

# Clinical trials of streptokinase

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## 1 acute myocardial infarction

Trial	Treatments	Patients	Trials design and methods
<b>streptokinase vs placebo</b>			
<b>EMERAS (7-12h) , 1993</b> n=2257/2277 follow-up:	intravenous streptokinase 1.5 MU versus placebo	patients presenting 7-12 h from symptom onset	Parallel groups double blind
<b>EMERAS (all delay) , 1993</b> n=2257/2277 follow-up:	streptokinase 1.5 MU versus placebo	patients entering hospital up to 24 h after the onset of suspected acute myocardial infarction	Parallel groups double blind south america
<b>GISSI I , 1986</b> n=5860/5852 follow-up: 1 y	Streptokinase 1.5 MU en perfusion IV en 1 heure versus usual care	patients within 12 h after the onset of symptoms and with no contraindications to SK	Parallel groups open
<b>ISAM , 1986</b> n=859/882 follow-up: 21 days	1.5 million IU of streptokinase over 1h versus Placebo	patients within six hours after the onset of symptoms of myocardial infarction	Parallel groups double blind
<b>ISIS 2 pilot , 1987</b> n=NA follow-up:	streptokinase 1.5 MU versus placebo	patients with suspected acute myocardial infarction	Parallel groups double blind
<b>ISIS-2 (SK) , 1988</b> n=8592/8595 follow-up: 15 mo	1-hour intravenous infusion of 1.5 MU of streptokinase versus Placebo	patients within 24h of the onset of suspected acute myocardial infarction	plan factoriel 2*2 double blind
<b>Western Washington Intravenous Trial , 1988</b> [NCT00000507] n=191/177 follow-up: 1.4 y	Streptokinase en IV, 1.5 M UI en 60 min aprs injection de benadryl 50 mg en IV et hydrocortisone 100 mg en IV; hparine en IV 1000 UI/h 2h aprs la streptokinase puis warfarine pendant au moins 3 mois versus Traitement standard, avec ou sans anticoagulant (dcid par le mdecin)	Hommes et femmes, <ou = 75 ans	Parallel groups
<b>streptokinase vs primary intervention</b>			

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Trial	Treatments	Patients	Trials design and methods
SAMI (ONeill) , 1992 n=59/63 follow-up: In hospital	facilitated PCI with streptokinase 15 million units(intravenous) versus primary intervention	symptom duration <4h	
PRAGUE (Widimisky) , 2000 n=100/101 follow-up: 30-day	facilitated PCI with Streptokinase 15 million units (intravenous) versus primary intervention	symptom duration <6h	
<b>t-PA + streptokinase vs streptokinase</b>			
GUSTO tPA-SK Hiv , 1993 n=10374/20251 follow-up: 30 d	tPA en IV 1 mg/kg, sans dpasser 90 mg, dont 10 % en bolus + streptokinase 1 MU en 60 min + hparine en IV (5000 U en bolus, 1000 U/h (de prference 1200 U/h si >80 kg), poursuivi au moins 48 h) versus Streptokinase 1.5 MU en 60 min + hparine SC (12500 U 2 fois/j commence 4h aprs thrombolytique) combin streptokinase (1.5 MU en 60 min) + hparine en IV (5000 U en bolus, puis 1000 U/h (1200 U/h si >80 kg) poursuivi au moins 48 h)	Hommes et femmes	Parallel groups International 15 countries

More details and results :

- myocardial revascularization for acute myocardial infarction in facilitated PCI at <http://www.trialresultscenter.org/go-Q90>
- myocardial revascularization for acute myocardial infarction in all type of patients at <http://www.trialresultscenter.org/go-Q129>
- Late revascularisation for acute myocardial infarction in late reperfusion at <http://www.trialresultscenter.org/go-Q134>
- myocardial revascularization for acute myocardial infarction in  $\geq 6$ h from onset of symptoms at <http://www.trialresultscenter.org/go-Q249>
- fibrinolysis for acute myocardial infarction in all type of patients at <http://www.trialresultscenter.org/go-Q260>

## References

### EMERAS (7-12h), 1993:

Randomised trial of late thrombolysis in patients with suspected acute myocardial infarction. EMERAS (Estudio Multicentrico Estreptoquinasa Republicas de Amrica del Sur) Collaborative Group. Lancet 1993 Sep 25;342:767-72 [[8103875](#)]

**EMERAS (all delay), 1993:**

Randomised trial of late thrombolysis in patients with suspected acute myocardial infarction. EMERAS (Estudio Multicentrico Estreptoquinasa Republicas de Amrica del Sur) Collaborative Group. Lancet 1993;342:767-72 [8103875]

**GISSI I, 1986:**

Effectiveness of intravenous thrombolytic treatment in acute myocardial infarction. Gruppo Italiano per lo Studio della Streptochinasi nell'Infarto Miocardico (GISSI). Lancet 1986 Feb 22;1:397-402 [2868337]

