

Respiratory Viruses Cases- Complications & Diagnosis

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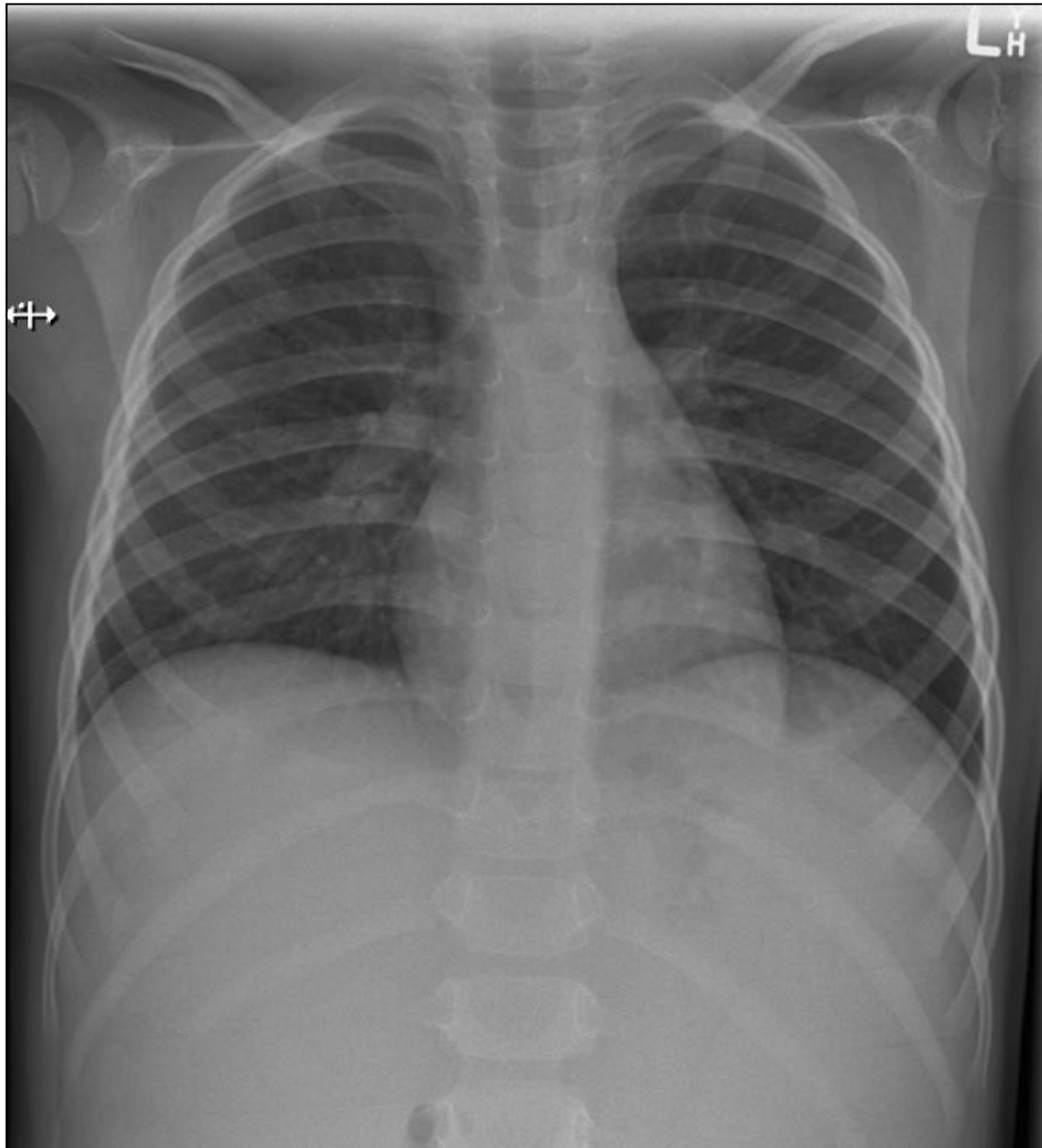
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- 5 yo male
- Newly diagnosed ALL
- Premature infant 35 wk, Triplet, BWt 1850g, SCN for 27 days
- Admitted to PICU post PortaCath insertion, BMA & IT chemoRx
 - Oxygen desaturations
 - Increased work of breathing
- O/E - RR 50; Oximetry 97%; HR 140; pale
- Decreased AE L chest; no crackles or wheeze
- Hepatosplenomegaly
- Petechiae: face & chest
- Dx – Tumour lysis syndrome
- Rx – Piperacillin-tazobactam/Teicoplanin & oxygen

