

## Multicentre prospective study of the epidemiology of central nervous system infections (meningitis and encephalitis) in emergency departments: subgroup analysis from the INFURG-SEMES Study<sup>☆,☆☆</sup>



## Estudio prospectivo y multicéntrico de la epidemiología de las infecciones del sistema nervioso central (meningitis y encefalitis) en los servicios de urgencias hospitalarios: análisis de subgrupo del estudio INFURG-SEMES

Dear Editor,

Infectious diseases of the central nervous system (CNS) are responsible for a sizeable portion of the morbidity and mortality associated with infectious disease in general. Hospital emergency departments (ED) usually serve as the first and fundamental link in the chain of care for severe infectious diseases, including neurological diseases that may require consultations with neurologists.<sup>1–3</sup> Most studies published in Spain during the past three decades have shown that infectious diseases account for 5% to 17% of all hospital emergencies, and that they also constitute one of the main causes of hospitalisation and mortality.<sup>4–7</sup> We completed a descriptive multi-centre study with a cross-sectional analysis of 49 EDs distributed all across Spain. The sampling procedure was to include all patients clinically diagnosed with an infectious disease in the ED between midnight and noon on the 10th day of every month, and between noon and midnight on the 20th day of every month, during the 12 consecutive months between October 2010 and September 2011. The sample excluded patients attended by the obstetrics and gynaecology department and children younger than 14. We recorded demographic variables, comorbidities, type of infection diagnosed, and presence or absence of clinical markers of sepsis.<sup>8,9</sup> During the study period, doctors

attended a total of 79 654 patients in participating Spanish EDs and diagnosed 11 399 cases of clinical infectious diseases (14.3%). A breakdown of the different disease types (Table 1) yielded 24 patients with infectious diseases of the CNS (0.2% of the total infections). Mean age (SD) of patients diagnosed with infection was 53.2 (23) years; 51.2% were women. The mean age for CNS infections only was 49.7 years. Analysis of the infections by the severity of clinical symptoms found that 707 patients (6.2%) presented clinical indicators of sepsis when they were examined; within this group, 140 patients (1.2%) presented indicators of severe sepsis, and 75 (0.7%) were in septic shock (Table 2). Of all types of infections, neurological infections were the most commonly associated with sepsis (16.7% vs 7.4% overall;  $P = .009$ ). Of the 24 patients diagnosed with a neurological condition, 4 were considered to be in critical condition because they displayed sepsis or septic shock (sepsis in 1 case, septic shock in 3 cases). Only 1 patient died out of the 24 recorded cases of CNS infections in the ED. The breakdown of the 24 patients by diagnosis listed 13 cases of pure meningitis without encephalitis (45.8%) and 11 cases of meningoen- cephalitis (54.2%). There were 14 men (58.3%) and 10 women (43.7%).

Infectious diseases of the CNS are associated with a higher severity index than the mean index for infections in general (16.7% vs 7.4%;  $P = .009$ ), with a higher probability of sepsis and other systemic infectious complications. During the data gathering phase, we recorded the diagnosis pronounced and reported by the doctor who attended the patient. We assume margins of error for both pathogenesis and pathochronia and also recognise that some cases seen in the ED are not diagnosed as infections by that department, but rather at a later point as doctors continue to monitor the patient's clinical course.

Gathering a multicentre sample from hospitals all across Spain according to such strict time frames also places certain limits on diagnostic criteria. While the percentage of CNS infections treated in the ED may be considered relatively low, these infections were very severe according to the data collected in this study. EDs and consulting neurologists should employ the maximum diagnostic caution with these infections, which have a high risk of associated septic and systemic complications.

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<sup>☆☆</sup> Part of this study was presented as an oral communication in the 2013 SEN Annual Meeting in Barcelona.

**Table 1** Characteristics of infections.

Type of infection	Total no. (%)	Specific diagnosis	Total no. (%)
LRTI	3678 (32.3)	Bronchitis	1818 (49.4)
		Pneumonia	1083 (29.4)
		AECOPD	735 (20)
		Bronchiectasis	32 (0.9)
		Lung abscess	10 (0.3)
Urinary tract	2517 (22.1)	Lower UTI	1798 (71.4)
		Pyelonephritis	439 (17.5)
		Prostatitis	166 (6.6)
		Catheterised patients	114 (4.5)
ORL	1678 (14.7)	Pharyngitis	1001 (59.7)
		Otitis	430 (25.6)
		Sinusitis	139 (8.3)
		Deep space infection	108 (6.4)
SSTI	1250 (11)	Non-necrotising	1017 (81.4)
		Necrotising	147 (11.8)
		Diabetic foot	46 (3.6)
		PU	40 (3.2)
AGE	689 (2.5)		
Intra-abdominal	482 (4.2)	Hepatobiliary	211 (43.8)
		Appendicitis	138 (28.6)
		Diverticulitis	108 (22.4)
		Peritonitis	25 (5.2)
Influenza	282 (2.5)		
Osteoarticular	41 (0.4)	Arthritis	17 (41.5)
		Osteomyelitis	13 (31.7)
		Prosthetic joint infection	11 (26.8)
Neurological	24 (0.2)	Meningitis	13 (54.2)
		Encephalitis	11 (45.8)
		Ocular	279 (27.7)
Miscellaneous	1009 (8.8)	Odontogenic infection	244 (24.2)
		Fever without a focus	180 (17.8)
		Viral infection	150 (14.9)
		Herpes zoster	92 (9.1)
		Pericarditis	11 (1.1)
		Other	53 (5.2)

AECOPD: acute exacerbation of chronic obstructive pulmonary disease; AGE: acute gastroenteritis; SSTI: skin and soft tissue infection; LRTI: lower respiratory tract infection; ORL: otorhinolaryngological infection; PU: pressure ulcers.

