TABLE 5. (*Continued*). Summary of Findings Tables

Outcomes (80)	Illustrative Comparative: Ultrasound	No Ultrasound	(95% CI) p
Success	97%	33%	< 0.05
Time (s)	13	30	< 0.05
Trials (no. of attempts)	1.7	3.7	< 0.05

Downgraded for indirectness as the technique is mostly useful in difficult patients such as infants, obese, and hemodynamically unstable patients and/or when previous unsuccessful attempts have been performed.

We Suggest the Use of Ultrasound Guidance (vs Landmark Technique) to Improve the Success Rate and Diminish Complications During Arterial Catheterization. Grade 2B (86–91)

Quality Assessment							Summary of Findings: Study Result	
Six Studies	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Overall Quality of Evidence	With Ultrasound	Without Ultrasound
Nine randomized controlled trial 5+4 in meta-analysis	No risk of bias	No serious inconsistency	No indirectness	No imprecision	Undetected	⊕⊕⊕⊕ High	All in favor of ultrasound with significant difference in reported outcomes	

Outcomes	Illustrative Comparative: Ultrasound	No Ultrasound	(95% CI) p
Success	Adult: 87%	62%	< 0.05
	Ped: 67%	14%	
Time (s)	136	148	< 0.05
First attempt	71% improvement over control (relative risk, 1.7)		< 0.05

Downgraded for indirectness as the technique is mostly useful in difficult patients such as infants, obese, and hemodynamically patients and/or when previous unsuccessful attempts have been performed.

Rationale: The sensitivity and specificity of ultrasound to diagnose a pneumothorax (by loss of lung sliding and absence of comet tail artifacts and a lung pulse and the presence of a lung point) exceed 85%, compared with approximately 30–75% for conventional radiography in both ED and ICU patients (29–36). Visualization of a comet tail reliably excludes a pneumothorax, whereas demonstration of a lung point without lung sliding invariably confirms the diagnosis. The absence of lung sliding alone can occur with pathology other than a pneumothorax (e.g., atelectasis, consolidation, or lung contusion). The sensitivity of CT scanning to detect small, so-called occult, pneumothoraces (that may not be clinically significant) exceeds that of both ultrasound and chest radiography and is also more helpful in determining the size of the pneumothorax. In a meta-analysis of the use of ultrasound versus chest radiography for pneumothorax detection, Ding et al (35) report a pooled sensitivity of 89% and specificity of 99% for ultrasound performance by nonradiologist clinicians. The ultrasound examination commonly performed using a linear high-frequency probe (5–12 MHz) with conventional B mode imaging oriented in the long axis starting at the third to fourth intercostal space in the mid-clavicular line moving laterally. Other transducers (e.g., linear array, phased array, and convex) may be chosen based on clinical setting and physician preference. M-mode imaging may also be beneficial.

The sonographic features of a pneumothorax are basic and objective and can be appreciated by intensivists who may perform the examination at the patient's bedside. Intensivists have been shown to perform the examination acceptably with an accuracy exceeding that of chest radiography (36–39). The largest ICU series wherein all enrolled patients (357 hemithoraces) were imaged with both a chest CT scan and an ultrasound revealed a sensitivity of 100% for sonographic loss of lung sliding and a specificity of 100% for the presence of a lung point in establishing the diagnosis of pneumothorax via ultrasound (36).