

Sequelae at hospital discharge in 49 children with invasive meningococcal disease. Chile, 2009-2019

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Background

To assess the sequelae is one of the pillars from the “Defeating meningitis by 2030” plan of the World Health Organization

Objective

The aim of this study was to describe the sequelae at hospital discharge caused by IMD in children between years 2009-2019.

Methods

Cross-sectional study performed with medical records in two pediatric public hospitals of Santiago, Chile. Patients with microbiologically confirmed diagnosis of IMD from 2009-2019 were included. Bivariate analysis and logistic regression were performed. Descriptive statistics and Stata 15 analysis were used.

Results

Table 1. Socio-demographic data of children with meningococcal disease, Chile, 2009-2019

Variables	Total n=49 (%)	Sequelae n=29 (%)	No sequelae n=20 (%)	p value	
		59%			
Age	Median [IQR], months	9 [4-27]	8.0 [4-23]	12.0 [4-82]	
	< 1 year old	28 (57.1)	18 (62.0)	10 (50.0)	0.40
	1-4 years old	11 (22.4)	7 (24.1)	4 (20.0)	0.74
	≥5 years old	10 (20.4)	4 (13.7)	6 (30.0)	0.14
Gender	Male	34 (69.3)	19 (65.5)	15 (75.0)	0.45
Socioeconomic status	High	1 (2.0)	1 (3.4)	0	0.40
	Middle	26 (53.0)	12 (41.3)	14 (70.0)	0.04
	Low	22 (44.9)	16 (55.1)	6 (30.0)	0.08
Comorbidity	Yes	16 (32.6)	9 (31.0)	7 (35.0)	0.76
Type of comorbidity	Recurrent wheezing	9 (18.3)	5 (17.2)	4 (20.0)	0.78
	Immunodeficiency	2 (4.0)	1 (3.4)	1 (5.0)	0.78
	Prematurity	2 (4.0)	2 (6.9)	0	0.26
	Neurological disease	1 (2.0)	0	1 (5.0)	0.22
	Congenital cardiopathy	1 (2.0)	0	1 (5.0)	0.22
	Obesity	4 (8.1)	3 (10.3)	1 (5.0)	0.52
	Malnutrition	2 (4.0)	1 (3.4)	1 (5.0)	0.78

Table 2. Clinical characteristics of invasive meningococcal disease by presents of sequelae in children during 2009-2019, Chile

Variable	Univariate Associations			Logistic Regression analysis		
	Total N 49 (%)	Sequelae N 29 (%)	No sequelae 20 (%)	p value	OR	95% CI
Onset of symptoms before consulting (days)	Median [IQR]	2.0 [1.0-4.0]	2.0 [1.0-3.0]	2.0 [1.0-3.0]	1	-
Number of medical visits	1	11 (22.4)	8 (27.5)	3 (15.0)	0.31	
	2	27 (55.1)	15 (51.7)	12 (60.0)	0.56	
	≥3	11 (22.4)	6 (20.6)	5 (25.0)	0.67	
Signs and symptoms	Fever	49 (100)	29 (100)	20 (100)	1	
	Compromised general condition	36 (73.4)	23 (79.3)	13 (65.0)	0.26	0.28 (0.03 – 2.56)
	Shock	25 (51.0)	8 (27.5)	3 (15.0)	0.03	2.15 (0.49 – 9.41)
	Vomiting	31 (63.2)	16 (55.1)	15 (75.0)	0.01	17.06 (1.74 – 166.94)
	Diarrhea	14 (28.5)	8 (27.5)	6 (30.0)	0.84	1.62 (0.23 – 11.40)
	Abdominal pain	6 (12.2)	2 (6.9)	4 (20.0)	0.16	0.29 (0.04 – 1.80)
	Drowsiness/irritability	23 (46.9)	17 (58.6)	7 (35.0)	0.10	2.83 (0.39 – 20.44)
	Meningeal signs	21 (42.8)	17 (58.6)	4 (20.0)	0.007	0.04 (0.00 – 0.55)
	Neurological deficit	20 (40.8)	16 (55.1)	4 (20.0)	0.2	0.34 (0.07 – 1.56)
	Headache	14 (28.5)	10 (34.4)	4 (20.0)	0.27	1.09 (0.16 – 7.28)
	Seizures	3 (6.1)	2 (6.9)	1 (5.0)	0.78	-
	Petechiae/rash	20 (40.8)	12 (41.3)	8 (40.0)	0.92	0.66 (0.12 – 3.48)

