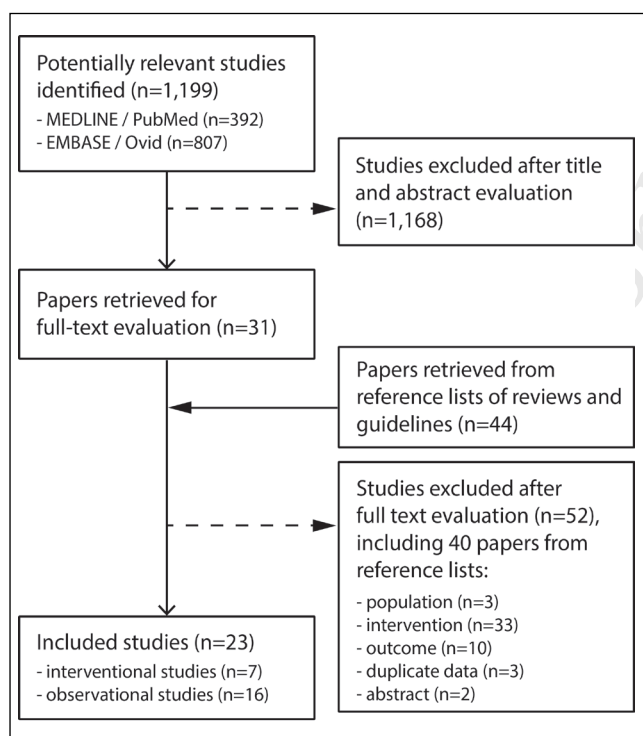


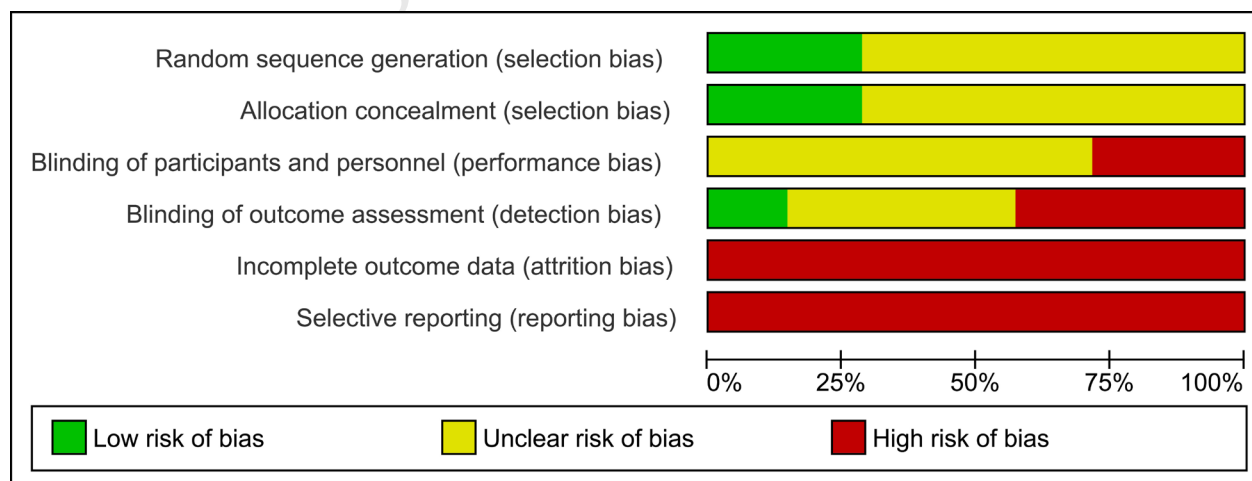
Supplementary Content

Literature search strategy: MEDLINE (accessed via PubMed on Nov 23, 2015)

("anticoagulants"[All Fields] OR "heparin*" [All Fields] OR "heparin*" [tiab] OR "heparin" [MeSH Terms] OR "fondaparinux" [tiab] OR "anticoagulant*" [tiab] OR "warfarin" [tiab] OR "acenocumarol" [tiab] OR "coumarins" [MeSH Terms] OR "phenprocoumon" [tiab] OR "rivaroxaban" [tiab] OR "dabigatran" [tiab] OR "apixaban" [tiab]) AND ("parenteral nutrition, total" [MeSH Terms] OR "total parenteral nutrition" [All Fields] OR "parenteral nutrition" [tiab] OR "parenteral nutrition" [MeSH Terms] OR "parenteral nutrition" [All Fields]) (n=392).



