High frequencies of Aspergillus colonization and associated inflammation in stable bronchiectasis

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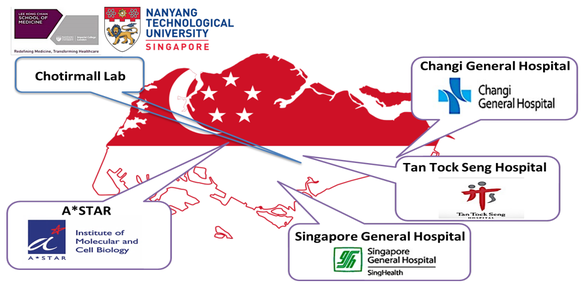
Background

Aspergillus spp. are colonizers of anatomically abnormal airways. Their occurrence and clinical consequences in non-cystic fibrosis (CF) bronchiectasis are unknown. We aim to determine the frequency of *Aspergillus* colonization and characterize associated airway inflammation in an Asian bronchiectasis cohort.

Methods

We assessed n=95 sputa from non-CF bronchiectasis patients recruited across three hospitals in Singapore. Quantitative PCR (qPCR) for A. fumigatus was used to identify and quantify Aspergillus bioburden. Concurrently, a panel of 41 inflammatory markers in sputum was assessed by luminex assay in a subset of n=64 patients.



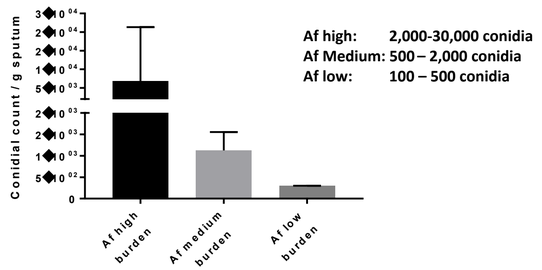
Results

Mean age of participants were 65.0 ± 12.8 and 57% (n=54) were female. Mean FEV1 was 66.2±17.6% predicted. Aetiology of bronchiectasis was idiopathic in (61.1%; n=58), post-tuberculosis (30.5%; n=29) and others (8.4%; n=8).

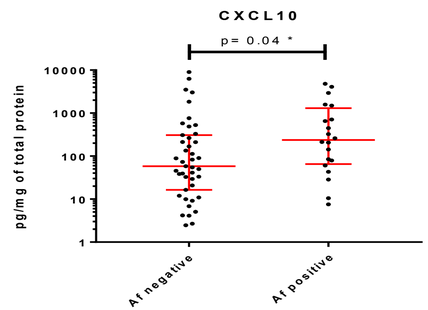
No patient had detectable Aspergillus on routine clinical culture, however 38% (n=36) were qPCR-positive.

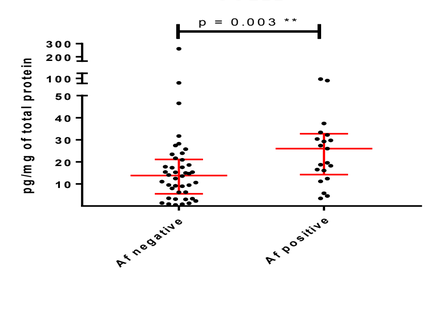
Patient No.	Aspergillus fumigatus status		A. fumigatus conidial load
	Culture	Molecular (qPCR) assessment	
1	Negative	Positive	High
2	Negative	Positive	High
3	Negative	Positive	High
4	Negative	Positive	High
5	Negative	Positive	High
6	Negative	Positive	High
7	Negative	Positive	High
8	Negative	Positive	High
9	Negative	Positive	Intermediate
10	Negative	Positive	Intermediate
11	Negative	Positive	Intermediate
12	Negative	Positive	Intermediate
13	Negative	Positive	Intermediate
14	Negative	Positive	Intermediate
15	Negative	Positive	Intermediate
16	Negative	Positive	Intermediate
17	Negative	Positive	Intermediate
18	Negative	Positive	Low
19	Negative	Positive	Low
20	Negative	Positive	Low
21	Negative	Positive	Low
22	Negative	Positive	Low
23	Negative	Positive	Low
24	Negative	Positive	Low
25	Negative	Positive	Low
26	Negative	Positive	Low

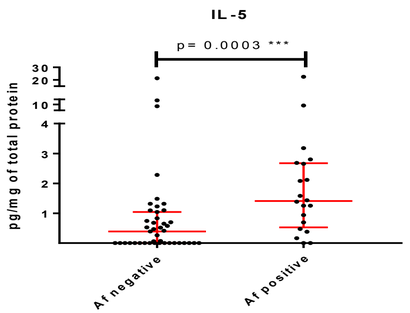
Median conidial burden was 2,011 conidia/g sputum (IQR: 935-5,967 conidia/g sputum).



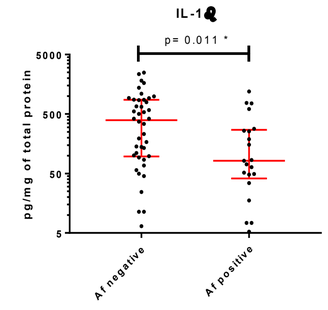
Levels of CCL22, IL-5 and CXCL10 were elevated in Aspergillus positive compared to those negative patients (all p<0.05).

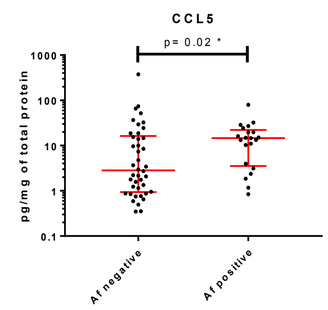


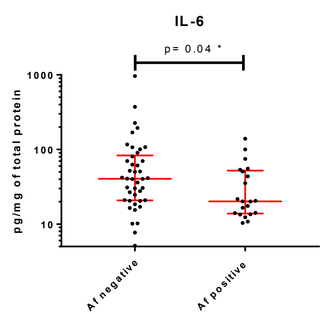


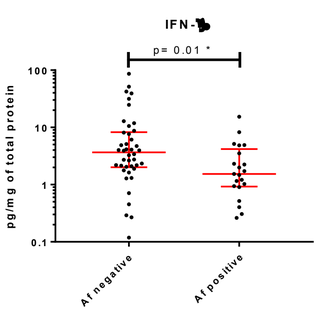


IL-1β, CCL5, IL-6 and IFN-γ levels were reduced in Aspergillus positive patients compared to those negative (all p<0.05).









Conclusion

High prevalence of A. fumigatus are present in the airways of non-CF bronchiectasis patients. An altered inflammatory milieu is detectable in these airways, potentially amenable for diagnostic use. The clinical implications of our findings require further study.

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