

ECHO ROUNDS Section Editor: Edmund Kenneth Kerut, M.D.

## The Air Gap Sign

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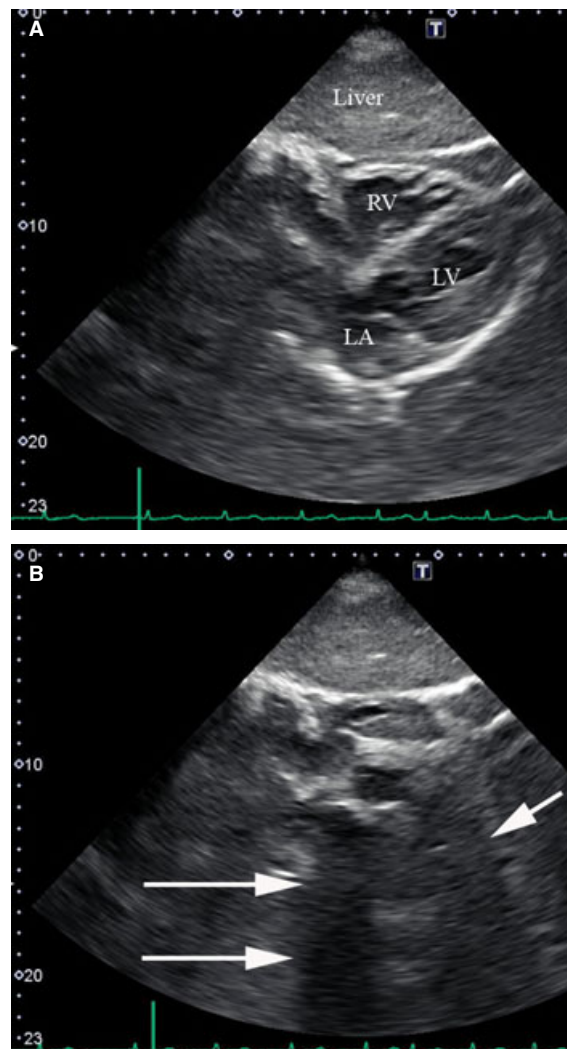
An elderly female aspirated a donut and subsequently had loss of consciousness and cardiopulmonary arrest. Family members performed chest compressions until emergency medical services arrived and resuscitated the patient with an adequate heart rate and blood pressure. On hospital admission, the patient was nonresponsive on a mechanical ventilator. Cardiac auscultation revealed distant heart tones, but no rub or mediastinal crunch was heard.

The admission chest x-ray revealed a normal cardiac silhouette, but the presence of a pneumopericardium (Fig. 1). Two-dimensional echocardiography was best imaged from the subcostal window. Loss of ultrasound signal was



**Figure 1.** Intensive care unit chest x-ray reveals a normal cardiac silhouette with a pneumopericardium (arrows).

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**Figure 2.** Subcostal long-axis image of the heart: **A.** Late diastolic image (LA = left atrium; LV = left ventricle; RV = right ventricle). **B.** Systolic image with loss of echo signal noted (arrows).

noted to occur in a cyclic manner, corresponding to the cardiac cycle (Fig. 2, movie clip S1).

This unique echocardiographic finding of a cyclic loss of echo signal was first described in 1983 as a sign of pneumopericardium or pneumomediastinum. It was termed the “air gap sign.”<sup>1</sup> As was noted with this patient, a “gap” in imaging was described as beginning in systole, and continuing into early diastole.

Features of the “air gap sign” were described as follows:

1. a band of echoes noted within the cardiac chamber beginning at the anterior cardiac border, due to air accumulation
2. dropout of echoes posteriorly
3. cyclic appearance of the “air gap sign”

The “air gap sign” was described as resulting from an accumulation of air anteriorly within the pericardium during systole, as the cardiac size

decreases. The air pocket is then displaced in diastole by the increasing cardiac dimension.

In conclusion, the “air gap sign” is a unique and distinctive echocardiographic finding due to pneumopericardium or pneumomediastinum.

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### Reference

1. Reid CL, Chandraratna AN, Kawanishi D, et al: Echocardiographic Detection of Pneumomediastinum and Pneumopericardium: The Air Gap Sign. *J Am Coll Cardiol* 1983;1:916–921.

### Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Movie clip S1.** The cyclic disappearance of the cardiac image coincides with the cardiac cycle.