Supplementary Figure 1 - Overview of the included and excluded papers.



Supplementary Figure 2 - Summary of risk of bias in interventional studies. The "Risk of bias" figure was drawn on the basis of the indications provided by the Cochrane Collaborations and using the model available in RevMan software.

Supplementary Table 1 - Baseline characteristics of the observational studies.

Study	Population	Central venous access	Patients, n (♂, age) ^a	Treatment	Follow-up	Outcome
Dollery, 1994 (r) ²⁵	Children	Hickman or Broviac CVC	32 (na; 0-13)	UFH 1 unit/mL (n=8), no heparin (n=24)	Range 0.4-7 years	(A)symptomatic PE, AC prevalence
Andrew, 1995 (cs) ²¹	Children	Single-lumen, thick-walled silicone rubber	12 (6; 0-6)	Warfarin (different length and INR target)	Not available	AC prevalence
Newall, 2003 (p) ²⁹	Children	Not available	8 (na; 0-17)	INR-adjusted warfarin (INR target 2.0-3.0 or 1.3-2.0; n=8)	15.2 warfarin years (mean 691.6 days; median 817; range 186-1,025)	Pharmacological study, quality of AC treatment
Vegting, 2012 (r-p) ³⁶	Children	Subcutaneous tunnelled single- or double-lumen central lines and ports	32 (na; 0-17)	Nadroparin 80 IU/kg or acenocoumarol (n=18); no AC (n=27)	Median 25 months (range 2-167)	(A) symptomatic CRT, bleeding, AC prevalence
Ladefoged, 1981 (r) ²⁸	Adults and children	Polyvinyl chloride or Broviac CVC	70 (33; 46, 6-69)	Phenprocoumon or UFH 5,000 IU bid	Median 4.5 months (range 1-63)	Symptomatic CRT, AC prevalence
Schmidt-S, 1990 (r) ³²	Adults and children	Broviac CVC (different venous access)	35 (na; 0-23)	UFH (1 IU/mL, PN solution)	Mean 577 days (range 58-2,633)	Symptomatic PE, AC prevalence
Imperial, 1983 (r) ²⁷	Adults	Hickman CVC	1010	UFH <6,000 IU/day (n=129); 6,000 IU/day (n=858); no AC (n=23)	Mean 25 days (2-56) in low-dose UFH; mean 14 days (2-42) in high-dose UFH	(A)symptomatic CRT, AC prevalence
Bern, 1986 (p) ²²	Adults	Silicone rubber Hickman or Broviac CVC	26	UFH 2000 IU/day flushes (all patients). Warfarin 2.0 mg qd (n=13); no warfarin (n=13)	Warfarin 3,235 days; no warfarin 2,763	Symptomatic CRT, AC prevalence
Veerabagu, 1994 (r) ³⁵	Adults	Not available	90 (47; 50)	Mididose warfarin 1-2 mg/day (n=53), INR-adjusted warfarin (n=18), no warfarin (n=46); UFH 6,000 IU/day (all patients)	1,312 months (mini-dose), 619 months (INR-adjusted), 931 months (no warfarin)	Symptomatic CRT, AC prevalence
Duerksen, 1996 (r) ³⁶	Adults	Permanent CVC (Hickman n=38, venous access discs n=9)	47 (43; 36)	Warfarin 1 mg/day vs (n=9), no warfarin (n=40)	Mean 6.3 months	Symptomatic CRT, bleeding, AC prevalence
Cowl, 2000 (p) ²³	Adults	PICC vs CVC	102 (56; 21-88)	UFH flushes with 3 mL (UFH 100 IU/ml), systemic AC	Not available	AC prevalence
v Gossium, 2001 (cs) ³⁴	Adults	CVC	228 (na; 0-23)	Any AC	12 months	AC prevalence
Puiggros, 2012 (cs) ³¹	Adults	Tunnelled CVC (77.6%), implanted port (22.4%)	49 (16; 52)	Any AC (n=11, 22%); flushes with UFH (n=34, 69%)	Mean 57.4 months (range 1-286)	AC prevalence
Olthof, 2014 (r) ³⁰	Adults	Hickman, port-a-cath	212 (102; 48)	Any systemic AC	Total: 600 catheter-year	AC prevalence
Touré, 2014 (p) ³³	Adults	Broviac (n=133), 77 PICC (n=77)	196 (77, 56)	VKA, heparins	Total: 134.6 catheter-year	AC prevalence
Cuerda (p), 2015 ³⁴	Adults	Tunnelled (n=52), implanted port (n=10)	62 (31, 50)	LMWH, low-dose VKA, VKA (target INR 2.0-2.5)	Median: 1 year	AC prevalence

