

Curved-needle approach to high right subphrenic collections

S Beningfield, MB ChB, FFRad (D)

Department of Radiology, University of Cape Town

Percutaneous drainages of intra-abdominal collections are routinely undertaken, commonly in the subphrenic area.¹ However, there are a number of areas in the abdomen in which it may be difficult to directly reach fluid collections with a needle, especially if the collections are not large.

One such area is the high right subphrenic space, as in this patient with a collection seen on CT and ultrasound (Figs 1 and 2), thought to be on the basis of a ruptured liver abscess. It was found to be difficult to gain safe entry to the fluid using any of the standard approaches. The intercostal route is not generally recommended due to the risk of pneumothorax¹ or subsequent pleural empyema, which therefore means that with either a right subcostal or an epigastric approach is required. The angles from these entry sites may not permit direct entry, and the needle may not be long enough to traverse the liver to reach the target. The hepatic flexure and transverse colon can be interposed from the subcostal or epigastric routes. The costal cartilages can also interfere with an epigastric approach, meaning that the puncture entry point needs to be moved to the left and inferior to the xiphisternum. This requires a more oblique course, and again may mean that the standard needle is too short, and that the central portal structures may come into the intended line. Longer needles are not always readily available, and may still be defeated by awkward angles and intervening portal structures.

An alternative technique is to smoothly curve a fine-needle by using gentle pressure applied with the thumb and first two fingers to produce a constant radius curve along the entire length of the needle (Fig. 3). Alternative bending techniques have been described, using a partly open

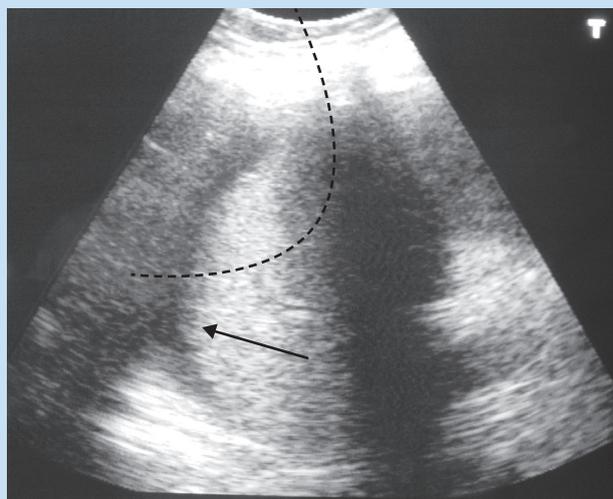


Fig. 1. Longitudinal ultrasound of the right upper quadrant showing crescentic collection (arrow) in the right subphrenic space. Dashed line showing approximate needle path.

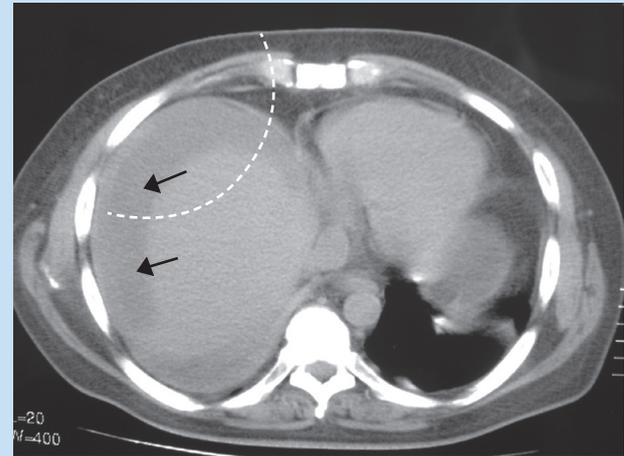


Fig. 2. Computed tomography scan showing right subphrenic collection (arrows). Dashed line showing needle course.

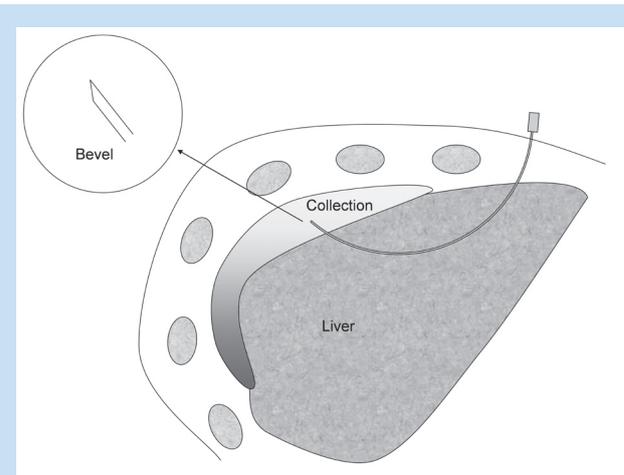


Fig. 3. Diagram of curved fine-needle path; needle bevel position as shown in circle.

forceps, or the side of a syringe.² Care must be taken to obtain a constant radius curvature to facilitate low resistance passage through the tissues, and easier placement of the stilette. The inner stilette should remain within the needle during the curving process to moderate and spread the bending forces. There may be some resistance of stilette withdrawal and re-advancement, especially if the curve is not even.

During placement and advancement of the needle, there may be an initial tendency for the needle to straighten somewhat and/or curve away from its intended target, but gentle pressure and torque generally overcome this. In theory, having the bevel of the needle facing to the outside of the arc should facilitate retention of the curve – this has also been suggested to allow determination of the curve direction from the hub orientation.² Varying degrees of gentle rotation accompanied by advancement or withdrawal can redirect and steer the needle tip.

TECHNICAL NOTE

Careful visualisation of the advancement of the needle to ensure that the diaphragm is not traversed is also important, with intermittent fluoroscopy and ultrasound to confirm needle position in relation to the diaphragm. It is also helpful to place the ultrasound probe intercostally over the intended point of entry of the needle into the collection, where the visualisation of both the needle tip and collection are frequently superior. If CT or CT fluoroscopy are available, these are more accurate. Once the collection is reached, the procedure is standard from there onward.

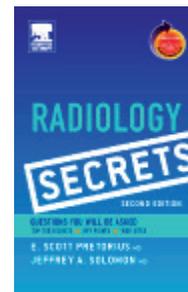
Discussion

The curved needle technique has previously been described in a coaxial configuration for use in CT-guided biopsy.² Abscess drainage routing is less tolerant than fine needle biopsy is to passage through intervening structures. The curved needle technique can usefully expand the role

of the radiologist in reaching and treating difficult-to-access collections. The transpleural route has associated risks of pneumothorax and delayed empyaema, and, although it has been used relatively safely in a series of post-splenectomy collections,³ should probably be reserved for when other options have been exhausted and after clear explanation of the possible risks to the patient and his/her doctor. The curved needle approach can sometimes overcome problems of length, angle and intervening structures.

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Radiology Secrets, 2nd edition With STUDENT CONSULT Online Access



By **E. Scott Pretorius** and **Jeffrey A. Solomon**
ISBN 0323034055 / 9780323034050 · Paperback
· **656 Pages** · **679 Illustrations**
Mosby · **Published November 2005**

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Private Bag X1, Pinelands, 7430
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