dental infections, and cancer. Liver and kidney disease: alcohol abuse, diabetes mellitus, and cancer. Lung abscess or bronchiectasis: alcohol abuse, diabetes mellitus, ear-nose-throat infections, and cancer.

Disclosures. All authors: No reported disclosures.

1397. Risk Factors of Unfavorable Clinical Outcomes in Patients with Brain Abscess and Subdural Empyema in Korea

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Background. Brain abscess is a fatal neurological infection, despite reduction of mortality rate on account of medical improvement. Therefore, we investigated to identify risk factors for poor clinical outcomes of patients with brain abscess and subdural empyema in Korea.

Methods. A retrospective analysis was conducted among patients treated for brain abscess or subdural empyema over a period of 11 years between May 2005 and July 2016 in a tertiary hospital, Seoul, South Korea. Based on medical records, we reviewed the clinical findings, therapeutic modalities and prognostic factors of brain abscess or subdural empyema. A multivariate analysis was performed to evaluate the independent risk factors of poor clinical outcomes. Unfavorable clinical outcomes were defined as death or neurologic deficit.

Results. In total, 121 patients were enrolled in this study. 79 (65.2%) were males and the mean age was 55.3 years. The common symptoms at presentation included a focal neurological deficit (52.8%), a reduced Glasgow coma scale (47%), headache (49.5%) and fever (22.3%). Gram-positive cocci were most frequently isolated as the causative microorganism. The most common location of brain abscess was the frontal lobe (32.5%), followed by parietal (18.7%) and temporal lobe (11.38%) and a subdural empyema (8.26%). 28-day mortality was 2.47% (3/121), and 43.8% (53/121) had long-term disability. In multivariate analysis, reduced GCS, headache at presentation and high blood urea nitrogen were independently associated with unfavorable clinical outcomes.

Conclusion. In this study, reduced GCS, headache at presentation and high blood urea nitrogen were significant risk factors for unfavorable clinical outcomes in patients with brain abscess and subdural empyema.

Table.			
Binary logistic regression of factors predicting an unfavorable outcome from brain abscess and subdural empyema			
Variable	OR	95% confidence interval	P value
GCS<15	0.713	0.559-0.909	0.06
BUN	1.062	1.004-1.122	0.036
Headache	0.46	0.196-1.082	0.05

Disclosures. All authors: No reported disclosures.

1398. Clinical Performance of Film Array Meningitis/Encephalitis Multiplex PCR Panel in CNS Infection

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Background. Rapid identification of pathogen is important in the management of meningoencephalitis. A fully-automated multiplex PCR, the FilmArray (FA) meningitis/encephalitis (ME) panel, detects 14 pathogens simultaneously in an hour. As there is not much data on this, we undertook this study to understand its performance.

Methods. A retrospective analysis was done on patients, both adult and pediatric, admitted with meningitis/encephalitis syndrome between December 2016 and 2018 and who underwent the FA–ME panel (BioFire Diagnostics, USA) multiplex PCR test on CSF. The performance of the FA- ME panel was compared with that of routine tests done on CSF which is cell count, biochemistry, gram stain, bacterial culture, and other relevant tests.

Results. FA- ME panel was done in 259 patients and it detected pathogen in 61 (23.6%) patients with ME syndrome. Viruses accounted for 70.4%, bacteria 24.5%, and 2 patients had 2 organisms in a single sample (enterovirus and *H. influenzae* on both occasions). Enterovirus was the commonest accounting for 29 cases, followed by varicella in 11, pneumococci in 9. HHV 6, *H. influenzae*, *Strep agalactiae* and *Listeria* were the rest. Enterovirus meningitis showed seasonal prevalence; 24 out of 29 cases occurred during October till December. CSF bacterial culture yield was low, positive only in 8 (3%) cases and matched with FA ME panel in one sample which grew pneumococci; 7 other cultures grew either Gram-negative pathogens, rare organisms/ contaminants not included in FA ME panel. CNS tuberculosis was diagnosed in 6, 7 patients had aseptic meningitis due to tropical infections, 5 of which were dengue fever, 2 were scrub typhus. Overall, 191 patients (73.7%) were treated as CNS infection through FA ME panel were negative in 130 of these, rest had alternative diagnosis. Antibiotic de-escalation was better in the group with positive FA ME panel result.