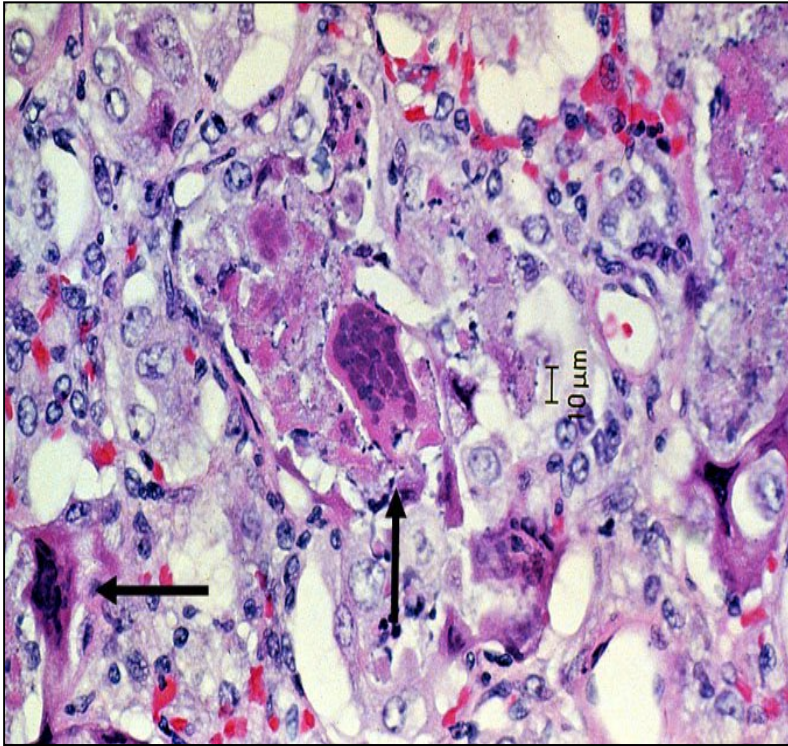
case 1



- 7/6/12 NPA – negative for 8 respiratory viruses
 - Influenza A/B, RSV, PIV 1-3, AdenoV, HMPV
- Discharged to Oncology Ward 8/6/12
- Remained unwell
- Ongoing respiratory symptoms
- 13/6/12 NPA – positive for RSV

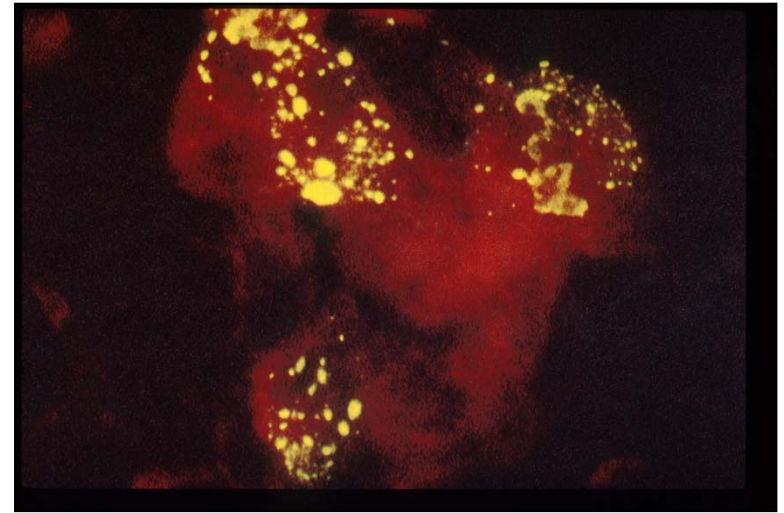
- What's going on?

