

# Clinical trials of antithrombotics for thrombosis prevention in general surgery

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## 1 low molecular weight heparin

Trial	Treatments	Patients	Trials design and methods
<b>enoxaparin vs no treatment</b>			
Ho [43] n=134/169	Enoxaparin 4000 anti-Xa units versus No treatment	-	Open
<b>nadroparin vs no treatment</b>			
Marassi [41] n=31/33	Nadroparin 2850 anti-Xa units versus No treatment	-	Open
<b>dalteparin vs placebo</b>			
Ockelford , 1989 n=102/95	Dalteparin 2500 anti-Xa units versus Placebo	general surgery	Blind
<b>fluxum vs placebo</b>			
Valle , 1988 n=50/50	Parnaparin 3200 anti-Xa units versus Placebo	general surgery	Blind
<b>nadroparin vs placebo</b>			
Balas [40] n=94/95	Nadroparin 2850 anti-Xa units versus Placebo	-	Blind
Pezzuoli , 1989 n=2247/2251 follow-up:	Nadroparin 2850 anti-Xa units versus Placebo	general surgery	Blind
<b>tinzaparin vs placebo</b>			
Bergqvist [42] n=39/41 follow-up:	Tinzaparin 3500 anti-Xa units versus Placebo	-	Parallel groups Blind
<b>antixarin vs unfractionated heparin</b>			
Limmer , 1994 n=103/100	Antixarin 2500 anti Xa units versus UFH 15 000 units	General surgery	Open
<b>ardeparin vs unfractionated heparin</b>			
Godwin , 1993 n=595/309	Ardeparin 90 and 50 units/kg b.i.d versus UFH 10 000 units	Abdominopelvic surgery	Blind
<b>certoparin vs unfractionated heparin</b>			

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<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Schmitz-Huebner , 1984 n=84/42 follow-up: 1 month	Certoparin (dose 1 and dose 2) b.i.d. versus UFH 10 000 units	Abdominal surgery	Blind
Sasahara , 1986 n=137/132 follow-up: 7 days	Certoparin 3000 + DHE versus UFH 10 000 units +DHE	Abdominal surgery	Blind
Voigt , 1986 n=103/97 follow-up: 10 days	Certoparin 3000 + DHE versus UFH 10 000 units	Abdominal surgery	Blind
Welzel , 1988 n=98/103 follow-up: 7 days	Certoparin 2500 + DHE versus UFH 10 000 units+DHE	Abdominal surgery	Open
Kakkar , 1989 n=88/91 follow-up:	Certoparin 3000 + DHE versus UFH 10 000 units+DHE	Abdominal surgery	Blind
Adolf , 1989 n=205/205 follow-up: 1 month	Certoparin 3000 versus UFH 15 000 units	Abdominal surgery	Blind
Heilmann , 1989 n=150/150 follow-up: 10 days	Certoparin 3000 versus UFH 15 000 units	Gynaecological surgery	Blind
Baumgartner , 1989 n=99/102 follow-up: 10 days	Certoparin 3000 + DHE versus UFH 5 000 units+DHE	Abdominal surgery	Blind
Hoffmann and Largiade , 1990  n=464/452 follow-up:	Certoparin 3000 + DHE versus UFH 10 000 units	Abdominal surgery	NA
Kopenhagen , 1990 n=51/53	Certoparin 3000 anti Xa units versus UFH 15 000 units	Abdominal surgery	Blind
Schielke , 1991 n=47/51	Certoparin 3000 anti Xa units + DHE versus UFH 10 000 units + DHE	Abdominal surgery	Open
Kopenhagen , 1992 n=336/337	Certoparin 3000 anti Xa units versus UFH 15 000 units	Abdominal surgery	Blind
Hoffmann and Largiader , 1992 n=298/296	Certoparin 3000 anti Xa units versus UFH 10 000 units	Abdominothoracic surgery	Blind
Heilmann , 1997 n=179/179	Certoparin 3000 anti Xa units versus UFH 15 000 units	Gynaecological and breast surgery	Blind

