Kingella kingae oropharyngeal carriage rate and distribution of their capsule type in young children in France

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Background

Kingella kingae is a normal inhabitant of the oropharynx of young children but it is also the leading pathogen of osteoarticular infections in several countries for children under 4 years of age¹

Oropharynx is now recognized as the portal of entry for *K. kingae*, which can therefore penetrate the bloodstream and invade distant organs, thanks to several factors.

Recently 4 capsule types (named a, b, c, and d) were internationally described. Whereas capsules a and b are most commonly observed among invasive strains, capsules c and d were more common among carriage strains²

Apart from Israel¹ and Switzerland³, no epidemiological data on the carriage in healthy children are available yet

Objectives

- To determine the rate of and the factors associated with *K. kingae* healthy carriage in young children in France
- To determine the capsule type of the French carriage strains

Methods

Paediatricians prospectively enrolled healthy children aged 6-36 months during well baby visit. A throat swab was sampled and clinical and epidemiological data were anonymously collected

Definition of the *K. kingae* carriage:

- positive throat culture
- and/or a combined result of 3 specific polymerase chain reactions (PCRs):
 1. positive *rtxA* (but false-positive observed with *K. negevensis*)
 2. positive real-time *cpn60* PCRs (but specificity unknown in the throat)
 3. Negative *K. negevensis* specific *groEL* PCR

Capsule types were determined by multiplex PCR

Ethics: protocol approved by the Saint-Germain-en-Laye Ethics Committee (CPP Ile-de-France XI).

Results

Between May 2015 and June 2016, 217 children were included (119 males [54.8%]). Two paediatricians out of 9 included 171 (78,8%) patients

***K. kingae* carriage:**

K. kingae was detected by PCR in 11 (5.1%; 95% confidence interval: 2.6-8.9%) cases, but no strains were isolated by culture. Carriage rate was higher in children aged 18-23 months (4/35; 11.4%) (**Figure 1**) and in children cared for out of home compared with those cared for at home (7/51; 13.7% vs. 4/166; 2.4%, respectively; p=0.004)

Capsule typing:

Capsules a and b were identified in 4 samples each, whereas simultaneous capsules a and c were identified in one sample (**Figure 2**)

Discussion

To our knowledge, it is the first epidemiological study on *K. kingae* carriage in France Consistently with Israeli and Swiss studies 18-23 month-old children and those carried for out of home were more likely to be colonized

Limitations: the low number of patients and carriers leads to interpret with caution the risk factors for carriage. Three quarters of children were included only by 2 investigators, and those were significantly less frequently cared for out of home than their counterparts (17.0% vs. 47.8%, respectively; p<0.001), leading potentially to underestimate the carriage rate

Conclusion

- *K. kingae* healthy carriage rate was 5,1% (2,6-8,9%) in France and day-care centre attendance was significantly associated with
- Capsules a and b, known to be associated with invasive infection, were commonly identified

Figure 1. Distribution of children per age group (95% CI, 95% confidence interval)

Figure 2. Composite picture of the gel electrophoresis of the multiplex PCR for *Kingella kingae* capsule typing

PCR was performed on (A) two *Kingella kingae* strains per capsule type which were used as positive control to identify capsule type: a, b, c, and d (from left-hand side to right-hand side) and on (B) DNA extract from oropharyngeal samples harboring a positive *rtxA* PCR. Mix is the positive control mix showing molecular weight of each capsule type, from capsule « a » with the highest molecular weight to capsule « d » with the lowest molecular weight