Clinical diagnosis	Meningitis + meningococcemia	19 (38.7)	17 (58.6)	2 (10.0)	<0.001	12.75 (2.48 – 65.54)
	Bacteremia	10 (20.4)	1 (3.4)	9 (45.0)	<0.001	0.007 (0.00 – 0.21)
	Septic arthritis	7 (14.2)	7 (24.1)	0	0.01	
	Meningitis	6 (12.2)	2 (6.9)	4 (20.0)	0.16	3.64 (0.31 – 41.65)
	Meningococcemia	5 (10.2)	0	5 (25.0)	0.06	-
	Waterhouse	2 (4.0)	2 (6.9)	0	0.23	-
	Friderichsen Syndrome					
Number of sequelae	1	19 (38.7)	19 (65.5)	-		
	2	8 (16.3)	8 (27.5)	-		
	3	2 (4.0)	2 (6.9)	-		
Type of sequelae*	Neurological disorders	19 (38.7)	19 (65.5)	-		
	Hearing loss	10 (20.0)	10 (34.4)	-		
	Osteoarticular	9 (18.3)	9 (31.0)	-		
	Skin scarring	3 (6.1)	3 (10.3)	-		
Post discharge follow-up	Yes	34 (69)	27 (93.1)	7 (35.0)	<0.001	
N. meningitidis serogroup	B	17 (34.6)	11 (37.9)	6 (30.0)	0.61	
	W	30 (61.2)	16 (55.1)	14 (70.0)	0.29	

Table 3. Classification of sequelae in children with meningococcal disease, Chile 2009-2019

Type of sequelae	Number of sequelae:	%
Neurological disorders	54	59.2
Psychomotor developmental delay	12	22.2
Speech-language impairment	7	12.9
Seizures	5	9.2
Hypertonia/Hypotonia	5	9.2
Nerve damage	2	3.7
Attention deficit/ hyperactivity disorder	1	1.8
Hearing loss	10	18.5
Cochlear implant	2	3.7
Skin scarring	3	5.5
Osteoarticular	9	16.6
Movement limitation	6	11.1
Surgical debridement	2	3.7
Amputation	1	1.8

Figure 1. Sequelae of meningococcal disease by serogroup in children, Chile, 2009-2019

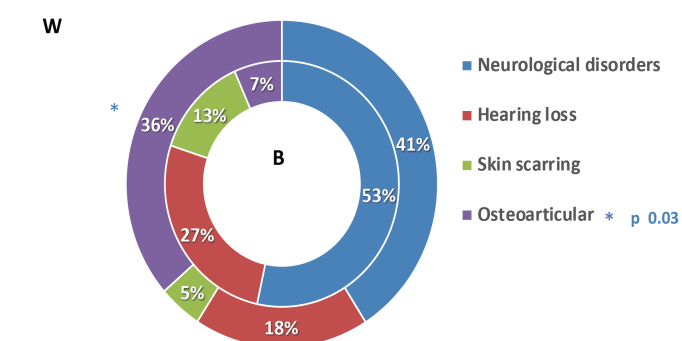
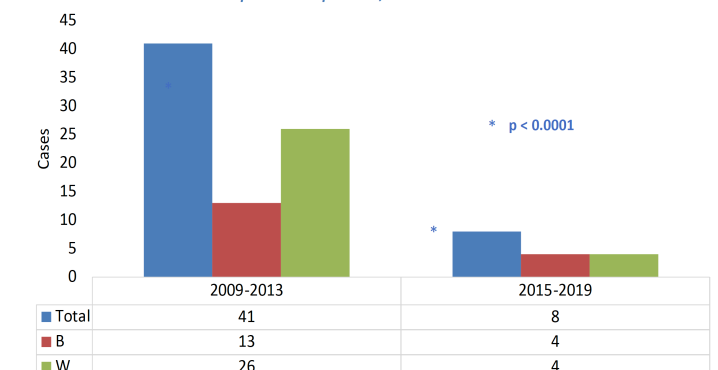


Figure 2. Sequelae of meningococcal disease by serogroup and years in pediatric patients, Chile 2009-2019



52 patients were reviewed, 3 patients died. Statistical analysis was performed in 49 patients. Sixty-nine% were male, median age 9 months [IQR-19.5], 67% were admitted to intensive care unit. Serogroups W and B were identified in 30 and 17 cases, respectively. We found 29 patients with at least one sequelae (59%). The presence of shock, vomiting and meningeal signs and meningitis + meningococcemia at admission were associated with the development of sequelae. Neurological sequelae were the most prevalent. Osteoarticular sequelae was associated with IMD by MenW

Conclusions

Invasive meningococcal disease remains as a public health concern. A high rate of sequelae were found in pediatric patients in Chile, A multidisciplinary follow-up protocols to reduce their long-term impact must be urgently established as a priority to assess all children and their families with the aim to reduce the long-term consequences/impact of IMD