Virulence factors of *Streptococcus pneumoniae* isolated from patients with invasive and non-invasive infection in a Japanese hospital during 2016

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**Background:** *Streptococcus pneumoniae*, a major causative pathogen of non-invasive and invasive disease, is responsible for the death of a large number of young children and the elderly worldwide. Although many virulence factors of *S. pneumoniae* have been reported, the knowledge of relationship between many of these factors and clinical features of pneumococcal diseases is limited.

**Materials/methods:** Pneumococcal surface protein (Psp)A families (*pspA*F1–3), group 4 PspC (*pspC.4*), Pilus-1 (*rrgC*), and Pilus-2 (*sipA*) virulence factor genes were investigated using 331 clinical isolates from individuals in a Japanese hospital in 2016. Gene distribution in serotypes and clinical diagnosis were analysed. Association of virulence factors and penicillin susceptibility were also analysed.

**Results:** Virulence factors found in pneumococcal isolates were serotype-dependent. All invasive pneumococcal disease (IPD) isolates contained *pspA* F1 or 2. The proportions of *pspA* F1 and *pspA* F2 in pneumococcal diseases including IPD were 46.8% and 50.8%, respectively. Whereas, all *pspA* F3 isolates were derived from individuals diagnosed as having colonization. IPD isolates had significantly higher *pspC.4* (69.2%) than non-IPD or colonization isolates (*p* <0.01). *sipA* was preferentially amplified in IPD (23.1%) versus colonization isolates (*p* <0.05). The *rrgC* positive rate (15.5%) was higher in the colonization group than in the diseases groups, although the differences were not significant. Penicillin susceptibility showed that the rates of *rrgC*-positive isolate (31.8%) and isolate with *pspA* F2 (68.2%) were significantly higher in non-susceptible than susceptible groups (*p* <0.01).

**Conclusions:** It is suggested that *pspA* families F1 and F2, *PspC.4*, and *sipA*, are associated with serotype along with clinical features, and *rrgC* and *pspA* F2 are related to penicillin resistance in certain serotypes. Further studies of virulence factors are required to fully elucidate *S. pneumoniae* pathogenic mechanisms.