

Pulmonary Flow Loop

J. Mambretti-Zumwalt, MD, FCCP

Pulmonary flow loops display characteristic patterns which may indicate the underlying pathology of airway or parenchymal lung disease.

Address: Prudential Life Insurance, 3033 Campus Dr, Plymouth, MN 55441.

Correspondent: J. Mambretti-Zumwalt, MD, FCCP.

Key words: Pulmonary flow loop, Pulmonary function testing.

Received: February 10, 2000.

Accepted: April 18, 2000.

Medical record review of a 55-year-old woman applying for \$200,000 revealed normal current measurements. On the application, she checked “yes” to lung disease/breathing problems, adding the comment “asthma.” Review of attending physician statement records indicated a smoking history of 2 packs per day for 35 years and a 6-month history of sore throat, hoarseness, and worsening respiratory distress. She was receiving inhaled albuterol and corticosteroids by metered dose inhaler, as well as oral theophylline, but she had not required oral or parenteral corticosteroids or hospitalization. She was thought to be better on her most recent office visit. Pulmonary function testing results are shown in the Table.

The history suggests asthma. In this case, the spirometry, lung volumes, and diffusion are all normal, as is expected between attacks in an asthma patient. The flow loop (see the Figure) shows a squared-off peak and a very

blunted inspiratory curve below the horizontal line. The abnormal pattern is suspicious for upper-airway obstruction. The pattern may also be seen when the patient does not make a good inspiratory effort, but the technician stated in the record that efforts were adequate to obtain a good inspiratory reading. Subsequent workup revealed an endotracheal carcinoma, which was surgically treated.

The shape of the flow loop gives clues as to the underlying pathology.¹ The clue for upper-airway obstruction is the squared-off peak expiratory and inspiratory loop. Upper-airway obstruction will not be detected on spirometry alone.

REFERENCE

1. Bandi V, Sirgi C, Pope C, Rios A, Eschenbacher W. Usefulness of flow volume loops in emergency center and ICU settings, Guntupalli K.K. *Chest*. 1997;3: 481–485.

	Ref	Pre Rx Meas	Pre Rx % Ref
Spirometry			
FVC (liters)	3.34	3.34	101
FEV1 (liters)	2.71	2.74	101
FEV1/FVC (%)	83.00	82	
FEF25-75% (L/sec)	2.03	2.98	102
FEF50% (L/sec)	3.64	4.03	111
PEF (L/sec)	6.10	5.64	92
FIVC (liters)	3.34	3.20	96
MVV (L/min)	96.00	93	97
Lung Volumes			
TLC (liters)	5.34	5.56	104
RV (liters)	1.96	2.22	113
RV/TLC (%)	36.00	40	
FRC Dil (liters)	3.12	3.71	119
Diffusion			
DLCO (mL/min/mm Hg)	20.4	18.1	89
DL Adj (mL/min/mm Hg)	20.4	18.1	89
DLCO/VA (l/min/mm Hg)	5.21	(3.25)	(62)
DL/VA Adj (l/min/mm Hg)		3.25	
VA (liters)		5.56	

