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

Cindy Arteta *(1,2),* **Rodolfo Villena *(1,3)*,** María Elena Santolaya *(1,2)*

1. Faculty of Medicine Universidad de Chile, 2. Hospital de niños Dr Luis Calvo Mackenna 3. Hospital de niños Dr Exequiel González Cortés

Contact: Rodolfo Villena. rvillena@uchile.cl

november 2021

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

- **Introduction**
  - “Defeating meningitis by 2030” is a goal of the World Health Organization
  - To address the sequelae is one of the pillar for it
  - Chilean study: overall IMD sequelae rate of 28% (MenB outbreak in 90s)
- **Objective**
  - Describe the sequelae caused by IMD in pediatric patients
- **Methods**
  - Cross-sectional study performed with medical records in two pediatric public hospitals in Santiago, Chile
  - Patients with diagnosis of IMD from 2009-2019 microbiologically confirmed were included
  - Bivariate analysis and logistic regression were performed

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

Results

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

Variables		Total n=49 (%)	Sequelae n=29 (%) 59%	No sequelae n=20 (%)	p value
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

79,5%

98%

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

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

		Univariate Associations				Logistic Regression analysis	
Variable		**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)

Results

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

Results

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

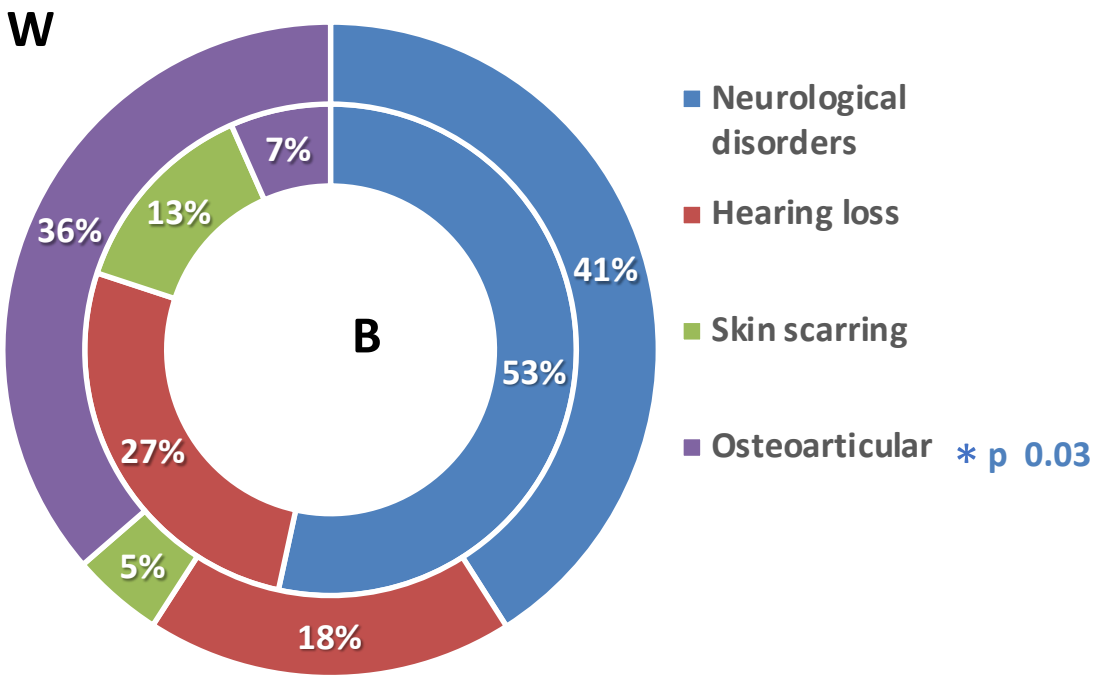
		Univariate Associations				Logistic Regression analysis	
Variable		**Total N 49 (%)**	**Sequelae N 29 (%)**	**No sequelae 20 (%)**	**P value**	**OR**	**95% CI**
Clinical diagnosis	Meningitis + meningococcemia	19 (38.7)	17 (58.6)	2 (10.0)	<0.001	12.75	(2.48 – 65.54)
	Bacteremia	10 (20.4)	1 (3.4)	9 (45.0)	<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 Friderichsen Syndrome	2 (4.0)	2 (6.9)	0	0.23	-	-
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		