Conclusion. FA-ME panel has better diagnostic yield compared with culture (26.3% vs. 3%). Viruses were commoner and majority were enteroviruses showing seasonal prevalence. Those bacteria that grew in CSF culture but not identified by FA ME panel were Gram-negative or unusual pathogens. Additional tests need to be used when considering post-traumatic or nosocomial meningitis, tuberculosis, and tropical infections.

Pathogens identified by Film Array, in numbers

Frequency of Enterovirus
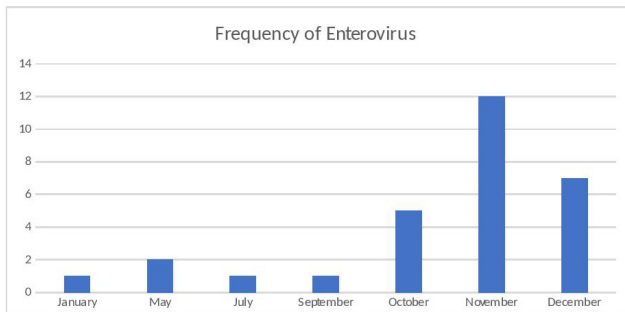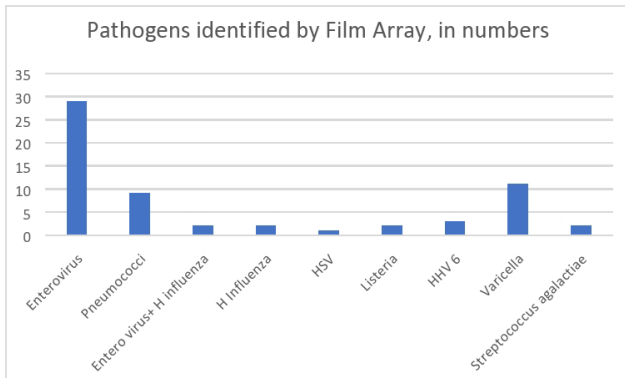
Pathogens identified in CSF culture whose FA ME panel was negative

Clinical diagnosis	CSF bacterial culture
aseptc meningitis	*Aerococcus viridans*
pyogenic	*Streptococcus species*
meinigitis/ epidural abscess	*Micrococcus luteus*
auto-immune encephalitis	*Aeromonas salmonicida*
septic cerebral venous thrombosis, meningitis	*Pseudomonas species*
Traumatic brain injury	*Klebsiella Pneumoniae*
Traumatic brain injury	*Klebsiella Pneumoniae*

Disclosures. All authors: No reported disclosures.

1399. A Prospective Cohort Study Regarding the Impact of Biofire® FilmArray® Meningitis/Encephalitis (FA) Panel in Children with Suspected Central Nervous System Infection

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Background. Rapid detection of pathogens involved in central nervous system (CNS) infections could be important for the optimal patient management and overall hospitalization cost. The aim of the study was to evaluate the possible benefits with the use of BioFire® FilmArray® meningitis/encephalitis (FA) panel in children with suspected CNS infection.

Methods. A prospective cohort study, was performed on children admitted to a tertiary pediatric hospital, over a period of 1 year (April 2018–April 2019), with possible CNS infection and cerebrospinal fluid (CSF) pleocytosis (>15 cells/mm^3). For each child that FA was used for the diagnosis, an age-matched control was selected, and separate molecular CSF microbiological tests were sent according to pediatrician's discretion. Conventional microbiological procedures were performed in all children. Length of hospital stay, duration of antimicrobials, and total cost of hospitalization were compared between groups. FA enables rapid automated cerebrospinal fluid testing for 14 common viral, bacterial and yeast pathogens that cause CNS infections. The cost was estimated according to ICD-10 diagnosis standard cost, adding additional daily hospitalization cost, FA or other molecular microbiological tests costs.

Results. A total of 142 children were included in the study (71 cases). The median age of cases and controls was 2.5 months (IQR: 1–72) and 2 months (IQR: 0.7–36) respectively (*P* = 0.157). A pathogen was detected in 38/71 (53.5%) children with the use of FA and in 16/71 (22.5%) in the control group (*P* < 0.001). In aseptic meningitis cases a virus was detected in 27/60 (45%) and in 11/64 (16.4%) controls (*P* < 0.001). Length of stay in cases and controls with aseptic meningitis was 5 days (IQR: 4–8) and 8 (IQR: 6–10) respectively (*P* < 0.001). The median duration of antimicrobials in cases was 4 days (IQR: 2–5.7) and 7 (IQR: 5–10) respectively (*P* < 0.001). The hospitalization cost was calculated in cases and controls 1,042 (IQR: 932–1372€) and 1,522 (IQR: 1,302–1,742€) respectively (*P* < 0.001).

