

Characteristics of included studies table

Author, year Country Single- or multicenter	Catheter material Catheter insertion site Catheter size range	N patients (baseline); catheters; catheter days Population Ward / procedure Follow-up	Outcomes	Remarks
<i>Randomized controlled trials</i>				
Mitra, 2024 Australia Single-center	FEP (Smiths Medical's Jelco) Hand Forearm Cubital fossa 18G to 20G	T: 181*; 178; NR Adults ED Until discharge from ED * Incomplete outcome data: 3	Thrombophlebitis ¹ Insertion failure Catheter failure	-
<i>Observational studies</i>				
Abbas, 2007 United Kingdom Single-center	PTFE (Teflon) NR 16G to 22G	T: 86; 86; NR Adults ED 14 days (until removal)	Thrombophlebitis ²	-
Abdul-Hak, 2014 Brazil Single-center	NR Upper limb 18/20G – 22/24G	T: 100; 234* Adults Pulmonology ward Cardiology ward Until removal * Catheter size unknown: 85	Phlebitis ⁶	Unit of analysis: catheter
Arias-Fernandez, 2017	NR Hand	T: 105; 178; NR Adults	Phlebitis ⁸	-

Spain Single-center	Forearm Cubital fossa ('flexure') Arm 18G to 24G	Internal medicine Medical oncology Neurosurgery Hematology Until removal		
Ben Abdelaziz, 2017 Tunesia Multicenter	FEP (B-CAT IV cannula) Hand Wrist Forearm Antecubital fossa Foot Head 22G to 24G	T: 98; 215; NR Children (<18 years) Pediatric ward Pediatric surgical ward Until removal	Catheter failure	-
Buzatto, 2016 Brazil Single-center	Vialon PU (Intima or Insyte) Dorsal metacarpal Forearm Arm 16G-24G	T: 102; 102; NR Adults CCU / receiving amiodarone MCU / receiving amiodarone NR	Phlebitis ⁶	-
Cicolini, 2009 Italy Single-center	NR Hand Forearm Cubital fossa 16G-22G	T: 427; 427; NR Adults Medical ward Surgical ward 12-96 hours (until removal)	Thrombophlebitis ⁴	-
Cicolini, 2014 Italy Multicenter	Teflon Polyurethane Polyvinyl Polyethylene	T: 1,498; 1,498. NR Adults Medical ward	Phlebitis ⁶	Multivariable analysis not considered (catheter size analyzed as continuous variable)

	Hand Forearm Antecubital fossa 14G-24G	Surgical ward Until 96 hours after insertion		
DeVries, 2022 Australia Single-center	Vialon PU (Nexiva / Insyte Autoguard) Hand Forearm Antecubital fossa 14G to 24G	T: NR; 4,305; 23,423 Adults All wards Until removal	Catheter failure	Unit of analysis: catheters
Erdogan, 2016 Turkey Single-center	NR Hand Wrist Forearm Antecubital fossa 20G-22G	T: 325; 347; NR Adults Neurosurgery ward Until 24 hours after catheter removal	Phlebitis ⁶	Unit of analysis: catheters
Faltoni, 2023 Switzerland Single-center	NR Hand Wrist Forearm Antecubital fossa Other ≤16G to ≥22G	T: 93,233; 206,804*; NR Adults and children Non-ICU wards Until removal * Catheter size NR: 5,391	CABSI	Unit of analysis: catheters / analysis adjusted for clustering within patients
Gómez-Neva, 2022 Colombia Single-center	Silicon, PTFE-coated NR 18G to 24G	T: 223; 223; NR Children (<= 15 years) Pediatric ward Pediatric ED Until removal	Phlebitis ³ Catheter failure	-
Gupta, 2022	PVC	T: 200; 200; NR	Thrombophlebitis ⁵	Post-hoc analysis of RCT

India Single-center	Hand Wrist Forearm 16G-22G	Adults Elective surgery Until 72 hours or removal (if earlier)		
Hasselberg, 2010 Sweden Single-center	PTFE (BD Venflon Pro) NR 16G-22G	T: 213*; 413; NR Adults Surgical ward Until removal * Incomplete outcome data: 17	Thrombophlebitis ¹ Occlusion	Unit of analysis: catheters
Kaur, 2011 India Single-center	NR Hand Wrist Forearm 16G-22G	T: 349*; 200; NR Adults ED Until removal * Excluded for early removal: 149	Phlebitis ⁸	-
Leroux, 2023 United States Single-center	NR Hand Forearm Antecubital fossa 16G-24G	T: 222; 222; NR Adults ED Until removal	Catheter failure	Post-hoc analysis of RCT Ultrasound guidance more frequent for small catheter size groups
Nassaji-Zavareh, 2007 Iran Multicenter	NR Upper extremity Lower extremity 18G-20G	T: 300; 300; NR Adults Medical ward Surgical ward Until removal or discharge	Phlebitis ⁷	-

