

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

## Appearance of the Duodenal Bulb in the Echocardiography Laboratory

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(*ECHOCARDIOGRAPHY, Volume 25, April 2008*)

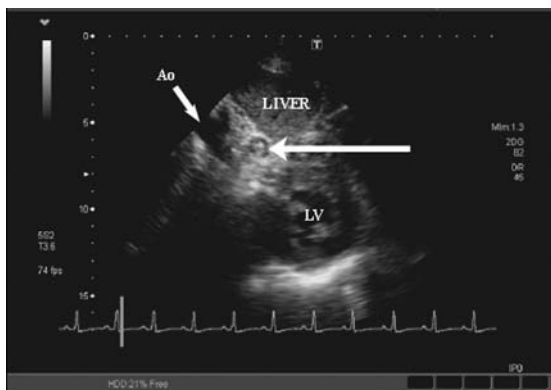
The cardiac sonographer and echocardiographer are generally not familiar with abdominal ultrasound anatomy. The pylorus and duodenal bulb may appear as a mass or “bulls-eye” when imaging<sup>1</sup> from a subcostal window (Figs. 1 and 2, Video Figure—video figure of the image obtained in Figure 1). When imaged in the transverse section, the inferior vena cava and aorta will appear longitudinally,<sup>2</sup> and left ventricle in the short-axis.

In the cross sectional view of a normal duodenum, a five layer circular echogenicity pattern has been described.<sup>3</sup> These layers represent the serosa, muscularis propria, submucosa, deep mucosa, and finally the interface between the superficial mucosa and luminal contents. This pattern is not seen with other findings. Other ultrasound findings that may be confused with a normal duodenum include, a liver mass, pancreatic mass, gallbladder (normal or diseased—especially if containing sludge with wall thickening), and gastric or intestinal thickening or mass.<sup>3,4</sup>

A liver mass will be separate and distinct from bowel and found intrahepatically (Fig. 3). While some complex liver masses such as abscesses and metastatic lesions display a

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**Figure 1.** Subcostal echocardiographic image demonstrates the duodenal bulb (horizontal arrow), appearing as a “bulls-eye” structure. The left ventricle (LV) is viewed in the short-axis and abdominal aorta (Ao) longitudinally.



**Figure 2.** Imaging of the proximal duodenum (arrow) in the transverse plane using a curved array transducer for abdominal studies.



**Figure 3.** Sagittal CT image demonstrates relationship of the liver to that of the duodenum (arrow).

“bull’s-eye” sign, this sign is of only two echogenicity differences, not five. A cystic lesion will appear anechoic and will have no alternating echogenicity pattern.<sup>3</sup>

From a midline subcostal approach, the pancreatic head (and a pancreatic mass) is located deep to the duodenal bulb. Again, there is ab-

sence of alternating bowel layers as seen in the normal duodenum.<sup>4</sup>

The gallbladder, in most cases, will not be seen in the standard subcostal view unless the sonographer veers far right of midline. A normal gallbladder will appear as a simple, cystic structure with a thin wall. The diseased gallbladder may contain a gravity-dependent, layering sludge collection, which may or may not contain stones. Again, this can be differentiated from the duodenal bulb by lack of normal layering anatomy and the far right lateral placement when compared to the normal placement of the bulb.<sup>3</sup>

Normal bowel, including the duodenum, will readily compress with the application of external pressure from the transducer. Thickened bowel and bowel containing a mass does not compress readily. In addition, while thickened bowel may still exhibit the classic five layer pattern, it will be exaggerated and its full wall thickness will exceed that of what is considered “normal”, which is 3–5 mm. Bowel that contains a mass whether it be intramural, mural, or exophytic will have its clearly defined wall pattern altered by the invading mass.<sup>3</sup>

The echocardiographer should be aware of the appearance of a normal duodenum, thus avoiding further unnecessary investigations.

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