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Influenza in hospitalized children in Singapore, a tropical country

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Background:

A retrospective review of hospitalized influenza children was done at KK Women's and Children's Hospital (KKH), Singapore from 2013-2014. We compared patient characteristics between influenza A and B and between severe cases admitted to ICU and high dependency (ICU+HD) with milder cases.

Material/methods:

Influenza patients were identified by a positive polymerase chain reaction or immunofluorescence antigen from nasopharyngeal swabs. Serotyping of influenza isolates was done at the National Public Health Laboratory.

Results:

There were a total of 1156 patients with a median age of 38 months (IQR 13-76 months); males constituted 57.2%. Nosocomial acquisition occurred in 2.9% of cases. Influenza A constituted 75.9%, serotypes: H3N2 (51.9%), H1N1 (19.6%), H3N1 (0.1%), H3N3 (0.1%); Influenza B constituted 24.1%, serotypes: Yamagata (16.4%), Victoria (6.1%) and untypeable (5.7%). The case-fatality rate was 0.3% (n=4, 2 died from invasive pneumococcal disease) with ICU+ HD admission in 4.5% (n=52).

Table 1 shows the statistically significant differences between influenza A and B.

Characteristic	Influenza A (n=874) (%)	Influenza B (n=279) (%)	P value	Odds ratio (A vs B) (95% confidence)

				interval)
Seizures	129 (14.8)	22 (7.9)	0.003	2.0 (1.26-3.25)
Diarrhoea	80 (9.2)	43 (15.4)	0.003	0.55 (0.37-0.82)
Underlying Asthma	62 (7.1)	31 (11.1)	0.003	0.61 (0.39-0.96)
Underlying Developmental delay	34 (3.9)	22 (7.9)	0.007	0.47 (0.27-0.82)
Mean Age (months)	46.57	70.81	<0.001	
Highest white blood cell count X10 ⁹ /L	7.99	5.68	0.041	

Table 2 : Univariate analysis of risk factors for ICU+HD admissions

Risk Factor	ICU+HD (n=52) (%)	General ward (n=1101) (%)	P value	Odds ratio (95%CI)
Mean Age (months)	80.7	51.1	<0.001	
Seizures	16 (30.8)	135 (12.3)	<0.001	3.18 (1.7-5.9)
Nosocomial	11 (21.2)	20 (1.8)	<0.001	14.5 (6.5-32.3)
Neurologic disease	14 (26.9)	50 (4.5)	<0.001	7.7 (3.9-15.2)
Hemoglobinopathy	4 (7.7)	24 (2.2)	0.011	3.75 (1.3-11.2)
Global developmental delay	10 (19.2)	24 (2.2)	<0.001	10.7 (4.8-23.8)
Congenital malformations	6 (11.5)	35 (3.2)	0.001	4.0 (1.6-9.9)
Gastro-oesophageal reflux	5 (9.6)	11 (10.0)	<0.001	10.6 (3.5-31.6)
Bacterial co-infection	14 (23.9)	36 (3.3)	<0.001	8.3 (4.2-16.4)

By multivariate analysis, nosocomial acquisition (OR 14.1, p <0.001), seizure (OR 2.9, p = 0.003), absence of diarrhoea (OR 9.1, p=0.045), neurologic disease (OR 4.0, p<0.001), global developmental delay (OR 3.6, p=0.014), bacterial co-infection (OR 3.5, p=0.022) were associated with ICU+HD admission.

Conclusions:

Influenza vaccination should be strongly recommended for patients with underlying neurologic disease, global developmental delay and for patients at risk of recurrent admissions as nosocomial acquisition is a risk factor for ICU+HD admission.