Usefulness of the Flow Volume Loop

To the Editor:

We have read with interest the article by Guntupalli et al (February 1997) on the usefulness of the flow volume loop (FVL) in emergency and ICU settings. The selection of cases where the FVL can easily help to establish the level of flow impairment was well chosen by the authors. In emergency situations, the FVL is easily helpful in identifying certain abnormalities quickly by visual pattern recognition. With respect to this, we were particularly interested in the two cases of variable upper airway obstruction: case 1 with bilateral vocal cord paralysis (BVCP) and case 5 with vocal cord dysfunction (VCD). The clinical description of BVCP was adequate, with a patient being able to speak almost normally but having tremendous difficulty breathing in, especially on the slightest effort. Therefore, the FVL will show a severely reduced forced inspiratory flow but almost normal expiratory flow, with the exception of an amputated peak flow, and usually a plateau following the peak flow (Fig 1). Contrary to the loop shown by Guntupalli et al, there is no restrictive pattern if the patient has normal lungs. In the patient shown, one can see that she did not inhale completely from residual volume to total lung capacity because the inspiratory flow is clearly not zero at the y-intercept. Thus, the FVL shown is compatible with, but not typical for, BVCP. We previously published a typical loop in a patient with BVCP, with a perfectly normal FEV₁ and FVC.²

A second point relates to the FVL pattern of the VCD illustrated by case 5. Again, the loop shown in Figure 10 is compatible with, but not typical for, VCD. It is also possible that the expiratory curve is perfectly normal with the inspiratory curve being completely flat,³ identical to the one obtained in BVCP. A further differential diagnosis with identical FVL to VCD is variable upper airway obstruction above the larynx due to pharyngeal constriction without concomitant VCD. Such a case has been described by Nagai et al (Fig 2).³ The only difference between the FVL in VCD and in BVCP is the amputated peak flow in the latter. In our opinion, the authors should have mentioned the lack of specificity of the FVL in both their cases in this otherwise excellent article.

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REFERENCES

To the Editor:

We appreciate the comments of Dr. Bolliger regarding two of the cases described in our article.¹

As Dr. Bolliger correctly points out, the flow volume loop in case 1 (the patient with bilateral vocal cord paralysis) is suggestive of a restrictive-type lung defect. Although there are clinical reasons why this patient could have such a restrictive lung defect (metastatic disease to the lung with or without radiation-induced charges), we do not have further information, such as lung volume measurements, to confirm the presence of these restrictive lung conditions.

For case 5 (the patient with vocal cord dysfunction), we agree that the appearance of the flow volume loop is nonspecific, as he suggests. This was included in the broader differential at the end of the article.

Figure 1. Typical FVL pattern in BVCP, showing a capped peak expiratory flow, an expiratory plateau, and severely limited flow throughout inspiration. Reprinted from Bolliger et al.²

Figure 2. FVL in psychogenic pharyngeal constriction, showing a perfectly normal expiratory curve and severely limited flow throughout the inspiration. Reprinted from Nagai et al.²