

A Novel CT Scoring System Differentiates Admissions secondary to Eosinophilic from Non-Eosinophilic Asthma

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Introduction. Post-mortem studies of patients who have died from asthma show that mucus plugging of the airways is a prominent feature. We have investigated whether this can be identified and quantified on CT scans taken at the time of a severe asthma attack and tested the hypothesis that mucus plugging is specific to attacks associated with a raised blood eosinophil count.

Methods. We developed a scoring system based on features on CT scans of asthmatic patients potentially associated with mucus plugging (see Table 1). We used this scoring system to retrospectively score CT scans of 6 patients admitted to the John Radcliffe Hospital, Oxford, with acute attacks of asthma. CT scans were performed within three days of admission to investigate whether there were alternative causes for symptoms.

Results. 4 patients had a blood eosinophils $> 0.3 \times 10^9/\text{litre}$ at the time of admission. The median (interquartile range, IQR) CT score was 17.5 (9.75 – 25.25) in these patients and 3 (1.5 – 4.5) in non-eosinophilic patients. (Include p-values.)

Conclusion. Our scoring system was repeatable within and between observers and might potentially identify a pathophysiological mechanism particularly associated with eosinophilic asthma attacks.

	0	1	2	3
Bronchial wall thickening	None	Some	Prominent	
Mucus plugging	None	Some	Prominent	
Mosaicism	None	Minor	Major	
Atelectasis	None	Linear	Segmental	Lobar

Table 1. CT scoring protocol for patients admitted secondary to asthma. Scans were interpreted by a specialist chest radiologist from slices at three locations on each lung: at the level of the inferior pulmonary vein, at the origin of the lingular bronchus, and at the aortic arch. This gives a score between 0 and 54.