^aData are expressed as n total (n male, age or age range); age and age range are expressed in years, age is expressed as mean or median according to data available from original papers, p: prospective study, r: retrospective study; cs: cross-sectional study; PICC: peripherally inserted central venous catheter; PN: parenteral nutrition; RCT: randomised controlled trial; aPTT: activated partial thromboplastin time; IVH: intraventricular haemorrhage; CVC: central venous catheter; CRT: central venous catheter thrombosis; UFH: unfractionated heparin sodium; DIC: disseminated intravascular coagulation; AC: anticoagulant.

Supplementary Table II - Indications for parenteral nutrition in the included studies.

Study	SBS	Cancer	IBDs	Inf./Thr.	Dismotility	AIDS	Radiation	Surgery	Other	Total n
Brismar ¹⁴	-	16 (32)	17 (34)	-	-	-	-	-	17 (34)	50
Fabri ¹⁶	-	-	-	-	-	-	-	-	-	46
Ruggiero ¹⁹	-	-	-	-	-	-	-	-	-	34
Fabri ¹⁵	-	-	-	-	-	-	-	-	-	40
Macoviak ¹⁸	-	-	-	-	-	-	-	-	-	37
Kamala ¹⁷	-	-	-	-	-	-	-	-	-	68
Uslu ²⁰	-	-	-	-	-	-	-	-	-	239
Ladefoged ²⁸	26 (37)	-	-	-	-	-	-	-	44 (63)	70
Schmidt ³²	8 (23)	-	26 (74)	-	1 (3)	-	-	-	-	35
Dollery ²⁵	-	-	15 (44)	-	7 (21)	-	-	10 (29.4)	2 (6)	34
Andrew ²¹	3 (25)	-	-	-	1 (8)	-	-	-	8 (67)	12
Newall ²⁹	-	-	2 (25)	-	1 (12)	-	-	-	5 (62)	8
Vegting ³⁶	10(22)	-	-	-	15 (33)	-	-	-	20 (44)	45*
Imperial ²⁷	-	-	-	-	-	-	-	-	-	1,010
Bern ²²	-	1 (4)	9 (39)	5 (22)	1 (4)	-	4 (17)	-	3 (13)	23
Veerabagu ³⁵	-	12 (13)	17 (19)	21 (23)	-	-	6 (7)	8 (9)	26 (29)	90
Duerksen ²⁶	-	-	-	-	-	47 (100)	-	-	-	47
Cowl ²³	10 (10)	16 (16)	12 (12)	1 (1)	-	-	-	17 (17)	56 (55)	102
Van Gossum ³⁴	-	-	75 (33)	57 (25)	18 (78)	-	-	43 (19)	23 (10)	228
Puiggros ³¹	-	8 (16)	1 (2)	10 (20)	10 (20)	-	10 (20)	4 (8)	6 (12)	49
Oltho ³⁰	(58-60)	-	-	-	(28-37)	-	-	-	(4-5)	212
Touré ³³	101 (52)	32 (16)	13 (7)	55 (28)	12 (6)	-	22 (11)	84 (43)	52 (27)	196
Cuerda ²⁴	-	-	8 (13)	13 (21)	11 (18)	-	10 (16)	8 (13)	12 (19)	62

Data are expressed as number and (percentages). *Thirteen patients were included in both groups (n=32). SBS: short bowel syndrome, IBD: inflammatory bowel disease; AIDS: acquired immunodeficiency syndrome; Inf./Thr.: infarction/splanchnic thrombosis.