**Table 2** Type of infection and criteria for sepsis.

	Urinary <i>n</i> (%)	LRTI <i>n</i> (%)	ORL <i>n</i> (%)	IA <i>n</i> (%)	SSTI <i>n</i> (%)	Osteoarticular <i>n</i> (%)	NRL <i>n</i> (%)	Total <i>n</i> (%)
Septic syndrome	210 (8.3)	327 (8.9)	21 (1.3)	74 (15.4)	41 (3.3)	3 (7.3)	4 (16.7)	707 (6.2)
Sepsis	141 (5.6)	231 (6.3)	18 (1.1)	49 (10.2)	24 (1.9)	2 (4.9)	1 (4.2)	492 (4.3)
Severe sepsis	46 (1.8)	60 (1.6)	3 (0.2)	17 (3.5)	11 (0.9)	1 (2.4)	3 (12.5)	140 (1.2)
Septic shock	23 (0.9)	36 (1)	0 (0)	8 (1.7)	6 (0.5)	0 (0)	0 (0)	75 (0.7)

IA: intra-abdominal; SSTI: skin and soft tissue infection; LRTI: lower respiratory tract infection; NRL: neurological infection; ORL: otorhinolaryngological infection.

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## Severe visual field alterations in patients with optic nerve drusen<sup>☆</sup>



## Alteraciones campimétricas graves en pacientes con drusas de nervio óptico

Dear Editor:

Optic nerve drusen (OND) are globular hyaline bodies measuring 5 to 1000  $\mu\text{m}$  in diameter and located anterior to the lamina cribrosa. They contain amino acids, nucleic acids, iron, and calcium, and have a clinical incidence of 3.4 per 1000 adults; histological autopsy studies reflect higher incidence.<sup>1</sup> Pathogenesis is not well understood, but the most widely accepted theories suggest an alteration in the axoplasmic transport of ganglion cells. They tend to be bilateral, asymmetrical, and more common in females; drusen formation is a dynamic process that generally begins in the second decade of life. Most cases are idiopathic in origin, although some show autosomal dominant transmission. Drusen are associated with such ocular vascular anomalies as cilioretinal arteries, pronounced vessel tortuosity, abnormal bifurcations, collateral retinochoroidal vessels, peripapillary neovascularisation, and occlusive vascular diseases.<sup>2</sup>

One type of OND is known as hidden or deep, with elevated papillae and poorly-defined edges; ultrasound images of this type do not reveal a nodular appearance. Visible or superficial OND, in turn, appear as yellowish nodules of different numbers and sizes within a papilla that is typically elevated and displays poorly-defined edges.<sup>3</sup>

We present a clinical case of OND with severe visual field alterations and marked atrophy of the retinal nerve fibre layer (RNFL).

Our patient was a 40-year-old man referred by the neuro-ophthalmology unit for an evaluation of

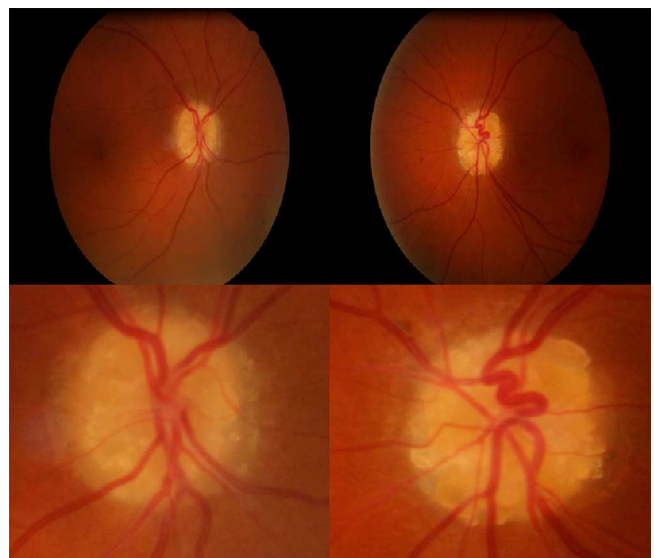
pseudopapilloedema. The patient was asymptomatic and had no relevant personal or family history.

Visual acuity was 0.60 in both eyes (OU); intraocular pressure (IOP) was 14 mmHg in OU. Biomicroscopy results were normal, and the fundus displayed elevated and asymmetrical papillae with round, yellowish deposits (Fig. 1).

Visual field analysis, performed using Octopus 1-2-3<sup>®</sup> and the G1X program, detected a bilateral nasal arcuate defect (Fig. 2A). Optic nerve tomography (ONT) showed a decrease in the nerve fibre layer in the temporal, superior, and inferior regions of OU (Fig. 2B).

OND may result in loss of central visual acuity, although this is infrequent. They can also cause severe visual field deficits, some of which may mimic those seen in glaucoma.<sup>4</sup> These deficits, added to the difficulty of examining the optic disc when OND are present, complicate diagnosis and follow-up in patients with possible glaucomatous lesions.

B-mode ultrasonography is the most reliable means of diagnosing OND. They may also be detected using



**Figure 1** Fundus showing raised, asymmetrical papillae with round yellowish deposits.

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