

**American College of Radiology
ACR Appropriateness Criteria®**

Central Venous Access Device and Site Selection

Variant 1: Device selection: Acutely ill patient requiring infusion of vesicant medication, hemodynamic monitoring, and frequent blood draws for 2 weeks or shorter.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|-------------------------------------|--------------------------|---------------|------------|---------------|--------|--------|-------------------|---|---|---|---|---|---|---|---|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Nontunneled central venous catheter | Usually appropriate | Moderate | N/A | N/A | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 7 | 4 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 15 (20857280) | | 1 | | | | | | | | | | | |
| | | 14 (16865322) | | 4 | | | | | | | | | | | |
| | | 13 (16100130) | | M | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| | | 11 (30095499) | | Good | | | | | | | | | | | |
| PICC | Usually appropriate | Strong | N/A | N/A | 8 | 8 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 4 | 6 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 17 (28665469) | | 4 | | | | | | | | | | | |
| | | 16 (20574104) | | 1 | | | | | | | | | | | |
| | | 15 (20857280) | | 1 | | | | | | | | | | | |
| | | 14 (16865322) | | 4 | | | | | | | | | | | |
| | | 13 (16100130) | | M | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| | | 11 (30095499) | | Good | | | | | | | | | | | |
| Tunneled central venous catheter | May be appropriate | Limited | N/A | N/A | 5 | 5 | 0 | 0 | 2 | 1 | 6 | 6 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | |
|------------------|-------------------------|---------------|-----|---------------|---|---|----|---|---|---|---|---|---|---|---|
| | | References | | Study Quality | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| Midline catheter | May be appropriate | Strong | N/A | N/A | 5 | 5 | 0 | 1 | 1 | 1 | 8 | 4 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 10 (34553435) | | 2 | | | | | | | | | | | |
| | | 9 (24811603) | | 1 | | | | | | | | | | | |
| Chest port | Usually not appropriate | Limited | N/A | N/A | 1 | 1 | 11 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 8 (23739070) | | 2 | | | | | | | | | | | |
| Arm port | Usually not appropriate | Limited | N/A | N/A | 1 | 1 | 11 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 8 (23739070) | | 2 | | | | | | | | | | | |

Variant 2: Device selection: Patient with acute renal failure requiring central venous access for renal replacement therapy, anticipated duration of therapy for 2 weeks or shorter.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|-------------------------------|--------------------------|---------------|------------|---------------|--------|--------|-------------------|---|---|---|---|---|---|---|----|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Nontunneled dialysis catheter | Usually appropriate | Moderate | N/A | N/A | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 10 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 11 (30095499) | | Good | | | | | | | | | | | |
| | | 18 (29202728) | | 2 | | | | | | | | | | | |
| Tunneled dialysis catheter | Usually appropriate | Limited | N/A | N/A | 7 | 7 | 0 | 0 | 0 | 2 | 0 | 2 | 8 | 3 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 18 (29202728) | | 2 | | | | | | | | | | | |

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|------------|-------------------------|------------------|-----|-----|---|---|----|---|---|---|---|---|---|---|---|
| Chest port | Usually not appropriate | Expert Consensus | N/A | N/A | 1 | 1 | 14 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Arm port | Usually not appropriate | Expert Consensus | N/A | N/A | 1 | 1 | 14 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| PICC | Usually not appropriate | Expert Consensus | N/A | N/A | 1 | 1 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

Variant 3: Device selection: Patient with renal failure requiring central venous access for renal replacement therapy, anticipated duration of therapy for more than 2 weeks.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|-------------------------------|--------------------------|------------------|---------------|----------|--------|--------|-------------------|---|---|---|---|---|---|---|----|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Tunneled dialysis catheter | Usually appropriate | Limited | N/A | N/A | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 12 |
| | | References | Study Quality | | | | | | | | | | | | |
| | | 12 (16970212) | M | | | | | | | | | | | | |
| | | 19 (30345873) | 3 | | | | | | | | | | | | |
| Nontunneled dialysis catheter | May be appropriate | Limited | N/A | N/A | 5 | 5 | 0 | 0 | 1 | 5 | 5 | 3 | 1 | 1 | 0 |
| | | References | Study Quality | | | | | | | | | | | | |
| | | 12 (16970212) | M | | | | | | | | | | | | |
| | | 19 (30345873) | 3 | | | | | | | | | | | | |
| Chest port | Usually not appropriate | Expert Consensus | N/A | N/A | 1 | 1 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Arm port | Usually not appropriate | Expert Consensus | N/A | N/A | 1 | 1 | 14 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| PICC | Usually not appropriate | Expert Consensus | N/A | N/A | 1 | 1 | 14 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

Variant 4: Device selection: Patient with cancer diagnosis requiring central venous access for weekly chemotherapy infusion for more than 2 weeks.

