

## Hypervirulent *Klebsiella pneumoniae* carriage in polyclinic attendees and national servicemen presenting with diarrhoea

### Dear Editor,

*Klebsiella pneumoniae* liver abscess is an invasive syndrome that mainly affects people living in East Asia. It especially affects adults with diabetes and is caused by hypervirulent strains that possess the *rmpA* gene (regulator of mucoid phenotype A), iron-sequestering genes, and usually belong to capsule types K1 and K2. *K. pneumoniae* liver abscesses may arise from intestinal colonisation with hypervirulent strains; however, the prevalence of carriage of these strains in the local population in Singapore is not well-described. We were also interested to see if ethnicity (possibly because of dietary preferences) has an influence on the carriage of such strains. Two outpatient populations were studied in 2013–2014: patients attending polyclinic for faecal occult blood testing, and national servicemen (Singapore and permanent resident men 18 years and above who are liable to join the national defence force) presenting with diarrhoea that had stool sent for bacterial and parasite investigation.

Residual stool left over from faecal occult blood testing, and bacterial and parasite investigation was screened for *K. pneumoniae* using *Klebsiella* selective agar. Any suspect *K. pneumoniae* colonies were identified by matrix-associated laser desorption/ionisation-time of flight mass spectrometry, and tested for antimicrobial susceptibility (ampicillin, amoxicillin-

clavulanate, piperacillin-tazobactam, cephalothin, ceftriaxone, cefepime, aztreonam, gentamicin, amikacin, ciprofloxacin, ertapenem and meropenem), and virulence and capsule genes by multiplex polymerase chain reaction.<sup>1</sup> A total of 438 stool samples were tested from patients (207 men and 231 women) in the Singapore polyclinics. The ages of the patients ranged from 3–95 years with a mean of 60 years. The ethnic breakdown of patients sending stool samples from polyclinics was: Chinese (374, 85.4%), Malay (31, 7.1%), Indian (17, 3.9%), and others (16, 3.7%). Of these, 153 stools had *K. pneumoniae* isolated, and 36 isolates had the *rmpA* gene. The capsule types of *rmpA* positive strains are summarised in Table 1: 14 had capsule K1 (9 men and 5 women, age range 44–82 years, mean 63 years) and 8 had capsule K2 (7 men and 1 woman, age range 42–72 years, mean 60 years). A total of 618 stool samples were tested from national servicemen. The ethnic breakdown of national servicemen sending stool samples was: Chinese (448, 72.5%), Malay (116, 18.8%), Indian (44, 7.1%), and others (10, 1.6%). Of these, 173 stools had *K. pneumoniae* isolated and 19 isolates had the *rmpA* gene. Of the latter, 14 had capsule K1 and 3 had capsule K2.

All *K. pneumoniae* strains were susceptible to multiple antimicrobials. The number of *rmpA* positive isolates was too small to pick up any clustering of capsule serotype by ethnicity.

Table 1. Capsule types of *rmpA*-positive *Klebsiella pneumoniae* isolated from patients by ethnicity

	Capsule types							Total
	K1	K2	K5	K20	K54	K57	Others	
<b>Ethnicity (polyclinic)</b>								
Chinese	13	7	1	2	1	4	2	30
Malay				1		1		2
Indian		1		1				2
Others	1			1				2
<b>Ethnicity (national servicemen)</b>								
Chinese	8	2				1		11
Malay	1							1
Indian	5	1					1	7
Others								

In a previous study, most *Klebsiella* liver abscesses in our hospital (n=40) were caused by capsule type K1 (n=16) and K2 (n=8) strains.<sup>2</sup> This corresponds with the prevalence of capsule types of strains colonising the human gut in the local community based on the present study. In conclusion, about 3–8% of the local population may carry hypervirulent *K. pneumoniae* in their gastrointestinal tract. It is likely that there is a yet-unknown environmental source that leads to acquisition of these strains by ingestion.

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#### REFERENCES

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Tse H Koh,<sup>1</sup>MD, PhD, Vernon Lee,<sup>2</sup>MBBS, PhD,  
Jeremiah Chng,<sup>2</sup>MBBS, MPH, Delphine YH Cao,<sup>1</sup>BSc (Hons),  
Boon C Khoo,<sup>1</sup>BSc, Audrey HJ Tan,<sup>1</sup>BSc,  
Peck L Tan,<sup>1</sup>Dip (Chemical Process Technology), Freddy JX Neo,<sup>3</sup>BSc,  
Dennis MW Heng,<sup>3</sup>BSc, Ching Ging Ng,<sup>3</sup>PhD

<sup>1</sup>Department of Microbiology, Singapore General Hospital, Singapore

<sup>2</sup>Headquarters Medical Corps, Ministry of Defence, Singapore

<sup>3</sup>Defence Medical & Environmental Research Institute, DSO National Laboratories, Singapore

Correspondence: Dr Tse Hsien Koh, Department of Microbiology, Level 7 Diagnostics Tower, 20 College Road, Academia, Singapore General Hospital, Singapore 169856.

Email: koh.tse.hsien@singhealth.com.sg