Neopane, 2013 Nepal Single-center	NR At and above elbow Below elbow 18G-22G	T: 100; NR; NR Adults Medical ward NR	Thrombophlebitis ¹⁰	Cannula and adhesive dressing brought by patient party
Petroski, 2015 United States Single-center	NR Hand Wrist Forearm Antecubital fossa Lower extremity 16G-24G	T: 652*; 652; NR Children (<18 years) ED NA * Exposure data not available: no insertion failure: 206; insertion failure: 21	Insertion failure	-
Rego Furtado, 2011 Portugal (Azores) Single-center	NR Back of hand Wrist Forearm Antecubital fossa Arm 18G-22G	T: 171; 286; NR Adults General surgery ward Until removal	Phlebitis ⁸	Unit of analysis: catheter
Saji, 2015 India Single-center	NR NR 18G-22G	T: 82; NR; NR Adults Surgery ward 72 hours after insertion	Phlebitis ⁸	-
Simin, 2019 Serbia Single-center	PTFE (Teflon) Vialon PU Hand Wrist Lower forearm	T: 368; 1,428; NR Adults Infectious disease wards	Phlebitis ³	Unit of analysis: catheter

	Antecubital fossa Lower limb 18G-24G	Until removal		
Singh, 2008 Nepal Single-center	NR Dorsum hand Forearm Joint 18G-20G	T: 230; 230; NR Adults ICU Medical ward Surgical ward Obstetrics/gynecology ward Until discharge or 2 days after removal	Phlebitis ⁸	-
Urbanetto, 2016 Brazil Single-center	NR Hand Wrist/arm Forearm Elbow pit 18G-24G	T: 171; 361*; NR Adults All hospital wards Until 96 hours after removal * Lost to follow-up: 18G/20G: 5; 22G/24G: 35	Phlebitis ¹	Unit of analysis: catheter
Uslusoy, 2008 Turkey Single-center	PTFE (Teflon) Hand Wrist Forearm Antecubital fossa 16G-22G	T: 355; 568; NR Adults General surgery ward Until 48 hours after removal	Phlebitis ⁶	Unit of analysis: catheter
Van Loon, 2016 The Netherlands Single-center	Vialon (Venflon Pro Safety BD) Hand Forearm Antecubital Upper arm 14G-22G	T: 1,104*; 1,104; NR Adults Scheduled for surgical procedure NA	Insertion failure	-

		*Lost to follow-up: 41		
Wallis, 2014	Vialon PU (Insyte Autoguard)	T: 3,283; 5,907; NR	Phlebitis ⁹	Unit of analysis: catheters
Australia	Hand	Adults		
	Wrist			
Multicenter	Forearm	Medical ward		
	Antecubital fossa	Surgical ward		
	Upper arm			
	≤18-≥22	NR		

CABSI = catheter-associated bloodstream infection; CCU = coronary care unit; ED = emergency department; FEP = fluorinated ethylene propylene; G = Gauge; MCU = medium care unit; NA = not applicable; NR = not reported; PTFE = polytetrafluoroethylene; PVC = polyvinylchloride; PU = polyurethane; RCT = randomized controlled trial; T = total number

1 Criteria not reported

2 At least two of: pain, erythema, swelling, palpable venous cord

3 Visual infusion phlebitis scale (Jackson/Gallant, 2006)

4 Lundgren checklist

5 At least two of: local warmth, tenderness, redness, swelling

6 Infusion Nurses Society (INS) phlebitis scale

7 At least four of: erythema, pain, tenderness, warmth, induration, palpable cord, swelling

8 Jackson standard visual phlebitis scale (1998)

9 At least two of: pain and/or tenderness, erythema, swelling, purulent discharge, palpable venous cord

10 Redness, pain, and tenderness, with or without swelling, with or without fever, and blockage of the vein intravenous flow