Conclusion. The use of FA was able to reduce significantly the hospitalization days and the total cost comparing to the control group in children with suspected CNS infection.

Disclosures. All authors: No reported disclosures.

1400. Impact of a Multiplex Polymerase Chain Reaction Meningitis/Encephalitis Panel and Antimicrobial Stewardship Bundle on Antimicrobial Use in Patients with Suspected Meningitis or Encephalitis

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Background. Optimal treatment of meningitis relies on prompt diagnostic evaluation and initiation of appropriate antimicrobials. The meningitis/encephalitis panel (MEP) is a multiplex rapid polymerase chain reaction, with the ability to detect 14 community-acquired pathogens in 1 hour. The purpose of this study was to evaluate impact of the MEP on de-escalation of antimicrobials in adult inpatients with suspected meningitis at a large community teaching hospital.

Methods. This single-center retrospective quasi-experimental pre/post study included adults admitted for ≥48 hours and initiated on antimicrobial therapy for suspected meningitis. Those with healthcare-associated meningitis, immunosuppression, initiation of antimicrobials >8 hours prior to lumbar puncture (LP), and use of antimicrobials for another indication were excluded. The pre-group included patients admitted prior to MEP introduction. The post-group included patients with the MEP performed. An antimicrobial stewardship bundle consisting of a meningitis order set, provider education, and use of a real-time meningitis alert in clinical decision support software was also implemented in the post-group. The primary outcome was percentage of patients experiencing antimicrobial de-escalation ≤48 hours after LP. Secondary outcomes included time to de-escalation, total duration of antimicrobial therapy (DOT), and hospital length of stay (LOS).

Results. A total of 45 patients were included in the study (23 pre-group and 22 post-group). Baseline characteristics were similar between groups. The percentage of patients experiencing de-escalation of antimicrobials ≤ 48 hours after LP increased by 44% in the post-group (82% vs. 38%, *P* = 0.005). The overall median time to de-escalation of antimicrobials decreased by 35 hours [11.1 (IQR 5.6, 17.6) vs. 46.1 (IQR 18.4, 66.5); *P* = 0.002] and the median time to de-escalation after LP decreased by 38 hours [13.6 (IQR 8.3, 20.3) vs. 51.6 (IQR 44.2, 69.8); *P* < 0.001]. No statistically significant difference in hospital LOS or total DOT was seen.

Conclusion. Implementation of the MEP and antimicrobial stewardship bundle increased the percentage of patients de-escalated in 48 hours and decreased the time to de-escalation. However, this did not impact the total DOT or hospital LOS.

Disclosures. All authors: No reported disclosures.

1401. Minimal Cerebrospinal Concentration of Miltefosine Despite Therapeutic Plasma Levels during the Treatment of Amebic Encephalitis

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Background. Miltefosine is an alkylphosphocholine compound used primarily for the treatment of leishmaniasis that also demonstrates *in vitro* and *in vivo* anti-amebic activity against *Acanthamoeba* species. As such, recommendations for treatment of amebic encephalitis generally include miltefosine therapy. Data support a minimum amebicidal concentration (MAC) of at least 16 μg/mL is required for most *Acanthamoeba* species. Given the high mortality associated with amebic encephalitis and a paucity of data regarding miltefosine levels in the plasma and cerebrospinal fluid (CSF) *in vivo*, we sought to determine whether a patient being treated with oral miltefosine at a higher-than-recommended dose obtained therapeutic plasma and CSF concentrations.

Methods. A patient with brain-biopsy-confirmed *Acanthamoeba* encephalitis was initiated on miltefosine 50mg by mouth every 6 hours (q6h), a higher frequency of therapy than recommended in the scant available literature (which suggests doses of 50 mg every 8 hours). Plasma and CSF miltefosine concentrations were collected on day 7 of treatment. CSF was collected via an external ventricular drain over a period of 1 hour. The quantification of miltefosine was performed using a Waters Xevo TQ-S triple quadrupole mass spectrometer coupled with a Waters Acquity UPLC I-class system.

Results. The trough plasma and CSF concentrations (taken 8 hours post-dose) were 16.2 and 0.007 μg/mL, respectively, resulting in a miltefosine plasma to CSF ratio