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<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Haas , 1999 n=11542/11536	Certoparin 3000 anti Xa units versus UFH 15 000 units	General surgery	Blind
<b>dalteparin vs unfractionated heparin</b>			
Briel , 1988 n=95/98 follow-up:	Dalteparin 5000 versus UFH 10 000 units+DHE	Gynaecological surgery	NA
Bergqvist , 1986 n=215/217 follow-up: 1 month	Dalteparin 5000 versus UFH 10 000 units	Abdominal surgery	Blind
Onarheim , 1986 n=25/27 follow-up: 1 month	Dalteparin 5000 versus UFH 10 000 units	Abdominal surgery	Blind
Koller , 1986 n=23/20 follow-up: 30 days	Dalteparin 7500 versus UFH 10 000 units	Abdominal surgery	Blind
Koller , 1986 n=75/75 follow-up: 30 days	Dalteparin 2500 versus UFH 10 000 units	Abdominal surgery	Blind
Fricker , 1988 n=40/40 follow-up: 1-2 months	Dalteparin 5000 versus UFH 15 000 units	Abdominopelvic surgery	Open
Bergqvist , 1988 n=505/497 follow-up: 1 month	Dalteparin 5000 versus UFH 10 000 units	Abdominal surgery	Blind
Caen , 1988 n=195/190 follow-up: 1 month	Dalteparin 2500 versus UFH 10 000 units	Abdominal surgery	Blind
Borstad , 1988 n=105/110 follow-up:	Dalteparin 5000 versus UFH 10 000 units	Gynaecological surgery	Blind
Creperio , 1990 n=20/20 follow-up:	Dalteparin 2500 versus UFH 10 000 units	General surgery	Blind
Hartl , 1990 n=126/124 follow-up: >7 days	Dalteparin 2500 versus UFH 10 000 units	Abdominal surgery	Blind
Borstad , 1992 n=77/75	Dalteparin 2500 anti Xa units versus UFH 10 000 units	Gynaecological surgery	Blind
Kakkar , 1993 n=1894/1915	Dalteparin 2500 anti Xa units versus UFH 10 000 units	Abdominal surgery	Blind
<b>enoxaparin vs unfractionated heparin</b>			

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<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Samama 2 , 1988 n=127/123 follow-up: 7 days	Enoxaparin 4000 versus UFH 15 000 units	General surgery	Open
Samama 1 , 1988 n=168/167 follow-up: 7 days	Enoxaparin 2000 versus UFH 15 000 units	General surgery	Open
Samama 3 , 1988 n=160/147 follow-up: 7 days	Enoxaparin 6000 versus UFH 15 000 units	General surgery	Open
Kaaja , 1992 n=37/31	Enoxaparin 2000 anti Xa units versus UFH 10 000 units	Gynaecological surgery	Blind
Gazzaniga (ISG) , 1993 n=561/561	Enoxaparin 2000 anti Xa units versus UFH 10 000 units	General and vascular surgery	Open
Nurmohamed , 1995 n=737/734	Enoxaparin 2000 anti Xa units versus UFH 15 000 units	General surgery	Blind
McLeod (Canadian) , 1995 n=674/675	Enoxaparin 4000 anti Xa units versus UFH 15 000 units	Colorectal surgery	Blind
Gonzalez , 1996 n=84/82	Bemiparin 2500 anti Xa units versus UFH 10 000 units	Abdominal surgery	Blind
ENOXACAN , 1997 n=555/560	Enoxaparin 4000 anti Xa units versus UFH 15 000 units	Abdominopelvic surgery	Blind
<b>nadroparin vs unfractionated heparin</b>			
Kakkar and Murray , 1985 n=200/200 follow-up: 10 days	Nadroparin 2850 versus UFH 10 000 units	General surgery	Blind
EFS , 1988 n=968/941 follow-up: 1 month	Nadroparin 2850 versus UFH 15 000 units	Abdominal surgery	Open
Dahan , 1989 n=46/41 follow-up:	Nadroparin 2850 versus UFH 15 000 units	Thoracic surgery	Open
Barbui , 1990 n=171/173	Nadroparin 2850 anti Xa units versus UFH 10 000 units	General surgery	Open
Eurin , 1994 n=241/239	Nadroparin 2850 anti Xa units versus UFH 15 000 units	Abdominopelvic surgery	Open
<b>parnaparin vs unfractionated heparin</b>			

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<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
<b>Catania , 1988</b> n=88/85 follow-up:	Parnaparin 3200 versus UFH 15 000 units	Abdominal surgery	Open
<b>Salcuni , 1988</b> n=73/68 follow-up:	Parnaparin 3200 versus UFH 15 000 units	Abdominal surgery	Open
<b>Verardi , 1989</b> n=44/44 follow-up:	Parnaparin 6400 versus UFH 10 000 units	Abdominal/urological surgery	NA
<b>Garcea , 1992</b> n=45/45	Parnaparin 3200 anti Xa units versus UFH 15 000 units	Abdominal surgery	Open
<b>reviparin vs unfractionated heparin</b>			
<b>Kakkar , 1993</b> n=672/679	Reviparin 1750 anti Xa units versus UFH 10 000 units	General and gynaecological surgery	Blind
<b>SSHA vs unfractionated heparin</b>			
<b>Torngren , 1984</b> n=309/162 follow-up: Discharge	SSHA 50 mg and 37.5 mg versus UFH 10 000 units	General surgery	Blind
<b>tinzaparin vs unfractionated heparin</b>			
<b>Leizorovicz , 1991</b> n=861/429	Tinzaparin 2500 and 3500 anti Xa units versus UFH 10 000 units	Abdominothoracic and gynaecological surgery	Blind

