

Table 11.1 Study characteristics and main findings for complications and image quality

Study (year)	N	Study	Type catheter	Injection rate and peak pressure	Safety	Image quality
Central Venous Catheters						
Herts, 2001	174 versus. 51 peripheral	RCT	117 port-type, 41 3L, 10 DL, 6 unknown	CVC: 1.5–2 mL/s, pressure cut-off 100 psi Peripheral: 2.5–3 mL/s, pressure cut-off 300 psi	1 (0.6%) CVC no longer patent 1 positive blood culture	Less contrast enhancement in thoracic aorta, pulmonary artery, liver in CVC group
Macht, 2012	104	Retrospective	Distal 16G lumen of Arrow multi-lumen (3L, 5L)	3L: 4.4 ± 0.5 mL/s; 200.7 ± 17.5 psi 5L: 4.6 ± 0.6 mL/s; 194.5 ± 6.5 psi	No complications	-
Sanelli, 2004	104	Prospective	Arrow multi-lumen CVC (n = 89) Percutaneous sheaths IJV (n = 15)	3 mL/s (n = 15); 4 mL/s (n = 8); 4 mL/s (n = 79); 5 mL/s (n = 2) Pressure limit 300 psi; 5/43 pressure-limited (306–316 psi)	13/60 (21.7%) blood cultures positive during ICU course	-
Peripherally Inserted Catheters						
Coyle, 2004	110	Prospective	12 SL 5F PICC 98 DL 5F PICC	1–2 mL/s (n = 8), 2 mL/s (n = 89), 2–3 mL/s (n = 9), 4 mL/s (n = 4) SL: 16–79 psi, DL: 40–135 psi.	2 (1.8%) ruptured 1 balloon (DL, 4 mL/s)	81 average; 23 above average; 6 below average
Lozano, 2012	78	Prospective	Power injectable PICC (4–6F, SL/DL)	Mean injection rate 4.13 ± 0.855 mL/s (range 3–5); pressure limit 300 psi	12/78 (15.4%) dislocation	-
Morden, 2014	243 high rate versus. 138 rate increase	Retrospective	CT-PICC (4–6F, SL/DL/3L)	Injection rates 2–5 mL/s Pressure limit 300 psi	20/243 (8.2%) displaced versus. 3/138 (2.2%)	-
Totally Implantable Venous Access Devices						
Goltz, 2011	141 versus. 50 peripheral catheter	Retrospective	141 TIVAP forearm	TIVAP: Max 1.5 mL/s; mean pressure 121.9 ± 24.1 psi Peripheral: 3 mL/s, pressure limit 300 psi	1 (0.7%) dislocation with rupture 3 (2.1%) suspected systemic infection < 4 weeks	31/44 (70.4%) trigger threshold not reached Significant higher aortic contrast via peripheral catheter

Legend: CVC = central venous catheter, SL = single lumen, F = French, PICC = peripherally inserted central catheter, DL = double lumen, TIVAP = totally implantable venous access port, 3L = triple-lumen, G = gauge, 5L = quintuple-lumen, IJV = inferior jugular vein, ICU = intensive care unit.