Long-term effects of intravenous thrombolysis in acute myocardial infarction: final report of the GISSI study. Gruppo Italiano per lo Studio della Streptochinasi nell'Infarto Miocardico (GISSI). Lancet 1987 Oct 17;2:871-4 [2889079]

**ISAM, 1986:**

A prospective trial of intravenous streptokinase in acute myocardial infarction (I.S.A.M.). Mortality, morbidity, and infarct size at 21 days. The I.S.A.M. Study Group. N Engl J Med 1986 Jun 5;314:1465-71 [2871492]

**ISIS 2 pilot, 1987:**

Randomized factorial trial of high-dose intravenous streptokinase, of oral aspirin and of intravenous heparin in acute myocardial infarction. ISIS (International Studies of Infarct Survival) pilot study. Eur Heart J 1987 Jun;8:634-42 [2887430]

**ISIS-2 (SK), 1988:**

Randomised trial of intravenous streptokinase, oral aspirin, both, or neither among 17,187 cases of suspected acute myocardial infarction: ISIS-2. ISIS-2 (Second International Study of Infarct Survival) Collaborative Group. Lancet 1988 Aug 13;2:349-60 [2899772]

**Western Washington Intravenous Trial, 1988:****SAMI (ONeill), 1992:**

O'Neill WW, Weintraub R, Grines CL, Meany TB, Brodie BR, Friedman HZ, Ramos RG, Gangadharan V, Levin RN, Choksi N A prospective, placebo-controlled, randomized trial of intravenous streptokinase and angioplasty versus lone angioplasty therapy of acute myocardial infarction. Circulation 1992;86:1710-7 [1451242]

**PRAGUE (Widimisky), 2000:**

Widimsk P, Groch L, Zelzko M, Aschermann M, Bednr F, Suryapranata H Multicentre randomized trial comparing transport to primary angioplasty vs immediate thrombolysis vs combined strategy for patients with acute myocardial infarction presenting to a community hospital without a catheterization laboratory. The PRAGUE study. Eur Heart J 2000;21:823-31 [10781354]

**GUSTO tPA-SK Hiv, 1993:**

An international randomized trial comparing four thrombolytic strategies for acute myocardial infarction. The GUSTO investigators. N Engl J Med 1993 Sep 2;329:673-82 [8204123]

## 2 venous thrombosis

Trial	Treatments	Patients	Trials design and methods
streptokinase vs no fibrinolysis			

continued...

<b>Trial</b>	<b>Treatments</b>	<b>Patients</b>	<b>Trials design and methods</b>
Arneson , 1978 n=43 follow-up:	streptokinase 250,000 U loading IV, then 100,000 IU/hour IV 72-96 hours versus heparin 15,000 IU IV bolus, 30,000 IU infusion IV 72-90 hoursl	inpatients with venographically confirmed DVT extending proximally beyond the calf <5 days duration?	Parallel groups single blind Norway
Common , 1976 n=50 follow-up:	hydrocortisone 100 mg IV then streptokinase IV 250,000 U over 30 minutes, then 100,000 U/hour titrated for 72 hours. Followed by IV heparin titrated over 7 days versus IV heparin 150 U/kg loading dose then titrated for 10 days	patients with venographically confirmed DVT duration <14 days	Parallel groups single blind US
Elsharawy , 2002 n=35 follow-up:	catheter-directed thrombolysis with streptokinase using popliteal approach. versus heparin IV bolus 5000 U, then adjusted continuous infusion. Warfarin begun the same evening	iliofemoral venous thrombosis confirmed by duplex or venography duration <10 daysicatio	Parallel groups single blind Egypt
Schulman , 1986 n=38 follow-up:	streptokinase 50,000 IU IV over 15 minutes then 100,000 IU over 12 hours for up to 7 days, titrated. Given with 5000 IU heparin IV over 12 hours. Warfarin begun after streptokinase ended versus heparin 5000 IU IV bolus then 30,000 IU per day, titrated for 7 days. Warfarin begun simultaneously	patients with venographically confirmed calf vein thrombosis of duration <7 days.	Parallel groups single blind Sweden
Tsapogas , 1973 n=34 follow-up:	titrated dose of streptokinase IV into ankle veinmage/pj versus heparin IV into affected limbitm	patients with DVT confirmed by venogram of duration <5 days.	Parallel groups open US
Kakkar (streptokinase) , 1969 n=NA follow-up:	streptokinase 500,000 U IV over 30 minutes, 900,000 U every 6 hours for 5 days versus heparin 10,000 U over 5 minutes, then 10,000 to 15,000 U every 6 hours for 5 dayslicatio	patients with venographically confirmed DVT of leg of duration <4 days	Parallel groups single blind UK

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Trial	Treatments	Patients	Trials design and methods
Schweizer (systemic SK) , 2000 n=NA follow-up:	Systemic streptokinase 3,000,000 U/day over 6 hours in conjunction with heparin for up to 7 days. Premedication: hydrocortisone 100 mg, ranitidine 50 mg, clemastine 2 mg versus heparin IV, adjusted	patients with thrombosis of popliteal or more proximal veins confirmed by venogram at more than one level of duration <9 days	Parallel groups single blind Germany

