Are neutrophils dysfunctional in idiopathic bronchiectasis?

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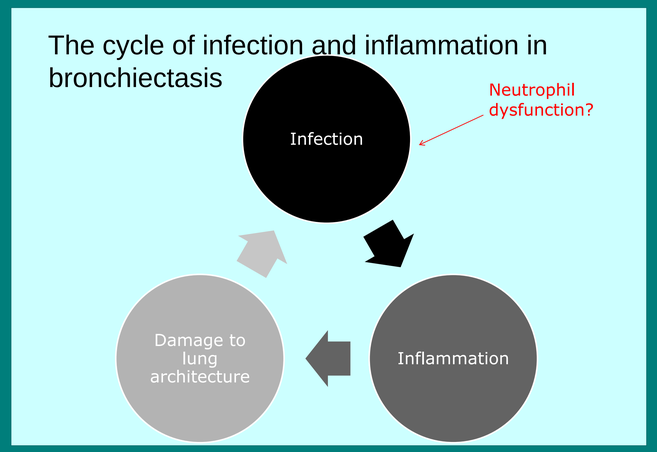
Aim

To test the hypothesis that neutrophil function is abnormal in patients with idiopathic bronchiectasis. Secondarily, to ascertain the effect of granulocyte macrophage-colony stimulating factor (GM-CSF) on neutrophil function.

Background

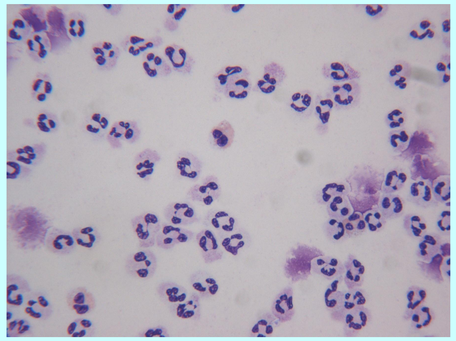
Idiopathic bronchiectasis is a respiratory condition of unknown cause characterised by recurrent chest infections and damage to normal lung architecture. It has been suggested that the problem may arise from a defect in the ability of neutrophils (polymorphonuclear cells , PMNs- a type of white blood cell) to kill invading bacteria, thus predisposing the patient to infection(1). It has also been described that GM-CSF can rescue defective neutrophil function(2).



Methods

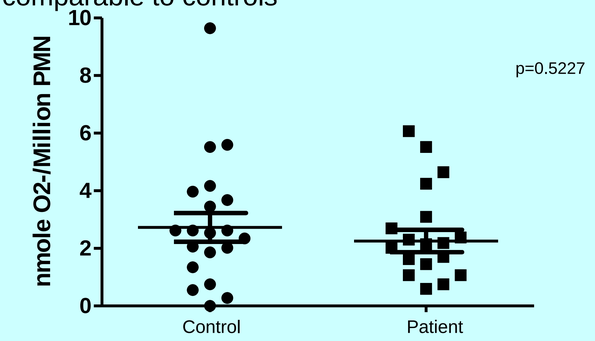
- Blood samples were collected from 20 patients with idiopathic bronchiectasis and 20 healthy age-matched controls
- Neutrophil superoxide generation was assessed using a cytochrome c reduction assay
- Neutrophil phagocytic capacity was assessed by exposing neutrophils to serum-opsonised zymosan particles and using light microscopy to determine neutrophils that had phagocytosed 2 or more zymosan particles

Freshly isolated neutrophils visualised under light microscopy

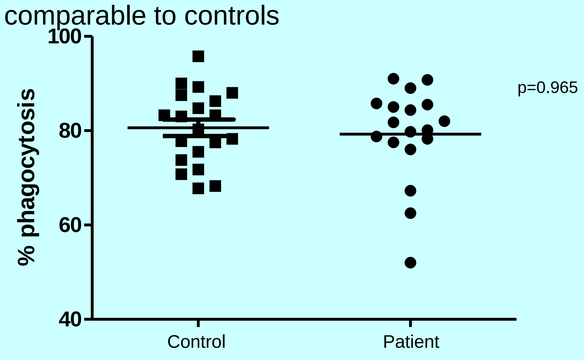


Results

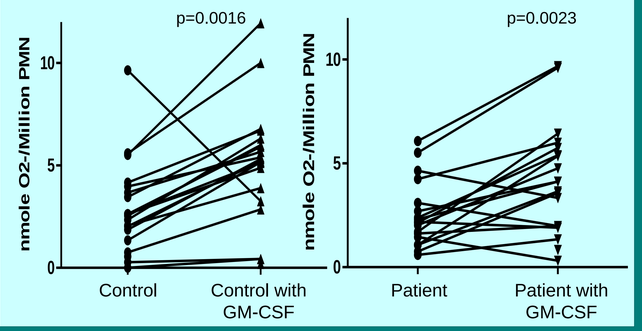
Bronchiectasis neutrophil oxidative burst is comparable to controls



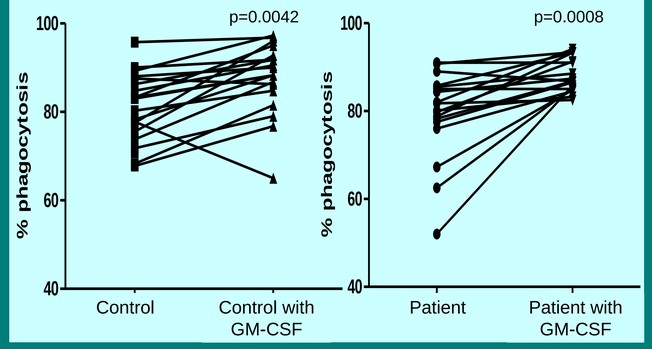
Bronchiectasis neutrophil phagocytic function is comparable to controls



GM-CSF enhances oxidative burst in both patients and controls



GM-CSF enhances phagocytosis in both patients and controls



Conclusions

- Superoxide generation and phagocytosis, two major modalities of neutrophil function, are not impaired in idiopathic bronchiectasis
- GM-CSF enhances neutrophil function in idiopathic bronchiectasis and in matched volunteers

References

(1)King PT et al. , Clinical Experimental Immunology, 2006, 144, 440-6
(2)Conway Morris A et al., Am J Respir Crit Care Med, 2009, 180, 19-28