[illegible]

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|----------------------------------|--------------------------|---------------|------------|---------------|--------|--------|-------------------|---|---|---|---|---|---|---|---|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Tunneled central venous catheter | Usually appropriate | Moderate | N/A | N/A | 7 | 7 | 0 | 0 | 0 | 0 | 1 | 2 | 7 | 4 | 2 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| | | 28 (21652113) | | 3 | | | | | | | | | | | |
| | | 27 (24218174) | | M | | | | | | | | | | | |
| | | 26 (31044308) | | Good | | | | | | | | | | | |

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|-------------------------------------|-------------------------|---------------|-----|---------------|---|---|---|---|---|---|---|---|---|---|---|
| PICC | Usually appropriate | Strong | N/A | N/A | 7 | 7 | 0 | 0 | 0 | 0 | 6 | 0 | 6 | 2 | 2 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| | | 25 (32479699) | | Inadequate | | | | | | | | | | | |
| | | 22 (31005243) | | 1 | | | | | | | | | | | |
| | | 21 (31464692) | | Not Assessed | | | | | | | | | | | |
| | | 20 (24005884) | | 1 | | | | | | | | | | | |
| Chest port | May be appropriate | Limited | N/A | N/A | 6 | 6 | 0 | 0 | 0 | 2 | 5 | 8 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 8 (23739070) | | 2 | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| | | 25 (32479699) | | Inadequate | | | | | | | | | | | |
| Arm port | May be appropriate | Limited | N/A | N/A | 4 | 4 | 0 | 0 | 1 | 7 | 7 | 0 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 8 (23739070) | | 2 | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| | | 25 (32479699) | | Inadequate | | | | | | | | | | | |
| Nontunneled central venous catheter | Usually not appropriate | Limited | N/A | N/A | 2 | 2 | 2 | 8 | 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | |
| | | 28 (21652113) | | 3 | | | | | | | | | | | |

Variant 6: Device selection: Patient requiring long-term total parenteral nutrition and another indication for central access.

[illegible]

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|---|--------------------------|---------------|------------|---------------|--------|--------|-------------------|---|---|---|---|---|---|---|---|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Tunneled central venous catheter double lumen | Usually appropriate | Limited | N/A | N/A | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 9 | 4 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 34 (29489708) | | 4 | | | | | | | | | | | |
| | | 33 (19464090) | | 4 | | | | | | | | | | | |
| | | 32 (28558699) | | 3 | | | | | | | | | | | |
| | | 31 (32511768) | | 2 | | | | | | | | | | | |
| Double lumen PICC | Usually appropriate | Strong | N/A | N/A | 7 | 7 | 0 | 0 | 0 | 1 | 2 | 3 | 3 | 3 | 4 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 35 (29148004) | | 2 | | | | | | | | | | | |
| | | 34 (29489708) | | 4 | | | | | | | | | | | |
| | | 33 (19464090) | | 4 | | | | | | | | | | | |
| | | 32 (28558699) | | 3 | | | | | | | | | | | |
| | | 31 (32511768) | | 2 | | | | | | | | | | | |
| Single lumen PICC | May be appropriate | Strong | N/A | N/A | 6 | 6 | 0 | 0 | 0 | 0 | 5 | 4 | 5 | 1 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 35 (29148004) | | 2 | | | | | | | | | | | |
| | | 34 (29489708) | | 4 | | | | | | | | | | | |
| | | 33 (19464090) | | 4 | | | | | | | | | | | |
| | | 32 (28558699) | | 3 | | | | | | | | | | | |
| | | 31 (32511768) | | 2 | | | | | | | | | | | |
| Tunneled central venous catheter single lumen | May be appropriate | Limited | N/A | N/A | 6 | 6 | 0 | 0 | 0 | 1 | 2 | 8 | 3 | 1 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 34 (29489708) | | 4 | | | | | | | | | | | |
| | | 33 (19464090) | | 4 | | | | | | | | | | | |
| | | 32 (28558699) | | 3 | | | | | | | | | | | |