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

Table 3. Classification of sequelae in children with IMD

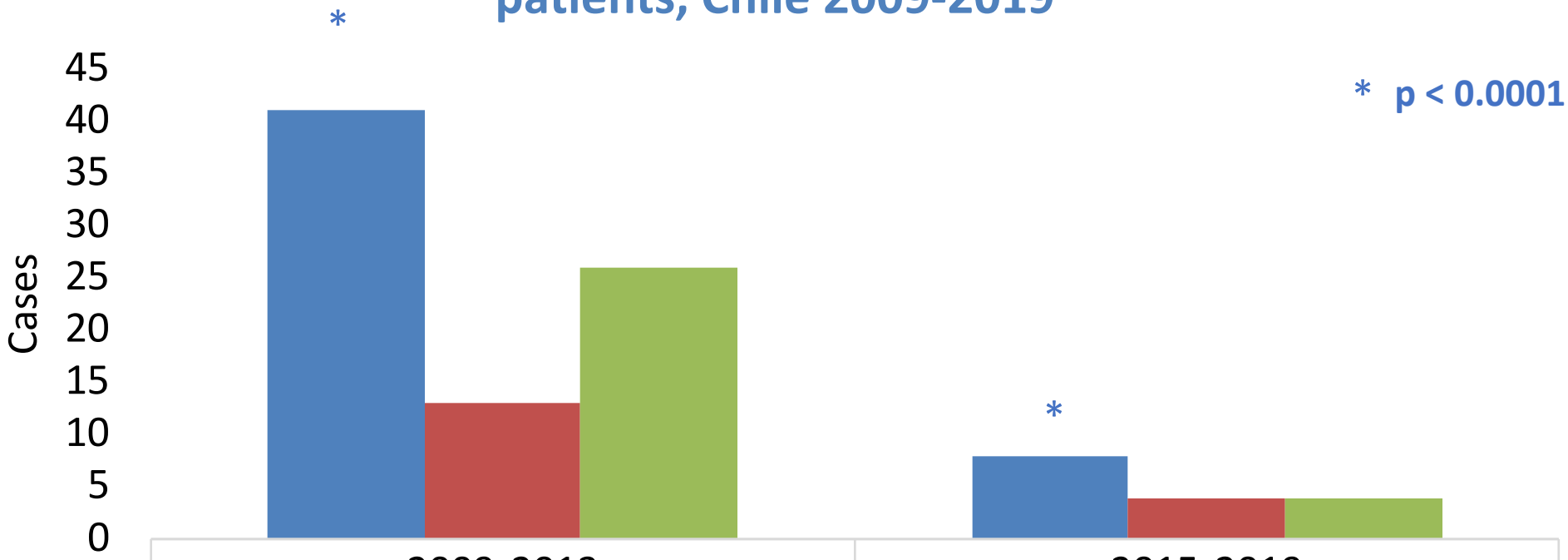
Type of sequelae	Number of sequelae: 54	%
Neurological disorders	**32**	**59.2**
Psychomotor developmental delay	12	22.2
Speech-language impairment	7	12.9
Seizures	5	9.2
Hypertonia/Hypotonia	5	9.2
Nerve damage	2	3.7
Attention deficit/ hyperactivity disorder	1	1.8
Hearing loss	**10**	**18.5**
Cochlear 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 chilean children, 2009-2019



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

Sequelae by serogroup and time interval in peadiatrics patients, Chile 2009-2019



	2009-2013	2015-2019
Total	41	8
B	13	4
W	26	4

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

Conclusions

- Invasive meningococcal disease remains as a public health concern
- A high rate of sequelae were found in pediatric patients in Chile (59%)
  - Focus in < 1 yoa, shock and meningeal signs at admission
  - Clinical manifestations: meningitis + meningococcemia
  - Neurological sequelae were the most prevalent
- 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

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

Cindy Arteta *(1,2),* **Rodolfo Villena *(1,3)*,** María Elena Santolaya *(1,2)*

1. Faculty of Medicine Universidad de Chile, 2. Hospital de niños Dr Luis Calvo Mackenna 3. Hospital de niños Dr Exequiel González Cortés

november 2021

Contact: Rodolfo Villena. rvillena@uchile.cl