CLINICAL FEATURES AND RISK FACTORS FOR SEVERE CLINICAL OUTCOME OF ITALIAN CHILDREN HOSPITALIZED FOR MEASLES

A. Lo Vecchio¹, C. Montagnani², A. Krzysztofiak³, A. Guarino¹, L. Galli² for the SITIP measles study group

¹ Department of Translational Medical Sciences - Section of Pediatrics, University of Naples - Federico II, Italy.

² Anna Meyer Children's University Hospital, Pediatric Infectious Diseases Unit, Florence, Italy.

³ Ospedale Pediatrico Bambino Gesù, Department of Pediatric infectious diseases, Rome, Italy.

BACKGROUND

Measles is a disease with potentially severe complications. Outbreaks have been recently reported in Europe, however risk factors for severe course are poorly investigated in this setting.

AIMS

To report the clinical features, complications and outcomes of measles in a national pediatric population and, specifically, to investigate the risk factors for severe course.

METHODS

The Italian Society for Pediatric Infectious Diseases conducted a retrospective observational study in children hospitalized during the 2016-2017 epidemic season. Presumptive diagnosis at hospital admission was recorded. Logistic regression analysis was used to detect risk factors for severe outcome, defined by complications at discharge, the need of intensive care or death.

FIGURE 1: Presumptive diagnosis at admission of 249 children

RESULTS

We enrolled 249 children, median age 14.5 months, 85% not immunised. 33 (13.2%) had any underlying chronic disease. Characteristics of enrolled children are reported in Table.

- ❖ Clinical diagnosis of measles at hospital admission increased from 30% to >70% during the outbreak ($p<0.001$) (**FIGURE 1**)
- ❖ Measles-related complications were reported in 83% of children: organ complications in 137 (55%) (**FIGURE 2**), cytopenia in 120 (48.1%).

Characteristics of population	Value
M/F, N (%)	127/125 (51/49)
Median age in months (IQR)	14.5 (8.0 - 45.5)
Mean length of hospitalisation (days)± SD	7.2 ± 8
Age classes, N (%)	
< 1 year	94 (37.7)
1-3 years	81 (32.5)
3-5 years	21 (8.4)
>5 years	53 (21.2)
Ethnicity, N (%)	
Caucasian	209 (83.9)
Roma/Sinti	28 (11.2)
Other	12 (4.9)
Immunization status, N (%)	
Children not vaccinated	210 (84.3)
Children receiving 1 dose	27 (10.8)
Children receiving 1 dose after measles exposure	5 (2.0)
Children receiving 2 doses	2 (0.8)
Children with unknown immunization status	5 (2.0)
Source of infection, N (%)	
Children without known contact with measles	128 (51.4)
Children with known contact with measles	121 (48.5)
Family contact	87 (34.9)
School contact	3 (1.2)
Hospital contact	5 (2.0)
Other contact	26 (10.4)

- ❖ Neutropenia was more commonly reported in children with B3 genotype infection if compared with D8 genotype (29.5 vs 7.7%, $p=0.01$).
- ❖ Six children developed encephalitis (one died and one accessed ICU) and a total of three children died.
- ❖ Development of pancreatitis (adjusted OR 10.8, $p<0.01$) or encephalitis (adjusted OR 9.07, $p<0.03$) were significantly related to a poor clinical outcome in multivariate analysis.
- ❖ Increased C-reactive protein (CRP) predicted severe clinical outcome (AUC 0.67, 95%CI 0.52 to 0.82) and children with CRP>2 mg/dl had significantly higher risk of complications (OR 2.0, 95%CI 1.15 – 3.7, $p=0.01$) or severe outcome (OR 4.13, 95%CI 1.43-11.8, $p<0.01$).

FIGURE 2: Distribution of organ complications (n= 137, 55% of total cases)

CONCLUSIONS

Severe clinical outcome in children with measles is not related to child age or underlying conditions, but with occurrence of complications such as encephalitis or pancreatitis. B3-genotypes infection is related with neutropenia. C-reactive protein value > 2 mg/dl during infection is related with a 2 to 4-fold increased risk of developing complications and severe clinical outcome.

Authors have no conflict of interest to declare.