



Figure 1 (A) Open lung biopsy specimen revealing necrotising granulomas (arrow) with giant cells aggregated in masses and distributed in a lymphangitic pattern. (B) Granulomatous vasculitis was also present: granulomas infiltrated the vascular walls and almost completely occluded the lumens of the vessels. (C) Genomic DNA of *Propionibacterium acnes* was detected in abundant amounts by in situ hybridisation in the lung tissue of a patient with necrotising sarcoid granulomatosis. Numerous dots indicate the existence of *P acnes* in the granulomas.

polymerase chain reaction⁴ and in situ hybridisation.⁵ The *P acnes* genome was less frequently and less abundantly detected in tuberculosis specimens.^{4,5} Thus, an aetiological relationship between *P acnes* and sarcoidosis has been advocated. We report here the first case of a patient with NSG in whose lung specimens were found abundant *P acnes* genome.

A 65-year-old female non-smoker with no history of dust exposure or pet ownership was referred to our hospital with bloody sputum. The patient's superficial lymph nodes were not palpable. No abnormal findings were revealed by ophthalmological

or otolaryngological examinations. Serum levels of C-reactive protein and lysozyme were raised to 2.62 mg/dl and 10.8 µg/ml, respectively. Antinuclear antibody, rheumatoid factor and antineutrophil cytoplasmic antibody were negative. The ACE level was within the normal range. A skin test with purified protein derivative was negative. Small mediastinal and hilar lymph nodes were detected on CT scanning. Multiple irregularly margined consolidations with air bronchograms were distributed predominantly in peribronchovascular or subpleural lesions of both lungs on a high-resolution CT scan. Total cell count of bronchoalveolar

lavage fluid was 9.7×10^5 /ml with a cell population of 88% macrophages, 5% neutrophils, 5% lymphocytes and 2% eosinophils; the CD4+/CD8+ ratio was 11.1. Pathological findings of open lung biopsy specimens were consistent with NSG (fig 1A and B) and no pathogenic organisms (including mycobacteria and fungi) were detected in culture of the biopsy specimens. The patient was diagnosed with NSG. *P acnes* DNA was detected in abundant amounts in the granulomas by in situ hybridisation (fig 1C).⁵

This is the first report of NSG with *P acnes* DNA found in the granulomas of lung specimens. This may indicate an aetiological link between NSG and *P acnes*, and it also suggests that NSG is an atypical sarcoidosis with a common aetiology. The clinical and pathological differences between these diseases could be explained by variability in the host response to *P acnes* or the histological location of *P acnes*, although further study would be necessary to arrive at more definite conclusions.

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Symptoms limiting activity in cancer patients with breathlessness on exertion: ask about muscle fatigue

Rehabilitation is an integral part of cancer care and aims to maximise the functional

Table 1 Symptoms limiting activities of daily living in 62 patients with cancer and breathlessness on exertion

Activity	DES score 2			DES score 3			DES score 4		
	Walking >100 yards on the level at own pace (n = 21)			Walking around house or ward on the level at own pace (n = 23)			Moving around in bed or getting out of bed (n = 18)		
	Symptom(s) limiting the activity								
	Breathlessness	Muscle fatigue	Both equally	Breathlessness	Muscle fatigue	Both equally	Breathlessness	Muscle fatigue	Both equally
Walking/moving	6	9	6	5	13	5	1	10	7
Washing	1	7	6	3	9	5	1	10	5
Bathing/showering	1	5	7	4	9	6	2	9	5
Dressing	1	5	7	2	10	5	1	6	3
Combing hair	1	4	4	1	8	5	1	9	3
Making a drink/light cooking	0	1	4	0	5	4	0	3	0
Dusting/light cleaning	1	2	3	1	5	3	1	2	0
Vacuum cleaning/brushing floors	2	2	1	2	3	2	0	1	0
Shopping	1	2	0	2	4	0	0	1	0

Patients were categorised using the Dyspnoea Exertion Scale (DES) according to the level of exertion at which breathlessness occurs. Within each category, the total number of responses for each activity reflects the number of patients who undertake that activity independently.

ability and independence of patients, whatever the stage of their disease.¹ To help achieve this, there is a need to identify which (if any) symptoms limit the patient's ability to undertake activities of daily living. Patients with cancer commonly report breathlessness on exertion, and practitioners may assume that the breathlessness is the limiting symptom and may not enquire about peripheral muscle fatigue, even though this is known to contribute to exercise limitation in patients with cardio-pulmonary disease and healthy volunteers.² We have begun to explore whether breathlessness and peripheral muscle fatigue limit activities of daily living in patients with cancer who report breathlessness on exertion. Ethical approval was received from Nottingham City Hospital ethics committee.

Sixty-two patients (37 men) admitted to a specialist palliative care unit for symptom control or respite were included in the study. Their median age was 70 years (range 28–92) and median survival was 8 weeks (range 1–120). They had a variety of cancers (22 genitourinary, 8 gastrointestinal, 5 breast, 2 lymphoma, 4 other) with one-third having either primary (14 non-small cell lung cancer, 3 mesothelioma, 1 small cell lung cancer) or secondary (2 colorectal, 1 renal) thoracic cancer. None had received surgery, chemotherapy or radiotherapy within the last month or were limited by pain.

Participants were asked to identify which one of the six statements (scored between 0 and 5) in the Dyspnoea Exertion Scale (DES) best described their experience of breathlessness. The DES is a modified version of the Medical Research Council Dyspnoea Scale which better discriminates patients breathless at lower levels of activity.^{3,4} They also indicated the limiting symptom for various activities of daily living which they undertook independently: breathlessness alone, limb muscle fatigue alone, or breathlessness and limb muscle fatigue equally.

All patients scored between 2 and 4 on the DES scale. The results suggest that, in patients with cancer experiencing breathlessness at various levels of exertion, muscle fatigue is also an important limiting symptom (table 1).

Our findings are consistent with those in other patient groups such as patients with chronic obstructive pulmonary disease or those with cardiac failure undertaking lower limb exercise, and with the importance given to limb muscle exercise in rehabilitation programmes.^{2,5} It may be most appropriate to examine whether a similar rehabilitative approach offered to patients with cancer soon after diagnosis could help those undergoing potentially curative treatment to recover more quickly, or for those with incurable disease to remain as independent as possible for as long as possible. A more detailed and prospective evaluation of

which symptoms limit activity is warranted, and we are currently undertaking this in patients with lung cancer carrying out a walking exercise test.

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