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|------------|-------------------------|---------------|-----|--|---------------|---|---|---|---|---|---|---|---|---|---|---|--|
| | | 31 (32511768) | | | 2 | | | | | | | | | | | | |
| Chest port | May be appropriate | Limited | N/A | | N/A | 4 | 4 | 1 | 2 | 3 | 5 | 4 | 0 | 0 | 0 | 0 | |
| | | References | | | Study Quality | | | | | | | | | | | | |
| | | 31 (32511768) | | | 2 | | | | | | | | | | | | |
| | | 32 (28558699) | | | 3 | | | | | | | | | | | | |
| Arm port | Usually not appropriate | Limited | N/A | | N/A | 3 | 3 | 1 | 2 | 7 | 3 | 1 | 1 | 0 | 0 | 0 | |
| | | References | | | Study Quality | | | | | | | | | | | | |
| | | 31 (32511768) | | | 2 | | | | | | | | | | | | |
| | | 32 (28558699) | | | 3 | | | | | | | | | | | | |

Variant 7: Device selection: Patient with chronic kidney disease requiring central venous catheter IV infusions for more than 2 weeks.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|---|--------------------------|---------------|------------|---------------|--------|--------|-------------------|---|---|---|---|---|---|---|---|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Tunneled central venous catheter single lumen | Usually appropriate | Limited | N/A | N/A | 8 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 8 | 3 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 46 (27647824) | | 3 | | | | | | | | | | | |
| Tunneled central venous catheter double lumen | Usually appropriate | Limited | N/A | N/A | 7 | 7 | 0 | 0 | 1 | 0 | 3 | 1 | 4 | 6 | 1 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 46 (27647824) | | 3 | | | | | | | | | | | |
| Chest port via internal jugular vein | May be appropriate | Strong | N/A | N/A | 6 | 6 | 0 | 0 | 1 | 1 | 6 | 2 | 3 | 1 | 2 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 38 (2314526) | | 2 | | | | | | | | | | | |
| | | 39 (1754109) | | 2 | | | | | | | | | | | |

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|--------------------------------|-------------------------|---------------|-----|---------------|---|---|---|---|---|---|---|---|---|---|---|
| Chest port via subclavian vein | Usually not appropriate | Strong | N/A | N/A | 3 | 3 | 6 | 1 | 3 | 4 | 1 | 0 | 1 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 38 (2314526) | | 2 | | | | | | | | | | | |
| | | 39 (1754109) | | 2 | | | | | | | | | | | |
| Arm port | Usually not appropriate | Limited | N/A | N/A | 2 | 2 | 8 | 3 | 2 | 1 | 1 | 0 | 1 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 36 (12616419) | | 2 | | | | | | | | | | | |
| | | 37 (33116552) | | 3 | | | | | | | | | | | |
| PICC | Usually not appropriate | Strong | N/A | N/A | 2 | 2 | 7 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 45 (-3195138) | | 4 | | | | | | | | | | | |
| | | 44 (32778223) | | 4 | | | | | | | | | | | |
| | | 43 (22704142) | | 2 | | | | | | | | | | | |
| | | 42 (29514546) | | 3 | | | | | | | | | | | |
| | | 41 (11099241) | | 3 | | | | | | | | | | | |
| | | 40 (15961840) | | 4 | | | | | | | | | | | |
| | | 36 (12616419) | | 2 | | | | | | | | | | | |
| | | 25 (32479699) | | Inadequate | | | | | | | | | | | |
| | | 22 (31005243) | | 1 | | | | | | | | | | | |
| | | 16 (20574104) | | 1 | | | | | | | | | | | |
| | | 15 (20857280) | | 1 | | | | | | | | | | | |

Variant 8: Site selection: Patient with acute illness requiring central venous catheter for anticipated therapy for 2 weeks or shorter.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|-------------------------------------|--------------------------|--------|------------|----------|--------|--------|-------------------|---|---|---|---|---|---|---|----|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Right or left internal jugular vein | Usually appropriate | Strong | N/A | N/A | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 10 |

