



Granulomatous Bronchiolitis Produced by Inhalation of Diacetyl From Microwavable Popcorn Bags.

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The Case

A previously healthy 50 year old female presented with six months of persistent, nonproductive cough refractory to treatment with inhaled corticosteroids and long acting beta 2 agonists. She denied smoking, occupational exposure, and recent travel. Her physical examination was normal. CBC, IgE and peripheral eosinophil counts were normal. A chest radiograph was normal.

Pulmonary function test revealed:

FVC 2.93 L (77% predicted)
FEV1 1.75 l (57% predicted)
FEV1/FVC 60%
TLC 4.58 L (81% predicted)
VC 2.93 L (77% predicted)
DLCO 6.1 ml/min/mmHg (21% predicted).

High resolution computed tomography (HRCT) of the chest showed multiple centrilobular nodules throughout both lungs. Bronchoscopy revealed normal bronchial mucosa. Bronchoalveolar lavage demonstrated no evidence of neoplastic cells, bacteria, fungal elements, or mycobacteria. Transbronchial biopsies revealed a chronic lymphocytic bronchiolitis with non-caseating granuloma, and mild peribronchiolar fibrosis.

The patient was on a weight-loss diet that involved eating two bags of microwaveable popcorn daily. She enjoyed smelling the aroma from the bags after heating. She was diagnosed with chronic granulomatous bronchiolitis likely produced by inhalation of diacetyl contained in the microwave popcorn bags. She was instructed to stop consuming microwaveable popcorn and was treated with oral prednisone for four weeks with taper.



Figure 1a. High computed tomography resolution (HRCT) scan of the chest obtained following the first clinic visit revealing multiple centrilobular hazy nodules distributed diffusely throughout both lungs.

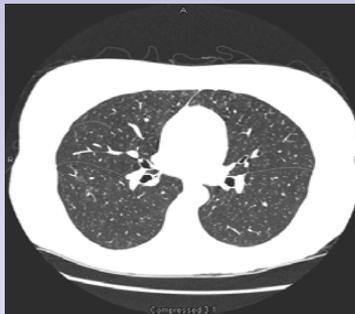


Figure 1b. Chest CT obtained six weeks after initiation of systemic steroid scan showing marked improvement of the diffuse hazy nodules.

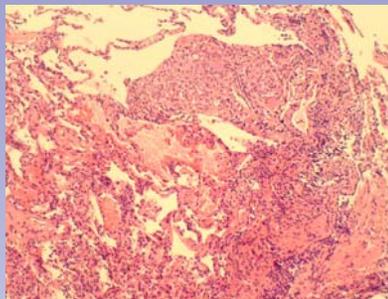


Figure 2. Transbronchial biopsies obtained from the right lower lobe revealing a chronic cellular (lymphocytic) bronchiolitis with non-caseating granuloma and mild peribronchiolar fibrosis.

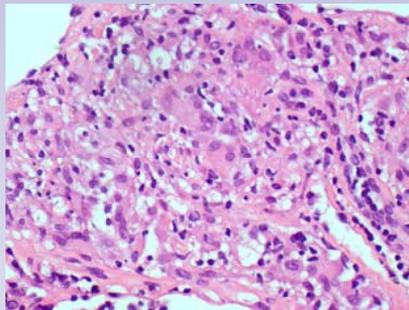


Figure 3. An interstitial lymphocytic infiltrate and intra-alveolar macrophages are also identified.

After six weeks, her symptoms had resolved. A chest CT showed marked improvement.

Spirometry had normalized:

FVC 3.71 L (101% predicted)
FEV1 2.72L (92% predicted),
FEV1/FVC of 73%,
TLC (105% predicted)
VC (101% predicted)
DLCO 16.9 mL/mmHG/min (61% predicted)

Conclusion

Bronchiolitis obliterans has been documented in microwave-popcorn factory workers who were diagnosed with high rates of airway obstruction correlating with exposure to diacetyl from artificial butter flavoring. Our case is the first to describe a chronic respiratory condition related to the consumption of microwaveable popcorn. These pathological findings may represent a forme fruste of the more common occupational disease (bronchiolitis obliterans) that has been documented in workers.

References

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