- Is it the test?
 - Bad sampling
 - RNA degradation?
 - Bad assay [Sensitivity of RSV NAA?]
- Is it nosocomial infection?
 - Incubation period for RSV?
- What were the confounding factors?
 - ALL
 - General anaesthetic
 - Birth history



- Epidemiology
 - Principal cause of LRTI in infants worldwide
 - Annual seasonal variation
 - 2 major antigenic lineages: types A & B
- Pathogenesis
 - RT incubation 4-5 days
- Clinical Features
 - Acute bronchiolitis
 - Infections continue to occur throughout life
 - ↑ recognition in elderly & immunocompromised

- Diagnosis
 - DFA & Direct Ag
[sensitivity 80%]
 - Culture-DFA [89%]
 - RT-PCR [91%]
- Treatment
 - Supportive
 - ? Ribavirin
- Prevention
 - IVIG
 - Monoclonal IG (Palivizumab)
 - ? vaccine



hRSV risk factors & severity

	Severity			<i>p</i> Value
	Mild (n=37)	Moderate (n=64)	Severe (n=26)	
Birth weight <2.5kg	16%	14%	42%	0.009
Gestation <36 wks	11%	13%	39%	0.006
Neonatal respiratory support	8%	8%	46%	<0.001
Day Care attendance	27%	14%	4%	0.04
Low SaO ₂ <94%	5%	25%	54%	0.001

There were **NO statistically significant differences** between the severity groups for: **demographics** (age<6m, sex), **past medical history** (breastfeeding, atopy, bronchiolitis), **psychosocial factors** (family hx atopy, smoke exposure, older children, annual income), **presenting signs** (tachycardia, tachypnoea, fever) or **Hb level**.

- 5 yo male
- Transferred to RCH PICU from Rockhampton with:
 - 3 days of fever, URTI, seizures with anticonvulsant OD
 - 1 day of increased work of breathing, tachypnoea
- Past history:
 - R spastic hemiplegia secondary to perinatal CVA
 - Premature infant 32 wks, IMV 7 days
- O/E: Ventilated; R lung crackles
- CXR: RLL lung consolidation
- Dx: Aspiration pneumonia
- Rx: Piperacillin-tazobactam

- 1/8/12 NPA – positive for Influenza B
- What's going on?
- Would you use oseltamivir?

- What's going on?
- Multiple risk factors:
 - Birth history
 - Predisposing CNS condition
 - URTI
 - Seizures
 - Anticonvulsant overdose
 - Intubation & IMV
- Would you use oseltamivir?
 - Yes

In pediatric patients: 26% (36-hour) reduction in duration of illness.⁸



Treatment and Prophylaxis Dosing of Oral Tamiflu for Influenza for Patients 1 Year of Age and Older Based on Body Weight[†]

Weight (kg)	Weight (lbs)	Treatment dosing for 5 days	Prophylaxis dosing for 10 days	Volume of oral suspension (6 mg/mL) for each dose*	Number of bottles of oral suspension to dispense	Number of capsules and strength to dispense
15 kg or less	33 lbs or less	30 mg twice daily	30 mg once daily	5 mL	1 bottle	10 capsules, 30 mg
16 kg thru 23 kg	34 lbs thru 51 lbs	45 mg twice daily	45 mg once daily	7.5 mL	2 bottles	10 capsules, 45 mg
24 kg thru 40 kg	52 lbs thru 88 lbs	60 mg twice daily	60 mg once daily	10 mL	2 bottles	20 capsules, 30 mg
41 kg or more	89 lbs or more	75 mg twice daily	75 mg once daily	12.5 mL [†]	3 bottles	10 capsules, 75 mg

*A 10-mL oral dosing dispenser is provided with the oral suspension. In the event that the dispenser provided is lost or damaged, another dosing dispenser may be used to deliver the volumes.

[†]Delivery of this Tamiflu for Oral Suspension dose requires administering 10 mL followed by another 2.5 mL.

