

Appendix 2: Final version of the checklist

1. Obtains informed consent <ul style="list-style-type: none"> • May not be possible in emergent cases 	<input type="checkbox"/>
2. Positions patient appropriately in a supported manner <ul style="list-style-type: none"> • Sitting on edge of bed and leaning forward • Alternatively: Lateral decubitus with operated side up • Alternatively: Supine or semi-recumbent • Alternatively: Supine oblique, as when performing procedure under CT guidance 	<input type="checkbox"/>
3. Inspects chest wall	<input type="checkbox"/>
4. Using imaging (e.g., US or CT) as a guide, marks an appropriate site of entry	<input type="checkbox"/>
5. Opens kit	<input type="checkbox"/>
6. Washes hands	<input type="checkbox"/>
7. Dons appropriate personal protective equipment	<input type="checkbox"/>
8. Applies sterile gloves	<input type="checkbox"/>
9. Arranges materials appropriately, including placing internal stiffener into pigtail catheter	<input type="checkbox"/>
10. Preps over marked site and surrounding skin with chlorhexidine or appropriate alternative	<input type="checkbox"/>
11. Applies sterile drape, leaving only the procedure site exposed	<input type="checkbox"/>
12. Performs a pre-procedure time out immediately before procedure <ul style="list-style-type: none"> • Including verification of patient ID, procedure, and site (including laterality) by all members of the team 	<input type="checkbox"/>
13. Confirms that the marked entry site is immediately above the lower rib bordering the selected intercostal space	<input type="checkbox"/>
14. Injects local anesthetic (for example, lidocaine) at the entry site <ul style="list-style-type: none"> • Using a 25 to 22 G needle, creates a superficial wheal • Then injects deeper into skin, aspirating before each injection for evidence of blood or entry into pleura • When pleural fluid or air is obtained, notes depth, pulls back needle slightly, and injects additional anesthetic to anesthetize the parietal pleura 	<input type="checkbox"/>
15. After reconfirming positioning immediately above the rib, uses appropriate blade to make a superficial skin incision that is parallel to the rib <ul style="list-style-type: none"> • Typically, a number 11 blade is used • Keeps incision superficial, enabling entry of catheter through the epidermis without causing injury to deeper structures 	<input type="checkbox"/>

16. Attaches appropriately sized syringe to the hub of a large hollow-bore needle (<i>typically, an 18G needle is used</i>) and after reconfirming position immediately above the rib, introduces needle through the incision site <ul style="list-style-type: none"> • If using real-time imaging guidance, use of a syringe may be omitted 	<input type="checkbox"/>
17. While inserting needle, continuously aspirates syringe in order to immediately recognize fluid or air return from pleural space <ul style="list-style-type: none"> • If using real-time imaging guidance, this step may be omitted 	<input type="checkbox"/>
18. Removes syringe from needle hub while carefully maintaining position of needle <ul style="list-style-type: none"> • If using real-time imaging guidance, use of a syringe may be omitted 	<input type="checkbox"/>
19. Threads guidewire through the hollow-bore needle <ul style="list-style-type: none"> • The guidewire should be inserted at least several centimeters beyond the tip of the needle • If resistance to guidewire insertion is encountered, stops and reconfirms placement of needle 	<input type="checkbox"/>
20. While continuously holding guidewire, removes hollow-bore needle	<input type="checkbox"/>
21. While continuously holding guidewire, inserts dilator over guidewire <ul style="list-style-type: none"> • The appropriate depth of dilator placement may be determined using the previously noted depth in Step 15 and/or when an abrupt loss of resistance (i.e., “give”) is felt • Subsequently, using small back and forth movement (racking) of the guidewire, confirms that it is freely moving and not kinked 	<input type="checkbox"/>
22. While continuously holding guidewire, removes dilator	<input type="checkbox"/>
23. While continuously holding guidewire, inserts pigtail catheter (with internal stiffener in place) over the guidewire, stopping if any resistance is noticed. <ul style="list-style-type: none"> • Keeps advancing until the tip is inside the pleura, then advances only the pigtail and not the internal stiffener 	<input type="checkbox"/>
24. Removes the guidewire, and then, removes the internal stiffener	<input type="checkbox"/>
25. Attaches catheter tubing to chest drain tubing and secures tightly via twisting motion. <ul style="list-style-type: none"> • Attaches chest drain to suction or leaves it on water seal as appropriate • Alternatively, attaches catheter tubing to a Heimlich valve 	<input type="checkbox"/>
26. Secures chest tube in place using either a sterile suture or alternate device	<input type="checkbox"/>
27. Obtains fluid for diagnostic workup if indicated, using the side/flushing port and a syringe (e.g., 60cc syringe)	<input type="checkbox"/>
28. Places a dressing at the catheter entry site	<input type="checkbox"/>
29. Cleans up <ul style="list-style-type: none"> • Disposes of sharps appropriately 	<input type="checkbox"/>
30. Writes procedure note	<input type="checkbox"/>
31. Confirms appropriate catheter positioning via chest imaging	<input type="checkbox"/>