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## 2 platelet aggregation inhibitors

Trial	Treatments	Patients	Trials design and methods
<b>aspirin vs control</b>			
Clagett , 1975 n=56/49	A1300 versus control	-	open
Zekert VI , 1982 n=50/50	A1500 versus control	-	open
<b>dipyridamol + aspirin vs control</b>			
Parodi I , 1973 n=40/22	Dip,A1000+Dip versus control	-	open
Parodi II , 1973 n=91/35	A1500,Dip,A+Dip versus control	-	open
Australian I , 1975 n=75/75	A1000+Dip versus control	-	open
Australian II , 1976 n=85/75	A1000+Dip versus control	-	open
Toulouse I , 1979 n=38/66	A990+Dip versus control	-	open
Zekert-III , 1977 n=135/46	A1500,A1300+Dip,A1000+Dip versus control	-	open
Harjola DVT , 1982 n=300/100	A1500,Dip,A+Dip versus control	-	open
Weiss , 1977 n=30/36	A990+Dip versus control	-	open
<b>sp vs control</b>			
Veth , 1985 n=120/118	Sp+Hep v Hep versus control	-	open
<b>aspirin vs placebo</b>			
MRC , 1972 n=153/150	A600 versus placebo	general surgery	double-blind

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<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Loew DVT , 1974 n=702/679	A600 versus Placebo	-	double-blind
Erfurt-A , 1979 n=357/357	A1500 versus Placebo	-	double-blind
Zekert V , 1980 n=50/49	A1500+Hep???	-	double-blind
Vinazzer I , 1980 n=402/404	A1500+Hep v Hep versus Placebo	-	double-blind
Vinazzer II , 1977 n=62/62	A1000+Hepv Hep versus Placebo	-	double-blind
PEP hip-fracture , 2000 n=6679/6677 follow-up: 35 days	aspirin 160mg/d started preoperatively and continued for 35 days versus placebo	patients undergoing surgery for hip fracture	Parallel groups Double blind Australia, New Zealand, South Africa,
PEP elective arthroplasty , 2000 n=2047/2041 follow-up: 35 days	aspirin 160mg/d started preoperatively and continued for 35 daysA versus placebo	Patients undergoing elective hip or knee arthroplasty	Parallel groups Double blind New Zealand
<b>dipyridamol + aspirin vs placebo</b>			
Encke IA , 1976 n=21/9	A990,A+Dip versus Placebo	-	double-blind
Encke IB , 1976 n=62/34	A1500,A990+Dip versus Placebo	-	double-blind
<b>hydroxychloroquine vs placebo</b>			
Carter IA , 1971 n=284/281	Hydroxy versus placebo	-	double-blind
Carter IB , 1971 n=26/26	Hydroxy versus placebo	-	double-blind
Carter II , 1974 n=107/97	Hydroxy versus Placebo	-	double-blind
New York , 1977 n=46/44	Hydroxy versus placebo	-	double-blind

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Trial	Treatments	Patients	Trials design and methods
Vermont , 1975 n=50/58	Hydroxy versus placebo	-	double-blind
<b>sp vs placebo</b>			
Athens , 1981 n=48/48	Sp versus placebo	-	double-blind
<b>Suloctidil vs placebo</b>			
Turpie , 1985 n=68/68	Suloctidil versus Placebo	-	double-blind
<b>ticlopidine vs placebo</b>			
Lasierra , 1982 n=40/40	Ticlopidine versus placebo	-	double-blind
Walker , 1974 <i>unpublished</i> n=31/33	ticlopidine versus placebo	-	double-blind

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### 3 unfractionated heparin

Trial	Treatments	Patients	Trials design and methods
<b>UFH vs no treatment</b>			
<b>Abernethy , 1974</b> n=63/62	UFH twice daily for 7 days versus no treatment	all other general surgery	
<b>Abraham-Inpijn , 1979</b> n=20/20	UFH twice daily for 7 days versus no treatment	all other general surgery	
<b>Bergqvist , 1980</b> n=53/58	UFH twice daily for 5 days versus no treatment	all other general surgery	
<b>Caloghera , 1984</b> n=40/40	UFH 3 times daily for 7 days versus no treatment	all other general surgery	
<b>Clarke-Pearson , 1983</b> n=95/105	UFH twice daily for 7 days versus no treatment	all other general surgery	
<b>Gallus , 1973</b> n=100/109	UFH 3 times daily for A versus no treatment	all other general surgery	
<b>Gallus , 1976</b> n=408/412	UFH 3 times daily for 7 days versus no treatment	all other general surgery	
<b>Gordon-Smith , 1972</b> n=NA	UFH twice daily for 5 days versus no treatment	all other general surgery	

continued...

