Image-Guided Percutaneous Abdominal Mass Biopsy
Technical and Clinical Considerations

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KEYWORDS

• Percutaneous • Image-guided • Abdominal • Biopsy • Liver • Kidney • Fine-needle aspiration • Core needle biopsy

KEY POINTS

- Image-guided percutaneous abdominal biopsy is a safe and effective method of obtaining tissue for diagnosis of a variety of pathologic processes.
- Percutaneous biopsy will play an increasing role in the evaluation of response to directed oncologic therapies.
- Tract seeding remains a concern when biopsy is performed for suspected hepatocellular carcinoma (HCC) and is a disastrous outcome in a liver transplant candidate.
- Tract seeding is relatively rare when biopsy of suspected renal cell carcinoma (RCC) is performed, and biopsy is playing an increasing role in treatment algorithms for RCC.

INTRODUCTION

Image-guided percutaneous biopsy of abdominal masses is one of the most frequently performed procedures in many interventional radiology practices. The success of this minimally invasive procedure rests on its excellent safety profile, rapid recovery time, and high diagnostic yield for a variety of pathologic processes. As imaging techniques have steadily improved, the ability to detect and target smaller lesions has likewise improved, allowing diagnosis and therefore treatment at earlier stages of disease.

PREPROCEDURE

General Indications and Contraindications

Patient preparation begins at the time of scheduling when a valid indication for the procedure should be established. General indications and contraindications for biopsy are listed in **Box 1**.

Contraindications to percutaneous biopsy are few and typically relative. Uncorrectable coagulopathy, inaccessible entry site, and an uncooperative patient are most often cited. However, many bleeding diatheses can be corrected; it is a rare location in the abdomen that cannot be safely reached by a fine needle, and general anesthesia remains an option for uncooperative patients. Ultimately, the risk of the biopsy needs to be weighed against the benefit of the information obtained for that particular patient.

Imaging Review

Relevant imaging should be reviewed to make sure that the requested biopsy can be performed with a high likelihood of success and minimum

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Box 1
Indications/contraindications for percutaneous abdominal mass biopsy

- Indications
  - Diagnosis
    - Organ-specific disease
    - Systemic disease
    - Mass lesion
  - Staging known malignancy
  - Tissue for biomarker/genetic analysis
  - Monitoring response to therapy
  - Evaluation for infection
- Contraindications
  - Uncorrectable bleeding disorder
  - Inaccessible target
  - Uncooperative patient

risk. This imaging review should include (1) whether or not a definitive diagnosis can be made based on imaging alone, obviating biopsy altogether; (2) if there is a more accessible biopsy target than what was requested; (3) if there is a safe route from the skin to the target; and (4) what the optimal imaging modality for guidance will be.

Anticoagulation Status

Typically, the most feared complication of abdominal biopsy is bleeding. As such, special attention during patient preparation should be paid to the patient's coagulation status. This problem is complex with often-conflicting viewpoints in the literature. Guidelines produced by national societies frequently get translated at the department level to suit local practice needs and the specific clinical circumstances of the patient.

Basic coagulation parameters based on the Society of Interventional Radiology consensus guidelines are suggested in **Table 1**.[1,2] Typically, laboratory results obtained in the previous month are acceptable, but the authors require updated laboratory results when the patient is on therapeutic anticoagulation; has a known bleeding disorder; has recently received chemotherapy, which may alter coagulation status; or has known comorbidities that may affect the bleeding parameters such as cirrhosis, malabsorption/malnutrion, significant hepatic metastatic disease, or renal failure.

The authors correct the international normalized ratio (INR) to less than 1.6 and platelets to greater than 50,000 by transfusing fresh frozen plasma (FFP) and platelets, respectively. Atwell and colleagues[3] demonstrated low overall rates of significant bleeding (0.5%) using these parameters in over 15,000 core needle biopsies, and notably, aspirin use did not affect the rate of major bleeding. However, it should be recognized that there is a paucity of studies to date that demonstrate a correlation between mild to moderate elevation in coagulation parameters and bleeding risk in image-guided procedures.[4] In addition, in patients with mild coagulopathy, attempts to correct the INR rarely result in normalization.[5] Thus, in certain clinical scenarios, the authors believe that it is acceptable to proceed with a biopsy when coagulation status is outside of these parameters, although the potentially elevated bleeding risk is discussed with both the patient and the referring physician. Given the short half-life of FFP and platelets, the authors prefer to have the last unit of blood products infusing during the procedure. Ultimately, the decision to transfuse FFP or platelets depends on the clinical scenario and consideration of the risks of transfusion, including reactions, volume overload, transmitted infections, and transfusion-related acute lung injury, balanced against the perceived increased risk of hemorrhagic complications.[1,6,7]

Basic management of agents affecting anticoagulation is addressed in **Table 2**. However, withholding anticoagulation and antiplatelet agents should always be discussed with the referring physician, particularly in cases of recent cardiac stent placement, because the risk of adverse events from stopping them may significantly outweigh the bleeding risk of the biopsy. In these cases, the biopsy is deferred until the time when anticoagulants can be safely stopped. If the information to be obtained by the biopsy is of urgency, the biopsy occasionally proceeds at higher risk, which is detailed with the patient during informed consent.

Table 1
Coagulation parameters

Laboratory Test	Normal	Suggested Cutoff
INR	0.9–1.1	$\leq$1.6
aPTT	25–35 s	<1.5$\times$ control
Platelets	150,000–450,000	>50,000

Abbreviations: aPTT, activated partial thromboplastin time; INR, international normalized ratio.

Adapted from Patel IJ, Davidson JC, Nikolic B, et al. Addendum of newer anticoagulants to the SIR consensus guideline. J Vasc Interv Radiol 2013;24(5):642; with permission.