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | | | |
|-------------------------------------|--------------------------|---------------|------------|---------------|--------|--------|-------------------|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| | | | | | | | | | | | | | | | | | |
| | | References | | Study Quality | | | | | | | | | | | | | |
| | | 62 (30231668) | | 3 | | | | | | | | | | | | | |
| | | 58 (26398070) | | 1 | | | | | | | | | | | | | |
| | | 56 (16280064) | | 2 | | | | | | | | | | | | | |
| | | 52 (29992634) | | 3 | | | | | | | | | | | | | |
| Right or left subclavian vein | Usually appropriate | Strong | N/A | | N/A | 7 | 7 | | 1 | 0 | 0 | 0 | 1 | 5 | 4 | 3 | 2 |
| | | References | | Study Quality | | | | | | | | | | | | | |
| | | 62 (30231668) | | 3 | | | | | | | | | | | | | |
| | | 61 (22419292) | | M | | | | | | | | | | | | | |
| | | 58 (26398070) | | 1 | | | | | | | | | | | | | |
| | | 57 (11495620) | | 1 | | | | | | | | | | | | | |
| | | 56 (16280064) | | 2 | | | | | | | | | | | | | |
| | | 52 (29992634) | | 3 | | | | | | | | | | | | | |
| Upper extremity vein | Usually appropriate | Strong | N/A | | N/A | 7 | 7 | | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 2 | 5 |
| | | References | | Study Quality | | | | | | | | | | | | | |
| | | 15 (20857280) | | 1 | | | | | | | | | | | | | |
| | | 51 (29148000) | | 2 | | | | | | | | | | | | | |
| | | 14 (16865322) | | 4 | | | | | | | | | | | | | |
| | | 13 (16100130) | | M | | | | | | | | | | | | | |
| | | 12 (16970212) | | M | | | | | | | | | | | | | |
| | | 11 (30095499) | | Good | | | | | | | | | | | | | |
| Right or left external jugular vein | May be appropriate | Limited | N/A | | N/A | 6 | 6 | | 0 | 0 | 1 | 0 | 1 | 7 | 4 | 2 | 1 |
| | | References | | Study Quality | | | | | | | | | | | | | |
| | | 54 (24306665) | | 2 | | | | | | | | | | | | | |

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|----------------------------|-------------------------|---------------|---------------|-----|---|---|---|---|---|---|---|---|---|---|---|
| | | | 53 (25198827) | | 4 | | | | | | | | | | |
| | | | 52 (29992634) | | 3 | | | | | | | | | | |
| Right or left femoral vein | May be appropriate | Strong | N/A | N/A | 5 | 5 | 1 | 0 | 0 | 2 | 6 | 6 | 1 | 0 | 0 |
| | | References | Study Quality | | | | | | | | | | | | |
| | | 61 (22419292) | M | | | | | | | | | | | | |
| | | 60 (8001386) | 1 | | | | | | | | | | | | |
| | | 59 (29924154) | 2 | | | | | | | | | | | | |
| | | 58 (26398070) | 1 | | | | | | | | | | | | |
| | | 57 (11495620) | 1 | | | | | | | | | | | | |
| | | 56 (16280064) | 2 | | | | | | | | | | | | |
| | | 55 (9831940) | 2 | | | | | | | | | | | | |
| | | 51 (29148000) | 2 | | | | | | | | | | | | |
| Hepatic vein | Usually not appropriate | Limited | N/A | N/A | 2 | 2 | 8 | 3 | 4 | 0 | 1 | 0 | 0 | 0 | 0 |
| | | References | Study Quality | | | | | | | | | | | | |
| | | 47 (14514812) | 2 | | | | | | | | | | | | |
| Inferior vena cava | Usually not appropriate | Limited | N/A | N/A | 2 | 2 | 7 | 3 | 4 | 1 | 1 | 0 | 0 | 0 | 0 |
| | | References | Study Quality | | | | | | | | | | | | |
| | | 50 (30281060) | 3 | | | | | | | | | | | | |
| | | 49 (7747727) | 2 | | | | | | | | | | | | |
| | | 48 (24190069) | 4 | | | | | | | | | | | | |

Variant 9: Site selection: Patient with chronic kidney disease or end-stage renal disease requiring central venous catheter.

| Procedure | Appropriateness Category | SOE | Adults RRL | Peds RRL | Rating | Median | Final Tabulations | | | | | | | | |
|-------------------------------------|--------------------------|--------|------------|----------|--------|--------|-------------------|---|---|---|---|---|---|---|----|
| | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Right or left internal jugular vein | Usually appropriate | Strong | N/A | N/A | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 10 |