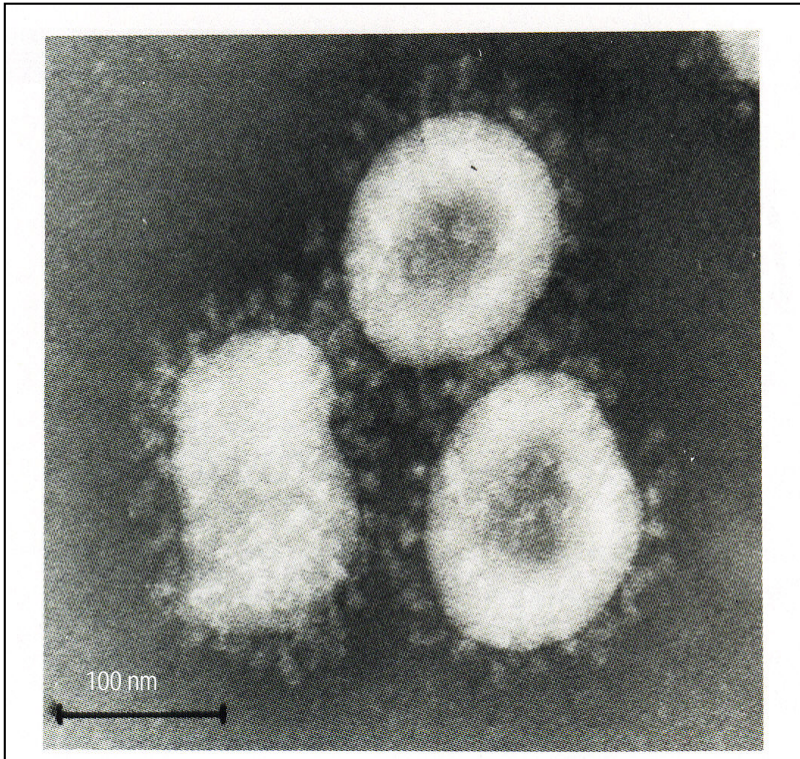
- 14 month old girl
- Attended to provincial hospital with bronchiolitis
- Treated supportively and symptomatically:
 - Nasal prong oxygen for 2 days
- Discharged after 3 days

- NPA – negative for 8 respiratory viruses
 - Influenza A/B, RSV, PIV 1-3, AdenoV, HMPV

- What's going on?

- Further analysis of NPA extract
 - Positive for:
 - HMPV B1
 - HCoV OC43
 - HCoV HKU1
 - No HRV done to date
- How common is that?

Coronaviruses



- Properties (*Coronaviridae*)
 - +ssRNA, 30 kb
 - 3-4 struct. proteins (N, S, M, HE)
 - 4 serotypes:
 - HCoV-229E, OC43, SARS, NL63
- Epidemiology
 - Incubation of 2-5 days
 - Viral shedding ~ 1week
 - Peaks in winter & early spring
 - Outbreaks ~ every 2-4 years
- Pathogenesis
 - Unique replication strategy
- Clinical Features
 - “common cold” (~15%)
 - Nosocomial infections
- Diagnosis
 - EIA
 - PCR
 - Difficult to grow (organ cultures)

- In 2005, a second new coronavirus, HKU1, was identified in an elderly adult.
- Subsequent studies have shown that it also causes RTIs in children.
- A large study of samples from the winter of 2001-2 in USA (n = 1048) showed 1% of respiratory samples (negative for other viruses) were positive for HKU1 and that clinical manifestations included URT & LRT diseases;
- Similar study in Australia with 2004 samples showed that 3.1% were positive for HKU1; most were in children < 2 yoa
 - [Arden et. al. J. Med. Virol. 2006: 78; 1232]
- There have also been reports of diarrhea/enteric disease caused by HKU1.
- Study in Japan found a low incidence of HKU1 in hospitalized patients with acute respiratory illness but found that 50% of children with HKU1-associated illness had febrile seizures.
- Not yet cultured *in-vitro*.

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Article

Co-circulation of Four Human Coronaviruses (HCoVs) in Queensland Children with Acute Respiratory Tract Illnesses in 2004

Ian M. Mackay^{1,2,*}, **Katherine E. Arden**^{1,2}, **David J. Speicher**^{1,3}, **Nicholas T. O’Neil**¹,
Peter K. McErlean^{1,4}, **Ristan M. Greer**⁵, **Michael D. Nissen**^{1,6} and **Theo P. Sloots**^{1,6}

- Screening of 888 inpatient and outpatient respiratory specimens spanning late autumn through to early spring, 2004, identified the presence of a human coronavirus (HCoV) on 74 occasions (8.3% of all specimens and 26.3% of all respiratory virus detections).
- Prevalence peaked in August (late winter in the southern hemisphere) when they were detected in 21.9% of specimens tested.
- HCoV-HKU1 and HCoV-OC43 comprised 82.4% of all HCoVs detected.