<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Groote Schuur , 1979 n=323/323	UFH 3 times daily for 6 days versus no treatment	all other general surgery	
Gruber n=119/113	UFH 3 times daily for 7 days versus no treatment	All other general surgery	
Kakkar (IMT) n=2111/2137	UFH 3 times daily for 7 days versus no treatment	All other general surgery	
Kettunen , 1974 n=83/117	UFH 3 times daily for 7 days versus no treatment	all other general surgery	
Kopenhagen , 1982 n=162/50	UFH twice daily versus no treatment	all other general surgery	
Kraytman , 1976 n=21/28	UFH 3 times daily for 6 days versus no treatment	all other general surgery	
Kraytman , 1977 n=23/27	UFH 3 times daily for 6 days versus no treatment	all other general surgery	
Marchelli , 1983 n=30/30	UFH 3 times daily for ? versus no treatment	all other general surgery	
Multiunit , 1974 n=128/128	UFH twice daily for 7 days versus no treatment	all other general surgery	
Nicolaides , 1972 n=128/122	UFH twice daily for 7 days versus no treatment	all other general surgery	
Plante , 1979 n=42/66	UFH twice daily for 8 days versus no treatment	all other general surgery	
Sagar , 1974 n=264/236	UFH twice daily for 5 days versus no treatment	all other general surgery	
Spebar , 1981 n=24/19	UFH twice daily for 5-7 days versus no treatment	all other general surgery	
Ziemski , 1979 n=30/20	UFH 3 times daily for 2 days versus no treatment	all other general surgery	
<b>UFH vs placebo</b>			

continued...

<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Belch , 1980 n=24/25	UFH twice daily for 7 days versus placebo	all other general surgery	
Covey , 1975 n=53/52	UFH twice daily for 8 days versus placebo	all other general surgery	
Jourdan , 1984 n=21/21	UFH twice daily for 5 days versus placebo	all other general surgery	
Kakkar , 1972 n=39/39	UFH twice daily for 7 days versus placebo	All other general surgery	
Kiil , 1978 n=650/663	UFH twice daily for 7 days versus placebo	All other general surgery	
Kraytman , 1977 n=25/22	UFH 3 times daily for 6 days versus placebo	all other general surgery	
Kruse-Blinkenberg , 1980 n=29/33	UFH 3 times daily for 8 days versus placebo	all other general surgery	
Lahnborg , 1975 n=58/54	UFH twice daily for 5 days versus placebo	all other general surgery	
Lahnborg , 1976 n=24/24	UFH twice daily for 5 days versus placebo	all other general surgery	
Lawrence , 1977 n=133/129	UFH twice daily for 5 days versus placebo	all other general surgery	
Marchetti , 1982 n=16/13	UFH 3 times daily versus placebo	all other general surgery	
Muiticentre , 1984 n=222/108	UFH twice daily for 5-7 days versus placebo	all other general surgery	
Ribaudo , 1975 n=75/75	UFH twice daily for A days versus placebo	all other general surgery	
Roberts , 1975 n=39/45	UFH twice daily for 7 days versus placebo	all other general surgery	
Strand , 1975 n=55/55	UFH twice daily for 7 days versus placebo	all other general surgery	

continued...

<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Taberner , 1978 n=50/50	UFH twice daily for 7 days versus placebo	all other general surgery	
Torngren n=47/62	UFH twice daily for 6-8 days versus placebo	all other general surgery	
Torngren , 1978 n=10/10	UFH 3 times daily for 6-8 days versus placebo	all other general surgery	
Torngren , 1978 n=66/62	UFH twice daily for 6-8 days versus placebo	all other general surgery	
Wu , 1977 n=44/44	UFH twice daily for 7 days versus placebo	all other general surgery	
<b>UFH vs aspirin</b>			
Loew , 1977 n=60/67	UFH twice daily for 7 days versus aspirin	all other general surgery	
Vinazzer , 1980 n=402/404	UFH twice daily for A days versus aspirin	all other general surgery	
<b>UFH vs DHE</b>			
Muiticentre , 1984 n=226/110	UFH twice daily for 5-7 days versus DHE	all other general surgery	
Muiticentre 53,S4 , 1984 n=214/110	UFH twice daily for 5-7 days versus DHE	all other general surgery	
<b>UFH vs oral anticoagulant</b>			
van Geloven , 1977 n=74/80	UFH twice daily for 4 days versus Oral anticoagulant	all other general surgery	

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