More details and results :

- fibrinolysis for venous thrombosis in all type of patients at <http://www.trialresultscenter.org/go-Q100>

## References

### Arneson, 1978:

Arnesen H, Heilo A, Jakobsen E, Ly B, Skaga E A prospective study of streptokinase and heparin in the treatment of deep vein thrombosis. Acta Med Scand 1978;203:457-63 [352099]

Arnesen H, Hiseth A, Ly B Streptokinase of heparin in the treatment of deep vein thrombosis. Follow-up results of a prospective study. Acta Med Scand 1982;211:65-8 [7041523]

### Common, 1976:

Common HH, Seaman AJ, Rsch J, Porter JM, Dotter CT Deep vein thrombosis treated with streptokinase or heparin. Follow-up of a randomized study. Angiology 1976;27:645-54 [802925]

Porter JM, Seaman AJ, Common HH, Rsch J, Eidemiller LR, Calhoun AD Comparison of heparin and streptokinase in the treatment of venous thrombosis. Am Surg 1975;41:511-19 [1101755]

Rsch J, Dotter CT, Seaman AJ, Porter JM, Common HH Healing of deep venous thrombosis: venographic findings in a randomized study comparing streptokinase and heparin. AJR Am J Roentgenol 1976;127:553-8 [970521]

Seaman AJ, Common HH, Rsch J, Dotter CT, Porter JM, Lindell TD, Lawler WL, Schlueter WJ Deep vein thrombosis treated with streptokinase or heparin. A randomized study. Angiology 1976;27:549-56 [1053467]

### Elsharawy, 2002:

Elsharawy M, Elzayat E Early results of thrombolysis vs anticoagulation in iliofemoral venous thrombosis. A randomised clinical trial. Eur J Vasc Endovasc Surg 2002;24:209-14 [12217281]

### Schulman, 1986:

Schulman S, Granqvist S, Juhlin-Dannfelt A, Lockner D Long-term sequelae of calf vein thrombosis treated with heparin or low-dose streptokinase. Acta Med Scand 1986;219:349-57 [3521207]

### Tsapogas, 1973:

Tsapogas MJ, Peabody RA, Wu KT, Karmody AM, Devaraj KT, Eckert C Controlled study of thrombolytic therapy in deep vein thrombosis. Surgery 1973;74:973-84 [4749637]

**Kakkar (streptokinase), 1969:**

**Schweizer (systemic SK), 2000:**

Schweizer J, Kirch W, Koch R, Elix H, Hellner G, Forkmann L, Graf A Short- and long-term results after thrombolytic treatment of deep venous thrombosis. J Am Coll Cardiol 2000;36:1336-43 [11028492]

### 3 pulmonary embolism

Trial	Treatments	Patients	Trials design and methods
<b>streptokinase vs no fibrinolysis</b>			
<b>Tibbutt , 1974</b> n=17/13 follow-up: 3 days	intrapulmonary SK 600,000-U bolus, then 100,000 U/h for 72 h and intrapulmonary heparin versus 5000U heparin plus 100mg hydrocortisone infused over 30 mins through pulmonary artery catheter. Followed by 2500 U for 72 hr	life-threatening pulmonary embolism	Parallel groups open UK
<b>Ly , 1978</b> n=14/11 follow-up: 10 days	streptokinase 250,000-U bolus, then 100,000 U/h for 72 h and heparin versus Heparin 15,000 IU initial dose i.v. followed by 30,000 IU/day continuous i.v., adjusted by TT	patients with major pulmonary embolism verified by angiography	Parallel groups open Norway
<b>Jerjes-Sanchez , 1995</b> n=43/5 follow-up: 3 days	streptokinase 1,500,000 U IV over 1 h and heparin versus heparin alone	high clinical suspicion for massive pulmonary embolism	Parallel groups open

More details and results :

- fibrinolysis for pulmonary embolism in all type of patients at <http://www.trialresultscenter.org/go-Q110>

### References

**Tibbutt, 1974:**

Tibbutt DA, Davies JA, Anderson JA, Fletcher EW, Hamill J, Holt JM, Thomas ML, Lee G, Miller GA, Sharp AA, Sutton GC Comparison by controlled clinical trial of streptokinase and heparin in treatment of life-threatening pulmonay embolism. Br Med J 1974;1:343-7 [4594580]

**Ly, 1978:**

Ly B, Arnesen H, Eie H, Hol R A controlled clinical trial of streptokinase and heparin in the treatment of major pulmonary embolism. *Acta Med Scand* 1978;203:465-70 [352100]

**Jerjes-Sanchez, 1995:**

Jerjes-Sanchez C, Ramrez-Rivera A, de Lourdes Garca M, Arriaga-Nava R, Valencia S, Rosado-Buzzo A, Pierzo JA, Rosas E Streptokinase and Heparin versus Heparin Alone in Massive Pulmonary Embolism: A Randomized Controlled Trial. *J Thromb Thrombolysis* 1995;2:227-229 [10608028]