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|-------------------------------------|-------------------------|---------------|---------------|-----|---|---|---|---|---|---|---|----|---|---|---|--|
| | | References | Study Quality | | | | | | | | | | | | | |
| | | 38 (2314526) | 2 | | | | | | | | | | | | | |
| | | 39 (1754109) | 2 | | | | | | | | | | | | | |
| | | 61 (22419292) | M | | | | | | | | | | | | | |
| Right or left femoral vein | May be appropriate | Strong | N/A | N/A | 6 | 6 | 0 | 0 | 0 | 0 | 3 | 10 | 2 | 1 | 0 | |
| | | References | Study Quality | | | | | | | | | | | | | |
| | | 64 (30359982) | 1 | | | | | | | | | | | | | |
| | | 61 (22419292) | M | | | | | | | | | | | | | |
| | | 60 (8001386) | 1 | | | | | | | | | | | | | |
| | | 58 (26398070) | 1 | | | | | | | | | | | | | |
| | | 57 (11495620) | 1 | | | | | | | | | | | | | |
| Right or left external jugular vein | May be appropriate | Limited | N/A | N/A | 6 | 6 | 0 | 0 | 0 | 0 | 4 | 9 | 2 | 0 | 0 | |
| | | References | Study Quality | | | | | | | | | | | | | |
| | | 53 (25198827) | 4 | | | | | | | | | | | | | |
| Right or left subclavian vein | May be appropriate | Strong | N/A | N/A | 4 | 4 | 0 | 3 | 1 | 8 | 3 | 0 | 0 | 0 | 0 | |
| | | References | Study Quality | | | | | | | | | | | | | |
| | | 38 (2314526) | 2 | | | | | | | | | | | | | |
| | | 39 (1754109) | 2 | | | | | | | | | | | | | |
| Inferior vena cava | May be appropriate | Strong | N/A | N/A | 4 | 4 | 0 | 1 | 4 | 5 | 5 | 0 | 0 | 0 | 0 | |
| | | References | Study Quality | | | | | | | | | | | | | |
| | | 63 (33318464) | 2 | | | | | | | | | | | | | |
| | | 50 (30281060) | 3 | | | | | | | | | | | | | |
| | | 49 (7747727) | 2 | | | | | | | | | | | | | |
| | | 48 (24190069) | 4 | | | | | | | | | | | | | |
| Hepatic vein | Usually not appropriate | Limited | N/A | N/A | 3 | 3 | 2 | 4 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | |
| | | References | Study Quality | | | | | | | | | | | | | |

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|----------------------|-------------------------|---------------|-----|---------------|---|---|---|---|---|---|---|---|---|---|---|
| | | 47 (14514812) | 2 | | | | | | | | | | | | |
| Upper extremity vein | Usually not appropriate | Strong | N/A | N/A | 2 | 2 | 7 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | References | | Study Quality | | | | | | | | | | | |
| | | 45 (-3195138) | | 4 | | | | | | | | | | | |
| | | 44 (32778223) | | 4 | | | | | | | | | | | |
| | | 43 (22704142) | | 2 | | | | | | | | | | | |
| | | 42 (29514546) | | 3 | | | | | | | | | | | |
| | | 41 (11099241) | | 3 | | | | | | | | | | | |
| | | 40 (15961840) | | 4 | | | | | | | | | | | |
| | | 36 (12616419) | | 2 | | | | | | | | | | | |
| | | 16 (20574104) | | 1 | | | | | | | | | | | |
| | | 15 (20857280) | | 1 | | | | | | | | | | | |
| | | 22 (31005243) | | 1 | | | | | | | | | | | |

Appendix Key

A more complete discussion of the items presented below can be found by accessing the supporting documents at the designated hyperlinks.

Appropriateness Category: The panel's recommendation for a procedure based on the assessment of the risks and benefits of performing the procedure for the specified clinical scenario.

SOE: Strength of Evidence. The assessment of the amount and quality of evidence found in the peer reviewed medical literature for an appropriateness recommendation.

- **References:** The citation number and PMID for the reference(s) associated with the recommendation.
- **Study Quality:** The assessment of the quality of an individual reference based on the number of study quality elements described in the reference.

RRL: Relative Radiation Level. A population based assessment of the amount of radiation a typical patient may be exposed to during the specified procedure.

Rating: The final rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Median: The median rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Final tabulations: A histogram showing the number of panel members who rated the procedure as noted in the column heading (ie, 1, 2, 3, etc.).

Additional supporting documents about the AC methodology and processes can be found at www.acr.org/ac.